Fall Quarter 2002
September 18, Wednesday
November 11, Monday
November 26, Tuesday
November 27-December 1, Wednesday-Sunday
December 2-7, Monday-Saturday
December 7, Saturday

Winter Quarter 2003
January 6, Monday
January 20, Monday
March 15, Saturday
March 17-22, Monday-Saturday

Spring Quarter 2003
March 31, Monday
May 26, Monday
June 7, Saturday
June 9-14, Monday-Saturday
June 14, Saturday

Summer Quarter 2003
June 16, Monday
July 4, Friday
July 17, Thursday
July 21, Monday
August 22, Thursday
August 23-24, Saturday-Sunday

Fall Quarter 2003
September 8, Monday
November 11, Tuesday
November 15, Saturday
November 17-22, Monday-Saturday
November 22, Saturday

Winter Quarter 2004*
January 5, Monday
January 19, Monday
March 13, Saturday
March 15-20, Monday-Saturday

Spring Quarter 2004*
March 29, Monday
May 24, Monday
June 5, Saturday
June 7-12, Monday-Saturday
June 12, Saturday

Summer Quarter 2004*
June 14, Monday
July 5, Monday
July 15, Thursday
July 19, Monday
August 19, Thursday

September 18–December 7, 2002
First Day of Fall Quarter Classes
Veteran’s Day (No Classes)
Last Day of Fall Quarter Classes
Thanksgiving Holiday (No Classes)
Final Examinations
Fall Commencement

January 6–March 22, 2003
First Day of Winter Quarter Classes
Martin Luther King, Jr. Day Observed (No Classes)
Last Day of Winter Quarter Classes
Final Examinations

March 31–June 14, 2003
First Day of Spring Quarter Classes
Memorial Day Observed (No Classes)
Last Day of Spring Quarter Classes
Final Examinations
Spring Commencement

June 16–August 21, 2003
First Day of Summer Classes, Terms A and C
Independence Day (No Classes)
Last Day of Summer Classes, Term A
First Day of Summer Classes, Term B
Last Day of Summer Classes, Terms B and C
Campus Electrical Power Shutdown

September 8–November 22, 2003
First Day of Fall Quarter Classes
Veteran’s Day (University Closed)
Last Day of Fall Quarter Classes
Final Examinations
Fall Commencement

January 5–March 20, 2004
First Day of Winter Quarter Classes
Martin Luther King, Jr. Holiday Observed (No Classes)
Last Day of Winter Quarter Classes
Final Examinations

March 29–June 12, 2004
First Day of Spring Quarter Classes
Memorial Day Holiday Observed (No Classes)
Last Day of Spring Quarter Classes
Final Examinations
Spring Commencement

June 14–August 22, 2004
First Day of Summer Classes, Terms A and C
Independence Day Holiday (No Classes)
Last Day of Summer Classes, Term A
First Last Day of Summer Classes, Term B
Last Day of Summer Classes, Terms B and C

*This proposed 2003–2004 Academic Calendar was not officially approved as this catalog went to press.
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## Important Numbers

All phone numbers in area code 937 unless otherwise noted.

### General Information

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<tr>
<th>Information Desk</th>
<th>E147 Student Union</th>
<th>775-5740</th>
</tr>
</thead>
<tbody>
<tr>
<td>Telephone Registration: Raider Express</td>
<td></td>
<td>775-4400</td>
</tr>
<tr>
<td>WSU Home Page Address</td>
<td></td>
<td><a href="http://www.wright.edu">http://www.wright.edu</a></td>
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</table>

### Offices and Facilities

#### Admissions
Graduate Admissions and Records
- E344 Student Union
- 775-2976

International Admissions
- E190 Student Union
- 775-5745

School of Medicine, Student Affairs/Admissions
- E344 Student Union
- 775-2934

School of Professional Psychology, Office of Student Affairs
- E148 Student Union
- 775-3492

Undergraduate Admissions, Office of
- E148 Student Union
- 775-5700

#### Affirmative Action Programs

<table>
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<tr>
<th>Affirmative Action Programs*</th>
<th>075 Allyn Hall</th>
<th>775-3207</th>
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<tr>
<td>Alumni Relations</td>
<td>108 Allyn Hall</td>
<td>775-2620</td>
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#### Asian/Hispanic/Native American Center

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<th>Asian/Hispanic/Native American Center*</th>
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#### Bolinga Cultural Resources Center

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<th>Bolinga Cultural Resources Center</th>
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#### Bookstore, University

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<th>Bookstore, University</th>
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#### Bursar, Office of the E236 Student Union

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#### Career Services, Office of

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<th>Career Services, Office of E334 Student Union</th>
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#### Disability Services, Office of

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<th>Disability Services, Office of E186 Student Union</th>
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#### Educational Resource Center

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<tr>
<th>Educational Resource Center</th>
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#### Financial Aid, Office of

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<tr>
<th>Financial Aid, Office of E136 Student Union</th>
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#### Housing (Office of Residence Services)

<table>
<thead>
<tr>
<th>Housing (Office of Residence Services)</th>
<th>6 Palms Forest Lane</th>
<th>775-4172</th>
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#### Libraries, Wright State University

<table>
<thead>
<tr>
<th>Libraries, Wright State University</th>
<th>775-4126 Information Paul Laurence Dunbar Library</th>
<th>126 Paul Laurence Dunbar Library (Administration)</th>
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<tr>
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<td>125D Medical Sciences Building (Administration)</td>
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### Parking Services

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<th>Parking Services</th>
<th>E138 Student Union</th>
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### Personal Counseling (Center for Psychological Services)

<table>
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<tr>
<th>Personal Counseling (Center for Psychological Services)</th>
<th>118 Frederick A. White Health Center, 2nd Floor</th>
<th>775-3407</th>
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### Registrar, Office of the

<table>
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<tr>
<th>Registrar, Office of the E244 Student Union</th>
<th>775-5588</th>
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### Residence Services

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<tr>
<th>Residence Services</th>
<th>6 Palms, Forest Lane</th>
<th>775-4172</th>
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### Student Employment

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<th>Student Employment</th>
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### Student Health Services

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<tr>
<th>Student Health Services</th>
<th>118 Frederick A. White Health Center</th>
<th>775-2552</th>
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### University Testing Services

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<tr>
<th>University Testing Services</th>
<th>180 University Hall</th>
<th>775-5771</th>
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### Veterans Affairs, Office of

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<th>Veterans Affairs, Office of E244 Student Union</th>
<th>775-5550</th>
</tr>
</thead>
</table>

### Women's Center

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<tr>
<th>Women's Center</th>
<th>148 Millett Hall</th>
<th>775-4024</th>
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### Colleges and Schools

#### College of Education and Human Services

<table>
<thead>
<tr>
<th>College of Education and Human Services</th>
<th>415 Allyn Hall</th>
<th>775-2821</th>
</tr>
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</table>

#### College of Engineering and Computer Science

<table>
<thead>
<tr>
<th>College of Engineering and Computer Science</th>
<th>405 Russ Engineering Center</th>
<th>775-5001</th>
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#### College of Liberal Arts

<table>
<thead>
<tr>
<th>College of Liberal Arts*</th>
<th>129 Allyn Hall</th>
<th>775-2225</th>
</tr>
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#### College of Nursing and Health, WSU–Miami Valley

<table>
<thead>
<tr>
<th>College of Nursing and Health, WSU–Miami Valley</th>
<th>160 University Hall</th>
<th>775-3131</th>
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#### College of Science and Mathematics

<table>
<thead>
<tr>
<th>College of Science and Mathematics</th>
<th>134 Oelman Hall</th>
<th>775-2611</th>
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#### Raj Soin College of Business

<table>
<thead>
<tr>
<th>Raj Soin College of Business</th>
<th>110 Rike Hall</th>
<th>775-2437</th>
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#### School of Graduate Studies

<table>
<thead>
<tr>
<th>School of Graduate Studies E344 Student Union</th>
<th>775-2976</th>
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#### School of Medicine

<table>
<thead>
<tr>
<th>School of Medicine</th>
<th>114 Medical Sciences Building</th>
<th>775-3010</th>
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#### School of Professional Psychology

<table>
<thead>
<tr>
<th>School of Professional Psychology</th>
<th>117 Health Sciences Building</th>
<th>775-3490</th>
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#### Wright State University Lake Campus

<table>
<thead>
<tr>
<th>Wright State University Lake Campus</th>
<th>100 Dwyer Hall</th>
<th>7600 State Route 703</th>
</tr>
</thead>
</table>

*This office is scheduled to relocate during the renovation of Millett Hall in fall 2002; however, the office phone number is expected to remain unchanged after the move.
Graduate Program Officers

School of Graduate Studies
Joseph F. Thomas, Jr., Dean and Associate Provost for Research
Gerald C. Malicki, Assistant Dean and Director of Graduate Admissions and Records
John M. Kimble, Associate Director of Graduate Admissions and Records and Program Evaluation Coordinator

Raj Soin College of Business
Berkwood M. Farmer, Dean
Richard E. Williams, Associate Dean for Academic Programs
Michael R. Evans, Director of M.B.A. Programs
Susan S. Lightle, Director of Master of Accountancy Program
Leonard J. Kloft, Director of M.S. in Social and Applied Economics Program

Accountancy
Kennard S. Brackney, Jr., Chair

Economics
James A. Swaney, Chair

Finance and Financial Services
Peter W. Bacon, Chair

Management
Crystal Owen, Chair

Management Science and Information Systems
Barbara B. Denison, Chair

Marketing
Richard E. Williams, Interim Chair

College of Education and Human Services
Gregory R. Bernhardt, Dean
Bonnie K. Mathies, Associate Dean
Valerie W. Doll, Assistant Dean
Kevin G. Watson, Assistant Dean
Charles W. Ryan, Director of Graduate Programs

Department of Educational Leadership
June K. Ovington, Chair

  Licensure Advisor for Advanced Programs in Educational Leadership
  Thomas Diamantes

  Business and Vocational Education
  Timothy F. Kerlin

  Licensure Advisor for Library/Media
  Bonnie K. Mathies

  Licensure Advisor for Computer/Technology
  Roger N. Carlsten

  Student Affairs in Higher Education—Administration
  Charles W. Ryan

  Teacher Leader
  Timothy J. Rafferty

Department of Human Services
Stephen B. Fortson, Chair

  Business and Industrial Management
  Counseling
  Eileen F. Self
  Community Counseling
  Mary Ann Jones
  Counseling Exceptional Children
  Diane E. Frey

  Marriage and Family Counseling
  Stephen B. Fortson

  Mental Health Counseling
  Donna M. Tromski

  School Counseling
  Phyllis A. Henderson

  Rehabilitation Counseling—Chemical Dependency
  Joseph E. Keferl

  Rehabilitation Counseling—Severely Disabled
  Jan La Forge

Department of Teacher Education
Steve Hansell, Chair

  Early Childhood
  Colleen A. Figueg

  Middle Childhood
  Linda Ramsey

  Adolescent Young Adult
  Ron Helms

  Intervention Specialist
  Patricia R. Remick

  Classroom Teacher
  Varies by Area

Department of Health, Physical Education, and Recreation
D. Drew Pringle, Chair

College of Engineering and Computer Science
James E. Brandeberry, Dean
Thomas L. Bazzoli, Assistant Dean
Richard K. Rathbun, Assistant Dean
P. Ruby Mawasha, Assistant Dean

  Computer Science and Engineering
  Oscar N. Garcia, Chair

  Biomedical, Industrial, and Human Factors Engineering
  S. Narayanan, Interim Chair

  Electrical Engineering
  Fred D. Garber, Chair

  Mechanical and Materials Engineering
  Richard J. Bethke, Chair

College of Liberal Arts
Mary Ellen Mazey, Dean
Sharon H. Nelson, Associate Dean

  Applied Behavioral Science
  David M. Orenstein, Director

  English Language and Literatures
  Henry S. Limouze, Chair

  History
  Harvey M. Watchell, Chair

  Humanities
  Ava Chamberlain, Director

  Music
  Herbert E. Dregalla, Chair

  Urban Affairs and Geography
  Jack L. Dustin, Chair

School of Medicine
Howard M. Part, Dean
Paul G. Carlson, Associate Dean for Student Affairs and Admissions
Aerospace Medicine
Stanley R. Mohler, Director

Pharmacology and Toxicology
Robert A. Grubbis, Director

College of Nursing and Health
Patricia A. Martin, Dean
Carol A. Holdcraft, Assistant Dean
Barbara S. O'Brien, R.N./B.S.N. Outreach Director

School of Professional Psychology
John Rudisill, Dean
Kathleen Glaus, Associate Dean for Academic Affairs
LaPearl Logan Winfrey, Associate Dean for Clinical Training Programs

College of Science and Mathematics
Michele Wheatly, Dean
Terry A. McKee, Associate Dean
Joyce Howes, Assistant Dean
Katie Mechlin, Assistant Dean
M. Paul Servé, Assistant Dean

Anatomy
Jane N. Scott, Chair

Biochemistry and Molecular Biology
Daniel T. Organisciak, Chair

Biological Sciences
David L. Goldstein, Interim Chair

Chemistry
Paul G. Seybold, Chair

Geological Sciences
Paul J. Wolfe, Chair

Interdisciplinary Science and Mathematics
Beth Basista, Director

Physiology and Biophysics
Peter K. Laut, Chair

Mathematics and Statistics
Manley Perkel, Chair

Physics
Gust Bambakidis, Chair

Psychology
Wayne L. Shebilske, Chair

Other Graduate Programs

Biomedical Sciences
Gerald M. Alter, Director

Selected Graduate Studies
Joseph F. Thomas Jr., Director

Graduate Council Members

School of Graduate Studies
Joseph F. Thomas Jr. (Dean)
Gerald C. Malicki (Dean's Alternate)

Raj Soin College of Business
Bertrand Farmer (Dean)
Richard Williams (Dean's Alternate)
Robert Premus (Faculty Member, 2000-2002)
Joseph Coleman (Faculty Member 2001-2003)
Nicolas Grissis (Faculty Alternate)

College of Education and Human Services
Gregory Bernhardt (Dean)
Bonnie Mathies (Dean's Alternate)
June Ovington (Faculty Member, 2000-2002)
Donna Coile (Faculty Member, 2001-2003)
Charles Ryan (Faculty Alternate)

College of Liberal Arts
Mary Ellen Mazey (Dean)
Sharon Nelson (Dean's Alternate)
William Pannier (Faculty Member, 2000-2002)
David Orenstein (Faculty Member, 2001-2003)
Ronald Geibert (Faculty Alternate)

College of Medicine
Howard Part (Dean)
Robert Koerker (Dean's Alternate)
Robert Grubbis (Faculty Member, 2000-2002)
Larry Ream (Faculty Alternate)

College of Nursing and Health
Patricia Martin (Dean)
Carol Holdcraft (Dean's Alternate)
Jan Belcher (Faculty Member, 2001-2003)
Donna Miles Curry (Faculty Member, 2000-2002)
Jan Fulton (Faculty Alternate)

College of Science and Mathematics
Michele Wheatly (Dean)
Terry McKee (Dean's Alternate)
Cindy Carney (Faculty Member, 2000-2002)
Helen Klein (Faculty Alternate)

College of Engineering and Computer Science
James Brandeberry (Dean)
Oscar Garcia (Dean's Alternate)
Marian Kazimierzuk (Faculty Member, 2001-2003)
S. Narayanan (Faculty Member, 2000-2002)
Ramana Grandhi (Faculty Alternate)

School of Professional Psychology
John Rudisill (Dean)
LaPearl Winfrey (Dean’s Alternate)
Stephen McConnell (Faculty Member, 2000-2002)
Scott Fraser (Faculty Member, 2001-2003)
(Faculty Alternate)

Biomedical Sciences Ph.D. Program
Gerald M. Alter, Director

Computer Science and Engineering Ph.D. Program
Nikolas G. Bourbakis, Director

Engineering Ph.D. Program
James E. Brandeberry, Director

Environmental Sciences Ph.D. Program
G. Allen Burton, Director

Human Factors and Industrial/Organizational Psychology Ph.D. Program
John M. Flach, Director

Student Representative

Ex Officio
Perry Moore, Provost
This Is Wright State University

Named after Orville and Wilbur Wright, the inventors of powered flight, Wright State University continues their tradition of innovation. A rich and dynamic community of nearly 16,000 students, Wright State is a place where tomorrow takes flight.

Wright State is a nationally accredited state university with an impressive range of study. Its six colleges and three schools offer more than 100 undergraduate degrees and nearly 50 Ph.D., master's, and professional degrees.

Whether it’s preparing students to take their place in our ever-changing world, conducting research that can improve our lives, or partnering with local communities and businesses, Wright State University is making an impact, both locally and globally.

The Campus

Wright State, located 12 miles northeast of Dayton, Ohio, gives you the best of both worlds: state-of-the-art facilities in a beautiful 557-acre wooded setting. It’s a national leader in accommodating the needs of students with disabilities. An extensive underground tunnel system links most of the 24 campus buildings, whose modern architecture is nationally recognized for being completely accessible to people with disabilities.

Faculty Excellence

Most classes are small and taught by fully affiliated faculty members, 80 percent of whom hold the most advanced degrees in their fields. The faculty is dedicated to advancing the frontiers of knowledge, as well as applying it to real problems.

Students gain hands-on experience through a variety of community-based programs, cooperative education, internships, service learning, and research projects. In fact, Wright State ranks as one of Ohio’s top state universities in terms of research funding. It is one of an elite group of universities doing research in cutting-edge fields—making new discoveries that are improving the world around us.

Educational Resources

The University Libraries, consisting of the Paul Laurence Dunbar Library and the Fordham Health Sciences Library, are linked through the OhioLINK system and Internet to holdings of other major academic libraries in Ohio and to a wide range of databases for electronic research. The Dunbar Library is home to one of the world’s most complete collections of the Wright brothers’ papers and memorabilia. Other special collections include the U.S. Patents and Trademarks Depository Collection, an African American collection, as well as sections on local history, children’s literature, and university history.

Athletics and Recreation

Wright State offers 16 Division I intercollegiate athletic programs, and many students participate in intramural sports programs. The Ervin J. Nutter Center, a 12,000-seat entertainment and sports complex, and other recreational facilities are available to students on a daily basis. More than 130 student clubs and organizations give vibrancy to campus life.

Student Population

The average age of the university’s 3,590 graduate and professional students is 32.5 years. Many classes are conveniently scheduled so graduate students can attend classes after work hours, and more than half attend all of their classes after 4 p.m.

History

Wright State University was willed into existence by the community it serves. In 1962, a group of visionary citizens, who saw a need for accessible higher education, organized a public campaign to raise seed money to establish the Miami Valley’s first public university. Wright State opened its doors in 1964 as the Dayton Campus of Miami University and The Ohio State University. In October 1967, Wright State became an independent state university.

Lake Campus

The 173-acre Lake Campus, located between Celina and St. Marys on the north shore of Grand Lake, offers associate and pre-baccalaureate degrees, and limited baccalaureate and master’s degree programs.
Organization

School of Graduate Studies

The School of Graduate Studies has the authority to grant graduate degrees at Wright State University. In addition, it shares responsibility for the administration of all graduate programs in the university with the discipline-focused colleges and schools and their academic departments, and administers all graduate academic and admission policies as developed and approved by the Graduate Council. The graduate school also helps develop new programs and maintains appropriate standards for graduate-level programs. The administrative services of the school are provided by the graduate school office, consisting of the dean and associate provost for research, the assistant dean and director of graduate admissions and records, and their staff.

The School of Graduate Studies had a total enrollment of over 3,100 students in the fall quarter of 2001, 63 percent of them part-time. In addition, 488 students were enrolled in the Schools of Medicine and Professional Psychology. The graduate school offers four Ph.D. programs, 40 master's degree programs, and one post-master's educational specialist degree program through Wright State's colleges and schools.

Academic Units

Academically, the university is organized into 10 units. Undergraduate degrees are awarded through the Colleges of Business, Education and Human Services, Engineering and Computer Science, Liberal Arts, Nursing and Health, and Science and Mathematics. The WSU Lake Campus offers associate's degrees. Master's degrees are awarded through the School of Graduate Studies and the departments offering graduate programs. The university offers the Ph.D. degree in biomedical sciences through the College of Science and Mathematics and the School of Medicine, the Ph.D. degrees in computer science and engineering, and in engineering, through the College of Engineering and Computer Science, the Ph.D. degrees in environmental sciences and in human factors and industrial/organizational psychology through the College of Science and Mathematics, and doctoral-level professional degrees through the School of Medicine (M.D.) and the School of Professional Psychology (Psy.D.).
The Graduate Council

The Graduate Council comprises deans, elected representatives, and alternates from each of the nine academic colleges and schools, the director of each Ph.D. program, and the graduate school representative from student government. The council is the graduate school's policy-making body, which acts for the graduate faculty and is chaired by the dean of the School of Graduate Studies.

The council's functions include developing university policies and procedures for graduate studies, recommending to the president and Board of Trustees the approval of new graduate degrees and programs, and establishing standards for the graduate faculty. The council regulates student admission, registration, academic requirements, and other procedures regarding graduate study. It provides the central planning required to promote programs of the highest quality and evaluates proposals for new graduate programs and major revisions of existing programs.

Graduate Faculty

The graduate faculty, the body primarily responsible for graduate study, is comprised of faculty members whose experience and records of scholarship qualify them to offer graduate-level instruction. The graduate faculty's purpose is to encourage and contribute to the advancement of knowledge through instruction and research of the highest quality. It is responsible for student academic advising and supervision of student research and graduate assistants. Emphasis is placed on the totality of a graduate faculty member's instructional, advising, and professional responsibilities as well as explicit scholarship criteria.

Graduate Student Representation

Student Government, the elected representative student assembly, represents the interest of the student body on the Faculty Senate and Graduate Councils, communicates with the student body on matters of policy, appoints students to university committees, and researches matters of interest to the student body. Student Government includes a representative from the School of Graduate Studies and one each from the Schools of Medicine and Professional Psychology. Student representatives also serve on several Graduate Council Committees.
Research and Sponsored Programs

Universities have traditionally been the source of new knowledge. This new knowledge has usually come from research or creative activities, and closely relates to graduate study. To enhance this tradition, the School of Graduate Studies encourages all forms of scholarly efforts by the graduate faculty and graduate students.

Instruction at the graduate level at Wright State often means that students are actively involved in cutting edge research. Professors share with their students the experience of seeking new knowledge, and students in turn gain insight into what is involved in a research project. This entails not only familiarity with the techniques being used, but also a sense of the intellectual rigor and honesty that academic scholarship demands.

At any one time, there are over 300 research projects being conducted by WSU faculty. These projects are funded by more than 200 "sponsors," including federal and state agencies, nonprofits and businesses, and foreign organizations. Most research is done in the university's extensive research facilities, but a large proportion is performed in the field and at other collaborating institutions.

Research, in the broad sense of seeking new knowledge, is not limited to laboratory and field experiments in the natural sciences, but includes correlation studies, naturalistic observations, economic research, historical and other documentary studies, and virtually any scholarly investigation in any field. To help sustain all these research efforts, the university has established a multi-layered support system.

The dean of the School of Graduate Studies also serves as associate provost for research. Within the latter's scope of authority lies the university's Office of Research and Sponsored Programs, which identifies sources of external funding, assists faculty in submitting proposals, and administers resulting awards. Research assistantships, which are one mechanism to enable graduate students to assist in research projects, are often funded through external grants and contracts.

The associate provost for research is the institutional official responsible for university compliance with federal and state guidelines for the ethical conduct of research. Research boards and committees monitor all research and instruction involving the use of human subjects, laboratory animals, radioisotopes, and radiation-producing devices. Graduate student researchers will be introduced to the issues of research ethics and safety to help them meet the high standards of performance required for appropriate research conduct.
Equal Opportunity/Affirmative Action Policy

Wright State University is committed to achieving full equal opportunity in all aspects of university life. We are proud of the diversity of the university community and strive to make all members of the community feel welcome.

The policy of Wright State University is to not discriminate against any persons on the basis of race, religion, color, sex, sexual orientation, disability, veteran status, national origin, age, or ancestry. In addition, we take affirmative action to recruit and assist members of various racial or ethnic groups, women, Vietnam-era veterans, and persons with disabilities whose ability to achieve academic success might otherwise be unrecognized because of cultural barriers. Our policy is fully consistent with the various federal and Ohio statutes which prohibit discrimination.

Any questions or comments about the university’s policy, and any complaint about perceived discrimination, may be directed to the director of Affirmative Action Programs, 075 Allyn Hall, (937) 775-3207.

The university’s Affirmative Action Plan is maintained in the Office of Affirmative Action Programs. Wright State is a public institution, and any member of the public may request a copy of the plan.

In addition, Wright State University is a national leader in accommodating the needs of persons with disabilities. Any questions or comments concerning a needed accommodation may be directed to the director of the Office of Disability Services, E186 Student Union, (937) 775-5680.

Accreditation and Memberships

Wright State is accredited at the doctoral degree-granting level by the North Central Association of Colleges and Schools. In addition, many of our programs have been professionally accredited by various accrediting agencies. Wright State holds memberships in a number of organizations and participates in many kinds of collaborative ventures with local colleges, universities, statewide programs, federal laboratories, and Ohio industry. General memberships include the Council of Graduate Schools and the Midwestern Association of Graduate Schools.

For specific information concerning Wright State or the programs’ accreditation or membership, please contact the graduate school or the colleges/schools.
RESOURCES, FACILITIES, AND ACTIVITIES
Student-Centered Resources, Facilities, and Activities

University Libraries

Serving the diverse needs of graduate students and faculty, the University Libraries are integral to the research and instructional programs at Wright State University. Besides traditional collections and services, the libraries use the latest technology to provide access to information. The on-line library system provides information about local library collections and, through OhioLINK, provides access to the major academic collections throughout the state of Ohio. Computer workstations, located in the reference areas of both libraries, provide access to numerous electronic journal indexes, research databases, and Internet resources in a wide range of subject areas. Reference librarians are available seven days a week to help students and faculty in the use of collections and on-line resources. Both libraries also offer group instruction sessions on various topics every quarter. Through a variety of cooperative agreements, Wright State users can borrow materials directly from many academic libraries in the local and statewide area.

The Paul Laurence Dunbar Library

The Dunbar Library collections, among the largest in the Dayton area, include over 615,000 bound volumes, 1.2 million microforms, 400,000 U.S. and Ohio documents, and 4,200 current periodical subscriptions. The library building is open over 100 hours per week. The facilities include study tables and carrels for group and individual study, a current periodicals/microforms reading room, and photocopyers on each floor. Staff at the information desk on the second floor assist users with brief factual or directional questions while professional librarians provide in-depth assistance at the research consultation office.

Special collections of note include one of the largest depositories of information about the Wright brothers in the world. The over 6,000 items include manuscripts, records, and books, as well as some 4,000 photographs made from the Wrights' own negatives. Other early aviation history materials and collections relating to local and regional history draw researchers from afar. A collection of materials relating to the history and culture of African Americans is maintained in a reading room on the second floor. In addition, a separate collection of music materials is housed in the Creative Arts Center.

Other services include library orientation tours, classroom instructional sessions and demonstrations, course reserves, and interlibrary loan for materials unavailable locally or through the OhioLINK system.

The Fordham Health Sciences Library

The Fordham Library, located in the Medical Sciences Building, serves as the primary library for the Schools of Medicine, Nursing, and Professional Psychology, and for graduate students in the biomedical sciences. The collections number over 140,000 volumes and 1,200 current serial subscriptions.

A unique cooperative relationship among the university's hospital libraries and the Fordham Health Sciences Library promotes sharing and nonduplication of library materials as well as reciprocal library services for students and professionals in the health care fields. Seven of the hospital libraries participate in OhioLINK; over 108,000 volumes in these affiliated libraries complement the university collections.

Special collections of the Fordham Library include the McFarland Collection in aerospace medicine and human factors engineering, the Aerospace Medical Association Archives, and the Wright State health sciences programs archives. The Thelma Fordham Pruett Rare Book Room houses American eighteenth and nineteenth-century medical books.

SOCHE

Wright State students also have hundreds of additional classes available to them through the university's membership in the Southwestern Ohio Council for Higher Education (SOCHE), a consortium that includes many colleges and universities in the area. Full-time students at Wright State may cross-register for credit at SOCHE member schools at Wright State's tuition rates as long as class space is available, they have their advisor's consent, and the course isn't available at Wright State. They must also meet the course and host college prerequisites.

The consortium also offers cooperative library privileges to students at all member institutions. These library holdings total more than a million volumes.

The Center for Teaching and Learning

The Center for Teaching and Learning provides comprehensive development and instructional support services for students and faculty. The center conducts numerous workshops for the professional development of faculty and teaching assistants in areas including improving instructional skills and developing an appreciation of, and the ability to apply, both traditional and evolving technologies to the instructional process. Distributed learning, a new addition to the center, encourages faculty to engage in new modes of
instruction for students far removed from traditional campus classrooms. Additionally, the center provides a wide variety of support services to the entire campus community.

The center's production services include a full range of photographic services, graphic design and production, audio and video services, multimedia, and web development. The center's technical service units provide for the selection, delivery, setup, and operation of media and computer equipment in classrooms and for other campus activities and events.

For more information, see the center's Web site at http://www.wright.edu/ctl/.

**Computing and Telecommunications Services (CaTS)**

**General Information**

CaTS provides service and support for university telephones, campus networking, Internet access, and administrative and student computing resources. WSU students are encouraged to use these resources to enhance their learning experience. CaTS maintains computer labs (most open 24 hours) with computers networked to international resources, laser printers, and numerous software applications to complement students' classroom activities. The computers in these labs not only provide desktop applications, but also provide access to larger computer platforms, such as our UNIX system, the University Libraries databases, and other Internet resources. WSU has a strong commitment to providing accessibility to all of its students. In support of this commitment, a variety of adaptive technologies are available to provide computer access to students with physical disabilities.

All students should obtain a CaTS UNIX and Novell account. The UNIX account provides students with the account name and password necessary to access the Internet, e-mail, and other computing resources. With their UNIX account and a Web browser, students can access the Internet from home using the CaTS modem banks. A Novell account is required to login to CaTS Novell lab machines and provide personal and class disk space on the network file servers. Student accounts remain active only as long as they are enrolled in classes. Account owners are responsible for any improper or illegal activities that occur on their accounts. These activities include, but are not limited to, harassment of others through electronic communication and the use of university resources for business purposes. Therefore, account owners should not share their passwords with anyone for any reason. Misuse of resources can result in loss of account privileges and charges filed with the appropriate university offices. Both UNIX and Novell accounts can be picked up at the Help Desk in 025 Library Annex. The CaTS Help Desk is the single point of contact for university computing questions, problems and requests. Analysts are available to help seven days a week. Problems not resolved on the phone are logged into a tracking system and dispatched to the appropriate support groups for resolution. When contacting the Help Desk, if you receive the queue message indicating all analysts are busy, please stay online. A message is sent to the analysts letting them know you are waiting.

**Residence Connect**

All student residence areas are connected to the Internet and Wright State's campus network. Every room is equipped with one network port for each student, so they don't have to share. Residence network connections provide fast and easy access to campus electronic mail, the ability to run an Internet browser to surf the Web, and much more. All of this can be done without leaving their room or tying up their phone line. Please call the Help Desk to set up an appointment, or look for Wired Week/Day postings.
Raider Online eXpress (ROX)

ROX is a Web-based interface to the existing student information system. Students can use ROX to register, to drop and add classes, and to access: student schedules, grades, Bursar account statement, registration information checklist, Wright 1 Card transaction details, class offerings, forgotten PINs, and PIN change services. Like the telephone Raider Express, students gain access to their records by using their Social Security number and PIN. Check out ROX at http://rox.wright.edu.

For more information, contact the CaTS Help Desk at (937) 775-4827, or send e-mail to helpdesk@wright.edu. Check out the CaTS Web site at http://www.cats.wright.edu.

Bolinga Cultural Resources Center

The Bolinga Cultural Resources Center opened on January 15, 1971, as a tribute to the memory of Dr. Martin Luther King Jr. The word bolinga means love in Lingala, an African language, and the center promotes cultural pluralism on campus through programs, lectures, and seminars. The center's programs consist of a minority scholars speakers series, community speakers series, and film series. Moreover, it has two important resources: the African American Collection, comprising over 3,000 books and periodicals relating to the African American experience (located in the university's main library), and the Peer Supportive Services Program, a program of advising, mentoring, and tutoring services.

Asian/Hispanic/Native American Center

The Asian/Hispanic/Native American Center was created in October 1997 to support the academic, social, and cultural needs of Asian, Hispanic, and Native American students, faculty, and staff at the university. It also serves as an informational resource center regarding the Asian, Hispanic, Native American experience and creates an appreciation and understanding of the diverse Asian, Hispanic, and Native American cultures represented within the community. The center's programs consist of guest speakers, workshops, film series, and celebrations of the Hispanic, Native American, and Asian Heritage Months.

Women's Center

The Women's Center serves as an information clearinghouse on women's issues and services, fostering greater ties between women at Wright State and women in the community. The center promotes gender equity through educational programs and activities that honor the roles, contributions, and experiences of all women. The center also provides resource
support for the Women's Studies program and accommodates meetings, workshops, and other small group gatherings that address the concerns and interests of women on campus.

**Student Affairs and Enrollment Services**

The Office of the Vice President for Student Affairs and Enrollment Services establishes broad goals and a vision for Student Affairs consistent with the mission of the university. Department directors manage planning, policy implementation, research, and evaluation, as well as maintain an advocacy role for all Wright State University students. In that capacity, the division provides many services, facilities, and co-curricular activities designed to create an environment in which students can grow intellectually, culturally, emotionally, physically, and socially. Student Affairs administrators manage budget and personnel services, publications, communications, data analysis and reporting, and resolve student issues. The office is dedicated to creating a strong student voice on campus and supporting excellence in education.

The departments within the Division of Student Affairs and Enrollment Services include Undergraduate Admissions, Financial Aid, Residence Services, Career Services, Disability Services, Veterans Affairs, Student Life, Campus Recreation, Intercollegiate Athletics, Student Union, Public Safety, Psychological Services, and Student Health Services. Select services are highlighted in this section of the catalog. Students are encouraged to refer to the Student Handbook available in the Office of Student Life or online at www.wright.edu/students/handbook for a complete description of each of these services.

**Career Services**

Career Services offers a variety of services to help students explore career options, find part-time employment, and enhance their search for career employment. Students may avail themselves of individual career advising, a career resource center, student employment and career employment job fairs, and on-campus interviewing opportunities. An academic course is offered that is focused on career decision making and career planning. Students find part-time employment through the Student Employment and the Cooperative Education programs. Through Cooperative Education/Internships, students gain practical, career-related experience that is essential in acquiring career employment upon graduation. Visit the Career Services Web page at http://career.wright.edu.

**Center for Psychological Services**

Located in suite 218-220 of the Frederick A. White Health Center, the Center for Psychological Services (CPS) offers individual, couples, family, and group therapy, and psychological assessment services to Wright State University students. The CPS also provides consultation services and workshops on various topics to university clubs, organizations, and residential halls. Registered students receive 12 sessions per academic year at no cost. Students who are not insured by the Wright State University Student Health Insurance program are charged $10 per additional session beginning with the 13th session. Students who are insured by the Wright State University Student Health Insurance program receive additional sessions for no additional cost.

**Student Health Services**

Student Health Services provides primary health care for all students. It is staffed by a nurse practitioner with prescriptive authority, a part-time family practice physician, and registered nurses who can treat illnesses and injuries and who will assess, treat, and refer more serious problems to the appropriate health care resource. The providers can perform health physicals and wellness checks, such as PAP smears and birth control. Student Health Service is located in the Frederick A. White Health Center. The Wright State University student health insurance program is administered through Student Health Services.

**International Programs**

The University Center for International Education Office offers assistance to the more than 450 international students with immigration and cultural adjustment issues. It also coordinates an international exchange program for students interested in visiting another culture. Month-long cultural exchange programs are offered each summer in Japan and Brazil. More traditional term or year-long study abroad opportunities are offered in Australia, Latin America, Europe, and Asia.

**Services for Students With Disabilities**

Extending the opportunities of higher education to people with disabilities is a high priority at Wright State. We rank as a leader in adapted physical facilities, and campus buildings have been designed to be free of architectural barriers. Ramps and ground-level entrances lead to each building and all buildings have adapted restrooms and elevator access to every floor. An underground tunnel system links most campus buildings.
The Office of Disability Services promotes the realization of each student’s potential by offering services in physical, academic, personal, and/or vocational areas. These services are provided on the basis of individual need, allowing students with physical or learning disabilities to pursue college educations.

Physical support services are designed to enable each student to be as independent as possible and include personal assistance for dressing and hygiene needs; adapted campus parking; assistance in locating on- or off-campus adapted housing; training in activities of daily living to achieve a greater degree of independence; campus mobility orientation for visually impaired students; and other related services.

The academic support services are designed to assist students with physical or learning disabilities in meeting all academic requirements. These include textbooks in alternative formats for students who have a visual impairment, learning disability, or an extensive physical disability; test proctoring for students who need reading or writing assistance, adaptive computers, and/or extra time to complete a test; and academic aids that accommodate individuals with disabilities in meeting class requirements and coursework in adaptive computer technology.

The vocational program assists students in making realistic occupational choices. Opportunities exist in the planning and development of a career, and there are services designed to provide experience at various employment sites. These methods allow students to make a realistic decision about a future career and ensure that students are able to meet the demands of the occupation.

Applicants requiring services available for students with disabilities are strongly encouraged to contact the Office of Disability Services prior to admission to make arrangements for the necessary services.

Public Safety

Public Safety, the official law enforcement agency for the university, provides police services 24 hours a day. Among the services provided are personal safety escorts, crime prevention, support services, investigation units, and educational programs that focus on the topics of crime awareness and prevention. To increase safety within the campus community, emergency phones are located throughout the campus in buildings, parking lots, and other remote areas. These phones ring directly into the Public Safety Communications Center to ensure an immediate response to all potential emergency situations.

Student Union

Always bustling with activity, the Wright State Student Union offers a place to play, relax, meet others, take care of academic needs, study, exercise, and grab a bite to eat all in one stop. At the heart of university life, the Student Union is committed to providing a safe gathering place that is friendly, student centered, and promotes interaction among students, faculty, staff, alumni, and the community.

The professional staff work closely with students to provide an opportunity for personal growth and recreation through a number of cultural, educational, and social experiences.

In addition to offering innovative programs, this 308,000-square-foot facility houses a fitness center, an arcade, gymnasium, the University Bookstore, an art gallery, a credit union, student services, graduate admissions and records, and more. The Student Union also provides students with a choice between a variety of dining options in a new market style dining facility.

Like all units within the university, the Student Union is committed to students and works to ensure that all students have the most memorable, rewarding, and worthwhile college experience possible. For more information, please contact the Student Union at (937) 775-5522, or visit our Web site at www.wright.edu/students/union/.

Housing

Wright State University offers accommodations for graduate and professional students in The Village. This apartment community offers efficiency and one- and two-bedroom style units. All apartments have wall-to-wall carpet, window coverings, and modern kitchens.

The Village is conveniently located on campus, within walking distance of all university facilities. A variety of shopping centers, restaurants, and attractions are minutes away from The Village community.

Once students are admitted to graduate school, they receive information regarding campus housing options. To be eligible for The Village, a student must be admitted to the university and meet one of the following criteria: graduate or professional student, 23 years of age or older, in an exclusive relationship, or have legal
dependent(s). As space allows, undergraduate students with junior or senior status may be allowed to reside in The Village.

Other housing options are also available in Wright State’s residence halls and campus apartments. Information about off-campus housing can be obtained through the Office of Student Life at (937) 775-5570.

Additional information concerning graduate student housing can be obtained by contacting the Office of Residence Services at (937) 775-4172 (Voice or TDD), or at our Web site at www.wright.edu/students/housing/.

Campus Recreation

The Wright State University Office of Campus Recreation is located in the Student Union, the heart of campus, and provides exceptional facilities and programs to promote the total health and well-being of each member of the university community. Professional staff work to meet the diverse needs of students, faculty, and university employees alike through activities and programs that promote health lifestyles, positive relationships, productive leadership, fair play, and of course, fun.

Recreational facilities consist of a fitness center, gymnasium, swimming pool, seven squash and racquetball courts, a spinning room, billiards room, game arcade, and outdoor playing fields. Students also have access to a second gymnasium, weight room, indoor running track, and outdoor tennis courts located just down the street at the Ervin J. Nutter Center.

Campus recreation offers something for everyone from basketball to wallyball, table tennis to costume bowling, and a variety of adapted recreation sports from billiards to quad rugby.

Students are encouraged to participate in the more than 20 intramural leagues, 22 sports clubs, and 25 special events and tournaments offered annually. For the outdoor enthusiast, Campus Recreation offers several camping trips, a ski trip, horseback riding, skydiving, inline skating, and more. Finally, students may take advantage of a wide offering of noncredit fitness instruction from traditional cardiovascular workouts such as step, dance or water aerobics, spinning, and kickboxing, to more nontraditional holistic offerings in meditation, tai chi, and feng shui.
The mission of the Office of Campus Recreation is to create recreational and wellness opportunities that promote a healthier and happier Wright State family. All sports and recreation are inclusive. If you require assistance or need reasonable adaptations to participate fully in any program, please contact the Office of Campus Recreation at (937) 775-5815. For a complete listing of activities and programs, visit our Web site at www.wright.edu/students/rec/.

Sports
The university offers a broad program of both intercollegiate and intramural sports for men and women. Wright State's student-athletes compete in NCAA Division I and the Horizon League. Men's and women's sports opportunities include basketball, cross country, soccer, swimming, and tennis. In addition, the university offers baseball and golf for men, along with softball, indoor and outdoor track and field, and volleyball for women. Under certain NCAA rules, graduate students may be eligible to compete. All students are admitted free to on-campus Wright State athletic events.

Organizations and Activities
Many opportunities for co-curricular involvement exist through participation in student organizations, clubs, and activities. Several academic departments sponsor departmental clubs and honoraries. Sports, religious, and special-interest clubs provide many avenues for exploring your interests with a group. In addition, the Office of Student Life conducts leadership training programs and offers community service opportunities.

The Union Activities Board (UAB), operated by students for students, schedules a wide variety of events including videos, guest speakers, comedy/novelty entertainment, concerts, recreational tournaments, and cultural activities. For students who wish to put their creative talent to work, there are several student media outlets on campus. The student newspaper, The Guardian, which utilizes editors, writers, proofreaders, salespeople, and photographers, is published weekly during the academic year. The literary magazine Nexus comes out three times a year and includes writing and original artwork from members of the university community. Students can also work on and off the air at the student-run campus radio station, WWSU-FM.

Many cultural opportunities on campus allow students both to see and to participate in the performing arts. The Department of Music presents many concerts and recitals by student and faculty soloists and choral and instrumental groups. University Theatre presents several major productions, several one-act plays, and at least one children's theatre production during the academic year. The Union Activities Board sponsors a variety of concerts, speakers, and cultural events and offers a highly regarded film series featuring foreign, cult classics, and avant garde films.
GRADUATE DEGREES, PROGRAMS, AND CREDIT
Graduate Degrees and Programs

The graduate programs at Wright State University provide advanced professional training in the area of a student's field of specialization and afford opportunities to conduct research and special investigations. The student's graduate program of study is an initiation into methods of intensive study and research in some selected area of knowledge. It is the objective of the School of Graduate Studies to provide its students with the opportunity to achieve a high level of professional competence.

The following are the graduate degree programs and their concentrations.

Master's Degrees and Programs

Accountancy/M.Acc.
Aerospace Medicine/M.S.
Anatomy/M.S.
Applied Behavioral Science/M.A.
Criminal Justice and Social Problems
International and Comparative Politics

Applied Statistics/M.S.
Biochemistry and Molecular Biology/M.S.
Biological Sciences/M.S.
Biological Sciences, Environmental Sciences
Business Administration/M.B.A.
Administration of Nursing and Health Care Systems/M.B.A. and M.S. dual degree
Business Administration/M.B.A. and Social and Applied Economics/M.S.
Chemistry/M.S.
Chemistry, Environmental Sciences
Classroom Teacher/M.A., M.Ed.
Career, Technical, and Adult Education
Vocational Teacher Licensure; Computer/Technology Education; Early Childhood Education; Library/Media; General; Mathematics; Modern Languages; Multi-Age; Adolescent Young Adult; Middle Childhood; Physical Education (HPR); Reading; Science; Intervention Specialist:
Gifted Educational Needs; Mild to Moderate Educational Needs; Moderate to Intensive Educational Needs

Computer Engineering/M.S.C.E.

Computer Science/M.S.

Counseling/M.A., M.R.C., M.S.
Business and Industrial Management, Exceptional Children, Community, Marriage and Family, Mental Health, Rehabilitation Counseling (Chemical Dependency, Severe Disabilities)

Earth Science/M.S.T.

Educational Leadership/M.A., M.Ed.
Educational Administrative Specialist: Vocational Education Administration; Educational Administrative Specialist: Teacher Leader; Principalship; Student Affairs in Higher Education—Administration; Educational Administrative Specialist: Curriculum, Instruction, and Professional Development; Educational Administrative Specialist: Curriculum, Instruction, and Professional Development—Technology

Engineering/M.S.Egr.
Biomedical, Electrical, Human Factors, Materials Science and Engineering; Mechanical

English/M.A.
Literature, Composition and Rhetoric, Teaching English to Speakers of Other Languages (TESOL)

Geological Sciences/M.S.
Environmental Sciences, Environmental Geochemistry, Environmental Geology, Geological Sciences, Geophysics, Hydrogeology, Petroleum Geology

History/M.A.

Humanities/M.Hum.

Interdisciplinary Science and Mathematics/M.S.T.

Mathematics/M.S.
Applied Mathematics, Mathematics

Microbiology and Immunology/M.S.

Music Education/M.M.

Nursing/M.S.
Acute Care Nurse Practitioner, Administration of Nursing and Health Care Systems, (M.S.), Administration of Nursing and Health Care Systems (M.S. and M.B.A. dual degree), Adult Health, Child and Adolescent Health, Community Health, Family Nurse Practitioner, School Nurse

Pharmacology and Toxicology/M.S.

Physics/M.S., M.S.T.
Physics, Medical Physics

Physiology and Biophysics/M.S.

Psychology/M.S.
Human Factors and Industrial/Organizational Psychology

Public Administration/M.P.A.

Pupil Personnel Services/M.A., M.Ed.
School Counseling

Selected Graduate Studies/M.A., M.S.

Social and Applied Economics/M.S.

Post-Master's Degree Programs

Educational Specialist Degree/Ed.S.

Educational Leadership
Advanced Curriculum and Instruction Higher Education/Adult Continuing Education Superintendent
Doctoral Degree Programs

Doctor of Philosophy/Ph.D.

Biomedical Sciences

The university's first academic doctoral program, leading to a Ph.D. in biomedical sciences, began in the fall of 1979. Cooperatively offered by the College of Science and Mathematics and the School of Medicine, this program is interdisciplinary, innovative, and staffed by more than 50 faculty from numerous departments across the campus.

The first year of the curriculum consists of an interdisciplinary core, laboratory rotations, and seminars, followed by a second year of advanced courses in preparation for dissertation research. Upon successful completion of the candidacy examination, students pursue dissertation research under the guidance of an advisor and supervisory committee. The program provides an integrated background in physical, chemical, and biological disciplines and an in-depth experience in research. Graduates are expected to be sufficiently flexible to participate in solving a broad range of complex biomedical problems.

Computer Science and Engineering

The graduate program of study leading to a Ph.D. in computer science and engineering is offered by the Computer Science and Engineering faculty with support from the faculty of the College of Science and Mathematics and the College of Engineering and Computer Science, particularly the departments of Mathematics and Electrical Engineering. The program requires a concentration of study in specific areas of computer science and engineering. Programmatic strength lies in the unique blend of faculty expertise, in the combination of theory with software and hardware design, and in the laboratory facilities available to the program. Most courses are offered in the late afternoon to allow practicing computer professionals to begin the program on a part-time basis.

A student may be admitted to the Ph.D. program in computer science and engineering with a baccalaureate degree or a master's degree in computer science, computer engineering, or related areas and appropriate experience, satisfaction of the admission requirements as set forth by the School of Graduate Studies, and a record that indicates potential for a career in computer science and engineering research.

A student should come to the program with a knowledge of high-level programming languages, data structures, real-time programming, computer organization, formal languages, operating systems, and computer systems design; however, it may be possible to make up minor deficiencies after admission to the program by taking appropriate courses.

Environmental Sciences

As the needs of society become more complex, so do the conflicts between growth and the environment. Wright State University's Ph.D. program in environmental sciences is the only one in Ohio and one of just a few in the country that equips scientists with the multifaceted skills and knowledge to solve today's environmental problems. Offered through Wright State's Institute for Environmental Quality, the program draws on the expertise and perspectives of faculty representing a range of disciplines in biology, chemistry, and geology.

The program focuses on three key environmental areas confronting business, industry, and government today: environmental chemistry and toxicology, environmental engineering

Interested in doing doctoral research in engineering that is geared specifically to solving real-world problems? If so, Wright State's College of Engineering and Computer Science has a very special Ph.D. program for you—one that crosses traditional boundaries of engineering and includes the resources of several universities and research facilities.

This interdisciplinary program is special for a couple of reasons. First, it includes a core curriculum that spans the commonality of various engineering fields including electrical, mechanical, materials, biomedical, and human factors engineering. The program also provides for specialization in a particular engineering major, and significant research in one of six focus areas where both regional demand and collaborative resources are available.

Second, the Ph.D. in engineering is special because it is a collaborative program that exploits the strengths and resources of five major regional institutions. In addition to Wright State University, classes and research can be conducted using the faculty and facilities at the Air Force Institute of Technology (AFIT), the University of Dayton (UD), the University of Cincinnati (UC), and The Ohio State University (OSU). In fact, classes taken by WSU Ph.D. in engineering students at AFIT and UD are treated seamlessly as residence courses at WSU. Courses at UC and OSU are readily transferable.

The Ph.D. in engineering incorporates (1) an interdisciplinary core curriculum that spans the commonality of the various engineering fields involved, (2) both major and breadth course specialization areas, and (3) significant research in one of six focus areas. In addition, the program provides for substantial collaboration with several graduate engineering programs at five different institutions. The educational experience afforded by the Ph.D. in engineering program provides a foundation for research and development careers in industry, government, and academia.
stressors, and environmental geophysics. Scientists trained through this program will be sought after by governmental agencies, industry, consulting firms, and academia to research and address complex environmental issues such as surface and groundwater quality management, preservation of aquatic and wildlife diversity, habitat restoration, chemical and physical contamination of watersheds, food chain contamination, and exposure to hazardous materials.

Students are asked to master a series of courses, and participate in seminars and laboratory rotation(s). These serve as an interdisciplinary base for the successful completion of dissertation research. Most courses are offered late in the day or in the evening to allow working professionals to begin the program on a part-time basis. The institution awards the degree when the student satisfactorily completes the required work. For more information, call us at (937) 775-2201, or visit our Web site at www.wright.edu/academics/ieq/phd.htm.

Psychology

The Ph.D. program in the Department of Psychology is focused on the study of human factors and industrial/organizational psychology. It provides students with a unique background for approaching research, design, and evaluation of human systems or organizations. Human factors is primarily concerned with interfaces between machines (including computers) and people or with the design of specific tasks. Industrial/organizational psychology emphasizes social and motivational processes, and looks for ways to modify the set of people who interact in and with a system by selecting people who fit an environment, by training, or by designing organizational structures to motivate performance. Each student major in either human factors or industrial/organizational psychology and minors in the other one. Students also get practical experience with applied problems, including design, evaluation, and field research. Students are expected to complete dissertation research that is innovative and leads to original results that are theoretically interesting and practically significant.

Professional Doctoral Degree Programs

Doctor of Medicine/M.D.

The School of Medicine educates physicians, placing emphasis on primary care, and awards the Doctor of Medicine (M.D.) degree. Within the context of preparing physicians to meet the needs of patients and society, the school conducts research, encourages the generation of new knowledge, and maintains continuing and graduate medical education programs.

Affiliated with 28 hospitals and health care facilities in the Dayton-Miami Valley region, the school features a four-year interdisciplinary curriculum with instruction in 26 departments and programs. Integrated or affiliated graduate medical education (residency) programs are conducted in the following disciplines: aerospace
medicine, dermatology, emergency medicine, family medicine, general surgery, internal medicine, internal medicine/pediatrics, obstetrics and gynecology, orthopedic surgery, pediatrics, psychiatry, and transitional.

**Doctor of Psychology/Psy.D.**

The School of Professional Psychology educates professional psychologists, offering a four- or five-year postbaccalaureate program leading to the Doctor of Psychology (Psy.D.) degree. Students may enter the program with either a bachelor's or master's degree, and provisions are available for transfer of some graduate credit.

The school was among the first doctoral programs in the country to open a practitioner model of training in which the primary emphasis in training is on application of psychology rather than on research. The program accepted its first students in 1978, and has been continuously accredited by the American Psychological Association.

The primary goal of the program is to train students broadly as general practitioners to allow students to prepare for an initial focus in a number of established and emerging areas of practice. Students receive training in each of the following areas: Intervention/psychotherapy, relationship skills, psychological assessment, research/evaluation/basic science, consultation/education, and management/supervision.

The program is dedicated to recognizing and infusing diversity throughout its curriculum. The interest in diversity is reflected in the student body, about half of whom are minorities and international students. Faculty and staff respect and reflect diversity.

The school maintains two training clinics—the university's counseling service and the Ellis Institute for Human Development, which is a training, service, and research center located near downtown Dayton. Each student is assigned for at least one year of practicum training to one of these sites. In addition, the program has contracts with a large number of community human service agencies that provide off-campus practicum training.

Extensive financial aid is available to students in the form of tuition waivers and stipends. Information about the program and materials for admission can be obtained from the school's admissions office at 117 Health Sciences Building, Wright State University, 3640 Colonel Glenn Hwy., Dayton, OH 45435-0001, or by visiting our Web site at www.wright.edu/sopp/. The telephone number is (937) 775-3492.

**Classroom Teacher Licensure Programs**

In addition to graduate degree programs, Wright State offers structured curricula that lead to licensure status for teachers consisting of a series of courses that will qualify a teacher for licensure in a specific area (see Education and Human Services section). The College of Education and Human Services also offers licensure programs for school counselors, administrative specialists, school administrators, school nurses (in conjunction with the College of Nursing and Health), and in workforce and technology education. Licensure for music education is offered through the Department of Music in the College of Liberal Arts.

**Certificate Programs**

Wright State also offers curricula that lead to a certificate awarded by the university after the completion of a specific sequence of courses. These courses may be an independent academic program or part of a master's degree program. Students who pursue the certificate as an independent program will be enrolled in nondegree status.

Certificates may be earned in the College of Nursing and Health (Nursing Education); Department of Anatomy (Anatomy); the Department of Computer Science and Engineering (Database Management and Design, Software Engineering, and Software Management); the Department of English Language and Literatures (Teaching of English to Speakers of Other Languages, TESOL Technical Writing, and Business and Professional Writing); the Department of History (Museum Studies and Archive Administration and Records Management); and the Department of Urban Affairs and Geography (Cartography, Photogrammetry, and Remote Sensing). The Women's Studies Program offers a graduate certificate in Women's Studies that can be pursued in the contexts of the Master of Humanities, the Master of Arts in English, or as a complement to any graduate or professional degree program by both degree and nondegree graduate students. Interested students should contact the appropriate departments or programs for further information.

The Database Management and Design, Software Engineering, and Software Management Certificate Programs offered in the College of Engineering and Computer Science through the Computer Science and Engineering department are intended for continuing education and retraining of computing professionals.
Graduate Credit

Categories of Graduate Credit

Graduate Courses

In order to take graduate courses for graduate credit, students must be officially accepted for admission to the School of Graduate Studies. Courses that carry graduate credit are listed in the graduate course section of this catalog. The section also contains the course numbering system and course abbreviations.

Workshops and In-Service Courses

All students who have completed the graduate admission requirements may take workshops and in-service courses. Students granted special status by the School of Graduate Studies are permitted only to take workshop courses for graduate credit without being admitted to the School of Graduate Studies.

Transfer Credit

Upon the recommendation of the student's advisor and the approval of the concerned department/college and the School of Graduate Studies, graduate credit (courses) completed at another regionally accredited academic institution may be transferred to a student's graduate academic record and applied toward the requirements of the student's graduate degree program at Wright State.

A student may transfer graduate credit if all of the following conditions are met:

- The student's advisor reviews the transfer of credit request and recommends that the course(s) be accepted for transfer credit.
- The student was admitted and enrolled as a graduate student at the institution where the graduate credit was completed. In addition, the student must be or have been in good standing at that institution.
- The graduate credit to be transferred is within the seven-year time limit for completing a master's degree. Graduate credit transferred toward a program's elective credit requirement does not have to meet the seven-year time limit.
- The amount of credit to be transferred does not exceed 12 quarter hours.
- The student has a program of study on file in the School of Graduate Studies. The program of study must clearly reflect the student's required (professional, core, advanced, introductory, general, etc.) and elective courses. Transfer courses do not have to be placed on the program of study until the courses have been approved by the School of Graduate Studies.
- The grade for the credit is "B" or better, or equivalent as determined by the School of Graduate Studies. The School of Graduate Studies may require additional information from the student and/or the institution in order to determine grade equivalency.
- The credit to be transferred has not been applied toward a previously awarded degree.
- An official transcript reflecting the credit to be transferred is on file in the School of Graduate Studies.
- The student is actively pursuing a graduate degree program at Wright State and has currently completed at least three credit hours of degree requirements.
- The transfer of credit request is approved by the School of Graduate Studies.

In order to be awarded a master's degree, a student must complete at least 45 hours of graduate credit in a graduate program. At least 33 of the 45 hours must be completed at Wright State and must be within the seven-year time limit. All required (other than elective) program course requirements must be completed within the seven-year time limit.

A student wishing to transfer credit should consult with his or her program advisor. If the advisor approves the courses for transfer credit and the courses meet all of the School of Graduate Studies requirements, then the advisor should request in writing that the School of Graduate Studies have the courses posted on the student's academic record. The request should indicate the courses and number of hours to be transferred (the hours to be transferred cannot exceed the number of hours the student earned for the course or courses).

Graduate courses completed at Wright State in nondegree status and later applied toward degree requirements are not considered as transfer credit from outside the university.

Credit by Examination

A graduate student may be awarded graduate credit by an academic unit based on the successful completion of an examination prepared by that academic unit. The development and offering of such an examination are at the discretion of the individual academic unit. To apply for credit by examination you must: be admitted to a graduate program and registered at Wright State University; complete the appropriate form (available from the Office of the Registrar); receive approval from both the graduate program director and the department administering the exam; schedule the examination with the participating academic unit; pay a nonrefundable $25 fee at the Office of the Bursar; take and pass the examination with at least a grade of "B". Signatures of the examiner and the department chair are required to indicate successful
completion of the examination. The completed form is presented to the Office of the Bursar with payment of $15 per credit hour. You must return the form to the Office of the Registrar for posting to the permanent record.

A particular course requirement may be waived through the successful completion of a proficiency examination. To apply for a proficiency examination, you must: complete the appropriate form (available at the Office of the Registrar); schedule the examination with the participating academic unit; pay the nonrefundable $25 fee at the Office of the Bursar; take and pass the examination.

**Graduate Credit Hour Limits**

The maximum number of credit hours for which graduate students may register in a quarter is 16. In a summer term of five weeks, nine hours is a maximum.

Students holding graduate assistantships must register for a minimum of eight quarter hours of graduate credit during each quarter they hold the appointment. Predoctoral fellows and students holding Graduate Tuition Scholarships are required to register for a minimum of 12 credit hours.

Students who wish to deviate from the normal registration loads listed above must have the approval of the program advisor and the School of Graduate Studies.

A graduate student who is employed full time should normally register for no more than two courses per quarter. This should be determined by the student and the faculty advisor based on such factors as the student’s employment and its effect on the student’s energy and mental alertness, the student’s previous academic records, and the nature of the course taken.

**The Grading System**

Academic achievement is indicated by the following letter grades and points used in calculating grade point averages.

- **A** Highest quality/4 points per credit hour
- **B** Second quality/3 points per credit hour
- **C** Third quality/2 points per credit hour
- **D** Lowest quality/1 point per credit hour
- **F** Failure/0 points
- **X** Failure to complete a course for which registered, without officially withdrawing/0 points (figured as an F in the grade point average)

The following symbols appear on the record, but are not included in calculating grade point averages.

- **L** Audit: given only if arranged for at time of registration.

- **N** No report; instructor did not report grade.
- **P** Passing; indicates work of B quality or better for graduate courses; given only for specially approved courses. (Credit is earned but is not computed in grade point averages.)
- **M** Satisfactory progress; final grade will be assigned upon completion of the project. The satisfactory M grade will be assigned only to courses that are of a continuing nature, such as research and thesis courses. Normally the number of these courses ends in _99, such as 799, 899, or 999. The M grade will not be contained in the grading format of all nonsequence courses. The School of Graduate Studies and the Registrar’s Office will ensure that requests for M grades within the grading formats will be confined to continuing or sequence courses.
- **U** Unsatisfactory performance; indicates work of C quality or below for graduate courses; given only for specifically approved courses.
- **I** Incomplete; given only when part of required work is missing and arrangements have been made with the instructor to complete the work. An agreement for the grade of incomplete must be signed and submitted by the instructor at the time the grade sheet is submitted. If the work is not completed by the date agreed upon, the I grade automatically becomes an F, unless the instructor submits another I grade. The maximum time allowed for the make up of an incomplete is the last day of class of the following quarter, except for spring quarter; spring quarter incompletes must be made up by the last day of class of the fall quarter.
- **W** Withdrawn; given for courses from which the student officially withdrew or dropped during the fourth through fifth weeks of classes or equivalent or for which the student successfully petitioned for withdrawal. Grade reports are sent at the end of each quarter to the addresses on file in the Registrar’s Office.
FINANCIAL ASSISTANCE,
FEES, AND TUITION
Financial Assistance

Introduction

Financial aid available to graduate students includes graduate assistantships, graduate tuition scholarships, Federal Perkins Loans, Federal Subsidized and Unsubsidized Stafford Loans, Federal Work-Study employment, and short-term loans. Information concerning applications for graduate assistantships or scholarships may be obtained from the department concerned or the School of Graduate Studies. Other types of financial aid are handled through the Office of Financial Aid.

Financial aid awards cannot be finalized until students have completed the admission process. Entering students should be sure that a transcript of credits has been sent to the School of Graduate Studies. Students must be enrolled in a degree or certification/licensure program to process Federal aid eligibility.

Assistantships

Assistantships are awarded through individual departments of instruction and require students to spend a specified amount of time assisting either in instruction, research, or academic support. Graduate assistants are required by the graduate school to register for a minimum of eight hours of graduate credit per quarter and some departments may require as many as 15 credit hours per quarter.

For information regarding assistantships, directly contact the chair of the department involved or the School of Graduate Studies. Financial need is not a criterion for selection of graduate assistants; the Free Application for Federal Student Aid (FAFSA) discussed in the section on Financial Aid applies to other forms of financial assistance.

Graduate Tuition Scholarships

A limited number of scholarships, which cover a graduate student's tuition for two years or program completion (whichever is less), are offered by the Colleges of Business, Education and Human Services, Engineering and Computer Science, Liberal Arts, Nursing and Health, Science and Mathematics, and the School of Professional Psychology.

The goals of the scholarship program are to recruit and retain master's and doctoral students who have demonstrated academic excellence in the past and who exhibit the potential for continued academic excellence in the future. The scholarships are awarded primarily to new incoming graduate students who intend to pursue a graduate degree program as a full-time student. To be eligible for the scholarships, students must qualify for regular admission into a master's or doctoral program. Questions regarding the tuition scholarship program should be addressed to the college or school of interest.
Graduate Council Scholars Program

Stipends and tuition remissions are awarded annually to full-time graduate students who are recommended by their respective college/school dean, and selected by the Graduate Council Student Affairs Committee. The stipend and tuition remission is awarded for up to two years. This program not only eases graduate students’ financial burdens but recognizes their academic achievements.

Professional Nurse Traineeships

The Professional Nurse Traineeship program was established in 1956 and expanded in 1975 to provide financial support to currently licensed professional nurses to study full time, to teach, to serve in administrative or supervisory capacities, or to serve in other professional nursing specialties requiring advanced training. Financial need is not a consideration in these awards. The required application and information can be obtained in the College of Nursing and Health.

Financial Aid

To be considered for federal financial aid, students must complete the Free Application for Federal Student Aid (FAFSA) or Renewal Application and submit it to the Federal Processing Agency. The FAFSA or Renewal Application can be completed on the Internet at http://www.fafsa.ed.gov. For students filing the FAFSA or Renewal online, a PIN number is needed for your online signature. If you do not have a PIN number, go to www.pin.ed.gov for a PIN request. The FAFSA application may be obtained from the Office of Financial Aid, but the Renewal Application will be mailed from the Federal Processing Agency to the student applicant. Please note: the Renewal Application will be mailed to students who have applied for financial aid through the FAFSA in the previous academic year. Those students receiving a Renewal Application will not have to complete the FAFSA. The FAFSA or Renewal Application must be mailed or electronically submitted to the Federal Processing Agency no later than February 15 prior to the start of the academic year to determine priority eligibility for the Federal Perkins Loan, the Federal Nursing Student Loan, Subsidized and/or Unsubsidized Stafford Loan, and the Federal Work-Study employment program. Applications received after the priority deadline date will be considered for Subsidized and/or Unsubsidized Stafford Loan eligibility. No processing fee is required for FAFSA or Renewal Application. Students who receive federal financial aid will also be expected to maintain standards of satisfactory academic progress as defined by federal guidelines and school academic policy.

Federal Perkins Loans

Eligibility for the Federal Perkins Loan is determined by the student having high computed financial need through the FAFSA or Renewal Application, and by applying by the priority deadline.

The repayment period and interest accrual for the Federal Perkins Loan does not begin until nine months after the student terminates at least half-time enrollment. The loan has a 5 percent fixed interest rate.

Federal Nursing Student Loan

Graduate nursing students who have high computed need through the FAFSA or Renewal Application, and who apply by the priority deadline, may receive funding through the Federal Nursing Student Loan. The Nursing Student Loan has the same interest rate, repayment period, and grace period as the Perkins Loan. Nursing Loan award amounts are based on yearly funding.

Federal Stafford Loan Program

Through the cooperation of lending institutions that participate in the Subsidized and Unsubsidized Stafford Loan program, students who are enrolled in a certification/licensure, or degree-seeking program, and are registered for a minimum of 4 credit hours, may receive long-term educational loans. The yearly Stafford loan limit for graduate students is $8,500. A brief description of each loan follows:

Stafford Loan (Subsidized)

The federally funded Subsidized Stafford Loan program enables students to borrow money to help meet educational costs. Repayment begins six months following graduation or termination of at least half-time enrollment. The minimum repayment is $50 per month and the variable interest rate begins at the time of repayment, not to exceed 8.25 percent. The student will be expected to pay a 3 percent fee, which is deducted from the loan before it is disbursed.

Stafford Loan (Unsubsidized)

The terms and conditions of the federally funded Unsubsidized Stafford Loan are the same as for the Subsidized Stafford Loan, except that the borrowers of the Unsubsidized Stafford Loan will be responsible for payment of the interest that accrues while they are in school. The interest rate is variable, not to exceed 8.25 percent. Unsubsidized Stafford Loans are available to students who do not qualify for the Subsidized Stafford Loan or have minimum eligibility through the Subsidized Stafford Loan. Graduate students
can borrow the loan limit based on their year of study, and up to an additional $10,000 through the Unsubsidized Stafford Loan.

**Federal Work-Study Program**

Employment through the Federal Work-Study Program is available to students who demonstrate financial need, according to federal guidelines, and who apply by the priority deadline.

Graduate students who are registered for at least four credit hours are eligible to work a maximum of 20 hours per week while classes are in session. Full-time summer employment is available to students who are registered for classes during the summer sessions they plan to work.

**Short-Term Loans**

Students who have earned at least three credit hours at Wright State University, and a minimum grade point average of 3.0, are eligible to borrow up to $300 for books or personal needs. You must be registered for at least 4 credit hours for the quarter for which you are requesting the loan. There is a $7 processing fee for the personal short-term loan. Short-term loans against a student's financial aid refund does not have a fee. Short-term loans cannot be used for tuition installment payments. There is a two-day processing time for a short-term loan, and applications are available through the Office of Financial Aid. Short-term loans that are borrowed at the beginning of a quarter must be paid in full by the sixth week of the quarter in which the money is borrowed.

**Veterans’ Benefits**

Active duty personnel and Vietnam-era veterans are eligible for the new G.I. Bill if they served without a break in service after October 19, 1984, through June 30, 1985. Only veterans separating after June 30, 1988, are eligible.

The All-Volunteer Force Education Assistance Program (New G.I. Bill) can be used by a veteran who entered on active duty at any time after June 30, 1985, and paid into the program.

Applications are available from the Veterans Affairs office at Wright State University or from any Department of Veteran Affairs office. Educational opportunities are available for children and surviving spouses of veterans whose deaths or permanent total disabilities were service-connected. Spouses and children of servicemen and service-women declared missing in action or prisoners of war are also eligible.

**Fees and Tuition**

**Paying Fees**

The method for paying fees depends on which registration period is used. Students who register during the early registration period will have their classes canceled if fees are not paid by the early registration period due date. Students who register during open registration will not have their classes canceled for nonpayment. You will be held responsible for all charges unless you take action to withdraw yourself by the seventh day of the term. Summer term refunds and flexible scheduled class refunds are prorated. If payment is not received by the open registration fee payment due date, a hold will be placed on your account to prevent further registration activity and a late payment penalty may be assessed.

Fee payment deadlines for each registration period are listed in the calendar, which is published in the quarterly class schedule. Fee payment deadlines can also be found on the Registrar’s Web site at [www.wright.edu/registrar](http://www.wright.edu/registrar). Students can also view account charges through Raider Online Express (ROX) at [http://rox.wright.edu](http://rox.wright.edu).

Students are encouraged to pay fees by check or money order, made payable to Wright State University and sent to the attention of the Bursar. The check or money order should be written for the exact amount due. Incorrect checks will be returned, and the registration will proceed on schedule if a new check or money order for the correct is received by the published deadline date for the payment of fees. Postdated checks will be returned to the sender.

Students may also pay fees by credit card by calling Raider Express (937) 775-4400 and selecting option “5” from the main menu. The university accepts Discover, Visa, and MasterCard. In order to use a credit card, students must either be the cardholder or have the cardholder’s authorization. All charge transactions are subject to approval by the financial institution that issued the credit card.

Students have the option of using the Student Installment Payment Plan (SIPP) to spread quarterly fees for tuition, insurance, and university housing (if applicable) over a three-month period. The plan is offered as an alternative to the single payment for fees that is normally due at the beginning of fall, winter, spring, and summer quarters. For a $30 nonrefundable fee, students pay one-third of their fees by the published fee payment deadline. The balance is divided into two installments which are payable at established dates about 30 days apart. Further information about SIPP is available on the Bursar’s Web site at [www.wright.edu/bursar](http://www.wright.edu/bursar).

Payment of fees can be mailed to the attention of the Bursar, called in through Raider Express (937) 775-4400 when paying by credit card, presented in person at the fee payment windows, or placed in the Raider Express Drop Box adjacent to the Office of the Bursar in the Student Union. Mailed payments should be sent to ensure their receipt by the fee payment deadline. Mailed payments received after the deadline will be returned and the original registration will be canceled.
Students whose fees are entirely paid by grants or scholarships must still notify the Office of the Bursar by the established fee payment deadline to complete the registration process. This may be accomplished by either calling Raider Express at (937) 775-4400 and selecting option "5" or mailing the remittance portion of the billing statement to the attention of the bursar.

Any payment made with a check not honored by the bank may result in the student's registration being canceled unless satisfactory payment arrangements are made within seven days after appropriate notification is mailed to the student. A returned check charge is assessed for each check not honored by the bank. All charges, including the returned check charge, must be paid by the date indicated in the notification.

At Wright State University, the payment of tuition and all other fees and charges including, but not limited to, room, board, course fees, general fees, bookstore charges, parking fees and fines, library fees and fines, telephone charges, and health insurance (hereafter referred to separately and collectively as "Student Obligations"), become your obligation at the time of registration. A late fee of $100 will be assessed to Student Obligations not paid in full by the specified date.

You agree to pay all costs, expenses, and attorney fees related to the collection of the Student Obligations to the full extent permitted by law. A hold will be placed on your records if your Student Obligations are not paid as agreed, which will prevent registration and your ability to receive an official university transcript.

Financial accounts may be audited at any time during students' enrollment or academic career. If an error is identified, a bill or refund will be issued. The university will issue a refund within 30 days or apply the credit to the account. If students do not make acceptable arrangements to pay any amount due after notification, a hold will be placed on their account. Transcripts will be released and future quarter registration will be permitted when payment in full is received.

Refunds

A current schedule of refunds can be found in the quarterly schedule of classes or through the Registrar's Web site at www.wright.edu/registrar. Refunds relating to withdrawal are initiated through the Office of the Registrar. Refunds will be calculated as of the date of official withdrawal, unless proof is submitted substantiating circumstances that were beyond the control of the student (e.g., hospital confinement) and that prevented the filing of the official withdrawal at an earlier date. In such a case, the refund will be determined as of the date of said circumstances. Nonattendance of classes or notification of the instructor or department does not constitute official withdrawal. Refunds or reduction of indebtedness for withdrawals after the official dates will not be made in cases of failure or inability to attend classes because of changes in business (e.g., work schedule) or personal affairs (e.g., illness).

Students who withdraw during the eighth through sixteenth calendar day of the quarter or its summer session equivalent will receive a credit based on 70 percent of the fees assessed. Students who withdraw during the 70 percent period will be charged 30 percent of the total instructional and general fees assessed, regardless of how much they have paid at the time of withdrawal. For students on the installment payment program, the charge of 30 percent of the total instructional and general fees assessed will be subtracted from their payments to determine the amount of any refund.

No refunds will be granted after the sixteenth calendar day of the quarter. Students who withdraw while owing the university money will be considered to be indebted to the university for that amount. Therefore, all refunds will be applied to any indebtedness before being issued to those students. All refunds will be issued within 30 days of the date of withdrawal from the university.

Students who drop courses during a partial refund period will receive the refund according to the published refund schedule that will be in compliance with the policy for complete withdrawal.

All refunds of fees other than instructional and general fees must be approved by the responsible office or department before submission to the Office of the Bursar (e.g., room and board refunds must be approved by the Residence Life Office).

Appeals regarding charges and refunds of instructional fees and late registration fees must be submitted in writing to the Office of the Registrar. Appeal procedures are available in that office.

Criteria for Ohio Residency

Students who are nonresidents of Ohio must pay a nonresident fee in addition to other fees and charges. The Ohio Board of Regents' Residency Rule 3333-1-10 determines who can be considered an Ohio resident and cites specific exceptions to the rules. The intent of this rule is to exclude from treatment as residents those persons who are present in the state of Ohio primarily for the purpose of receiving the benefit of a state-supported education. If you are in doubt as to your status as an Ohio resident as it applies here, see the Appendix of this catalog, which lists Rule 3333-1-10 in its entirety. Information and application materials regarding Ohio residency for tuition purposes are online at www.wright.edu/admissions/residency.html.

To receive the same information through the mail, you may call the Office of the Registrar at (937) 775-5588.
Fees*

New Fee Assessment Policy

Beginning fall quarter 2002, quarterly instructional and general fees will be assessed on a dual rate schedule. Under a dual rate schedule, new students will be assessed under a higher rate structure than continuing students except for Lake Campus undergraduate and School of Medicine students.

You are a continuing student if you meet all of the following criteria:
1. You attended one of the following quarters: summer 2001, fall 2001, winter 2002, spring 2002; and
2. You were not classified by the university as a consortium or high school student, including the Post-Secondary Education Opportunity Program (PSEOP), during the above periods of attendance; and
3. Beginning winter quarter 2003, you attend at least one of the immediate prior four quarters leading up to the current registration term.

You must meet the above criteria each quarter to maintain continuing student status as long as the dual rate schedule is in effect.

If you do not meet all of the above criteria, you are considered a new student.

2002–2003 Quarterly Fees as of Fall 2002**

<table>
<thead>
<tr>
<th>Master’s, Ed.S., Ph.D. Students</th>
<th>Returning Student</th>
<th>New Student</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1 through 10.5 credit hours/per hour</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instruction and general fee</td>
<td>$219</td>
<td>$225</td>
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<tr>
<td>Nonresident tuition</td>
<td>$160</td>
<td>$160</td>
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<tr>
<td>Total nonresident</td>
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<td>$385</td>
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<tr>
<td><strong>11 through 18 credit hours†</strong></td>
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<tr>
<td>Instruction fee</td>
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<tr>
<td>General fee</td>
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<tr>
<td>Total Ohio resident I&amp;G fee</td>
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<tr>
<td>Nonresident tuition</td>
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<tr>
<td>Total nonresident I&amp;G fee</td>
<td>$4,042</td>
<td>$4,108</td>
</tr>
</tbody>
</table>

Additional Fees and Charges

Late registration fee/all students | $100–250
Nondegree application fee | $10
Graduate degree student and certification student application fee | $25
Application fee to change from nondegree to degree student | $15
Audit fee/per credit hour (laboratory and special courses not open to audit) | same as for credit courses
Transcript fee/first request | $4
each additional at same time—$4
Transcript fee/same day/first request | $10
each additional at same time—$4
Returned check penalty/per check | $25
Proficiency credit/per credit hour | $15
Credit by examination proficiency test fee | $25
Graduation fee | $35
International student fee | $52
Student’s Installment Payment Plan application fee/late payment fee | $30/$35
Technology fee/per credit hour per quarter | $15†

* Fee assessment is based on course level. Fees for School of Medicine and School of Professional Psychology students differ from those listed above. For these fee schedules, consult the Office of the Registrar.
† The hourly rate applies to all credit hours in excess of 18.
‡ Up to a maximum of $100 per quarter per student will be assessed on all courses taught within the College of Engineering and Computer Science.

**Fee schedules are subject to change depending on action by the state legislature and approval by the Ohio Board of Regents and the University Board of Trustees. For an up-to-date list, contact the Office of the Registrar, (937) 775-5588, or visit www.wright.edu/admissions/fees.html.
ADMISSION AND REGISTRATION
Admission and Registration

Students must be officially accepted for admission to the School of Graduate Studies before they may register for graduate credit. Application and information can be obtained from the School of Graduate Studies office at E344 Student Union on the main campus or by calling (937) 775-2976. All correspondence pertaining to the admission of a student should be addressed to the School of Graduate Studies, Wright State University, 3640 Colonel Glenn Hwy, Dayton, Ohio 45435-0001. The School of Graduate Studies will coordinate the processing of the application.

Applications for admission and supporting credentials should be received at least four weeks before registration for the quarter in which the student wishes to begin graduate study.

All documents received by the university in connection with an application for admission become the property of Wright State University. Under no circumstances will they be returned to applicants or forwarded to any agency or other college or university.

Admission to the School of Graduate Studies does not necessarily indicate admission to an advanced degree. Such admission is subject to specific requirements as defined by the individual programs.

Students are identified by the School of Graduate Studies as being in one of the following categories.

Admission Categories

Regular Status

The student is admitted as fully qualified to pursue a program leading toward a graduate degree.

Provisional Status

Under certain conditions, a student may be admitted provisionally (for one quarter only), pending receipt of credentials. If admission requirements are not met during the quarter in which a student was admitted provisionally, registration for future quarters will be denied and the student will lose graduate credit for any graduate courses completed during the quarter.

Conditional Status

The student who does not meet the admission requirements for regular status, or who has conditions placed on his or her admission by an academic program, is admitted to a degree program in this status. Graduate credit earned while in this status will apply toward degree requirements. If all admission requirements are satisfied and the student has completed the first 12 hours of graduate credit, after being admitted into this status, with a 3.0 (a grade equivalent of a B) cumulative grade point average, regular status will be granted upon approval of the graduate program. A student who does not meet these conditions will be dismissed from the School of Graduate Studies.

Nondegree Status

A student who does not plan to work toward a degree may be admitted on a nondegree basis in order to take selected graduate courses. A student cannot receive a degree while in this status. Admission into this status does not imply or guarantee that a student will be granted admission into a degree program; the student must meet all the admission requirements for degree status. Should students be accepted into degree status at a later date, a maximum of one-half (50 percent) of the graduate hours required for completion of degree requirements may consist of applicable graduate courses completed in nondegree status (see Retroactive Graduate Credit, page 44 of this catalog, for additional information).

A student in nondegree status must maintain a 3.0 graduate grade point average. Furthermore, a student in this status who does not have a 3.0 graduate cumulative grade point average during the quarter in which he or she completes 12 hours of graduate course work while in this status will be dismissed from the School of Graduate Studies.

Certification/Licensure Status

A student who wishes to complete teacher certification/licensure requirements at the graduate level but who does not wish to pursue a graduate degree may be admitted as a certification/licensure candidate. A student cannot receive a degree while in this status. Subject to subsequent admission into a degree program and program approval, a maximum of one-half (50 percent) of the graduate hours required for completion of degree requirements may consist of applicable graduate courses completed in certification/licensure status (see Retroactive Graduate Credit, page 44 of this catalog, for additional information).

Senior Permission Status

Seniors at Wright State who have completed 162 credit hours toward the baccalaureate degree and have earned a cumulative grade point average of 3.0 may apply for permission to elect specified graduate courses for graduate or undergraduate credit. Approval must be granted by these students' undergraduate advisor, the chair of the department in which graduate or undergraduate credit is being sought, and the School of Graduate Studies. Only 12 hours of graduate course work taken for graduate credit
may be applied toward degree requirements with the graduate department’s or program’s approval after the students have been admitted into a graduate program.

Special Status

Students in special graduate status are not considered to be admitted into the School of Graduate Studies.

Students who have a bachelor’s degree may enroll in certain workshop courses for graduate credit without being admitted to the graduate school. Should students be accepted into degree status at a later date, a maximum of 12 quarter hours of graduate workshop credit can be applied with program approval toward degree requirements (see Retroactive Graduate Credit, page 44 of this catalog, for additional information).

Transient Status

Students actively pursuing a graduate program at another college or university who wish to earn credits for transfer to that institution may be admitted for one quarter. Transient students will normally not be required to submit official transcripts. Students must complete the admission application and request the dean of their graduate school to complete the Wright State transient form indicating they are in good standing.

Admission Requirements

1. Complete an application form.
2. Pay a nonrefundable application fee.
3. Have an earned bachelor’s degree from an accredited college or university.
4. Request all colleges/universities previously attended to send one official transcript directly to the School of Graduate Studies. Official transcripts are required for all previous undergraduate and graduate (if applicable) college work. If courses from one university or college appear on another university’s or college’s transcript, the applicant is still required to submit an official transcript from the university or college where the course was taken. (Note: Students applying for nondegree status need only submit an official transcript reflecting the award of a bachelor’s, master’s, or doctoral degree from a regionally accredited college or university. Nondegree applicants having completed graduate work should also submit official transcripts reflecting that work.)
5. Meet the minimum requirements for the appropriate admission statuses as follows:

   Regular Status
   Admission into regular status requires an overall undergraduate grade point average of 2.7 (based on a 4.0 grading system) or an overall undergraduate grade point average of 2.5, but with a 3.0 or better for the last 90 quarter hours (60 semester hours) earned toward the undergraduate degree. Admission into this status also requires approval by a degree program.

   Conditional Status
   Students are admitted in this status when their undergraduate grade point average is less than 2.7 but at least 2.5 (based on a 4.0 grading system) or have an undergraduate grade point average of less than 2.5 but above 2.3 if the grades in the last half of undergraduate work constitute 2.7 or better. Admission into this status also requires approval by a degree program. Students having master’s degrees from regionally accredited institutions may be admitted into Wright State graduate degree programs regardless of their undergraduate grade point averages provided the appropriate academic departments or programs recommend them for admission.

   Nondegree Status
   To be admitted into nondegree status, a student must have a bachelor’s, master’s, or doctoral degree from a regionally accredited college or university.

   Certification/Licensure Status
   This status requires a student to have a minimum undergraduate grade point average of 2.5.
6. Students who have taken graduate courses prior to seeking graduate admission to Wright State University must have an overall grade point average of 3.0 or better and must be in good standing (not holding probationary, conditional, or equivalent status) at all previously attended colleges or universities.

7. Submit admission test scores, if applicable. (See the following section for test requirements.)

8. To be a degree-seeking student, a candidate must be admitted to a department and college/school for an identified program of study, as well as be admitted to the School of Graduate Studies.

9. For international student requirements, see the International Students section on the following page.

10. Admission by Petition. An applicant who does not meet minimum requirements for admission, who has been dismissed from a program, or who has been denied admission to a program may submit a petition to the School of Graduate Studies for review. The petition form may be obtained from the School of Graduate Studies. The petition must contain supporting documentation of why any requirement should be waived. Submission of test grades, such as the Graduate Record Examinations and/or the Miller Analogies Test, may be required by the applicant's prospective graduate program in instances where the applicant has a grade point average below the minimum required for admission. Applicants should contact their graduate program officer for further details. The petition is submitted for review to the college/school petitions committee. The petition with the committee's recommendation is then reviewed by the dean of the School of Graduate Studies, who will make the decision.

Admission Test Requirements

Graduate Management Admission Test (GMAT)

Each applicant for admission to the Master of Business Administration and Master of Accountancy programs, regardless of previous academic record, must submit satisfactory scores on the Graduate Management Admission Test before admission will be considered. The GMAT is available year-round as a computer-based test at noted GMAT test centers. Preregistration directly with the Educational Testing Service is required. Registration information may be obtained from the University College, the graduate school, or the testing service.

Miller Analogies Test (MAT)

Applicants for admission to the College of Education and Human Services must submit satisfactory scores on either the Miller Analogies Test (MAT) or the Graduate Record Examinations (GRE). Information concerning the MAT may be obtained from the University College or the School of Graduate Studies.

Students applying to Teacher Education, Educational Leadership, and Health, Physical Education, and Recreation degree programs need not take the GRE or MAT if their cumulative undergraduate GPA is at least a 3.0. Students applying to Human Services degree programs need not take the GRE or MAT if their cumulative undergraduate GPA is at least a 3.3. (The PRAXIS test will not be waived for students applying to programs requiring this test.)

Graduate Record Examinations (GRE)

Applicants to Ph.D. programs and to graduate programs in computer science, computer engineering, human factors and industrial/organizational psychology, pharmacology and toxicology, social and applied economics, and certain other programs under particular circumstances, may be required to submit scores on the aptitude and advanced portions of the Graduate Record Examinations (GRE). The GRE consists of two parts: the general test, which contains verbal, quantitative, and analytical portions, and the subject tests, which assess achievement in the student's major field. Students will be advised by the School of Graduate Studies when the GRE is required as an additional admission requirement.

Graduate Record Examinations, for which fees are charged, are available as follows: General Test—year-round computer-based testing at designated GRE test centers; Subject Test—scheduled throughout the United States at designated GRE test centers in April, November, and December. Preregistration directly with the Educational Testing Service is required. Information and registration forms may be obtained from the University College, the graduate school, or the testing service.

Applicants will be advised concerning GRE test requirements following a review of their admission files.

Students with visual or upper extremity impairments who wish to take the GRE should follow the directions outlined in the GRE brochure, which is available in the University College, from the graduate school, or directly from the testing service.
Readmission

A student or applicant who falls into one of these categories must reapply for admission:

1. An applicant who has previously been admitted to the university but did not enroll for the quarter admitted (have file updated).
2. A graduate student at Wright State who was accepted for one degree program and wishes to apply for another program or degree.
3. A graduate student who has not completed at least one course in four consecutive quarters. The term "course" includes formal courses, independent study, thesis research, continuing registration, etc.
4. A graduate student who has completed the degree requirements for which he or she was originally admitted and wants to take additional graduate courses as a nondegree student or start a new degree program.

Admission of Students with Three-Year Bachelor's Degrees

Admission to graduate school is normally predicated on completion of a four-year baccalaureate degree. Students seeking admission into graduate status at Wright State who have earned a three-year bachelor's degree may not be eligible to be admitted. In order to be eligible for admission, the students' three-year programs must be equivalent to and meet the standards of regionally accredited four-year degree programs in the United States. The determination of equivalency will be made by International Admissions (UCIE) and/or the School of Graduate Studies. Students with three-year degrees that are not equivalent to regionally accredited four-year degrees may be eligible for admission if the students have earned a master's degree prior to coming to Wright State or complete a minimum of 45 hours of additional coursework. The 45 hours should consist of either general education courses or program specific courses as determined by a graduate program or the School of Graduate Studies. Students may be required to take English 101 and 102 as part of or in addition to the 45 hours if it is determined by a program or the School of Graduate Studies that they have difficulty with the English language and/or have not met the requirements of freshman English. Students may be referred to the Department of English Language and Literatures for diagnostic testing for English deficiencies.

International Students

Wright State welcomes applications from qualified international students. Approximately 550 students on F-1 and J-1 student visas currently attend the university. Application materials may be requested from the University Center for International Education (UCIE). Applications for admission must be completed three months prior to the quarter in which the applicant wishes to begin studies at Wright State; applications for fall quarter must be completed by the end of May. Graduate international applicants are expected to meet the following criteria for admission:

1. Graduate applicants must have earned a baccalaureate degree or its equivalent, similar or equal to a degree from a regionally accredited U.S. college or university, from a recognized college, university, or other institution of higher learning. Only an official transcript, translated into English, will be accepted as evidence of academic preparation. If the credentials cannot be evaluated by the Office of International Admissions, the applicant will be required to submit the credentials to an evaluation service and pay the cost of the evaluation.
2. All international applicants must demonstrate proficiency in English. If the applicant's native language is not English, a minimum score of 550/213 on the Test of English as a Foreign Language (TOEFL) is required. Several departments or programs have set higher requirements for English proficiency. In addition, international students may be required by their academic advisors to take a university-administered English writing placement test. Students failing this test may be required to take supplemental on-campus classes to strengthen their English skills. Students who have earned a degree from a regionally accredited U.S. college or university are exempted from the TOEFL requirement.
3. Since the only type of internal financial assistance available to international graduate students is in the form of graduate assistantships and academic scholarships, the university must be assured that all international applicants have adequate financial resources to attend Wright State. The financial statement form must be accompanied by an affidavit of support and a bank statement provided by the sponsor, indicating the amount of money available to the applicant for the purpose of studying at Wright State University. International students applying for a graduate teaching assistantship (GTA) are required to take the Test of Spoken English (TSE) before they can be assigned to classroom, laboratory, or tutor duties. International GTA applicants will be asked to take the university's Oral Proficiency Test (OPT) if their TSE scores are older than one year. Those with current TSE scores between 55-60 (250-300 on the OPT) will be
allowed to teach in the classroom, laboratory, or other instructional settings; those with current TSE scores between 45-50 (210-249 on the OPT) will be allowed to teach in the classroom, laboratory, or other instructional settings on the condition that they enroll concurrently in English 095, a course designed to help their language, interpersonal, and public speaking skills. International graduate students who do not have TSE scores prior to their arrival on campus may take the OPT at Wright State when they apply for a GTA.

Those applicants financing their own education from personal funds must also submit an official bank statement together with the financial statement. Wright State University reserves the right to require prepayment equivalent to one year’s expenses.

4. Form I-20 will be issued by the international student advisor when the applicant has met the above requirements and has been admitted to the university.

5. All admitted international students are required to purchase and maintain Wright State’s student health insurance for themselves and their dependents during their studies.

Registration
Students must be admitted to the School of Graduate Studies in order to register for and earn graduate credit. Students granted special status may also earn graduate credit but only in workshop courses.

Wright State is on the quarter system. The academic year is divided into three quarters (fall, winter, and spring) and a summer session (two five-week terms and one 10-week term). Registration dates are announced in the quarterly class schedule.

Registration Procedures

Initial Registration
Upon completion of the admission requirements and acceptance by the School of Graduate Studies, students are authorized to register.

Students in the following programs must meet additional requirements before registration will be authorized:

1. Students admitted to the biomedical sciences Ph.D. program will be given registration instructions during the fall quarter program orientation period.

2. Students admitted to the geological sciences program will receive their registration instructions at the orientation meeting in the geological sciences department prior to fall quarter.

3. Students admitted to the M.B.A. program and the M.S. program in social and applied economics are advised in their admission letter to contact an advisor for an appointment in order to complete a program of study form. After this advising session, the advisor will authorize students to register.

4. Students in biological sciences, biomedical sciences, microbiology and immunology, pharmacology and toxicology, and physiology and biophysics will not be able to register without first meeting with an academic advisor. Students should contact the academic program for an appointment to meet with an advisor.

Registration must be completed by the date indicated in the quarterly class schedule. Students who register early will be mailed fee statements.

Registration will not be accepted after the first week of the quarter unless the department chair or dean of the college or school approves the late registration. Students who register with permission after the 14th day of the term will be charged a late registration fee. Fees must be paid by the date indicated in the quarterly class schedule. No students may be admitted to classes for which they have not been properly registered.

Telephone Registration
After new students have met with their advisor, they are ready to register for classes. Registration information and dates are announced in the quarterly schedule of classes. Once students have advisor approval (if required), they may register through the Raider Express Telephone System using a touch-tone phone or in person at the windows of the Office of the Registrar. Students in the School of Professional Psychology, Biomedical Sciences Ph.D. Program, or Department of Theatre Arts may not use Raider Express for registration. Students must register in person in these cases.

Continuing students should check the quarterly class schedule or their registration information on ROX for the specific date they may begin to register.

Paying Fees
Students will find fee payment information and deadlines in the quarterly class schedule and online. Students who register during the early registration period and online but do not pay the fees by the required due date may have their registration canceled in order to make classroom space available to other students. Mailed payments received after the deadline will be returned.
Registrations will not be canceled for students who register during the open registration period but do not pay their fees on time. These students will be responsible for payment of fees and are subject to deadline dates as stated in the quarterly class schedule for dropping and receiving refunds.

Students may pay fees by check or money order, made payable to Wright State University, and sent to the Office of the Bursar. Students may also use Discover, MasterCard, or Visa credit cards to charge most fees paid to the university. In addition, students have the option of using the Student Installment Payment Plan (SIPP) to spread quarterly fees for tuition, insurance, and university housing (if applicable) over a three-month period.

Refunds
A current schedule of refund dates and other information about refunds can be found in the quarterly class schedule, online, and in the Office of the Registrar.

Subsequent Registration
Students who have registered for graduate classes at Wright State University for any of the four preceding quarters will be authorized to register for the current quarter. Students who have not registered during the preceding year must reapply to the School of Graduate Studies to have their files updated.

Auditing Courses
If class space permits, students admitted to the School of Graduate Studies may audit a course with written approval from the instructor before they enroll. The amount of participation required of auditing students is left to the discretion of the instructor, but it cannot exceed that required of regular students. Audited courses may not be used to establish full-time status, and students may not change their registration from audit to credit or from credit to audit after the first week of class.

Change in Courses
A change in registration is made through ROX, submitting a drop and add form to the Office of the Registrar or by calling the Raider Express Telephone System. Students should refer to the quarterly class schedule for specific deadlines for dropping courses and receiving refunds. The deadline for adding classes is the end of the first week of classes. There is no fee for adding courses, although instructional and general fees are charged where applicable. A late registration fee will be assessed for students who register or add classes on or after the 15th day of the term.

Withdrawal From Courses
Students may drop a course without a grade of W appearing on their transcript if the course is dropped by the date specified in the quarterly class schedule. Students should refer to the quarterly class schedule for deadline dates for dropping a class or withdrawing. A student who stops attending a course and does not officially withdraw will receive a grade of F or X at the instructor's discretion. The X grade remains on the student's permanent record and is computed in the grade point average as an F.

Course Repeat
Students may repeat once any graduate course previously taken for credit in which the grade received was below a B. Only the hours and grade points earned from the repeated course will be included in the computation of the grade point average and in meeting degree requirements.

Students should indicate that they are repeating a course when registering. Repeats are permitted only twice in any master's degree program.

Continuing Registration
A student's registration each quarter should reflect the level of academic participation in university life and anticipated progress toward the degree. This is particularly true of students involved in thesis, dissertation, and special project research. Academic units may set minimum registration requirements for continuing and readmitted students which represent the unit's supervision of those students' efforts to complete degree requirements.

Students must be registered for at least one hour of graduate credit as designated by the department during the quarter in which the successful defense of a thesis or dissertation is accomplished.

Any exception must be approved by the student's advisor, department chair, and the dean of the School of Graduate Studies.
ACADEMIC POLICIES AND
GRADUATE DEGREE
REQUIREMENTS
Master’s Degree

General Requirements

The School of Graduate Studies administers academic policies and procedures and enforces graduate degree requirements determined by the Graduate Council and applicable to all graduate students. In addition, graduate degree programs may set additional policies and degree requirements. It is important for students to be familiar with both graduate school and degree program policies and requirements, since both must be adhered to for satisfactory academic performance and subsequent graduation. The following sections address graduate school policies and requirements and act as a general guide.

Program of Study

A student’s program of study is administered by the department or college/school and is subject to the approval of the School of Graduate Studies. The program of study is a defined program that is negotiated between a student and an academic department offering a program. The institution specifically indicates that it will award the degree sought by the student if the work stipulated in the program of study is satisfactorily completed. Similarly, the student specifically agrees to the responsibility for completing the program as stipulated in the program of study.

The program of study will be used by the School of Graduate Studies to certify students for graduation, to assist in the evaluation of requests for transfer credit, and to verify graduate student petitions requesting waivers to academic policies. Consequently, degree certifications, transfer credit requests, and petitions will not be processed without a completed current and/or amended program of study on file in the student’s academic folder in the School of Graduate Studies.

Credit Hour Requirement

All master’s degree programs at the university require completion of 45 or more credit hours of graduate course work. A department may require completion of more than 45 credit hours. Please consult requirements for a specific degree and major area.

Residence Requirements

Students are considered to be in residence whenever they are registered on campus as graduate students. A minimum residence of three quarters at Wright State University, devoted wholly or partly to graduate work, is required. In addition, a minimum of 33 credit hours toward the master’s degree must be completed at Wright State.

Retroactive Graduate Credit

Under the rules of the Graduate Council, students must be admitted to the School of Graduate Studies in order to receive graduate credit.

Wright State graduate students in certification/licensure and nondegree statuses who later are admitted into a graduate degree program may apply, with program approval, a limited number of hours completed in these statuses toward degree requirements. A maximum of one-half (50 percent) of the graduate hours required for completion of degree requirements may consist of applicable graduate courses completed in nondegree and certification/licensure statuses. Students earning workshop credits under special status who subsequently are admitted into a degree program may apply, with program approval, a maximum of 12 quarter hours of applicable graduate credit toward degree requirements. For example, if a program of study stipulates that 50 graduate hours are required for the award of a degree, then up to 25 hours of applicable graduate credit completed in certification/licensure or nondegree status may be applied toward degree requirements (12 of the 25 hours may be workshop credit).

Colleges/programs may set lower nondegree credit hour limits for completion of a degree program. While the nondegree hours that can be applied toward degree requirements may be a mixture of courses completed in nondegree, certification/licensure, and special graduate status, workshop credit is limited to a total of 12 hours.

Academic Standards

All students in graduate study programs are expected to maintain a minimum grade point average of 3.0. The grade of C is the minimum passing grade for graduate credit. However, no more than nine credit hours of C may be applied toward a master’s degree. The attainment of a large proportion of C grades, even when balanced by A’s, can be considered by the faculty as unsatisfactory course work. A course taken for graduate credit in which a D is received may not be applied toward the requirements of a graduate degree.

An average of 3.0 for all graduate course work is required for graduation in any graduate degree program. It should be emphasized that the successful completion of a required number of courses is not sufficient, of itself, to earn a master’s degree. Students must also receive the recommendation of the departmental faculty after an evaluation based on total performance.
Student Evaluation

At the end of 12 credit hours of graduate work, a student's grade point average will be reviewed by the graduate school. Based on this review, a student who has a cumulative grade point average less than 3.0 may be placed on probation or dismissed from the School of Graduate Studies.

At the completion of one year of graduate work or 24 credit hours, whichever comes first, each student will be evaluated by the departmental faculty. This evaluation will be based on performance in courses, research, and seminars and will be forwarded to the graduate dean. On the basis of this evaluation, a student will be: (1) recommended for continuance in the graduate program; (2) placed on probationary status; or (3) recommended for dismissal from graduate study at this university.

Probation

A student placed on probation will be required to change this status by achieving a cumulative grade point average of 3.0 the quarter the student completes the next 12 quarter hours of credit work. Failure to achieve the 3.0 grade point average will result in the student's dismissal from the School of Graduate Studies. If a portion of these credits is in research for the thesis requirement, the student's major department must certify the student's eligibility to continue studies at the university.

Thesis

Certain programs specify the presentation of a thesis as a requirement for the master's degree. Students completing this requirement should secure a copy of the Graduate Thesis/Dissertation Handbook, published by the School of Graduate Studies and available in the graduate office. The requirements outlined in this manual are basic minimal criteria that have been approved by the Graduate Council for preparing the thesis. Students should seek the advice of their thesis supervisors and departments for further details.

Students are encouraged, but not required, to obtain a format check prior to the final deposit of the thesis. This format check significantly reduces the likelihood of a last-minute rejection. The School of Graduate Studies requires two working days to perform a format check.

The topic of the thesis should come from the student's personal exploration in his or her major or minor field. The formal petition for approval of the thesis topic must clearly set forth the problem, the intended organization, and the methods of development of the thesis. The thesis topic must be approved by the student's advisor and committee. The thesis must be written in English.

Students should consult with the academic department as to the course or courses and number of credit hours for which they should register while working on an approved thesis.

One unbound copy of the thesis, in prescribed form, is to be taken to the graduate office no later than 30 days after the degree was granted. (The due dates are published by the graduate school and distributed to the departments and program offices.) The thesis copy submitted to the graduate school is sent to the library, where a microfilm copy of it is made. The microfilm copy is considered an archival copy and is deposited in the university's closed stacks in the library. The thesis copy is then bound and made available for circulation in the library. Since some departments require additional thesis copies, students should consult their advisors to determine the total number of copies needed.

Students have the option to submit a copy of their thesis, either on floppy disk or electronically, and in pdf format, to the School of Graduate Studies for electronic transmission to OhioLINK in Columbus. OhioLINK is the repository for Electronic Theses and Dissertations (ETDs) for the state universities system in Ohio. Students interested in ETD submission should contact the School of Graduate Studies.

Comprehensive Examinations

Some departments require a final comprehensive examination to test the candidate's mastery of the course of study pursued. It may be written or oral, or both, at the option of the examining committee. Candidates for a degree requiring a thesis must satisfactorily complete written and/or oral examinations conducted by the major committee prior to the submission and approval of the thesis.

Arrangements for taking the examinations should be made with the candidate's advisor and the department at least three weeks in advance.

Time Limit

A student must complete all requirements for a master's degree within seven years unless the student's specific program has a shorter time limit. The time limit is defined as being from the beginning date of the earliest course taken at Wright State University that is included in the program of study for the degree. This time does not include a leave of absence granted in advance for adequate cause by petitioning the Graduate Petitions Committee.

Graduate students who fail to take courses or otherwise to pursue their graduate education for a period of one calendar year will automatically be retired from the active files of the School of
Graduate Studies. Reapplication for admission will be required to reactivate the student's records. (No additional fee will be charged.)

Second Master's Degree
A second master's degree may be earned by taking a minimum of 33 credit hours. Credits for the second master's degree must be taken after the award of the first master's degree. These hours must be taken at Wright State University. Departments or programs may specify additional requirements depending on the length of the program, prerequisites for the individual student, and/or the nature of the first degree. Admission policies and procedures are the same as those for any student applying to the program, except that an application fee is not required if the first degree was earned at Wright State.

Dual Master's Degree Program
A dual master's degree program permits common course work to apply toward two graduate programs. Currently, Wright State has approval to offer two dual programs: a Master of Business Administration (M.B.A.) degree and the Master of Science (M.S.) degree in social and applied economics; and the Master of Business Administration (M.B.A.) degree and the Master of Science (M.S.) degree in administration of nursing and health care systems. The requirements for these programs are contained in this catalog under Raj Soin College of Business and College of Nursing and Health programs.

Working on Two Master's Degrees
Graduate students desiring to work on two master's degrees at Wright State at the same time may do so provided:
1. The student formally applies and is admitted into the second master's degree program before registering for any courses for that program.
2. Within two quarters from the start of the programs, approved programs of study are on file in the School of Graduate Studies for both graduate programs.
3. The first program must have a minimum of 45 graduate hours. The second program must have a minimum of 33 graduate hours (programs may require more hours than the minimum requirement).
4. Courses required for one program cannot be applied toward the second program's requirements.
5. Only 12 hours of transfer credit can be applied, with program and Graduate Studies approval, toward the requirements of the first master's degree. No transfer credit can be applied toward the 33 graduate hours required for the second master's degree.
6. Students may graduate with the two degrees at the same commencement exercise.

Application for Degree
Degree candidates must submit a formal application for graduation. The university has established the following filing periods for submitting applications for degrees, based on anticipated date of completion (indicated in parentheses):
- June 1 to September 1 (December)
- September 1 to December 1 (March)
- December 1 to March 1 (June)
- March 1 to June 1 (August)

Applications for graduation may be obtained in the School of Graduate Studies. A fee of $35 must be paid to the bursar, then the completed application should be returned to the School of Graduate Studies. If the degree requirements are not completed at the time specified, another application (no fee), which will replace any previously submitted, must be filed.

Commencement is held twice annually, in December and June. Students who complete their degree requirements in August and December may participate in the December ceremony. March and June graduates may participate in the June ceremony.

Summary of Requirements for the Master's Degree
Listed below is a summary of the requirements graduate students must complete to earn a master’s degree at Wright State University.
1. Complete a Program of Study form to be filed in the School of Graduate Studies.
2. Complete the requirements for the graduate degree within seven calendar years.
3. Achieve a cumulative grade point/hour ratio of at least 3.0 in all courses taken for graduate credit (no more than nine hours of C are acceptable).
4. Be registered during the quarter in which a thesis is defended.
5. Successfully complete the final comprehensive examination (if required in program).
6. Present one copy of an approved thesis (if required in program).
7. Complete a minimum of 45 quarter hours of program required graduate credit. A minimum of 33 quarter hours of graduate credit must have been completed at Wright State.
Individual departments/colleges have requirements that must be met in addition to the general requirements set forth above. Please consult the appropriate section for specific requirements.

**Fresh Start**

Graduate students may request a "fresh start" when changing or returning to graduate programs within the School of Graduate Studies. A "fresh start" is defined as beginning a graduate program and having the graduate academic record recalculated to reflect no hours attempted and no graduate grade point average for the new program. A "new program," for fresh start purposes, is defined as a program into which a student transfers while in active status, or a program to which a student returns from inactive status. All courses previously taken (and grades earned) at Wright State University will remain on the student's academic record.

Course work completed in a previous Wright State program or other institutions' graduate programs will not be automatically transferred or applied to the requirements of the new program. The new graduate program may, however, recommend to the School of Graduate Studies which courses previously taken are acceptable for transfer into the new program. In no cases will the transfer credit exceed 12 quarter hours. All credit recommended for acceptance must meet the transfer credit policy contained in the Graduate Catalog. After the dean of the School of Graduate Studies approves the transfer credit, the program advisor should enter the courses on the student's program of study. Transfer credit will not be computed into the student's graduate grade point average for the new program.

A student granted a fresh start will be admitted into the new program as a conditional degree-seeking student.

Concentrations of graduate programs do not constitute a new program and, therefore, do not apply to the fresh start policy.

The new program must be completed with a minimum of 45 quarter hours of graduate credit.

The seven-year rule for completing the program requirements starts with the quarter in which the student first registers for courses required by the new program.

To be considered for a fresh start, the student must submit an application to the dean of the School of Graduate Studies. Application forms are available in the School of Graduate Studies office. The dean can approve the application or defer action on it to the Student Affairs Committee of the Graduate Council, which is the final appellate body for such decisions. The student and the academic program are advised by letter of the dean's or the Student Affairs Committee's decision. If a favorable decision is rendered, the registrar is sent a copy of the approved application and advised to make the appropriate adjustments to the student's academic record.

Only one fresh start will be granted to a graduate student at Wright State University.

Petitions to waive any of the conditions of the fresh start policy will not be favorably considered by the School of Graduate Studies.
Fresh Start in Another Graduate Program

A graduate student may be granted a fresh start in another graduate program if:
- the graduate student is currently in active status or is in inactive status for less than five years since withdrawal or dismissal from a graduate program at Wright State University.
- the student has applied for admission and has been accepted by a graduate program different from the one that the student is currently pursuing or had pursued (an admissions petition may have to be submitted to permit acceptance into the graduate program).

Fresh Start in the Same Graduate Program

A fresh start in the same program may be granted to students who have withdrawn or were dismissed from a graduate program at Wright State University under the following conditions:
- A period of time of no less than five years has expired since the student withdrew or was dismissed from a Wright State graduate program.
- The student has been accepted into the same graduate program (an admissions petition may have to be submitted to permit acceptance into the graduate program).

Change of Program

Students who wish to change from one degree program to another must have the approval of the departments concerned as well as the graduate school.

Program changes within the College of Education and Human Services may be initiated by submitting a change of program form available in the student services office in the College of Education and Human Services or the graduate school office. Approval is granted by the College of Education and Human Services and the School of Graduate Studies.

Students admitted to the M.B.A. program in the Raj Soin College of Business who wish to change their programs must submit a new Stage II Program of Study form to the director of the M.B.A. program. Approval is granted by both the Raj Soin College of Business and the School of Graduate Studies.

All other requests for change of program must be processed by completing and submitting an application for admission (no fee required) to the School of Graduate Studies. (Note: New letters of recommendation may be required. If permission to use the previous letter or letters for the new program is granted in writing to the students by the original author or authors and the new program, new letters will not be required.) The application and supporting documents will be forwarded to and reviewed by the program concerned and subsequently by the director of graduate admissions and records. The School of Graduate Studies will notify students of the admission decision.

Petition Procedure

Students who wish to deviate from the normal graduate school regulations and procedures may submit a petition to the School of Graduate Studies.

Petition forms are available in the graduate school. These students should include all supporting documents and must have the recommendation of the advisor, the instructor (if applicable), and the appropriate department or college. The completed form should be returned to the School of Graduate Studies office.

An action taken on a petition will not be considered as a precedent for any future action.

Post-Master’s Degrees

The Educational Specialist Degree

Wright State University offers a post-master’s program in educational leadership which leads to an Ed.S. degree. This program was created for administrators and educational leaders who seek additional training and expertise.

Admission Requirements

- Admission to the School of Graduate Studies
- Earned a master’s degree from a regionally accredited post-secondary institution
- Submission of 3 letters of recommendation
- Earned cumulative grade point average of 3.5 in master’s degree study
- Satisfactory scores on either the GRE or the MAT

An applied research thesis is required for completing the degree. Planning for the research project will begin in the research courses and will be implemented during the two years of the program. An oral defense of the findings will be presented to the thesis committee.

The Doctor of Philosophy (Ph.D.) Degree

An interdisciplinary Ph.D. program in biomedical sciences is offered by a program faculty in a cooperative effort between the College of Science and Mathematics and the School of Medicine.
Ph.D. programs in engineering and in computer science and engineering are offered by program faculty in the College of Engineering and Computer Science.

Ph.D. programs in environmental sciences and in human factors and industrial/organizational psychology are offered by program faculty in the College of Science and Mathematics.

Admission Requirements
See individual program descriptions.

Program of Study
See individual program descriptions.

Credit Hour Requirements
Doctoral students are required to earn a minimum of 135 acceptable quarter hours of credit. Individual programs may have a higher credit hour requirement.

Residence Requirements
Students in a Ph.D. program are considered to be in residence whenever they are registered for at least eight credit hours of Wright State graduate courses. A minimum residence of three consecutive full-time academic quarters at Wright State University, devoted wholly to graduate work, is required. In addition, completion of a minimum of 90 credit hours toward the program must be completed at Wright State.

Grade Standards
Graduate students working toward the Doctor of Philosophy degree must maintain at least a 3.0 grade point average in all graduate courses in which a letter grade is assigned. Students who do not meet these requirements are subject to dismissal. Individual programs have probationary procedures concerning students who are temporarily not meeting grade standards. Individual programs may utilize criteria in addition to course work grades to evaluate students' status in the program. Matters pertaining to dismissal for nonacademic matters are handled by the Office of Student Life.

Dissertation
The dissertation is an original contribution to scholarly or scientific knowledge in a specialized area. Students are expected to demonstrate in the dissertation the highest level of mastery in the techniques of research and a thorough understanding and application of the subject matter.

Before undertaking the dissertation, the student must (1) pass the qualifying examination, (2) be admitted into candidacy status, and (3) gain approval of the proposed dissertation topic from the student's dissertation or advisory committee. Students must complete the dissertation within the time frame established for candidacy. All course work associated with the dissertation must earn a grade of "A", "B", or "P" in order to qualify the student for graduation. The dissertation must be written in English.

The final defense of the dissertation will normally be open to the public. The dissertation committee may also elect to privately question the candidate following the public presentation. The procedures for the defense of the dissertation will be established by the program's graduate committee. The dissertation must be approved by at least three (3) members of the dissertation committee.

Doctoral students are required to complete all arrangements for submission of one copy of the doctoral dissertation to University Microfilms International (UMI) as a condition for its final approval by the dean of the School of Graduate Studies. Contact the School of Graduate Studies for UMI forms and additional information.

Qualifying Examination
All students in a Ph.D. program are expected to take and pass the qualifying examination before they will be admitted into candidacy status. The purpose of the qualifying examination is to determine if a student has acquired and is able to apply fundamental knowledge and acumen in the program area. The examination may be written, oral, or both. The type of examination and the procedures for the examination will be determined by the graduate committee of the Ph.D. program. Students will normally not take the examination until they are familiar with the material in the core courses of the program. Failure to pass the examination may result in dismissal from the program regardless of performance in other aspects of the program. Depending on the committee's recommendation, a student failing the examination may repeat it once. Students will normally be expected to repeat the examination at its next scheduled date. Passing the examination does not guarantee a student's admission into candidacy. The program may establish additional criteria to determine students' eligibility for candidacy.

Students will be provided written notification of the results of the examination and of any actions to be taken within 10 days of having taken the examination.

The Ph.D. program will notify, in writing, the Office of Student Life of the administration and results of the qualifying examination and the actions to be taken for those students who have
failed to pass the examination. If dismissal action is to be taken, the School of Graduate Studies will formally notify the student by letter.

Candidacy

Acceptance into candidacy in a Ph.D. program indicates that students have the basic potential to undertake work on the dissertation and to successfully complete all other requirements of the program.

Students in a Ph.D. program may achieve candidacy by passing the preliminary or qualifying examination and having obtained approval of their dissertation topic from their dissertation committee. The programs will determine the requirements for achieving dissertation approval. Candidacy is valid for five years. The program can, however, terminate candidacy for unsatisfactory progress. Students may petition for an extension to the candidacy term.

Time Limit

Students must complete all the requirements for a Ph.D. degree within 10 years from the date the student matriculated in the program. Courses older than 10 years on the students' programs of study cannot be used toward degree requirements.

Summary of Requirements for the Doctor of Philosophy Degree

The following list is a summary of the requirements graduate students must complete to earn a Doctor of Philosophy degree at Wright State University.

1. Maintain a minimum grade point average of 3.0 (B).
2. Complete minimum program course work requirements.
3. Be admitted to doctoral candidacy by passing the qualifying examination.
4. Conduct an acceptable original research problem and submit an approved dissertation.
5. Accumulate a minimum of 135 hours of acceptable graduate credit.
6. Meet residency requirements.
7. Successfully defend the dissertation.
8. Be registered in the quarter of the final dissertation defense.
9. Present one copy of the approved dissertation to the graduate school office and complete arrangements for submission of a copy of the dissertation to UMI. Students have the option to submit a copy of their dissertation, either on floppy disk or electronically, and in pdf format, to the
Additional information is available on our Web site at www.wright.edu/sopp. Application materials may be obtained from our Admission Office at the School of Professional Psychology, Wright State University, 3640 Colonel Glenn Hwy., Dayton, OH 45435-0001, or from our Web site, by e-mail at sopp1@wright.edu, or by phone at (937) 775-3492.

Doctor of Medicine (M.D.) Degree

The Wright State University School of Medicine offers an innovative, four-year interdisciplinary curriculum with instruction in 26 academic departments. Students will graduate from the School of Medicine with a solid understanding of the basic and clinical sciences. In addition, students will learn to address patient care in a manner that considers the entire individual, including the promotion of health and the prevention of diseases rather than just the immediate diagnosis of a disease or injury.

Additional information concerning the Doctor of Medicine program and admission requirements may be obtained by contacting the School of Medicine.

Doctor of Psychology (Psy.D.) Degree

The School of Professional Psychology offers a four- or five-year doctoral program in clinical psychology, following a practitioner model of training. The program provides a multifaceted curriculum with training in psychotherapy/intervention, psychological assessment, research/evaluation/basic science, consultation/education, and supervision/management. Diversity is infused throughout the curriculum and is highlighted in specific courses. Extensive financial aid in the form of tuition waivers and stipends is available.
GRADUATE PROGRAMS
Accountancy
See Business

Aerospace Medicine
The aerospace medicine Master of Science degree program is conducted by the School of Medicine's Department of Community Health. The program provides fundamental information about aviation and spaceflight biomedical factors including physiological, psychological, bioengineering, and clinical factors. Selection and periodic examination requirements for airmen and airwomen are detailed, as are normal and pathological changes associated with various airmen and airwomen.

The Graduate Faculty
Professors
Stanley R. Mohler (director), aerospace medicine
Mary Anne Frey (Emerita), aerospace physiology

Associate Professor
Robin E. Dodge, aerospace medicine

Assistant Professor
Farhad Sahiar, aerospace medicine

Instructor
Adrienne Stolfi, biostatistics

Admission
The minimum requirement for admission to the M.S. degree program in aerospace medicine is the M.D. degree, a clinical year of medical training, and the general requirements for admission into the School of Graduate Studies. Prospective students communicate with the Department of Community Health for acceptance. It is possible that certain advanced students can take individual courses in the curriculum and apply these to other degree programs.

Degree Requirements
Students must complete the required courses and conduct specific research that becomes part of the required thesis. The research may be of laboratory, field, or, in selected cases, conceptual in nature.

Program
Required Core Courses
CMH 601, 602, 621, 622, 641, 642, 651, 652, 654, 700, 701, 711, 731, 899

Wright State's Aerospace Medicine Residency Program is the longest-running civilian program of its type in the nation. Graduates of the program provide medical leadership at NASA, the FAA, and international space programs, most recently as flight surgeons for the American astronauts on Mars and for John Glenn's return to space.

Anatomy
The Department of Anatomy offers a program leading to the Master of Science degree (M.S.). The major purpose of the Master of Science program is to provide the student with a solid foundation in anatomy that can serve as a basis for further graduate studies. A continuation of graduate studies with faculty in the Department of Anatomy leading to a Doctor of Philosophy (Ph.D.) degree is available through the Biomedical Sciences Ph.D. Program.

The Graduate Faculty
Anatomy
Professors
Nancy Bigley, microbiology and immunology
Robert Fyffe, neuroscience

Associate Professors
Frank Nagy, ultrastructure, cell division, kinetics, male reproductive system, embryology, computer software development
Gary L. Nieder, early embryo development, embryo implantation
John C. Pearson, neuroscience
Larry J. Ream, neuroscience
Jane N. Scott (chair), embryology, reproductive systems

Assistant Professor
Francisco J. Alvarez, neuroscience

Admission
Minimum requirements include an overall undergraduate grade point average of 3.0-plus. Although there are no uniform prerequisites, it is recommended that applicants have completed at least two years of biology, including vertebrate anatomy, and two years of chemistry, including organic chemistry. Letters of recommendation are an important admission consideration.
Students who do not plan to complete the degree program or who do not meet the admission requirements of the School of Graduate Studies may be admitted on a nondegree basis in order to take selected anatomy courses. Written permission by the appropriate course director is required to enroll in each anatomy course. Contact the Anatomy Department for information concerning enrollment procedures.

Degree Requirements

In addition to the requirements of the School of Graduate Studies, the following requirements of the Department of Anatomy must be met:

1. Completion of a minimum of 45 or 50 graduate credit hours (see number 4) in courses that have prior approval of the department. Approval is normally given through the student's faculty advisor.
2. The graduate credits must include 33 credit hours of core courses in anatomy.
3. Required courses are human gross anatomy, human microanatomy, advanced human embryology, human neurobiology, and four seminars.
4. There are two program-of-study options leading to a master's degree:
   a. Course Option (50 credits): In addition to the 33 credits listed above, students are required to take an oral comprehensive examination covering the core anatomy courses listed above, assist with teaching an anatomy department course, learn a research technique, and write a scholarly paper. The remaining 3 credits include elective graduate courses in the anatomy or other science department.
   b. Thesis Option (45 credits): Requires the submission and oral defense of a thesis based on original research performed while enrolled as a graduate student at the university. Two major research interests in the department are neuroscience and immunity. Students interested in pathology research may substitute courses in immunobiology and pathogenic mechanisms for human gross anatomy.

Residency

Full-time students generally complete the master's degree program in:

a. Course Option: 6–7 quarters
b. Thesis Option: Two years

Certificate Program in Anatomy

The anatomy certificate program is a three-quarter, post-baccalaureate program. The program provides graduate-level education in three of the four human anatomy core courses—microanatomy, gross anatomy, embryology, and neurobiology. The program is applicable to physical therapists, occupational therapists, physician assistants, athletic trainers, health and physical education majors, and others in allied health disciplines.

The Center for Brain Research was established to promote interdisciplinary research collaborations among scientists and doctors who study how the brain functions in health and disease. The center provides shared laboratories and technical staff for researchers in the Department of Anatomy as well as in other WSU School of Medicine departments like Physiology and Biophysics, Neurology, and Psychiatry. The Center for Brain Research houses state-of-the-art-imaging technology with related facilities for processing anatomical samples and analyzing microscopic images.

Applied Behavioral Science

The Applied Behavioral Science Program offers Master of Arts Degree tracks in two fields: Criminal Justice and Social Problems, and International and Comparative Politics.

The Criminal Justice and Social Problems track emphasizes methodology and theoretical courses and topics-focused workshops aimed at improving the research and intellectual foundations for employment and professional advancement in the criminal justice fields. Students in the program typically work for, or plan to work for, the courts, probation offices, police agencies, prison administrations, or private and public programs for juvenile offenders. The training received in basic social science skills and knowledge is also a useful foundation for those who wish to proceed to doctoral-level study in a number of fields. An optional practicum provides field experience for those without prior experience in a criminal justice field. The program culminates in an applied research effort that, at the student's option, takes the form of either a journal article...
project or a traditional thesis. Courses are offered primarily in the evenings and workshops primarily on the weekends to accommodate employed students.

The International and Comparative Politics track prepares students who intend to continue their education in a Ph.D. program in international relations, comparative politics, or a related field. The program also provides continuing international education opportunities for those working in the public or private sector. Graduate seminars, independent readings, and practicum opportunities enable students to explore the scholarship in their field and its applications. Students may select from among four specialized areas of study: Peace and Security Studies, International Organizations, Developing States, and Developing States Area Studies. Program students are required to complete or demonstrate a quantitative or foreign language research requirement. The degree culminates in either a traditional thesis or a project developed in consultation with a program advisor.

Participating Faculty
Professors
Jeanne Ballantine, applied research methods, sociology of education
Edward Fitzgerald, international law, natural resource law
Charles Funderburk, corruption
Donna M. Schlagheck, American foreign policy, terrorism, United Nations
James Walker, peace studies

Associate Professors
Anna Bellissari, human evolution, human growth and development, cultural diversity, women's issues
Carl Brun, child welfare, qualitative methods, program evaluation, domestic violence
Anita Curry-Jackson, social work
Marilese Durr, organization, occupations and work, research methods
December Green, Africa, human rights, gender, violence
David Orenstein (director), theoretical foundations, qualitative methods
Mark Sirkin, Middle East, Israeli-Palestinian
Jim Steinberg, family dysfunctions, child welfare

Assistant Professors
Liam Anderson, Europe, Russia, Central Asian, weapons destruction
Laura Luehrmann, China, Chinese foreign policy, transitions
Tracy Snipe, Africa, France, radical black thought
Tracey Steele, crime and social control, gender, sexuality, medical sociology
Norma Wilcox, corrections, criminological theory, quantitative methodology

Instructor
Jackie Bergdahl, women and crime, methodology

Admission
In addition to meeting the admission requirements of the School of Graduate Studies, students applying for admission into the Criminal Justice and Social Problems M.A. degree program are generally expected to have an undergraduate degree in criminal justice, social work, or a social science (such as sociology, psychology, or political science). Significant experience working in a criminal justice field can substitute for this expectation for students with degrees in other fields. Admission is generally for summer or fall quarters.

Applicants to the International and Comparative Politics M.A. degree program must meet the graduate school's admission criteria, and should additionally demonstrate in their letter of application how their undergraduate and/or professional record will be enhanced by participation in the program.

Financial Aid
The ABS program offers several graduate assistantships. Graduate fellowships for both part-time and full-time students may be available through the School of Graduate Studies. Awards of financial assistance are generally for the entire academic year, which begins with the fall quarter. Applications for assistantships are obtained from the ABS office and should be submitted to that office by March 15.

There are a limited number of graduate assistantships available in nonacademic university departments each year. The ABS director can provide more information about these.
**Program of Study**

**Criminal Justice and Social Problems Track**

<table>
<thead>
<tr>
<th>Core Requirements</th>
<th>26</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABS 700 Electronic Research</td>
<td>2</td>
</tr>
<tr>
<td>ABS 701 Methodology I</td>
<td>4</td>
</tr>
<tr>
<td>ABS 702 Methodology II</td>
<td>4</td>
</tr>
<tr>
<td>ABS 703 Applied Methodology</td>
<td>4</td>
</tr>
<tr>
<td>ABS 751 Theoretical Foundations</td>
<td>4</td>
</tr>
<tr>
<td>ABS 752 Explaining Crime</td>
<td>4</td>
</tr>
<tr>
<td>ABS 753 Criminal Justice</td>
<td>4</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Additional Courses (four options)</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Option 1 (for students with sufficient work experience in the field who select to complete a project)</td>
<td></td>
</tr>
<tr>
<td>ABS 788 Graduate Seminar in Applied Behavioral Science</td>
<td>10</td>
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<tr>
<td>Elective Alternatives (to be selected with an advisor)</td>
<td>8</td>
</tr>
<tr>
<td>ABS 798 Graduate project</td>
<td>4</td>
</tr>
<tr>
<td>Option 2 (for students with sufficient work experience in the field who select to complete a traditional thesis)</td>
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</tr>
<tr>
<td>ABS 788 Graduate Seminar in Applied Behavioral Science</td>
<td>6</td>
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<tr>
<td>Elective Alternatives (to be selected with an advisor)</td>
<td>8</td>
</tr>
<tr>
<td>ABS 799 Thesis Research</td>
<td>8</td>
</tr>
<tr>
<td>Option 3 (for students without sufficient work experience in the field who select to complete a project)</td>
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</tr>
<tr>
<td>ABS 788 Graduate Seminar in Applied Behavioral Science</td>
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<tr>
<td>ABS 779 Practicum</td>
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<tr>
<td>ABS 798 Graduate project</td>
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<td>Option 4 (for students without sufficient work experience in the field who select to complete a traditional thesis)</td>
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<td>ABS 788 Graduate Seminar in Applied Behavioral Science</td>
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<tr>
<td>ABS 779 Practicum</td>
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<tr>
<td>ABS 799 Thesis Research</td>
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| Total                                    | 48 |

**International and Comparative Politics Track**

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<tr>
<th>Core Requirements</th>
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</tr>
</thead>
<tbody>
<tr>
<td>ABS 730 Theories in International and Comparative Politics</td>
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<tr>
<td>ABS 731 Seminar in International and Comparative Politics</td>
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**Research Methods**

<table>
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<tr>
<th>Research Methods</th>
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<tbody>
<tr>
<td>ABS 700 Electronic Research</td>
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<tr>
<td>ABS 703 Applied Methodology</td>
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**Language Skills/Alternative**

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</thead>
<tbody>
<tr>
<td>Students who do not have sufficient foreign language skills may substitute the following two research methods courses:</td>
<td></td>
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<tr>
<td>ABS 701 Methodology I</td>
<td>4</td>
</tr>
<tr>
<td>ABS 702 Methodology II</td>
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</table>

**Specialized Track**

<table>
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<tr>
<th>Specialized Track</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Select one in consultation with advisor. Courses related to Peace and Security Studies</td>
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</tr>
<tr>
<td>Courses related to International Organizations</td>
<td></td>
</tr>
<tr>
<td>Courses related to Developed Nations</td>
<td></td>
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<tr>
<td>Courses related to Developing Nations</td>
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</table>

<table>
<thead>
<tr>
<th>Thesis or Project</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student selects either in consultation with advisor</td>
<td></td>
</tr>
<tr>
<td>ABS 799 Thesis Research or</td>
<td></td>
</tr>
<tr>
<td>ABS 798 Graduate Project</td>
<td></td>
</tr>
</tbody>
</table>

| Total                                      | 48–56 |

**Applied Mathematics**

See Mathematics

**Applied Statistics**

See Statistics

**Art Education**

See Education and Human Services

**Biochemistry and Molecular Biology**

The Department of Biochemistry and Molecular Biology offers a program of study leading to the Master of Science degree in biochemistry and molecular biology. The major purpose of the M.S. program is to provide the student with a strong biochemical background that can serve as a basis for further graduate or professional study. Graduate study with faculty in the Department of Biochemistry and Molecular Biology leading to a Doctor of Philosophy degree is available through the Biomedical Sciences Ph.D. Program.
Major research interests of the department are grouped into three interrelated areas: molecular structure and function, molecular genetics, and the application of magnetic resonance (MR) to biomedical research. Specific research projects deal with the structure and function of membranes, proteins and enzymes, nucleic acids, chromatin structure and function, molecular genetics, nucleotide metabolism, and the use of MR to study biochemical phenomena.

The Graduate Faculty

**Professors**
- Michael Leffak, DNA replication and cloning
- Daniel T. Organisciak (chair), visual biochemistry, membrane function, neuronal lipid metabolism
- Lawrence J. Prochaska, energy-transducing membranes, cytochrome oxidase
- Robert A. Weisman, *in vivo* magnetic resonance, positron emission tomography

**Associate Professors**
- Gerald M. Alter, enzyme structure, hemoglobin conformation, site directed mutagenesis
- Steven J. Berberich, regulation of cell proliferation, oncogenes
- John V. Paietta, gene expression, recombinant DNA
- Nicholas V. Reo, carbohydrate metabolism, *in vivo* magnetic resonance
- John J. Turchi, mechanisms of eukaryotic DNA replication and repair
- Dawn P. Wooley, virology

**Assistant Professor**
- Patrick B. Dennis, regulation of ribosomal biosynthesis and breakdown

**Adjunct and Joint Faculty**
- Paul G. Seybold, professor (chemistry), chemical carcinogens, physical biochemistry

**Voluntary Faculty**
- Darrell E. Fleischman, associate professor, cyclic nucleotides, biophysical aspects of photosynthesis

**Admission**

Applicants must fulfill the requirements for admission established by the School of Graduate Studies. A bachelor's degree in the biochemical, biological, or chemical sciences, including course work in organic chemistry, physics, and calculus, is generally required. In addition, letters of recommendation are an important admission consideration.

**Degree Requirements**

Qualification for the Master of Science degree requires a candidate to fulfill the requirements of the School of Graduate Studies, to complete departmental course work, and to submit an acceptable research thesis.

**Summary of Course and Thesis Requirements**

1. Biochemistry lecture sequence (BMB 750 and 752). A grade of B must be obtained in each quarter of these courses. If a B is not obtained, the student may repeat the course (or courses) once. A repeat of BMB 750 and/or 752 must be completed within a year of the quarter in which the deficiency occurs.
2. Research Perspectives (BMB 702).
3. Research Ethics (BMB 703).
4. Graduate seminars: a total of 6 credit hours of graduate-level seminars in biochemistry or other departments.
5. Two additional 700-level courses: these may include 700-level courses from other departments.
6. The student and his or her thesis advisor will have the responsibility for selecting advanced courses and seminars suited to each student's program needs and interests.
7. The thesis must be based on hands-on research. BMB 899 (or BMB 699) must be taken each quarter the student performs laboratory research. The thesis advisory committee must be made up of at least three faculty from the Department of Biochemistry. The student will orally defend the completed thesis and present a departmental seminar on his or her research.

**Special facilities in the Department of Biochemistry and Molecular Biology include**

- a BSL-3 laboratory designed to contain agents that may cause serious or lethal disease if contacted;
- a gene expression laboratory to examine changes in gene expression from a host of different species;
- and a nuclear magnetic resonance (NMR) laboratory for high-resolution spectroscopic analyses, imaging, and NMR studies.
Biological Sciences

The program leading to the Master of Science provides students with the opportunity to gain a solid foundation in modern interdisciplinary biology in preparation for careers as professional biologists in industry, government, or education and research organizations or for further professional training.

Areas of specialization available through the Department of Biological Sciences are cellular/molecular biology including recombinant DNA, molecular genetics, cell models of carcinogenesis, differentiation and regulation, and organismic/environmental biology including aquatic biology, genetics, animal and plant physiology, parasitology, environmental microbiology, ecology, and toxicology.

Instructional areas within the department consist of formal course work, laboratory research, and special topic seminars. In order to provide flexibility and an interdisciplinary approach, specific prerequisites for many graduate courses are not listed. However, areas of prior training are recommended for students in order to obtain maximum benefits. In addition, the other life science departments (Biochemistry and Molecular Biology, Anatomy, Physiology and Biophysics, Pharmacology) as well as the Departments of Chemistry, Geological Sciences, Mathematics and Statistics, Physics, Psychology, and the College of Engineering and Computer Science, currently offer courses that support the biology program. A graduate in biology, therefore, may receive exposure to subjects in the field of specialization, in related biological fields, and to supporting disciplines outside the department.

Students may pursue an M.S. degree in biology through one of two options. Option One requires the submission and oral defense of a thesis based on original research performed while enrolled as a graduate student at the university. Although there is little specific course work required for this option, candidates will be advised to enroll in graduate-level courses deemed appropriate for successful understanding of the research to be undertaken. Option Two is a course work option that requires the successful completion of 45 quarter credits of graduate-level course work, including a critical literature review, a laboratory rotation, and a final oral examination. The desired option can be elected by students only after consultation with the chair of the graduate committee. Consideration for electing the appropriate option must be given to the availability of research topics and advisors and to the student's research and educational interests.

All candidates, regardless of the option chosen, are required to obtain a major advisor and an advisory committee. The advisory committee will help formulate a study program, provide counseling, and evaluate student progress. If a student is uncertain of a major field of interest or of an appropriate option, the department graduate committee will assign a temporary advisor who will function in place of an advisory committee until the student selects an option and it is accepted by an advisory professor. Enrollment in BIO 702, Introduction to Research, enables the student to choose an advisor.

All candidates must meet requirements for the Master of Science degree defined in the section Degree Requirements. They must, in addition, meet the specific requirements of the option chosen.

For additional information on the department and its programs, you might wish to consult our Web site at http://biology.wright.edu.

Environmental Sciences Core

The requirements for the Master of Science degree in biology are quite flexible, and include a thesis and nonthesis option. The department also permits a student to pursue an advanced course of study that ensures an interdisciplinary environmental perspective. Both the thesis and nonthesis M.S. degree options in biological sciences can be specialized to provide an interdisciplinary environmental perspective. When selecting this option, a student's advisory committee includes a member from outside the department, e.g., a member of the geology or chemistry faculty. And, in addition to meeting the general requirements for the Master of Science degree in biology, course requirements for the environmental core include:

- Environmental chemistry
- Geologic and environmental applications of geographic information systems
- Environmental statistics
- Risk assessment
- Environmental sciences seminar
- Two environmental sciences electives outside the biology department

A student completing these requirements will receive an M.S. degree in environmental sciences.

The Graduate Faculty

Professors

Larry G. Arlian, medical entomology, immunoparasitology, physiology
G. Allen Burton, ecotoxicology
Wayne W. Carmichael, aquatic biology/toxicology, isolation, culture, toxicology of toxic algae, biotechnology
David J. Giron, virology
David L. Goldstein, comparative physiology of osmoregulation, physiological ecology, ornithology
Barbara E. Hull, cell biology, histology, electron microscopy, reconstruction of skin in vitro
Larry D. Isaacs, human lifespan motor development
James R. Runkle, plant ecology, general ecology
Michele G. Wheatly (chair), crustacean physiology, calcium transport
Timothy S. Wood, invertebrate ecology, biology of freshwater bryozoans

**Associate Professors**

James P. Amon, microbial ecology, including molecular biology, cell biology, and electron microscopy
Scott E. Baird, developmental genetics
Keith A. Grasman, wildlife toxicology and immunotoxicology
Dan E. Krane, molecular and genome evolution, human population substructuring
Mark D. Mamrack, cellular biochemistry, signal transduction, carcinogenesis
Mill W. Miller, cellular and developmental biology/nuclear transport
Roberta L. Pohlman, exercise physiology
James H. Tomlin, science education, learning theory

**Assistant Professors**

Donald Cippollini, Jr., plant physiological ecology
Susan Kirch, neurodevelopment, genetics, teacher education
Thomas Van't Hof, physiology, endocrinology, biological rhythms

**Lecturer**

Hunting W. Brown, Institute for Environmental Quality

**Facilities**

The Department of Biological Sciences is housed in a modern, air-conditioned building, well equipped with the newest research instruments. The department maintains classrooms and research laboratories for over 150 upper-division and graduate students. Excellent ancillary facilities include specialized instrument rooms, cold rooms, constant temperature rooms, animal rooms, a greenhouse, radioisotope laboratories, and an electron microscopy center, including complete darkroom capability. The Biological Sciences Building, completed in 1975, contains approximately 100,000 square feet and houses facilities of the biological and health sciences departments.

Major items of available research equipment include liquid scintillation counters; amino acid analyzer; infrared, visible, and ultraviolet spectrophotometers; spectrophuorometer; DNA and protein chip technology; flow cytometer; confocal microscope; greenhouse and experimental garden; field and aquatic sampling gear; preparative ultracentrifuges; nuclear magnetic resonance spectrometer; mass spectrometer; wide range of instruments for light microscopy; transmission and scanning electron microscopes; preparative and analytical chromatography instruments; specialized cell and tissue culture facilities, and facilities for recombinant DNA research; and computer services (both PCs and mainframe).

A biological preserve plus additional wooded areas on campus totaling about 200 acres provide opportunities for field-oriented research and teaching experiences. Nearby natural areas include an extensive wetlands and a wide variety of aquatic habitats.

The department has excellent working relationships with other departments on campus, with the scientific complex of Wright-Patterson Air Force Base, and with several facilities that are affiliated with the Wright State University School of Medicine.

**Financial Assistance**

Graduate teaching assistantships (GTA) and tuition scholarships are available on a competitive basis, and graduate research assistantships (GRA) may be available by arrangement with individual faculty. These appointments carry a waiver of most tuition and instructional fees for both residents and nonresidents, and GTA and GRA appointments also include a stipend. Appointments are made for the academic year and may be renewed for a second year. Additional assistantship support may be available for the summer quarter. See the "Financial Assistance, Fees, and Tuition" section of the graduate catalog for details.
Degree Requirements
Students who are candidates for the Master of Science degree in biology must meet the following requirements:

1. The candidate must complete a minimum of 45 quarter credits. A maximum of 12 credits of graduate courses may be transferred from other institutions. At least 30 quarter hours must be at the 600-800 level in biological sciences and related fields.

2. One course in scientific or technical writing (such as BIO 608 or ENG 533 and 544) is required.

3. Candidates must be registered in the quarter in which they defend their thesis.

4. The candidate must maintain a 3.0 cumulative average; no more than 9 credit hours of "C" grades may be applied to the degree.

5. The degree options have the following requirements:

Option 1:

a. Candidates must complete at least four graduate seminars (BIO 800). Three of the four graduate seminars must be offered by the Department of Biological Sciences faculty.

b. The College of Science and Mathematics requires a Program of Study to be filed with the School of Graduate Studies by the start of the third quarter of enrollment for full-time students, and by the time 18 hours have been taken for part-time students.

c. Candidates must submit an approved thesis proposal with the Graduate Committee by the end of the second quarter. This proposal should be prepared in consultation with the student's advisory committee. Students who have not done so will not be permitted to continue enrollment in BIO 899 (Graduate Research). Upon acceptance of the thesis proposal by the advisory committee, one copy is filed in the graduate student's file. Research may deviate from the original proposal, however, suitable supplementary information must be submitted to the advisory committee.

d. Candidates must submit and orally defend a thesis based on original research performed while enrolled as a graduate student at the university.

Option 2:

a. Candidates must complete 45 credit hours of graduate course work. For all Option 2 students, except those in the Environmental Sciences program, a maximum of 12 credits can be earned in departments other than life science departments.

b. Four seminar credits are required, two of which must be taken in the Department of Biological Sciences.

c. Candidates must form an advisory committee and file a Program of Study before the end of their third quarter (or 25 credit hours).

d. Candidates must complete 4-6 credit hours of BIO 699 (Special Problems in Biology). A copy of their written report must be put in the student's department file.

e. Candidates must write a critical review (BIO 799, six hours maximum) and pass an oral exam administered by the advisory committee upon completion of course work.

Environmental Sciences Ph.D. Program
In addition, students in biological sciences can pursue an interdisciplinary Ph.D. in Environmental Sciences. See the separate listing for that program on page 125.

Biomedical Engineering

The Department of Biomedical, Industrial, and Human Factors Engineering offers a program of graduate study leading to a Master of Science in Engineering (M.S.E.) degree with a major in biomedical engineering. The M.S.E. program is broad in scope and emphasizes portable concepts in the design and analysis of complex physical systems using modeling, synthesis, and optimization techniques, and bridges interdisciplinary engineering areas such as controls, robotics, electronics, and communications.

A Ph.D. in engineering with a major in biomedical engineering is also available. For details, see Engineering Ph.D. Program.

The Graduate Faculty

Professors

Thomas N. Hangartner, biomedical engineering, medical imaging, CAT scanning, instrumentation, computers

Ping He, biomedical engineering, medical imaging, ultrasonics, instrumentation, computers

S. Narayanan (Interim chair), modeling, interactive systems, simulation, decision aiding

Chandler A. Phillips, mathematical modeling of biomechanics, fuzzy decision making in rehabilitation, functional electrical stimulation
Blair A. Rowley, biomedical engineering, rehabilitation engineering, computer applications to augmentative communication, instrumentation, bioelectric effects of low-level electrical currents on tissue growth and healing

**Associate Professor**

David B. Reynolds, biomedical engineering, biofluid mechanics, engineering approaches to respiratory/pulmonary physiology

**Admission**

To be considered for admission to the M.S.E.-Biomedical Engineering program, students must first satisfy basic requirements of the School of Graduate Studies. This includes having a bachelor's degree in engineering or a related area with an overall undergraduate grade point average of at least 2.7 (on a 4.0 scale) or an overall undergraduate grade point average of at least 2.5 with an average of 3.0 or better for the last 90 quarter hours (60 semester hours) earned toward the undergraduate degree. International students must have a TOEFL score of at least 550/213. In addition, the program requires students from non-ABET accredited undergraduate programs to submit general GRE test scores. Program admission decisions are based on complete application information including overall academic performance and standardized test scores where applicable.

**Facilities**

Graduate students have access to a wide range of computer systems interconnected by local and wide-area networks. Access is available to three DEC Alpha AXP 4000/610s, numerous Sun, DEC, and Silicon Graphics file servers and workstations; X-windowing terminals; and personal computers. Access is also available to the Ohio Supercomputer via the Ohio Academic and Research Network (OARNET). In addition, each graduate faculty member has a well-equipped research laboratory.

**Research**

Research in biomedical engineering currently encompasses two main areas: medical imaging and rehabilitation engineering. Included are neural prosthesis for spinal cord injured rehabilitation, muscle biomechanics, medical ultrasound with emphasis on soft tissue characterization, specialized CAT scanners with emphasis on sensitivity and imaging of bone, computerized augmentative communications for the disabled, applied bioelectric phenomena, and implantable prosthesis such as bladder control devices. Facilities include laboratories at the university and at area hospitals. The Biomedical Imaging Laboratory and the Advanced Augmentative Communication Laboratory offer unique opportunities for research projects involving instrumentation, mechanics, and computers applied to medical and rehabilitation problems. Graduate students in biomedical engineering work on real-life problems.

Research at Wright State is not limited to the laboratory facilities on campus. Several industrial companies, laboratories, and Wright-Patterson Air Force Base are involved in joint research efforts with the university and have unique facilities that are available for faculty and graduate research.

**Collaboration**

The Dayton Area Graduate Studies Institute provides collaboration opportunities through the graduate engineering courses, faculty, and research resources of the Air Force Institute of Technology, the University of Dayton, The Ohio State University, and the University of Cincinnati.

**Graduate Assistantships**

Assistantships are available to students on a competitive basis. Students awarded assistantship support are eligible for stipends and remission of tuition fees. Interest in financial support should be indicated at the time of application.

**Degree Requirements**

Students should plan a program of study in consultation with a faculty advisor. The program of study should be finalized by the time the student completes 12 credit hours of graduate study.

1. Completion of 45 graduate credit hours in courses that have prior approval by an engineering graduate advisor.
2. At least 36 of the total 45 graduate credit hours must be engineering or computer engineering courses. At least 24 of these must be biomedical engineering courses.
3. At least 24 of the 45 graduate credit hours must be courses numbered 700 or above.
4. At least 6 of the total 45 graduate credit hours must be courses in mathematics, statistics, or computer science.
5. Students may choose either a thesis option or a 45 credit hours graduate advanced
course work option. The thesis option consists of a research project satisfying all requirements of the School of Graduate Studies. The final report (thesis) must be completed and successfully defended in an oral examination before the major committee. Up to 12 credit hours of 899, Thesis, may count toward degree requirement of 45 graduate credit hours.

Biomedical engineering research includes computerized augmentative communications for persons with disabilities; ultrasound scanners with emphasis on soft tissue characterization and prosthetics; and specialized CAT scanners for bone density research.

Biomedical Sciences Ph.D. Program

This interdisciplinary program leads to the Doctor of Philosophy degree in biomedical sciences. It recognizes the interrelatedness of the various traditional disciplines and seeks to educate scientists who are qualified to develop this potential. Classroom and laboratory instruction stresses experiences that span a broad spectrum of knowledge.

The program provides an integrated background in biological, physical, chemical, and computational disciplines and an in-depth experience in research. Graduates are expected to be sufficiently flexible to participate in solving a broad range of complex biomedical problems.

The primary aim of the program is to prepare students for a research career. In-depth study is possible in a number of areas.

Participating Faculty

The program is a cooperative effort between the College of Science and Mathematics and the School of Medicine.

The program faculty at Wright State reside in a number of departments including anatomy, biochemistry and molecular biology, biological sciences, chemistry, community medicine, computer science, biomedical and human factors engineering, family practice, mathematics and statistics, medicine, pathology, pediatrics, pharmacology and toxicology, physiology and biophysics, psychiatry, psychology, and surgery. In addition, the 58 faculty members who participate in the program include scientists from affiliated institutions including the Tri-Service Toxicology Laboratory at Wright-Patterson Air Force Base, the Kettering/Scott Magnetic Resonance Laboratory, and the Veterans Affairs Medical Center in Dayton.

Admission Information

Entrance Requirements

Applicants for all but the Chemical and Structural Biomedical Sciences and the Applied Biomedical Computation concentrations should have:

1. A baccalaureate degree from an accredited institution
2. An undergraduate grade point average of at least 3.0 on a 4.0 scale
3. One year of mathematics, including introductory calculus
4. One year of physics
5. One year of biology
6. Two years of chemistry, including an organic chemistry sequence
7. A minimum TOEFL score of 600/250 (international students)
8. A minimum GRE score of 1750

Applicants for the Chemical and Structural Biomedical Sciences concentration should have:

1. A baccalaureate degree from an accredited institution
2. An undergraduate grade point average of at least 3.0 on a 4.0 scale
3. One year of mathematics, including introductory calculus
4. One year of physics
5. One year of biology OR a two-quarter survey course in biochemistry
6. One year of organic and one year of physical chemistry
7. A minimum TOEFL score of 600/250 (international students)
8. A minimum GRE score of 1750

Applicants for the Applied Biomedical Computation concentration should have:

1. A baccalaureate degree from an accredited institution
2. An undergraduate grade point average of at least 3.0 on a 4.0 scale
3. One year of calculus
4. One year of physics
5. Two years of chemistry, including an organic chemistry sequence
6. A computer language course or demonstrated programming expertise, preferably in C++
7. A minimum TOEFL score of 600/250 (international students)
8. A minimum GRE score of 1750

Prospective students must submit one official transcript from each institution attended. Under special circumstances, deficiencies in prerequisites may be waived or corrective measures arranged by action of the Admissions Committee.

Note: All application material should be submitted by March 1.

Financial Assistance
Predoctoral assistantships are available to students on a competitive basis. Students awarded assistantship support are eligible for stipends and remission of tuition fees. There are no special forms to submit for financial assistance. Students interested in financial support should indicate their interest at the time of application.

Degree Requirements
Students are asked to master a series of core courses, advanced content courses, and laboratory rotations. These serve as an interdisciplinary base for the development of dissertation research. The institution awards the degree when the student satisfactorily completes the required work.

The program first develops a reservoir of basic knowledge through an interdisciplinary core, consisting of a combination of biochemistry and molecular biology, cell biology, chemistry, human physiology, and intercellular communication. The advanced curriculum is organized into interdisciplinary areas of concentration.

The program requires students to take 18 credit hours of advanced courses and six seminars, pass a preliminary examination, and produce an acceptable dissertation based on original research.

Waiver of Program Requirements
Students may petition for exemption from all or part of the core curriculum. Petitions may also be submitted for waiver of credit for previous graduate courses taken in another accredited program. Course credit of up to 12 credit hours may be waived providing (a) the grade attained in each course is a B or above, (b) the course was taken within five years of the actual waiver, and (c) the course relates to the area of concentration chosen in this program. Petitions for obtaining credit for laboratory experiences may be made subject to the same credit hour limitations and time constraints as for courses.

The Curriculum

Interdisciplinary Core for all but Chemical and Structural Biomedical Science and Applied Biomedical Computation students:

<table>
<thead>
<tr>
<th>Core</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biochemistry and Molecular Biology</td>
<td>8</td>
</tr>
<tr>
<td>Mammalian Cell Biology</td>
<td>4</td>
</tr>
<tr>
<td>Human Physiology</td>
<td>5</td>
</tr>
<tr>
<td>Intercellular Communication</td>
<td>4</td>
</tr>
<tr>
<td>Research Ethics</td>
<td>1</td>
</tr>
<tr>
<td>Introduction to Research</td>
<td>5</td>
</tr>
<tr>
<td>Laboratory Rotations (a minimum of two)</td>
<td>6-12</td>
</tr>
<tr>
<td>BMS Seminar</td>
<td>3</td>
</tr>
<tr>
<td>Core Seminar</td>
<td>2</td>
</tr>
</tbody>
</table>

Interdisciplinary Core: Chemical and Structural Biomedical Sciences Concentration Only

<table>
<thead>
<tr>
<th>Core</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biochemistry and Molecular Biology</td>
<td>8</td>
</tr>
<tr>
<td>Mammalian Cell Biology</td>
<td>4</td>
</tr>
<tr>
<td>Structural Organic</td>
<td>3</td>
</tr>
<tr>
<td>Instrumentation</td>
<td>3</td>
</tr>
<tr>
<td>Thermodynamics</td>
<td>3</td>
</tr>
<tr>
<td>Research Ethics</td>
<td>1</td>
</tr>
<tr>
<td>Introduction to Research</td>
<td>5</td>
</tr>
<tr>
<td>Laboratory Rotations (a minimum of two)</td>
<td>6-12</td>
</tr>
<tr>
<td>BMS Seminar</td>
<td>3</td>
</tr>
<tr>
<td>Core Seminar</td>
<td>2</td>
</tr>
</tbody>
</table>

Interdisciplinary Core: Concentration in Applied Biomedical Computation Only

<table>
<thead>
<tr>
<th>Core</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biochemistry and Molecular Biology</td>
<td>8</td>
</tr>
<tr>
<td>Mammalian Cell Biology</td>
<td>4</td>
</tr>
<tr>
<td>Fundamentals of Biological Computing and Modeling</td>
<td>5</td>
</tr>
<tr>
<td>Computational Tools and Strategies</td>
<td>4</td>
</tr>
<tr>
<td>Research Ethics</td>
<td>1</td>
</tr>
<tr>
<td>Introduction to Research</td>
<td>5</td>
</tr>
<tr>
<td>Laboratory Rotations (a minimum of two)</td>
<td>6-12</td>
</tr>
<tr>
<td>BMS Seminar</td>
<td>3</td>
</tr>
<tr>
<td>Core Seminar</td>
<td>2</td>
</tr>
</tbody>
</table>

Advanced Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced Seminars (a minimum of two)</td>
<td>2-4</td>
</tr>
<tr>
<td>Dissertation Research—Credit hours arranged</td>
<td></td>
</tr>
</tbody>
</table>
The program does not have a fixed time for the awarding of the Ph.D. degree. This depends on the rate of progress of the individual student, but averages five years. Graduate credit applied toward the doctoral degree is valid for only nine years from the date the student enters the program. Extenuating circumstances must be acceptable to the Academic Policies Committee of the Biomedical Sciences faculty, the program director, and the dean of the School of Graduate Studies.

A minimum of 76 credit hours toward the doctoral degree must be completed at Wright State University.

**Curriculum Overview**

**Note:** See below for Chemical and Structural Biomedical Sciences or Applied Biomedical Computation Concentrations.

**Year I**

**Quarter I—Fall**
- Biochemistry and Molecular Biology I
- Mammalian Cell Biology
- Introduction to Research
- Biomedical Sciences Seminar
- Core Seminar

**Quarter II—Winter**
- Biochemistry and Molecular Biology II
- Human Physiology
- Biomedical Sciences Seminar
- Lab Rotation or Advanced Course

**Quarter III—Spring**
- Intercellular Communication
- Research Ethics
- Research
- Biomedical Sciences Seminar
- Lab Rotation or Advanced Course

**Quarter IV—Summer**
- Core Seminar
- Advanced Course
- Lab Rotation or Research Advanced Course

**Year II—V**
- Complete advanced courses
- Take preliminary examination (by end of Year II)
- Seminars
- Research leading to dissertation and defense

**Year III—V**
- Chemical and Structural Biomedical Sciences Concentration Only.

**Year I**

**Quarter I—Fall**
- Biochemistry and Molecular Biology I
- Structural Organic Chemistry
- Introduction to Research

<table>
<thead>
<tr>
<th>Quarter II—Winter</th>
<th>Biochemistry and Molecular Biology II</th>
<th>Biomedical Sciences Seminar</th>
<th>Lab Rotation or Advanced Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quarter III—Spring</td>
<td>Instrumentation</td>
<td>Thermodynamics</td>
<td>Biomedical Sciences Seminar</td>
</tr>
<tr>
<td>Quarter IV—Summer</td>
<td>Core Seminar</td>
<td>Research</td>
<td>Lab Rotation or Advanced Course</td>
</tr>
</tbody>
</table>

**Quarter IV—Summer**
- Core Seminar
- Advanced Course
- Lab Rotation or Research

**Year II—V**
- Complete advanced courses
- Take preliminary examination (by end of Year II)
- Seminars
- Research leading to dissertation and defense
Dissertation

Each student chooses a faculty member to guide and direct the dissertation research on a daily basis. In addition, a supervisory committee is formed to periodically review the student's progress. The relationship between the student, the faculty advisor, and the committee is central to the program. The committee determines when the research may be considered complete and must approve the written dissertation, as well as the student's public defense of it. The committee certifies to the program director the competency and achievement of the dissertation.

Grade Standards

Graduate students working toward the Doctor of Philosophy degree must maintain at least a 3.0 grade point average in all graduate courses and in all other graduate work that is assigned letter grades. Dissertation research will receive grades of satisfactory (M) or unsatisfactory (U) until the dissertation is accepted; these will then be converted to a standard letter grade. A 3.0 GPA and the recommendation of the student's supervisory committee and the program director are required for graduation.

Probation

Any student whose cumulative grade point average falls below 3.0 will be placed on probation. For students beyond Year I, failure to reattain a cumulative GPA of 3.0 within the next 12 credit hours of course work will result in a recommendation for dismissal from the program.

A first-year student enrolled in the core curriculum must achieve an overall grade point average of at least 3.0 after completing Year I. A student who completes Year I with a GPA of less than 2.7 will be recommended to the dean of the School of Graduate Studies for dismissal from the program. Students with a GPA above 2.7 but below 3.0 must reattain a 3.0 by the end of the next quarter (fall). Students who fail to attain a GPA of 3.0 by the end of fall quarter following Year I will be recommended for dismissal from the program. Students who receive a C in a core course during Year I may repeat the course while continuing advanced courses as determined by the program director. If a student repeats a core course, the grade received the second time will be used in calculating the student's GPA.

Students who fail the preliminary examination at the end of the second year will either be dropped from the program or be allowed one reexamination, depending on the recommendation of the Examination Committee.

Matters pertaining to dismissal for non-academic matters are handled by the Office of Student Affairs.

Summary of Requirements

Listed below is a summary of the requirements for the Doctor of Philosophy degree in biomedical sciences at Wright State University. Students must:

1. Complete core and advanced courses with a minimum grade point average of 3.0 (B)
2. Choose a dissertation director and a supervisory committee with the approval of the program director
3. Pass a preliminary examination
4. Prepare a written dissertation proposal
5. Accumulate a minimum of 150 didactic, laboratory, and research quarter hours
6. Conduct an acceptable original research problem, submit an approved written dissertation, and make a successful public defense
7. Be certified by the program director as having completed all requirements for the Ph.D. degree
8. Meet residency requirements
9. Be registered in the quarter in which the degree is conferred
10. Present one copy of the approved dissertation to the School of Graduate Studies and one copy to the BMS program office
11. Fulfill all requirements within nine years of entrance into the program

Students who have an M.D. degree or are in good standing in the preclinical curriculum of an accredited medical school may be exempted from the BMS core curriculum. Depending on the area of concentration and the recommendation of the dissertation director, a student may be exempted from 12 hours of advanced courses based on medical credit. Similarly, one of the two lab rotations may be exempted if a student has previously participated in a research project.

Topics for the preliminary exam shall be specified by the supervisory committee. Students must accumulate a minimum of 100 quarter hours in the biomedical sciences. All other requirements for the Ph.D. in biomedical sciences are the same as listed previously.

Areas of Concentration

Faculty research interests represent a broad spectrum of the biomedical sciences and are concentrated in the areas of specialization described in subsequent sections. Within each area of specialization, and across areas, there are extensive interactions and collaborations that enhance the interdisciplinary approaches and training opportunities available to students in the advanced curriculum and dissertation phases of
the program. In the advanced curriculum, course requirements will be tailored to fit the needs of individual students according to their area of specialization. Through this series of lecture, laboratory, seminar, and independent study experiences, students will be trained to draw on a multidisciplinary background to attack current problems in the biomedical sciences.

Some of the most important aspects of biomedical research today concern the elucidation of the regulatory mechanisms of cellular and molecular processes and the genetic factors that determine the structural and functional differences between cells. These important areas are central to the teaching and research activities of faculty and students in the areas of molecular biology/biochemistry, cell biology and physiology, chemical and structural biomedical sciences, and applied biomedical computation.

**Molecular Biology/Biochemistry**

This concentration is the forefront of our understanding of the basic mechanisms that govern living systems. In the molecular biology and biochemistry concentration, you will have access to the latest (molecular) techniques, equipment, and expertise to aid in your training as a research scientist. You will have the opportunity to contribute to advancing our understanding of DNA replication, repair and transcription, human molecular genetics, protein/enzyme and polynucleotide structure and function, molecular evolution, mechanisms of oncogenesis, retroviral recombination, and signal transduction mechanisms. You will train in a collaborative, collegial research environment. By aligning yourself with the area of concentration, you will maximize your exposure to the variety of molecular biological and biochemical approaches currently available. You will participate in departmental student research seminars, hear the most recent research from nationally acclaimed laboratories through departmental seminar programs, and participate in annual molecular biology retreats. Current and recent Ph.D. students in this track have published over 36 papers and presented their work at over 40 national, international, and local meetings over the past five years.

**Cell Biology and Physiology**

Investigate intra- and inter-cellular processes for insights into critical processes of organs and organ systems. As a student in the cell biology and physiology concentration, you will be using state-of-the-art techniques to study both normal and abnormal cellular processes at the molecular, cellular, organ, and whole organism level. You can choose from research studying processes that are fundamental to our understanding, prevention, and eventual treatment of diseases of the cardiovascular system, skin, blood, kidneys, lungs, gastrointestinal tract, and brain.

Specific research projects that you can become involved in and make a major contribution to include membrane transport related to cell volume and ion regulation, cell differentiation, intracellular sorting and secretion of hormones, comparative aspects of kidney function, cellular growth control, intracellular signaling pathways, membrane channels, transporters and receptors: structure and function, neural control of respiration, effects of hyperoxia and hyperbaria on neural cell function, mitochondrial energy production, nuclear transport, brain edema, immunity, and wound healing.

Several interesting model systems are employed including hematopoietic progenitor cells, sheep red blood cells, bird kidney cells, crayfish gill cells, mammalian brain slices, and a variety of mammalian cells in culture. Many of the projects involve collaborations with faculty from other areas of concentration, including neuroscience, molecular biology/biochemistry, and toxicology, creating a highly cooperative environment for your research.

In addition to your research, you will be involved in departmental seminars, journal clubs, and laboratory meetings. BMS students in this concentration will likely attend several national meetings to present their work. Students in this concentration have published over 30 papers and presented at numerous national and international meetings.

**Chemical and Structural Biomedical Sciences**

Chemistry plays a pivotal role in the biomedical sciences, especially as the functional properties of biologically relevant molecules are encoded in their covalent and non-covalent structures. To understand such structure/function, as well as the molecular basis of drug action, scientists in this multidisciplinary area of concentration routinely employ cutting-edge techniques spanning the entire breadth of the chemical/biological interface. The complementary subspecialties of this area include: computational methods for molecular modeling and design, as well as establishing quantitative structure-activity relationships (QSAR); transient and steady state spectroscopic methods relevant to macromolecules; biological magnetic resonance; novel technologies for the rapid-synthesis, chromatographic purification and spectroscopic analysis of organic molecules of pharmaceutical interest and biological macromolecules; and a molecular understanding of diverse metabolic processes.
You will have the opportunity to contribute to advancing our understanding of diverse projects involving:

- Molecular modeling and design
- Development of novel polymeric supports and immobilized reagents
- Combinatorial chemistry/solid-phase organic synthesis
- High throughput purification and analysis
- Analytical methods for drugs and biological macromolecules
- Quantitative structure-activity relationships
- Cheminformatics
- Protein and enzyme structure and dynamics
- Structural basis of catalysis
- Metabolic regulation

Applied Biomedical Computation

Recent advances in structural biology, cell biology, molecular genetics, and computer science have transformed biological sciences into a discipline in which computation is an essential component. Computational methods allow researchers to rationally propose structures of complex molecules and systems; to quantitatively test hypotheses regarding multifaceted molecular, cellular, organismic, and population processes; and to organize, as well as test relationships in vast and complex data sets. In this concentration, you will train with faculty from biologically-based and computationally-based departments whose research emphases range from refinement of computational methods to describing particular biological processes or structures. Modeling of macromolecular structure, biological processes, and construction as well as mining of large databases are areas of emphasis within this concentration. In addition to BMS seminars and curriculum, students within this area of concentration will participate in a Biological Computation seminar program, in departmental seminar programs, and in biological/biomedical research forums. Through these ways, graduates from this concentration are trained for research careers in the exciting and dynamic interface between biomedical and computational disciplines.

The immune system and the nervous system act, often in concert, to regulate body function and responses to external influences. Neurological disorders, degenerative diseases that affect nerve cells, traumatic brain injury, infectious diseases, autoimmune diseases, and AIDS represent some of the most significant causes of hospitalization and health care expenditure in this country. Interdisciplinary approaches target some of the fundamental mechanisms underlying nervous and immune system function and are pursued by faculty and students in the areas of immunology and neuroscience:

Immunology

Under the mentoring of faculty who are leaders in their field, the immunology concentration provides a large array of opportunities for graduate students to conduct cutting-edge research relating to immunology and infection. Many of the faculty have, or have had, federal (including NIH, NSF, and EPA) and corporate grants to support their research. They regularly publish the results of their research in high-quality journals. The faculty presently have research interests in indoor allergies, basic and clinical immunology, retrovirology—retroviral variation, HIV, endogenous retroviruses, immunotoxicology, viral pathogenicity, vaccine development, immunoparasitology of ectoparasites, microbial ecology, immune modulation, algal toxins, inflammatory and immune effector cell function, cytokine signaling, and apoptosis.

Neuroscience

Neuroscience offers an opportunity to pursue a fundamental biomedical science with immediate clinical applications. Neuroscience is by definition an interdisciplinary enterprise, with research interests ranging from the genetic to the behavioral levels. The breadth of approaches that must be employed to understand brain function in health and disease encompass electrophysiological, computational and biophysical methods, molecular biology and genomic technology, immunohistochemistry, and light and electron microscopic imaging techniques. The neuroscience laboratories associated with the BMS Ph.D. program use many of these techniques in vivo and in vitro studies at the molecular, cellular, and system levels.

The faculty groups involved in neuroscience research are highly interactive, as are their research students. Individual laboratories are well equipped with state-of-the-art instrumentation, and the Center for Brain Research provides access to additional resources for student and faculty research, including imaging workstations and confocal and electron microscopy expertise. A unique facility for hyperbaric studies is also the focus of much research in this track.

Faculty from the participating departments and the Center for Brain Research sponsor exciting seminar series and regular national and international symposia that expose our students to diverse research areas and facilitate the networking that is so valuable as students prepare for their postdoctoral careers. In addition, students in the neuroscience track are encouraged to attend and present at national meetings and in recent years, have garnered several awards for the quality of their presentations at these meetings.
Research opportunities are available in several areas of interest including ion channel, ion transporter, and neurotransmitter receptor expression and localization, development of synaptic connections, hyperbaric physiology, cardiovascular and respiratory control, neuroendocrinology, regulation of ion channel and receptor function, and cell volume.

The basic and clinical aspects of biomedical science described above have many points of overlap and convergence. Likewise, the fields of biomedical engineering and toxicology, which are multidisciplinary in themselves, impact on and interact with the research objectives, techniques, and conceptual advances made in the foregoing areas. The interdisciplinary training obtained in the core curriculum and advanced course work prepares students well to contribute in these areas of specialization:

Biomedical Engineering

Confronting the increasing dependence of health care on sophisticated technology used in research, diagnostic and therapeutic procedures, and prosthetic and other medical devices, biomedical engineering is the application of engineering principles and methods to the solution of problems in medical and biological areas. Current efforts in biomedical engineering include the development of medical and surgical instrumentation systems, the design of rehabilitative devices, the interfacing of complex systems in data collection and analysis, and the adaptation of computer technology to assist the health care industry.

Primary faculty interests include medical imaging, human factors engineering, rehabilitation engineering, biomechanics, biomaterials, medical instrumentation, mathematical modeling, and computer simulation.

Exercise and rehabilitation physiology involves interdepartmental cooperation. It has direct relevance to the patient populations who participate in development of instrumentation, visual performance, and aerospace systems applications.

Environmental Toxicology

Environmental toxicology works on resolving problems of compatibility between chemicals and life processes. Each and every day, we breathe, ingest, apply, and dispose of chemicals. The effects of these chemicals on our health and well-being, and on our environment, range from miraculous to disastrous. As our technology-driven culture continues to develop new chemicals for agricultural, medicinal, military, and industrial uses, we need to understand what the ecological, societal, and health risks/effects of these chemicals will be.

If these kinds of problems/issues interest you, then you should consider training in the area of environmental toxicology. You will find many opportunities to expand your knowledge and contribute to the advancement of this field among the faculty from three departments (Biology, Biochemistry and Molecular Biology, and Pharmacology and Toxicology) that are actively engaged in research addressing toxicological problems. The inherently interdisciplinary nature of this area utilizes the latest molecular, biological, chemical detection, and immunocytochemical techniques and applies them to a broad range of problems of immediate and long-term relevance.

Areas of faculty expertise include aquatic toxicology, dermal toxicology, ecotoxicology, environmental toxicology, immunotoxicology, risk assessment toxicogenomics, and stress/toxicant interactions.

State-of-the-art approaches currently employed include DNA and protein chip array analysis, laser scanning confocal microscopy, in vitro and in vivo monitoring of toxicant effects, HPLC and LC/MS based detection, and quantification of chemicals.

Human Risk Factors

Research related to changes in human growth and body composition with respect to risk factors for cardiovascular and other diseases are the focus of the human risk factors concentration. Data used in the human risk factors is part of the ongoing Fels Longitudinal Study. Decades before the university was founded, the Fels Foundation instituted a program tracking health and wellness of a large number of individuals over their lifetimes. The statistics are now maintained in the department of Community Health, Wright State School of Medicine.

Research projects include genetic epidemiology, the development, implementation and validation of new methods for the study of body composition, new statistical methods and models, determination of causal relationships involving body composition, adipose tissue distribution, lifestyle, and risk factors for cardiovascular disease.

Business

The Raj Soin College of Business is committed to providing quality education that is both broad-based and professionally relevant; to creating an environment that fosters faculty development and strengthens the college’s links with the external community; and to exceeding the high standards of personal and professional conduct advanced by AACSB International, which accredited the college’s M.B.A. program in 1979. As a result of this commitment to teaching,
research, service, and outreach, the university's mission extends to the growth and development of the metropolitan Dayton area and Miami Valley, and explores problems that have local, state, regional, national, and international applications. The Raj Soin College of Business offers degree programs leading to the Master of Business Administration (M.B.A.) degree, the Master of Science (M.S.) degree in Social and Applied Economics, and the Master of Accountancy (M.Acc.) degree. Each student's program is planned on an individual basis, taking into consideration the student's background, needs, and objectives. This allows any program to be built on the student's undergraduate work in business, the arts, sciences, engineering, or other fields of study.

A chapter of Beta Gamma Sigma, the national scholastic honor society in the field of business and administration, was established by the College of Business and Administration in 1976.

The M.B.A. Degree
The mission of the Wright State M.B.A. degree program is to develop managers and leaders whose understanding and vision encompass the total organization. Graduates will work effectively within and across functional areas and understand the entire organization and its environment. Consistent with this mission, the primary learning objectives of the program are to develop in our students a cross-functional understanding of organizational operations; further develop students' critical and analytical thinking skills; enhance students' communication skills—oral, written, and interpersonal; and develop the ability to work collaboratively.

The M.B.A. concentration in e-commerce provides technical skills and marketing principles to help students understand the Internet's impact on the rapidly evolving technologies driving global commerce.

The M.Acc. Degree
The aim of the Master of Accountancy (M.Acc.) program is to provide students with a broad set of competencies designed to facilitate success in professional accounting careers and to qualify graduates to sit for the uniform CPA examination in the state of Ohio. See M.Acc. degree requirements on pages 71 and 72 of this catalog.

The Graduate Faculty
Accountancy
Professors
Hans Dieter Sprohge, managerial and financial accounting
John C. Talbott Jr., taxation and managerial accounting
Associate Professors
Kennard S. Brackney (chair), financial and international accounting
Russell H. Hereth, taxation
Susan Lightle, auditing, financial accounting
Assistant Professors
David M. Bukovinsky, managerial and governmental accounting
Carolyn Hartwell, financial accounting
Paul Lin, accounting systems

Economics
For a list of Department of Economics graduate faculty, see Economics

Finance, Insurance, and Real Estate
Professors
M. Fall Ainina, financial management, investments
Peter W. Bacon (chair), financial management
Nicolas Gressis, financial management, investments
Robert J. Sweeney, financial management
Associate Professors
Khurshid Ahmad, insurance, real estate, personal finance
James E. Larsen, real estate, financial institutions
Richard E. Williams, financial management, investments, estate planning
Assistant Professor
Marlena Akhbari, financial management

The M.S. Degree in Social and Applied Economics
For more information about the Master of Science Degree in Social and Applied Economics program, see Economics section on pages 88-91 of this catalog.
Management

Profsors
Charles J. Hartmann, legal environment of business, government regulation
Crystal L. Owen (chair), organizational behavior, organizational development, human resource management
Joseph A. Petrick, international management, management ethics, quality management, leadership studies, environmental management
Robert F. Scherer, organizational behavior, human resource management, organization development

Associate Professors
Francis J. (Bud) Baker, project management, leadership, organizational behavior, strategic management
Jeanette Davy, organizational behavior, organizational development, compensation, human resource strategy
William M. Slonaker, legal environment of business, legal aspects of business organizations, legal aspects of commercial transactions, labor law, real estate law
Ann C. Wendt, labor relations, human resource management, public policy

Assistant Professors
Mark Cordano, strategic management, environmental management

Management Science and Information Systems

Professors
Andrew W. Lai, quantitative methods for business, logistics systems, computer simulation, decision support systems
Nadia R. Sanders, forecasting, decision theory, materials management, expert systems
Li D. Xu, systems theory, integrated information systems, artificial intelligence
Vincent Yen, operations research, statistics, management information systems, systems development, decision support systems

Associate Professors
Joseph W. Coleman, statistical analysis, simulation, management information systems
George G. Polak, network optimization, supply chain modeling, discrete and combinatorial optimization

Assistant Professors
Jung Choi, software metrics, IS development methodologies and software productivity and quality
Barbara B. Denison (chair), small business applications, systems analysis and design
Gregory A. Graman, supply chain management, delayed product differentiation, logistics and distribution systems
Hong Wang, AI search techniques and optimization, decision support systems and models, telecommunications, behavioral and strategic MIS/DSS
Frederick R. Watson, linear and integer programming, network modeling and optimization
Larry B. Weinstein, integration of production and maintenance planning, TQM in manufacturing and education environments, issues concerning ISO/QS 9000 registration

Marketing

Professors
Inder P. Kherta, marketing strategy, consumer behavior, international marketing, marketing of services
Paula M. Saunders, marketing strategy, service marketing, direct marketing

Associate Professors
Charles S. Gulas, advertising, consumer behavior, marketing management, entrepreneurship
Robert A. Ping Jr., marketing management, marketing research

Admission

Admission to the M.B.A. or Master of Accountancy program requires submission of the form “Application for Admission to a Graduate Status” to the School of Graduate Studies. All applicants for admission to a degree program must pay the application fee, submit official transcripts from all colleges/universities attended, submit a current resume, and direct Educational Testing Service to forward an official score report to Wright State for the Graduate Management Admission Test (GMAT). International applicants must submit an official score report for the Test of English as a Foreign Language (TOEFL) with a score of at least 550/213. Applicants must have an earned baccalaureate degree (or the equivalent) from a regionally accredited institution.

Applications for the M.Acc. degree program should have an undergraduate degree with a major or concentration in accounting in addition to the above requirements. Those with deficiencies may be required to successfully complete
selected preparatory courses. Students without the undergraduate accounting major will be required to take undergraduate preparatory courses before beginning the M Acc.; all such students should contact the Department of Accountancy before enrolling.

The Raj Soin College of Business admits only those individuals who show high promise for successful completion of the program. Admission to the program is based on a variety of criteria including past academic performance, standardized test score(s), intellectual capacity (including analytical and quantitative skills), preparedness for graduate study, and other factors.

**Regular Admission in Business**

Applicants who have submitted all materials for admission to the program will be considered by the college’s graduate admission committee for regular admission. An admission index (AI), overall or last half, is computed for each applicant. The overall AI is computed by multiplying the overall undergraduate GPA by 200 and adding the total GMAT score. The last half AI is computed by multiplying the last 93 quarter credit hours undergraduate GPA by 200 and adding the total GMAT score. The college’s graduate admission committee looks for the overall AI to be 1050 (last half 1100) or greater for regular admission. Applicants who have completed any graduate course work must have a minimum graduate GPA of 3.0. International applicants must have a score of at least 550/213 on the TOEFL.

**Conditional Admission in Business**

Applicants who have been denied admission, but who believe they are qualified for graduate work, may petition for conditional admission status. Applicants seeking such status must petition the School of Graduate Studies and the Raj Soin College of Business. Graduate credit earned while in this status can be applied toward degree requirements. Regular admission status will be granted once all admission requirements are satisfied and the student completes 12 hours of graduate credit with a cumulative GPA of 3.0. A student who does not meet these conditions will be dismissed.

**Provisional Admission in Business**

Under certain conditions, an applicant may be admitted provisionally (for one quarter) pending receipt of the official credentials. Provisional admission is granted for one quarter to allow the applicant the time necessary for Wright State to receive the official documents. Provisional admission is not a final admission category. Once all official documents are received, the college will make a final decision to admit or not.

If admission requirements are not met during the quarter in which a student was admitted provisionally, registration for future quarters will be denied and the student will lose graduate credit for any graduate courses completed during the quarter.

**Provisional Admission in Accountancy**

Students without the undergraduate accounting major (or business degree) will be required to complete preparatory courses with a minimum GPA of 3.0 before they can attain regular admission status.

**Nondegree or Transient Admission in Business**

Applicants who meet all School of Graduate Studies requirements for nondegree admission or transient admission will be admitted into these categories. Students wanting to switch to degree status must reapply to the School of Graduate Studies for such status and may apply only 12 credit hours of Stage II requirements toward the degree.

**M.B.A. Degree Requirements**

**Stage I—Foundation Course Work**

The following outlines the preparatory foundation course requirements for the M.B.A. degree program. Candidates should consult with a graduate advisor in the Raj Soin College of Business for information on the policies and procedures to waive the foundation courses. All candidates must have or obtain a knowledge of the fundamentals in the following areas: accountancy, computing, economics, finance, law, management, marketing, mathematics, and statistics. Students deficient in any of these areas are required to successfully remedy the deficiency by completing the appropriate Stage I course(s). Stage I courses may be waived for individuals who have completed comparable courses at regionally accredited institutions. Waiver of foundation course work is based on the grade received, credit hours, course content, age of course, focus, and other factors. Additionally, students may demonstrate competency by successfully passing a proficiency test. The Stage I Program of Study form must be completed by the student prior to registering for graduate business courses.

**Stage I—Foundation Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EC 523</td>
<td>Survey of Microeconomics</td>
<td>2</td>
</tr>
<tr>
<td>EC 524</td>
<td>Survey of Macroeconomics</td>
<td>2</td>
</tr>
<tr>
<td>MBA 511</td>
<td>Survey of Financial Accounting</td>
<td>2</td>
</tr>
<tr>
<td>MBA 512</td>
<td>Survey of Managerial Accounting</td>
<td>2</td>
</tr>
<tr>
<td>MBA 532</td>
<td>Survey of Finance</td>
<td>2</td>
</tr>
<tr>
<td>MBA 541</td>
<td>Survey of Law</td>
<td>2</td>
</tr>
</tbody>
</table>
Stage II—Core, Functional, Integrated, and Concentration Course Work

After completion of the necessary Stage I foundation courses, students undertake the Stage II course work, a 51 minimum credit hour program. Thirty-nine credit hours of graduate business course work is common to all M.B.A. students. This common course work is broken into three areas. The first area encompasses 15 credit hours of business core course work. The second area consists of 12 credit hours of functional course work. The third area includes 12 credit hours of integrative course work. The final 12 hours (minimum) of course work is completed in one, and if the student so chooses, or more area(s) of concentration. Additional hours will be required for each added concentration. Students have the flexibility to choose and structure concentration(s) to meet their career objectives. Foundation courses cannot be used as electives within the concentration area(s). Students taking graduate business courses are expected to follow course prerequisite requirements.

Candidates for the M.B.A. degree will complete a Stage II—Program of Study form, in consultation with their assigned faculty advisor, in accordance with university and college policy. Students must coordinate with a graduate advisor prior to starting their Stage II course work and prior to meeting with the faculty advisor.

Business Core Courses  
EC 722 Economics for Managers 3  
MBA 751 Managing People in Organizations 3  
MBA 762 Business Professionalism 3  
MBA 781 Quantitative Methods for Business Decision Making 3  
MBA 783 Quality Management and Continuous Improvement 3

Functional Area Courses  
MBA 711 Strategic Cost Management 3  
MBA 731 Financial Analysis and Decision Making 3  
MBA 761 The Marketing Process 3  
MBA 782 Managing Operations 3

Integrative Courses†  
EC 723 International Business and the Global Economy 3  
MBA 741 Law, Regulation, Politics, and the Social Environment of Business 3  
MBA 753 Developing and Implementing Organizational Competitive Strategies 3  
MBA 771 Information, Technology, and Organizations 3

Area of Concentration Courses (minimum) 12
See the following for Stage II area of concentration course work (M.B.A.)

Total (minimum) 51
Integrative courses should be taken only after all Foundation course work is satisfied and a minimum of seven (21 credit hours) of the Business Core and Functional Area courses have been completed.

Stage II—Areas of Concentration Course Work (M.B.A.)

Business Economics
EC 709 Applied Econometrics 3  
EC 712 Forecasting Economic Activities 3  
EC 715 Applied Microeconomics 3  
EC 717 Applied Macroeconomics 3

E-Commerce
MKT 747 Internet Marketing I 3  
MKT 748 Internet Marketing II 3  
MIS 705 Electronic Commerce 3  
MIS 785 Electronic Commerce Implementation 3

Finance
Required Concentration Courses 12  
FIN 710 Investment Management 3  
FIN 742 Seminar in Financial Theory 3  
FIN 790 Seminar in International Financial Management 3  
Another 700-level finance course 3

International Business
ACC 753 International Accounting 3  
EC 641 International Trade and the Economy 3  
FIN 790 Seminar in International Financial Management 3  
MKT 716 International Marketing 3  
MGT 721 International Management 3

Logistics Management
MS 753 Inventory Management 3  
MS 757 Production Planning and Control 3  
MS 759 Purchasing and Materials Management 3

Select one of the following:
MS 755 Advanced Quality Management 3  
MS 771 World Class Strategies 3  
MKT 713 Logistics Systems 3
Management

The management concentration is highly flexible. The general structure the student must follow is that of the 12 concentration credit hours; at least nine but not more than 12 credit hours must be management (MGT) or law (LAW) course work.

Management Information Systems

*Prerequisite*
MIS 521 Survey of Information Systems Technology

Choose four of the following:
MIS 710 Database Management
MIS 720 Telecommunications Management
MIS 750 Information Systems Planning
MIS 760 Systems Analysis Methodologies
MIS 761 Systems Design Methodologies
MIS 770 Information Systems Implementation

*MIS concentration requires an introductory information systems course and a programming language course at the undergraduate level to waive MIS 521. See the MIS faculty advisor.

Operations Management

MS 753 Inventory Management
MS 755 Advanced Quality Management
MS 757 Production Planning and Control

Select one of the following:
MS 759 Purchasing and Materials Management
MS 771 World Class Strategies
MKT 713 Logistics Systems

Marketing

Four additional 600- or 700-level marketing courses chosen, based on the student’s career objectives

Project Management

MGT 770 Fundamentals of Project Management
MGT 772 Project Contract Management
MGT 773 Project Planning, Evaluation, and Control Techniques

Elective

Dual Degree with Economics

Students may obtain both the M.B.A. degree and the M.S. degree in Social and Applied Economics under the dual-degree program, which permits common course work to be applied to both programs as long as the courses are completed within the time limit set for completion of graduate degree programs. This policy does not apply to students who received a M.B.A.

Dual Degree with Nursing

Students may obtain both the M.B.A. degree and the M.S. degree in administration of nursing and health care systems under the dual-degree program, which permits common course work to be applied to both programs. Students who receive a M.B.A. degree or M.S. degree in nursing from schools other than Wright State cannot enter this dual degree program. For further information, contact the director of graduate programs in business and logistics management and director of M.S. in nursing program.

M.Acc. Degree Requirements

Stage I—Preparatory Course Work

The following information outlines the preparatory requirements for the M.Acc. degree program. Candidates should consult with an academic advisor in the Raj Soin College of Business for further details concerning policies and procedures.

All candidates must have or obtain a knowledge of fundamentals in the following areas: accounting, business finance, business law, computing and information systems, economics, management, marketing, quantitative methods, and statistics. Students deficient in any of these areas are required to successfully remedy the deficiency by completing the appropriate undergraduate preparatory courses or the graduate equivalent. Individual courses may be waived for students who have successfully completed comparable courses at a regionally accredited institution. Waiver of preparatory course work is based on the grade received, credit hours, when the course was completed, course content, focus, and other factors. Additionally, students may demonstrate preparation by proficiency testing. The Stage I Program of Study form must be completed by students before they will be permitted to register for graduate business courses.

Business Preparatory Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business Finance (FIN 301, 302, 303)</td>
<td>9</td>
</tr>
<tr>
<td>Business Law (LAW 350, LAW 360 or 370)</td>
<td>6</td>
</tr>
<tr>
<td>Computing and Information Systems (MIS 300)</td>
<td>4</td>
</tr>
<tr>
<td>Economics (EC 320)</td>
<td>3</td>
</tr>
<tr>
<td>Management (MGT 300, 302, 490, 491, 492)</td>
<td>13</td>
</tr>
<tr>
<td>Marketing (MKT 301, 302, 302L)</td>
<td>7</td>
</tr>
<tr>
<td>Quantitative Methods (MS 306)</td>
<td>3</td>
</tr>
</tbody>
</table>
In addition to the above courses, the following undergraduate accounting courses are prerequisites for the M.Acc. program.

**Accounting Preparatory Courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accounting Principles (ACC 201, 202, 203)</td>
<td>9</td>
</tr>
<tr>
<td>Management Accounting (ACC 321, 322, 498)</td>
<td>9</td>
</tr>
<tr>
<td>Accounting Systems (ACC 328)</td>
<td>3</td>
</tr>
<tr>
<td>Auditing (ACC 421)</td>
<td>3</td>
</tr>
<tr>
<td>Income Tax Accounting (441, 442)</td>
<td>6</td>
</tr>
</tbody>
</table>

**Stage II—Core and Concentration Course Work (M.Acc.)**

After completion of required prerequisites, students may begin the 45-hour M.Acc. Program. Twenty-four credit hours of accounting courses are required of all M.Acc. candidates. Three credit hours may be earned through an internship. The additional 18 hours of course work must be outside of the accounting curriculum. They may be additional graduate business or nonbusiness courses.

**Required Accounting Courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACC 717 Professional Research Methodology</td>
<td>3</td>
</tr>
<tr>
<td>ACC 731 Contemporary Accounting Theory</td>
<td>3</td>
</tr>
<tr>
<td>ACC 732 Risk Analysis and Attestation</td>
<td>3</td>
</tr>
<tr>
<td>ACC 733 Accounting for Not-for-Profit Entities</td>
<td>3</td>
</tr>
<tr>
<td>ACC 736 Systems Control Assessment</td>
<td>3</td>
</tr>
<tr>
<td>ACC 738 Tax Research and Planning</td>
<td>3</td>
</tr>
<tr>
<td>ACC 739 Application of Professional Standards</td>
<td>3</td>
</tr>
<tr>
<td>ACC 753 International Accounting</td>
<td>3</td>
</tr>
</tbody>
</table>

**Accounting Elective(s)**

ACC 775 Accounting Internship

**Non-accounting courses**

Total: 45

**Note:** Students are encouraged to take English and/or communications courses. Possibilities are ENG 543, Advanced Composition; ENG 718, Study of Professional Writing; COM 643, Interviewing; and COM 647, Organizational Communication. Other COM and ENG courses are available, depending on the interest of the student. All courses must be graduate-level courses.

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**Cartography, Photogrammetry, and Remote Sensing**

Contact the Department of Urban Affairs and Geography for information about this certificate program.

**Chemistry**

The Department of Chemistry offers a graduate program leading to the Master of Science degree in chemistry. Balanced programs of course work and research are individually designed to prepare students for careers as professional chemists or for advanced degree study. Joint programs with other departments are encouraged for students interested in pursuing interdisciplinary research with emphasis in chemistry.

**The Graduate Faculty**

**Professors**

Rubin Battino (Emeritus), physical chemistry  
Sue C. Cummings (Emerita), inorganic and bioinorganic chemistry  
William A. Feld, organic and polymer chemistry  
John J. Fortman (Emeritus), inorganic chemistry and chemical education  
Roger K. Gilpin (Mead Professor of Environmental Sciences), analytical and environmental chemistry  
Ivan J. Goldfarb (Emeritus), polymer chemistry  
Vladimir Katovic, analytical, inorganic, and environmental chemistry  
M. Paul Servé, organic and medicinal chemistry  
Paul G. Seybold (chair), physical and biophysical chemistry  
Thomas O. Tiernan (Emeritus), physical, analytical, and environmental chemistry

**Associate Professors**

Daniel D. Bombick, analytical chemistry and mass spectrometry  
David A. Dolson, physical chemistry and laser spectroscopy  
David A. Grossie, inorganic chemistry and X-ray crystallography  
George G. Hess (Emeritus), organic, analytical, and environmental chemistry  
Daniel M. Ketcha, organic and natural products chemistry
Audrey E. McGowin, analytical and environmental chemistry
Kenneth Turnbull, organic chemistry
Assistant Professor
Eric A. Fossum, organic and polymer chemistry
Suzanne Lunsford, chemical education

Admission
In order to meet the minimum requirements for admission to the graduate program in chemistry, applicants must fulfill the requirements for admission established by the School of Graduate Studies. In addition, applicants must have completed basic calculus, one year of physics, and approximately 50 quarter hours (33 semester hours) of chemistry, including lecture and laboratory courses in general chemistry, quantitative analysis, and introductory courses in organic, inorganic, and physical chemistry. Students who do not meet these requirements will be asked to do some remedial work in addition to fulfilling the usual graduate degree requirements.

Degree Requirements
In order to qualify for the Master of Science degree, candidates must fulfill the requirements of the School of Graduate Studies, complete 30 credit hours of course work and a minimum of 15 credit hours of thesis research, submit an acceptable thesis, and pass a written or oral examination. Students will normally concentrate in one of the following areas: analytical, environmental, inorganic, organic, physical or polymer chemistry, or chemical education.

Courses
Candidates for the Master of Science degree must complete 30 credit hours of course work in chemistry and related fields, including designated chemistry core courses (as outlined below). The chemistry courses must be numbered 600 or above and comprise a program acceptable to the advisory committee. The related courses must be numbered 500 or above and be acceptable to the advisory committee. In addition to courses in the traditional areas of analytical, inorganic, organic, and physical chemistry, courses are also offered in applied areas such as environmental, medicinal, and polymer chemistry.

Core Course Requirements
Five core areas have been designated from which each M.S. chemistry candidate must take at least one course. Acceptable core courses are listed below. No substitution will be allowed.

Physical Chemistry
CHM 750, 751, 752

Inorganic Chemistry
CHM 720, 721, 722

Organic Chemistry
CHM 744, 746, 748

Analytical Chemistry
CHM 637, 762, 763

Applied Chemistry
which includes:
Environmental Chemistry: CHM 610, 611, 612
Polymer Chemistry: CHM 661
Medicinal Chemistry: CHM 640, 641
Toxicological Chemistry: CHM 643, 644

Language Requirement
A reading knowledge of a foreign language is not required for the Master of Science degree in chemistry. However, certain students, because of the nature of their specific area of interest in chemistry, may be required to demonstrate an ability to read chemical literature in a foreign language.

Residency Requirement
Full-time residency is not required to qualify for the Master of Science degree. However, students must be registered for three consecutive quarters of full- or part-time study.

Thesis
The candidate must enroll in CHM 899 (thesis research) under the supervision of an advisor approved by the chemistry graduate studies committee. An acceptable thesis based on a minimum of 15 credit hours of laboratory or theoretical research (CHM 899) must be submitted to the thesis advisory committee (chaired by the candidate's advisor and selected by the advisor, student, and the department chair). After the presentation of the thesis and at least two weeks prior to the date proposed for conferring the degree, the candidate must pass a written or oral examination. If the student's record is satisfactory, the scope of the examination will generally be confined to the candidate's field of specialization.

Four copies of the final draft of the thesis must be submitted to the thesis advisory committee and the department chair for approval prior to binding. After approval by the School of Graduate Studies, one copy will be deposited in the library. One copy each is kept by the advisor, the graduate, and the department chair.
Environmental Sciences

The environmental sciences concentration was developed by the College of Science and Mathematics to promote interdisciplinary research. Accordingly, for a student with a strong interest in chemistry and in the environment, a Master of Science degree in chemistry with a concentration in environmental sciences has been designed. This program entails approximately two more courses than the regular chemistry major, but provides much greater breadth and depth in environmental sciences that the traditional chemistry major would obtain.

The advisory committee of the student selecting this option will differ from the usual committee in that at least one individual will be a faculty member from outside the chemistry department, e.g., a member of the biology or geology faculty. In addition to meeting the general requirements for the Master of Science degree in chemistry, including the preparation and defense of a research-based thesis, course requirements for the environmental track include:

- Geologic and environmental applications of geographic information systems or hydrogeology or hydrogeochemistry;
- Environmental statistics;
- Risk assessment;
- Environmental sciences seminar (1 hour); and
- Two environmental sciences electives outside the chemistry department.

A student completing these requirements will receive an M.S. degree in chemistry with an emphasis in environmental science.

Wright State's chemistry department ranks in the top 25 in the nation for the number of Master of Science graduates in chemistry, according to Chemical and Engineering News, the magazine of the American Chemical Society.

Environmental Sciences Ph.D. Program

In addition, students in chemistry can pursue an interdisciplinary Ph.D. in Environmental Sciences. See the separate listing for that program on page 125.

Classroom Teacher

See Education and Human Services

Computer Engineering

The Department of Computer Science and Engineering offers a program of graduate study leading to the Master of Science in Computer Engineering degree. The program balances theory, software, hardware, and practice with degree requirements concentrated in the areas of computer design and analysis. Most courses are offered in the late afternoon to allow practicing computer professionals to begin the program on a part-time basis.

The department also offers the Master of Science in Computer Science degree and the Ph.D. in computer science and engineering, as well as graduate certificates in Database Management and Design, Software Engineering, and Software Management.

The Graduate Faculty

Professors

Nikolaos G. Bourbakis, (director, Information Technology Research Institute), information security (encryption, information hiding, compression), computer systems (distributed, formal languages, processors, modeling), applied artificial intelligence (knowledge representation, planning, learning, autonomous agents, natural language processing), machine vision and image processing (architectures, languages, algorithms), Robotics (navigation, grasping, 3-D space maps, walking)

James E. Brandeberry (dean) digital electronics, microprocessors, system theory

Chien-In Henry Chen, computer aided design, simulation and testing of VLSI circuits and systems, specifically testability, synthesis, timing analysis and optimization for DSM ICs, and chip design for signal processing, communication, and networking applications

C. L. Philip Chen, computer communication and networking, neural networks and applications, CAD/CAM and robotics, intelligent systems and interfaces, knowledge-based systems

Oscar N. Garcia (chair), speech recognition and articulatory synthesis, knowledge-based systems, computer architecture, human-computer interaction, intelligent interfaces, machine intelligence, bioinformatics

A. Ardeshir Goshtasby, image and video understanding, medical image analysis, geometric modeling, curves and surfaces, multi-modal image capture and fusion

Jack Jean, high-performance computer architectures, machine intelligence
Terry A. McKee (Department of Mathematics and Statistics), graph theory, logic
Kuldip S. Rattan (Department of Electrical Engineering), fuzzy control, robotics, digital control systems, prosthetic/orthotics and microprocessor applications
Thomas A. Sudkamp, fuzzy set theory, soft computing, approximate reasoning

**Associate Professors**

- Soon M. Chung, database, data mining, multimedia, parallel processing, computer architecture
- Guozhu Dong, database systems, data mining and knowledge discovery, data warehousing and integration, data cubes and OLAP, bioinformatics
- Prabhaker Mateti, distributed computing, Internet security, formal methods in software design
- Francis K. H. Quek, human-computer interaction related to computer vision, biomedical imaging, computer vision, robot navigation
- Mateen M. Rizki, evolutionary computation, pattern recognition, image processing, machine intelligence
- Krishnaprasad Thirunarayan, knowledge representation and reasoning, programming languages: specification, design and implementation

**Assistant Professors**

- Wasfi G. Al-Khatib, multimedia databases, video data modeling, content-based retrieval, data mining, artificial intelligence, software engineering
- Michael T. Cox, intelligent interfaces, case-based reasoning, automated planning, machine learning, natural language processing
- Travis E. Doom, computational biology, digital design automation, computer architecture and operating systems, computational mathematics and theory
- John M. Emmert, computer aided design (CAD) for VLSI circuits and systems, fault tolerance, built-in-self-test (BIST) for VLSI circuits and systems, automatic test insertion for mixed-signal circuits
- John C. Gallagher, neural networks, computational neuroscience, machine intelligence, genetic algorithms, evolvable hardware
- Michael L. Raymer, evolutionary computation, machine learning, pattern recognition, computational biology, protein structure and function, protein-water interactions, bioinformatics

Bin Wang, communications networks, quality of service provisioning, routing, wireless networks, WDM optical networks, reliable multicast and congestion management, protocol design and development, stochastic modeling and queuing analysis, simulation optimization

**Admission**

Students may be admitted to the graduate program in computer engineering with a baccalaureate degree in computer science, computer engineering, or a related area and appropriate experience; satisfaction of the admission requirements as set forth by the School of Graduate Studies; and a record that indicates potential for a professional career in computer science and/or computer engineering as evaluated by the department’s admission committee.

Students should come to the program with a knowledge of higher-level languages, data structures, concurrent programming, computer organization, operating systems, digital hardware design, electronic circuits, linear systems, and electronic devices. It may be possible to make up minor background deficiencies after admission to the program by taking appropriate courses.

**Facilities**

A wide range of computing systems interconnected via the campus-wide network supports the program. Full Internet connectivity is provided from campus labs and from residence halls. A variety of high-end and special-purpose systems are available for research efforts through the Ohio Supercomputer Center. Wright State University is also an Internet 2 member. University and college systems include a variety of servers and workstations running current popular operating systems, including UNIX systems from SGI, Sun, and Compaq (formerly DEC), and a variety of personal computer labs featuring current versions of Windows, Windows NT, and Mac OS. Department facilities provide specialized systems and support equipment tailored to specific curriculum and research areas. These include an SGI Origin 2000 system with 32 parallel processors, an NCR Teradata 4800, an 8-processor SGI Onyx 2 system, a Linux-based Operating Systems and Internet Security lab, and a variety of workstations and personal computers providing software tools for project design and development. The program has laboratories dedicated to student and faculty study and research in the areas of human-computer interaction, vision interfaces and systems,
intelligent systems, parallel and distributed computing, pattern analysis and machine intelligence, software engineering, collaboration and cognition, fuzzy systems, adaptive vision, optical computing, computer networking, neural dynamics and controls, and bioinformatics.

Research

A steadily increasing number of funded research projects support modern graduate research in such areas as database systems, knowledge-based systems, knowledge discovery from databases, parallel and distributed computing, machine intelligence, hardware systems and communications, neural networks, software systems and engineering, computer graphics and visualization, human-computer interaction, optical computing, and robotics. A strong research faculty in the Department of Computer Science and Engineering is assisted by qualified research faculty in mathematics, statistics, and electrical engineering.

Recent and current sources of research support include federal agencies, military agencies, and local industries. Research at Wright State University is not limited to on-campus laboratory facilities. Several industrial laboratories, Wright-Patterson Air Force Base laboratories, and the Major Shared Resource Center at Wright-Patterson Air Force Base are involved in joint research efforts with the university. The Information Technology Research Institute (ITRI) is closely associated with the Department of Computer Science and Engineering in seeking and pursuing research and development opportunities with state and federal agencies and local information-intensive industries.

Graduate Assistantships

Teaching assistantships are available on a competitive basis for students who have established strong academic credentials and can demonstrate good communication and teaching skills. A number of departmental research assistantships are awarded annually based on exceptional performance or potential. Additional graduate support is available in the form of assistantships associated with research projects of the faculty. Scholarships are also available from the Dayton Area Graduate Studies Institute (DAGSI). Application forms for these assistantships and scholarships are available from the department for students admitted to the graduate program.

Master of Science in Computer Engineering Degree

Requirements for the Master of Science in Computer Engineering degree are a department-approved program that must include the following:

Thesis Option

1. Completion of 48 graduate credit hours in an approved program of study, including 24 hours of formal coursework at the 700/800 level, of which at least 12 credit hours of formal coursework at the 700-800 level must be taken in the computer engineering specialty (courses with a CEG prefix).

2. Completion of at least one course at Wright State University in each of the following areas, selected from the courses listed for each area:
   - CEG Systems: CEG 602, CS 607, CS 609, CEG 634, CS 714, CEG 730, CEG 830, EE 701, EE 710, EE 761
   - Software: CEG 660, CEG 760, CEG 763, CEG 860, CS 605, CS 701, CS 801
   - Hardware: CEG 653, CEG 658, CEG 659, CEG 720, CEG 750, CEG 751, CEG 752, CEG 753, CEG 754, CEG 758, CEG 820, EE 649
   - Engineering Applications: CEG 619, CEG 628, CEG 656, CEG 676, CEG 677, CEG 724, CEG 728, CEG 756, CEG 759, CS 765

3. All CS and CEG graduate courses listed in the catalog, or approved to be listed in the next catalog (except CS 700 and CEG 700), may be used to complete the credit hour requirements beyond those course requirements specified above. Other courses may be used to satisfy the requirements only if they are listed in the topic areas above or in a program or study that has been approved by the department prior to enrollment in the course.

4. Satisfactory completion of a master's thesis. A maximum of 12 hours of independent study (CEG 795) and thesis (CEG 799) may be included in the program of study.

Nonthesis Option

1. Completion of 48 graduate credit hours in an approved program of study, including 32 hours of formal coursework at the 700/800 level, of which at least 12 credit hours of formal coursework at the 700-800 level must be taken in the computer engineering specialty (courses with a CEG prefix).
2. Completion of at least one course at Wright State University in each of the following areas, selected from the courses listed for each area:
   
   CEG Systems: CEG 602, CS 607, CS 609, CEG 634, CS 714, CEG 730, CEG 830, EE 701, EE 710, EE 761
   
   Software: CEG 660, CEG 760, CEG 763, CEG 860, CS 605, CS 701, CS 702
   
   Hardware: CEG 653, CEG 658, CEG 659, CEG 720, CEG 750, CEG 751, CEG 752, CEG 753, CEG 754, CEG 758, CEG 820, EE 649
   
   Engineering Applications: CEG 619, CEG 628, CEG 656, CEG 676, CEG 677, CEG 724, CEG 728, CEG 758, CEG 759, CS 765
   
   3. All CS and CEG graduate courses listed in the catalog, or approved to be listed in the next catalog (except CS 700 and CEG 700), may be used to complete the credit hour requirements beyond those course requirements specified above. Other courses may be used to satisfy the requirements only if they are listed in the topic areas above or in a program of study that has been approved by the department prior to enrollment in the course.
   
   4. A maximum of 4 quarter hours of independent study (CEG 795) may be included in a program of study.

   The Department of Computer Science and Engineering maintains a "three C policy" for graduate students. A graduate student who receives 9 or more credit hours of grades C, D, F, or U in computer science and computer engineering graduate courses will be recommended for dismissal from the degree program. Dismissal action will be taken by the School of Graduate Studies. The rule includes prerequisite courses taken for graduate credit (500/600 level), independent study, and thesis research. Note that repeating a course replaces the grade in the calculation of the GPA but does not remove it from consideration of this rule.

   A maximum of 12 graduate credit hours may be transferred after admission to the computer engineering degree program by petitioning the Graduate Study Committee.

   Students who have been employed as teaching or research assistants through the School of Graduate Studies are required to complete the thesis option.

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**Faculty in the Department of Computer Science and Engineering**

Faculty in the Department of Computer Science and Engineering are leaders among universities in Ohio with doctoral programs in computer science in obtaining awards from the National Science Foundation (NSF). The average NSF award per faculty member exceeds $165,000.

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**Computer Science**

The Department of Computer Science and Engineering offers a program of graduate study leading to the Master of Science in Computer Science degree.

The program balances theory, software, hardware, and practice with degree requirements concentrated in the areas of theory and software. Most courses are offered in the late afternoon to allow practicing computer professionals to begin the program on a part-time basis.

The department also offers the Master of Science in Computer Engineering degree and the Ph.D. in computer science and engineering, as well as graduate certificates in Database Management and Design, Software Engineering, and Software Management.

---

**The Graduate Faculty**

**Professors**

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Chien-Hen Chen, computer aided design, simulation and testing of VLSI circuits and systems, specifically testability, synthesis, timing analysis and optimization for DSM ICs, and chip design for signal processing, communication, and networking applications.
Admission

Students may be admitted to the graduate program in computer science with a baccalaureate degree in computer science, computer engineering, or a related area and appropriate experience; satisfaction of the admission requirements as set forth by the School of Graduate Studies; and a record that indicates potential for a professional career in computer science and/or computer engineering as evaluated by the department’s admission committee.

Students should come to the program with a knowledge of higher-level programming languages, data structures, concurrent programming, computer organization, operating systems, and digital hardware design. It may be possible to make up minor background deficiencies after admission to the program by taking appropriate courses.

Facilities

A wide range of computing systems interconnected via the campus-wide network supports the program. Full Internet connectivity is provided from campus labs and from residence halls. A variety of high-end and special-purpose systems are available for research efforts through the Ohio Supercomputer Center. Wright State University is also an Internet 2 member. University and college systems include a variety of servers and workstations running current popular operating systems, including UNIX systems from SGI, Sun, and Compaq (formerly DEC), and a variety of personal computer labs featuring current versions of Windows, Windows NT, and Mac OS. Department facilities provide specialized computer-aided design (CAD) for VLSI circuits and systems, fault tolerance, built-in-self-test (BIST) for VLSI circuits and systems, automatic test insertion for mixed-signal circuits.

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Kuldip S. Rattan (Department of Electrical Engineering), fuzzy control, robotics, digital control systems, prosthetic/orthotics and microprocessor applications.

Thomas A. Sudkamp, fuzzy set theory, soft computing, approximate reasoning.

Associate Professors

Soon M. Chung, database, data mining, multimedia, parallel processing, computer architecture.

Guozhu Dong, database systems, data mining and knowledge discovery, data warehousing and integration, data cubes and OLAP, bioinformatics.

Prabhaker Mateti, distributed computing, Internet security, formal methods in software design.

Francis K. H. Quek, human-computer interaction related to computer vision, biomedical imaging, computer vision, robot navigation.

Mateen M. Rizki, evolutionary computation, pattern recognition, image processing, machine intelligence.

Krishnaprasad Thirunarayan, knowledge representation and reasoning, programming languages: specification, design and implementation.

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Michael T. Cox, intelligent interfaces, case-based reasoning, automated planning, machine learning, natural language processing.

Travis E. Doom, computational biology, digital design automation, computer architecture and operating systems, computational mathematics and theory.
systems and support equipment tailored to specific curriculum and research areas. These include an SGI Origin 2000 system with 32 parallel processors, an NCR Teradata 4800, an 8-processor SGI Onyx 2 system, a Linux-based Operating Systems and Internet Security lab, and a variety of workstations and personal computers providing software tools for project design and development. The program has laboratories dedicated to student and faculty study and research in the areas of human-computer interaction, vision interfaces and systems, intelligent systems, parallel and distributed computing, pattern analysis and machine intelligence, software engineering, collaboration and cognition, fuzzy systems, adaptive vision, optical computing, computer networking, neural dynamics and controls, and bioinformatics.

Research

A steadily increasing number of funded research projects support modern graduate research in such areas as database systems, knowledge-based systems, knowledge discovery from databases, parallel and distributed computing, machine intelligence, hardware systems and communications, neural networks, software systems and engineering, computer graphics and visualization, human-computer interaction, optical computing, and robotics. A strong research faculty in the Department of Computer Science and Engineering is assisted by qualified research faculty in mathematics, statistics, and electrical engineering.

Recent and current sources of research support include federal agencies, military agencies, and local industries. Research at Wright State University is not limited to on-campus laboratory facilities. Several industrial laboratories, Wright-Patterson Air Force Base laboratories, and the Major Shared Resource Center at Wright-Patterson Air Force Base are involved in joint research efforts with the university. The Information Technology Research Institute (ITRI) is closely associated with the Department of Computer Science and Engineering in seeking and pursuing research and development opportunities with state and federal agencies and local information-intensive industries.

Graduate Assistantships

Teaching assistantships are available on a competitive basis for students who have established strong academic credentials and can demonstrate good communication and teaching skills. A number of departmental research assistantships are awarded annually based on exceptional performance or potential. Additional graduate support is available in the form of assistantships associated with research projects of the faculty. Scholarships are also available from the Dayton Area Graduate Studies Institute (DAGSI). Application forms for these assistantships and scholarships are available from the department for students admitted to the graduate program.

Degree Requirements

Master of Science Degree in Computer Science

Requirements for the Master of Science in Computer Science degree are a department-approved program that must include the following:

Thesis Option

1. Completion of 48 graduate credit hours in an approved program of study, including 20 hours of formal coursework at the 700/800 level, of which at least 12 credit hours of formal coursework at the 700-800 level must be taken in the Computer Science specialty (courses with a CS prefix).

2. Completion of at least one course at Wright State University in each of the following areas, selected from the courses listed for each area:

   - CS Systems: CEG 602, CS 607, CS 609, CEG 634, CS 714, CEG 720, CEG 730, CEG 830
   - Software: CEG 660, CEG 760, CEG 763, CEG 860, CS 605, CS 701, CS 801
   - Language: CS 680, CS 774, CS 776, CS 780, CS 781, CS 784, CS 884
   - Computer Science Theory: CS 610, CS 658, CS 666, CS 740, CS 840

3. All CS and CEG graduate courses listed in the catalog, or approved to be listed in the next catalog (except CS 700 and CEG 700), may be used to complete the credit hour requirements beyond those course requirements specified above. Other courses may be used to satisfy the requirements only if they are listed in the topic areas above or in a program of study that has been approved by the department prior to enrollment in the course.

4. Satisfactory completion of a master’s thesis with maximum of 12 hours of independent study (CS 795) and thesis (CS 799) included in the program of study.
Nonthesis Option

1. Completion of 48 graduate credit hours in an approved program of study, including 32 hours of formal coursework at the 700/800 level, of which at least 12 hours of formal coursework at the 700-800 level must be taken in the Computer Science specialty (courses with a CS prefix).

2. Completion of at least one course at Wright State University in each of the following areas, selected from the courses listed for each area:
   - CS Systems: CEG 602, CS 607, CS 609, CEG 634, CS 714, CEG 720, CEG 730, CEG 830
   - Software: CEG 660, CEG 760, CEG 763, CEG 860, CS 605, CS 701, CS 702
   - Language: CS 680, CS 774, CS 776, CS 780, CS 781, CS 784, CS 884
   - Computer Science Theory: CS 610, CS 658, CS 666, CS 740, CS 840

3. All CS and CEG graduate courses listed in the catalog, or approved to be listed in the next catalog, except CS 700 and CEG 700, may be used to complete the credit hour requirements beyond those course requirements specified above. Other courses may be used to satisfy the requirements only if they are listed in the topic areas above or in a program of study that has been approved by the department prior to enrollment in the course.

4. A maximum of 4 quarter hours of independent study (CS 795) may be included in the program of study.

The Department of Computer Science and Engineering maintains a “three C policy” for graduate students: a graduate student who receives 9 or more credit hours of grades C, D, F, or U in computer science and computer engineering graduate courses will be recommended for dismissal from the degree program. Dismissal action will be taken by the School of Graduate Studies. The rule includes prerequisite courses taken for graduate credit (500/600 level), independent study, and thesis research. Note that repeating a course replaces the grade in the calculation of the GPA, but does not remove it from consideration of this rule.

A maximum of 12 graduate credit hours may be transferred after admission to the computer science degree program by petitioning the Graduate Study Committee.

Students who have been employed as teaching or research assistants through the School of Graduate Studies are required to complete the thesis option.

Computer Science and Engineering Certificate Programs

The Department of Computer Science and Engineering offers three graduate certificate programs designed to provide up-to-date technical knowledge and experience in the rapidly evolving computer software environment to practitioners desiring to upgrade their knowledge of modern software engineering, software management, or database management and design practices and methodologies.

The objective of these programs is to provide timely technical experience in the fundamentals and methodologies of modern software engineering practices, modern software management practices, and modern database management design practices for experienced practitioners of more classical approaches.

Admission

Admission requirements are a baccalaureate degree in computer science, computer engineering, or closely related field, and at least three years of industrial experience in the programming field. Students must be admitted to the School of Graduate studies in non-degree status and must also submit a certificate program application to the department.

Graduate Certificate in Software Engineering

Program Requirements

- CS 600 Data Structures and Software Design
- CEG 660 Introduction to Software Engineering
- CEG 661 Object-Oriented Programming and Design
- CEG 663 Personal Software Development Process

Graduate Certificate in Software Management

Program Requirements

- CS 600 Data Structures and Software Design
- CEG 660 Introduction to Software Engineering
- CEG 663 Personal Software Development Process
- CEG 668 Managing the Software Development Process

Graduate Certificate in Database Management and Design

Program Requirements

- CS 600 Data Structures and Software Design
- CEG 605 Introduction to Database Management Systems
- CS 701 Database Systems and Design I
- CS 801 Database Systems and Design II
Note: For all certificates, a minimum of 12 quarter credit hours of formal course work must be taken at Wright State University. The CS 600 requirement may be waived based on prior accredited relevant course work or very extensive industrial experience in the software area.

## Computer Science and Engineering Ph.D.

The Department of Computer Science and Engineering offers a program of graduate study leading to the Doctor of Philosophy degree in computer science and engineering. The Ph.D. degree is awarded for demonstrated, scholarly excellence in study and research that provides a significant contribution to the fields of computer science or computer engineering. The program requires a concentration of study and research in specific areas of computer science and engineering. Programmatic strength lies in the unique blend of faculty expertise, in the combination of theory with software and hardware design, and in the laboratory facilities available to the program.

Most courses are offered in the late afternoon to allow practicing computer professionals to begin the program on a part-time basis.

The department also offers Master of Science in Computer Science and Master of Science in Computer Engineering degrees, as well as graduate certificates in Database Management and Design, Software Engineering, and Software Management.

### The Graduate Faculty

#### Professors

Nikolaos G. Bourbakis, (director, Information Technology Research Institute), information security (encryption, information hiding, compression), computer systems (distributed, formal languages, processors, modeling), applied artificial intelligence (knowledge representation, planning, learning, autonomous agents, natural language processing), machine vision and image processing (architectures, languages, algorithms), Robotics (navigation, grasping, 3-D space maps, walking)

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Michael L. Raymer, evolutionary computation, machine learning, pattern recognition, computational biology, protein structure and function, protein-water interactions, bioinformatics.

Bin Wang, communications networks, quality of service provisioning, routing, wireless networks, WDM optical networks, reliable multicast and congestion management, protocol design and development, stochastic modeling and queuing analysis, simulation optimization.

Admission

Students may be admitted to the Ph.D. program in Computer Science and Engineering with a baccalaureate degree or a master's degree in computer science, computer engineering, or a related area and appropriate experience; satisfaction of the admission requirements as set forth by the School of Graduate Studies; and a record that indicates potential for a career in computer science and engineering research, as evaluated by the department's admission committee.

Students should come to the program with a knowledge of higher-level programming languages, data structures, real-time programming, computer organization, formal languages, operating systems, and computer systems design. It may be possible to make up minor background deficiencies after admission to the program by taking appropriate courses.

Facilities

A wide range of computing systems interconnected via the campus-wide network supports the program. Full Internet connectivity is provided from campus labs and from residence halls. A variety of high-end and special-purpose systems are available for research efforts through the Ohio Supercomputer Center. Wright State University is also an Internet 2 member. University and college systems include a variety of servers and workstations running current popular operating systems, including UNIX systems from SGI, Sun, and Compaq (formerly DEC), and a variety of personal computer labs featuring current versions of Windows, Windows NT, and Mac OS. Department facilities provide specialized systems and support equipment tailored to specific curriculum and research areas. These include an SGI Origin 2000 system with 32 parallel processors, an NCR Teradata 4800, an 8-processor SGI Onyx 2 system, a Linux-based Operating Systems and Internet Security lab, and a variety of workstations and personal computers providing software tools for project design and development. The program has laboratories dedicated to student and faculty study and research in the areas of human-computer interaction, vision interfaces and systems, intelligent systems, parallel and distributed computing, pattern analysis and machine intelligence, software engineering, collaboration and cognition, fuzzy systems, adaptive vision, optical computing, computer networking, neural dynamics and controls, and bioinformatics.

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A strong research faculty in the Department of Computer Science and Engineering is assisted by qualified research faculty in mathematics, statistics, and electrical engineering.

Recent and current sources of research support include federal agencies, military agencies, and local industries. Research at Wright State University is not limited to on-campus laboratory facilities. Several industrial laboratories, Wright-Patterson Air Force Base laboratories, and the Major Shared Resource Center at Wright-Patterson Air Force Base are involved in joint research efforts with the university. The Information Technology Research Institute (ITRI) is closely associated with the Department of Computer Science and Engineering in seeking and pursuing research and development opportunities with state and federal agencies and local information-intensive industries.

Graduate Assistantships

Teaching assistantships are available on a competitive basis for students who have established strong academic credentials and can demonstrate good communication and teaching skills. A number of departmental research assistantships are awarded annually based on exceptional performance or potential. Additional graduate support is available in the form of
assistantships associated with research projects of the faculty. Scholarships are also available from the Dayton Area Graduate Studies Institute (DAGSI), and through the Information Technology Research Institute. Application forms for these assistantships and scholarships are available from the department for students admitted to the graduate program.

Degree Requirements

Doctor of Philosophy Degree in Computer Science and Engineering

A student entering the program with a Bachelor of Science or Bachelor of Arts degree must complete a minimum of 136 credit hours. A student entering the program with a master's degree in computer science, computer engineering, or a related field from a regionally accredited university must complete a minimum of 91 credit hours. The program must be completed with a minimum grade point average of 3.0.

The following course requirements must be satisfied in completing the necessary number of credit hours:

1. Course Requirements:
   A student must complete a minimum of 76 hours of course work at the graduate level. CS 600/CEG 633 will not be counted toward meeting this requirement.

   The 76 credit hours in courses must include:
   At least 40 hours of formal computer science and computer engineering courses available to graduate students only (CS/CEG 700/800 level), including at least eight quarter hours of formal 800 level courses. A course other than those listed may be used to satisfy the graduate only course requirement if it is part of a coherent program and has received approval from the Graduate Studies Committee prior to enrollment in the course.
   At least 24 hours of graduate level CSE technical electives including at least 8 hours of formal course work.
   At least 12 credit hours of graduate courses outside of the CSE Department, e.g. mathematics or statistics, electrical engineering, psychology, biology, etc.
   Courses that are co-listed as CS or CEG cannot be used toward this requirement except MTH 607, MTH 619, MTH 656, MTH 658, EE 619, EE 654, EE 656, EE 658, EE 659, and HFE 665.

   Formal Courses:
   For the purposes of the course requirements given above, a formal course is defined as follows:

   A formal course meets on a regularly scheduled basis throughout the quarter as specified in the quarterly university bulletin. In a formal course, a faculty member delivers a series of lectures and students are evaluated using a combination of projects, presentations, and examinations. Consequently, this excludes seminars, independent study, thesis research, dissertation research, principles of instruction, or other directed research hours. However, the 24 hours of graduate level CSE technical electives allows for 16 hours of independent study type courses, but not thesis or dissertation research.

2. Additional Requirements:
   The student's program of study must include:
   A minimum of 2 credit hours in a Ph.D. Seminar (CS 891 or CEG 891)
   Registration for the Ph.D. Qualifying Examination (CS 892 or CEG 892)
   Registration for the Candidacy Examination (CS 894 or CEG 894)
   Registration for the Dissertation Defense (CS 896 or CEG 896)
   Registration for the 36 hours of Residency Research (CS 897 or CEG 897)

3. Qualifying Examination:
   Students entering the Ph.D. program with a master's degree must demonstrate proficiency in computer science and engineering by passing the qualifying examination within five enrolled quarters of admission into the program. Students entering with a bachelor's degree must pass the examination within eight enrolled quarters.
   The qualifying examination is designed to ascertain the student's depth of knowledge in selected areas of computer science and engineering, and explore the student's ability to integrate concepts and ideas to form solutions for complex problems and applications.
   The examination will cover three core areas of computer science and engineering:

   1. operating systems
   2. computer architecture
   3. mathematical foundations of
      a. computer science
      b. computer engineering

   The student must take examinations in areas 1, 2, and 3a or 3b. The department maintains a syllabus for each examination. The content of the examinations is not directly tied to a set of formal courses that the student must complete prior to attempting the examination. Students who have completed graduate level course work in the
three core areas should be able to pass the examination by reviewing materials described in the examination syllabi.

The qualifying examination will be offered twice a year, at the beginning of winter quarter and the end of spring quarter.

Students not passing the examination on the first attempt will be given a grade of U, but will be given one additional opportunity to pass the examination at the next available offering. Any student who fails to pass the examination on the second attempt will be dismissed from the program.

4. Residency Research:
A student must enroll in three quarters over two consecutive years of Residency Research (CS/CEG 897). A student will generally enroll in residency research after completing the Ph.D. Qualifying Examination. Enrollment in residency research prior to completion of the Qualifying Examination will be permitted only by the petition to the Graduate Studies Committee.

5. Course Grade Requirements:
Prior to taking the Candidacy Examination, a student must meet all of the following course grade requirements at the same time.

Out of the following three areas, a student must have:
1) at least three A's in a concentration area,
2) at least one course from each of the other two areas,
3) at least a G.P.A. of 3.3 in each of the three areas

Students transferring directly to the Ph.D. program from another institution may count graduate-level courses with grades to meet the grade requirements through a petition process.

Area 1. Machine Intelligence and Human Computer Interaction
CS 711 Knowledge-Based Systems in AI
CS 712 Advanced Topics in AI
CS 714 Machine Learning I
CS 765 Foundations of Neurocomputing
CS 766 Evolutionary Computing
CS 767 Fuzzy Set Theory and Approximate Reasoning
CS 771 Natural Language Processing Techniques
CS 772 Advanced Natural Language Processing Concepts
CS 865 Advanced Topics in Soft Computing
CEG 724 Computer Vision
CEG 725 Computer Vision II
CEG 756 Robotics I
CEG 759 AI in Robotics
CEG 770 Computer Engineering Mathematics

Area 2. Database and Software Systems
CS 701 Database Systems and Design
CS 740 Computational Complexity and Algorithm Analysis
CS 774 Logic Programming
CS 776 Functional Programming
CS 780 Compiler Design and Construction
CS 781 Compiler Design and Construction II
CS 782 Compiler Design and Construction III
CS 784 Programming Languages
CS 801 Advanced Topics in Database Systems
CS 840 Advanced Topics in the Theory of Computation
CS 884 Advanced Topics in Programming Languages
CEG 730 Distributed Computing Principals
CEG 760 Advanced Software Engineering
CEG 763 Formal Methods in Software Engineering
CEG 830 Distributed Computing Systems
CEG 860 Object-Oriented Programming

Area 3. Computing Systems and Technologies
CS 716 Numerical Analysis I
CS 717 Numerical Analysis II
CS 735 Evaluation and Prediction of System Performance
CEG 720 Computer Architecture
CEG 728 Introduction to Optical Computing
CEG 729 Optical Computer Architectures
CEG 750 Microprocessors
CEG 751 Microprocessors II
CEG 752 VLSI Subsystem Design
CEG 754 VLSI Testing and Design for Testability
CEG 758 CMOS Analog IC Design
CEG 820 Computer Architecture II

6. Candidacy Examination:
The Candidacy Examination permits the student to present his/her proposed research to the dissertation committee and the public. The dissertation committee may be formed only after completion of the Qualifying Examination, but prior to the Candidacy Examination. It is the responsibility of the student to find a faculty member who agrees to be the dissertation director and who will supervise the student's research. The dissertation director, in consultation with the dissertation committee, will determine when the student has identified a program of research suitable for a Ph.D. dissertation and is prepared to take the Candidacy Examination. The examination will consist of a public presentation of the proposed research and a question-and-answer period. The dissertation committee may also have an interrogatory session with the student that is closed to the public. Unanimous consent of the dissertation committee is required to pass the Candidacy Examination.
The research proposal must exhibit the student’s thorough background knowledge of the research area, indicate previous work in the area, and explicitly outline the proposed research to be undertaken in the dissertation.

7. Dissertation Defense:
   In the Dissertation Defense, the student presents the results of his/her research to the dissertation committee and the public. The dissertation director, in consultation with the dissertation committee, will determine when the student has completed sufficient research to defend the dissertation. The dissertation director is the chair of the Dissertation Defense. The examination consists of a public presentation of the student’s research and a question-and-answer period. The dissertation committee may also have an interrogatory session with the student that is closed to the public. Unanimous consent of the dissertation committee is required to pass the Dissertation Defense.

8. Time Limit:
   Students must complete all the requirements for a doctoral degree within 10 years from the date that student was admitted to the Ph.D. program.

   The department has a three C rule for graduate students. A graduate student who receives 9 or more credit hours of grades C, D, F, or U in computer science or computer engineering graduate courses will be recommended for dismissal from the program. The rule includes prerequisite courses taken for graduate study, independent study, and thesis or dissertation research. Dismissal action will be taken by the School of Graduate Studies.

Database Management and Design
See Computer Science and Engineering Certificate Programs

Earth Science
See Geological Sciences

Economic Education

The Center for Economic Education has been established as a center of excellence to increase economic understanding in a designated 15-county area through a number of community outreach programs. The center offers courses designed for the special needs of kindergarten through twelfth grade teachers and administrators. Each course helps participants develop an understanding of economic principles and concepts and demonstrates materials and methods useful in teaching the K-12 curricula. Participants are challenged to develop teaching units for their classrooms or schools. Although graduate credit is awarded for these courses, this credit may not be applied toward the M.B.A. or M.S. in Social and Applied Economics degrees.

The Center for Economic Education offers in-service training to teachers on a wide range of educational topics. Workshops provide a practical approach to teaching that can be useful in preparing for proficiency testing.

Economics

The Department of Economics offers a professionally oriented graduate program that leads to a Master of Science degree in Social and Applied Economics. This program is designed to develop professional economists who can solve contemporary economic problems with a unique set of skills created by a curriculum that combines applied economics with social economics. In doing so, the program bridges the gap between...
research and the application of research for use in a wide variety of business and government professions. Students are encouraged to develop and evaluate new approaches to economic problem solving. The curriculum stresses research and field experience, which is complemented by the faculty's teaching and research emphasis on the interplay of theory and applications.

The Graduate Faculty

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**Professors**

John P. Blair, urban and regional economics, economic policy, public finance

Rudy Fichtenbaum, econometrics, labor economics, macroeconomics, health economics

Rishi Kumar, international economics, economics of development, comparative economic systems, economic theory, monetary and fiscal policy

Robert Premus, regional-urban economics, public finance, economic theory, monetary economics

Stephen M. Renas, cost-benefit analysis and public project evaluation, macroeconomics, monetary theory, environmental economics, financial institutions and markets

G. Thomas Sav, microeconomics, public finance, energy economics, property rights

James A. Swaney, history of economic thought, methodology, environmental and resource economics

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**Associate Professors**

Tran Huu Dung, microeconomics, international economics, physical economics

Paulette Olson, labor economics, history of economic thought, methodology, economics of gender

Thomas Traynor (chair), forecasting, econometrics, industrial organization, microeconomics

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**Assistant Professors**

Barbara E. Hopkins, comparative economic institutions, development economics, gender analysis, economics of the Pacific Rim

Ryan W. Osborne, microeconomic theory, law and economics, public choice, international economics

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**Admission**

An application for graduate study in the social and applied economics program is required to meet the general requirements of the School of Graduate Studies and also to be accepted by the Graduate Studies Committee of the Department of Economics. Students need not have an undergraduate degree in economics to enter this program. The Graduate Record Examination (GRE) general test is required. (Students selecting to do the dual degree with the MBA may substitute the GMAT for the GRE.) Application forms for admission and for the GRE are available in the office of the chair of the Department of Economics or from the School of Graduate Studies. Both full- and part-time students are accepted for admission to the program.

**Degree Requirements**

Candidates for the Master of Science degree in Social and Applied Economics must successfully complete a minimum of 48 credit hours in courses numbered 600 or above, exclusive of prerequisite survey courses. Of the total 48 hours, 42 must be taken in the department (36 credit hours of courses plus six credit hours of internship). Students must achieve a cumulative grade point average of 3.0 in all graduate courses exclusive of the internship, which requires a grade of pass. No more than nine credit hours of C grades may be applied toward the degree. As many as 12 graduate credit hours may be transferred into the M.S. program in social and applied economics by petition to the Graduate Studies Committee in the Department of Economics and subject to approval by the School of Graduate Studies.

All candidates are required to complete an internship. Prior to the internship, students should have completed a minimum of 24 credit hours (including EC 709 and EC 712). Approval by the student's advisor and the Graduate Studies Committee of the department is also required. Detailed information on internship objectives, standards, and supervision is available upon request from the director of the M.S. in economics program.

In very rare cases, the Graduate Studies Committee of the Department of Economics may require a student to take and pass a comprehensive written and/or oral examination as a degree requirement.
Prerequisites

A bachelor's degree in economics is not required prior to entering the program; however, basic courses in economics principles, introductory statistics, and calculus are minimum requirements. Students who have not had these courses or the equivalent should complete these courses before entering the program. Upon approval of the Graduate Studies Committee of the Department of Economics, students may make up deficiencies in program prerequisites after admission to the program, but before taking courses requiring these specific prerequisites. The following survey courses have been designed to meet the program prerequisites: MBA 581 (for calculus), MBA 582 (for statistics), and EC 521 and 522 (for principles of micro- and macroeconomics). For full-time students, these requirements must be completed prior to the fall quarter entry date.

Program of Study

Any modification of the following program requirements requires petition approval by the department, college, and university graduate studies committees.

Required Courses 33

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EC 625</td>
<td>Development of Economic Thought</td>
<td>3</td>
</tr>
<tr>
<td>EC 709</td>
<td>Econometrics and Its Applications</td>
<td>3</td>
</tr>
<tr>
<td>EC 712</td>
<td>Forecasting Economic Activity</td>
<td>3</td>
</tr>
<tr>
<td>EC 715</td>
<td>Applied Microeconomics</td>
<td>3</td>
</tr>
<tr>
<td>EC 717</td>
<td>Applied Macroeconomics</td>
<td>3</td>
</tr>
<tr>
<td>EC 721</td>
<td>Contemporary Political Economy</td>
<td>3</td>
</tr>
<tr>
<td>EC 725</td>
<td>Economic and Social Systems</td>
<td>3</td>
</tr>
<tr>
<td>EC 780</td>
<td>Economic Problems Seminars</td>
<td>3</td>
</tr>
<tr>
<td>EC 785</td>
<td>Internship*</td>
<td>6</td>
</tr>
</tbody>
</table>

Choose one of the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EC 635</td>
<td>Comparative Economic Systems</td>
<td>3</td>
</tr>
<tr>
<td>EC 641</td>
<td>International Trade and the Economy</td>
<td>3</td>
</tr>
<tr>
<td>EC 642</td>
<td>International Monetary Theory and Problems</td>
<td>3</td>
</tr>
<tr>
<td>EC 644</td>
<td>Economic Development and World Poverty</td>
<td>3</td>
</tr>
</tbody>
</table>

Electives 15

Choose five courses:

Three courses must be in economics, of which two must be at the 700 level. Two courses may be noneconomics. Approval of advisor is required for electives taken outside of the Raj Soin College of Business.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economics</td>
<td></td>
<td>9-15</td>
</tr>
<tr>
<td>Noneconomics</td>
<td></td>
<td>0-6</td>
</tr>
</tbody>
</table>

Total 48

*Students may serve the internship with a private or public institution, participate in a faculty research project, or, with the approval of the department, develop an individual field research project.

Dual Degree with M.B.A.

Students may obtain both the Master of Business Administration degree and the Master of Science degree in Social and Applied Economics under the dual-degree program, which permits common course work to apply to both programs. This policy does not apply to students who receive an M.B.A. degree from schools other than Wright State. For further information, contact the director of the M.S. program in economics or the director of the M.B.A. program.

Graduate Assistantship

Assistantships are available on a competitive basis for the first year of study. Undergraduate GPA, GRE scores, letters of recommendation, TOEFL score, and other materials are used in the assistantship decision. Funding will be continued in the second year for those students making satisfactory progress. The department reserves the right to adjust the level of funding conditional on the availability of funds and the student's academic progress. Assistantships require students to spend a specified amount of time assisting either in instruction or in research. The balance of their time is devoted to graduate studies. Graduate assistants are required by the graduate school to register for a minimum of eight hours of graduate credit per quarter (a maximum of six credit hours for each five-week summer term is considered the normal load).

Financial Aid/Graduate Academic Fellowships

Other financial assistance programs are available for graduate students. This assistance may be provided through financial aid and/or graduate academic fellowships. For further information concerning financial aid, please contact the Office of Financial Aid. Information regarding graduate academic fellowships may be obtained by contacting the director of the graduate program.
Courses Offered

The economic course descriptions listed on pages 209-212 represent the range of graduate courses offered at Wright State by the Raj Soin College of Business. Not all courses described are offered every quarter or every year. For a more detailed listing of prerequisites, enrollment restrictions, and specific courses offered in a particular quarter, consult the Wright State class schedule published each fall, winter, spring, and summer quarters:
Education and Human Services

The College of Education and Human Services offers programs leading to graduate degrees in the following areas: educational leadership, with programs in curriculum and supervision (M.A., M.Ed.) and school administration (M.A., M.Ed.); teacher leadership (M.Ed.), the M.A., M.Ed. in student affairs in higher education, and Ed.S. in adult and higher education; human services with programs in counseling (M.A., M.S.), rehabilitation counseling (M.R.C.), and student personnel services (M.A., M.Ed.); and teacher education, with a classroom teacher program (M.A., M.Ed.) that includes a variety of concentrations and specialized areas in K–12 such as art, physical education, reading, and special education. Concentrations in these programs are listed in the graduate programs section in the first chapter and are described in detail in the following pages.

Wright State also offers a post-master's degree program leading to the educational specialist (Ed.S.) degree.

U.S. News & World Report listed Wright State’s online Master’s Degree in Rehabilitation Counseling as one of the nation’s best online graduate degree programs offered by a regionally-accredited university.

The Graduate Faculty

Professors
Gregory R. Bernhardt (dean), education, counselor education
Donna Cole, teacher education
Diane E. Frey, counselor education
G. William Gayle, health and physical education
Glenn T. Graham, educational leadership
T. Stevenson Hansell, reading, language arts
Jan La Forge, rehabilitation counseling
Bonnie K. Mathies, educational technology
Charles W. Ryan, educational leadership, counselor education

Associate Professors
Thomas Diamantes, educational leadership
Colleen Finegan, early childhood education
Stephen Fortson, counselor education

Stephen D. Frederick, health and physical education
Samuel T. Harris, early childhood education
Ron Helms, teacher education
Phyllis A. Henderson, counselor education
Mary Ann Jones, counselor education
Burga Jung, teacher education
Susann Mathews, mathematics education
June A. Ovington, educational leadership
D. Drew Pringle, health and physical education
Linda Ramey, teacher education
Patricia Renick, special education
James Tomlin, science education/biology
Carol Wagner Williams, rehabilitation counseling
Richard Wantz, counselor education

Assistant Professors
Kathy Adams, educational leadership
Mary Ellen Bargerhuff, special education
Beth Basista, science education/physics
Angela Beumer-Johnson, English education
Roger Carlsen, educational leadership
James Dunne, special education
Scott Graham, educational leadership/organizational leadership
Grant Hambright, educational leadership
Charlotte Harris, teacher education
Doris Johnson, teacher education
Joseph Keferl, rehabilitation counseling
Tim Kerlin, educational leadership/workforce education
Susan Kirch, biology and science education
Jill Lindsey-North, educational leadership
Richelle O’Connor, teacher education
Timothy Rafferty, educational leadership
Joanne Risacher, educational leader/student affairs in higher education
Doug Roby, educational leadership
Tracy Rusch, mathematics education
Ken Schatzmeyer, literacy education
Eileen F. Self, counselor education
William Slattery, science education/geology
Donna Tromski, counselor education

Lecturer
Tony Ortiz, athletic training
Admission

In addition to meeting requirements for admission established by the School of Graduate Studies, candidates for these degrees who do not meet the minimum cumulative GPA requirement to waive the GRE or MAT, must submit satisfactory Graduate Record Examination (GRE) or Miller Analogies Test (MAT) scores, unless otherwise noted (see Admission Standards). The Adolescent Young Adult, Multi-Age, and Middle Childhood initial teacher licensure programs require passing scores on the state of Ohio’s mandated Praxis II Specialty (Content) Area Exam(s). Contact the college’s Office of Student Services or visit their Web site at www.ed.wright.edu/ss to learn more about the Praxis II exams.

All students considering graduate-level courses in education and human services should do so with the understanding that graduate study differs in quality from undergraduate study. Graduate study requires that students be increasingly self-directed. Students are not guaranteed a master’s degree by attending and completing courses. Exit requirements must be met in all programs.

Admission to the College of Education and Human Services is based on the candidate’s written statement of purpose, consideration of undergraduate and/or graduate cumulative grade point average, submission of satisfactory scores on either the MAT, GRE, or other required examination, and in some cases, letters of reference and a personal interview (see Admissions Standards).

Technology Policy

All College of Education and Human Services students, graduate and undergraduate, part-time and full-time, will be expected to certify that they own or have access to a computer and the Internet for admission to the college.

In order to meet the mission of the college “...to prepare professionals to meet the educational and human services needs of a diverse, democratic society,” it is necessary for our students to play an active role in the technological environment the college and Wright State University are creating to assist in the completion of this mission. An increasing number of classes and options will become available to students using a variety of distributed learning formats; library resources are available in a growing number of full-text formats, and global connections via telecommunications will be part of daily operations. Students preparing to become professionals in education and human service areas must demonstrate appropriate and effective skills and knowledge in technological aspects of their work.

Minimum equipment standards will be either a Power Macintosh or Pentium-based Personal Computer (PC). The college supports Macintosh computers in faculty and staff offices and maintains computer labs. Wright State University has purchased a site license for most Microsoft software (see the Web page for Wright State’s Computing and Telecommunications Services, http://www.cats.wright.edu/ for details). The college’s standard software packages are currently Office 2001 (Word, Excel, Powerpoint), FileMaker Pro, and Netscape, the specific packages, however, are subject to change.

Initial Teaching Credential

Students seeking to enroll in a Teacher Education program designed to deliver an initial teaching credential (license) are required to pass the Praxis II specialty/content area exam(s) as defined by current state of Ohio standards. Candidates to these programs must contact the college’s Student Services Office for assistance in identifying the appropriate exam(s) for his/her desired teaching field. Students unable to achieve a passing score as defined by state of Ohio standards will not be admitted to a Teacher Education program. Students seeking to enroll in a Teacher Education program designed to deliver an initial teaching credential will not be required to take the GRE or MAT exams. An exception to this rule are the Intervention Specialist programs and the Early Childhood program. Applicants to these programs must take the GRE or MAT exams, unless eligible to waive testing requirement based on cumulative GPA (see Admission Standards).

Admission Standards

Candidates with a grade point average of less than 2.3 on a 4.0 grading system are not admitted to graduate school. Candidates for admission to the Department of Human Services must meet additional requirements, which include a 2.7 minimum GPA, three letters of reference, a personal interview, and a writing sample. Candidates for admission to certain programs in the Departments of Educational Leadership and Teacher Education must meet additional requirements, which include letters of reference, a personal interview, a writing sample, a self-assessment instrument, and Praxis II specialty area exams.

Candidates to Educational Leadership master’s degree programs, Health, Physical Education, and Recreation (HPR) programs, and select Teacher Education programs may not be required to submit passing GRE or MAT scores if their cumulative undergraduate GPA is a 3.0 or higher (graduate level GPA must be 3.0 or higher.) Candidates to Teacher Education programs requiring a passing score on a Praxis II specialty area exam(s) must submit passing Praxis scores regardless of undergraduate GPA.
Candidates to Human Services programs may not be required to submit passing GRE or MAT scores if their cumulative undergraduate GPA is 3.3 or higher.

**Conditional**

Students who have an undergraduate grade point average of 2.5 or better, or who have an average between 2.3 and 2.5 with 2.7 or better in the last half of undergraduate work, may be granted conditional admission.

Regular admission to the College of Education and Human Services is granted after successful completion of 12 hours of course work with a grade of B or better in each course.

**Licensure Candidate**

Students who wish to complete licensure requirements at the graduate level but do not wish to pursue a graduate degree may be admitted as licensure candidates with the permission of the department in which the programs are housed. See Praxis II testing requirement above.

**Nondegree Status**

Persons who have a bachelor's degree may enroll in nondegree status for graduate courses without being admitted to a graduate program. Only 50 percent of such credits may be applied to a degree program if they are appropriate.

**Degree Requirements**

**Master of Arts**

The Master of Arts (M.A.) degree in education may be obtained in almost all of the programs offered by the College of Education and Human Services. The M.A. degree requires a thesis with a minimum of 45 credit hours, including a maximum of nine hours of thesis credit. An oral defense is required for students writing a thesis. The examining committee will consist of three members of the graduate faculty selected by the student and advisor.

Each graduate student will be assigned an advisor upon admission as a degree student. The student is required to consult with the advisor to plan the program of study during the first quarter of graduate study and to review the procedure for admission to candidacy.

**Master of Education**

A program of concurrent degree and licensure work typically will require more course work than the standard master's degree program, and may require the individual to take undergraduate courses. These undergraduate courses apply to licensure requirements, but do not apply as graduate credit toward a master's degree.

The Master of Education (M.Ed.) degree may be obtained by completing one of three patterns:

(a) a minimum of 45 credit hours of course work,
(b) a minimum of 40 credit hours of course work, plus five credit hours of a research project, or
(c) 73 credit hours to receive the M.Ed. in school counseling.

Each graduate degree student will be assigned an advisor upon admission to the college. The student is required to consult with the advisor to plan the program of study during the first quarter of graduate study and to review the procedure for admission to candidacy.

An exit requirement must be successfully completed at the end of the program of study in all CEHS departments.

**Master of Science**

The Master of Science (M.S.) degree in counseling and guidance offers concentrations in five specialties: mental health counseling, community counseling, business and industrial management counseling, marriage and family counseling, and counseling exceptional children. An M.Ed. in school counseling is also offered.

Admission requirements include a writing sample, three letters of recommendation, and an interview. The Master of Science degree may be obtained by following one of two patterns: either by completing: (a) a minimum of 60-72 credit hours of course work, or (b) a minimum of 55 credit hours plus five hours of a research project.

Each graduate degree student will be assigned an advisor upon admission to the college. The student is required to consult with the advisor to plan the program of study during the first quarter of graduate study and to review the procedure for admission to candidacy.

Successful completion of a written departmental comprehensive examination is required at the end of each program of study.

**Master of Rehabilitation Counseling**

The Master of Rehabilitation Counseling (M.R.C.) program offers training and course work designed to develop skills in the holistic counseling process. The program prepares students for work within a wide variety of settings and students may choose to specialize in either the rehabilitation of persons with severe disabilities or the rehabilitation of the chemically dependent. M.R.C. students must successfully complete a 600-hour internship.

Each graduate degree student will be assigned an advisor upon admission as a degree student. The student is required to consult with the advisor to plan the program of study during the first quarter of graduate study and to review the procedure for admission to candidacy.

Successful completion of a written departmental comprehensive examination is required at the end of the degree program.
**Educational Specialist**

The Educational Specialist (Ed.S.) program is an advanced (post-master’s) degree program in educational leadership for individuals who have career interests in superintendent or central office administration, higher education, administration, and adult continuing education. Successful thesis defense constitutes the comprehensive examination for this degree.

**Final Evaluation for Programs**

For students in the M.A. programs, the oral defense of the thesis constitutes the major emphasis of the final evaluation. The examining committee will consist of three members of the graduate faculty selected with the student’s advisor.

Students in the M.Ed., M.S., M.R.C., and M.A. programs must successfully complete a departmental comprehensive exit requirement. Should the student fail to pass the final comprehensive requirement, the student and advisor will plan a remedial program of study in preparation for reevaluation. Such a program could include independent study, further course work, or both. As a result, the quarter hour requirements for the degree may also be increased. Students may retake the comprehensive examination a maximum of three times.

**Thesis and/or Project Procedures (for M.A. Candidates)**

Students planning to write a thesis or do a research project in partial fulfillment of the requirements for the master’s degree should do the following:

1. Upon completion of EDL 751, (consult with your advisor), register for one of the following to receive thesis credit:
   - ED 899 1–9 hours or
   - EDL 999 1–9 hours.

2. Prepare a preliminary thesis or project proposal following the college or departmental outline for proposals. This proposal is to be developed with the assistance of the faculty advisor.

3. Establish a thesis or project committee. It is customary, although not required, for a student’s advisor to be a member of the committee. The remainder of the committee may include persons in the College of Education and Human Services or other disciplines and should be chosen as resource persons relative to the research. The function of the committee is to facilitate the student’s progress toward completing the proposal, conducting the study, and preparing the final report or thesis. Further, the committee serves as the primary source of evaluation of the student’s oral defense.

4. Upon completion of the oral defense, submit three bound copies of the final project or thesis to the School of Graduate Studies. The outline for thesis and project proposals may be obtained from the college’s Office of Student Services. The Graduate Thesis/Dissertation Handbook may be obtained from the School of Graduate Studies.

**Educational Leadership Department Programs—Overview**

The programs within educational leadership are designed primarily for those who want to prepare for leadership roles in educational settings. All of the programs lead to licensure except the Teacher Leader Program. Completion of a professional, reflective portfolio is the exit requirement for all graduate programs in this department. The programs are:

- **Educational Administrative Specialist:**
  - Curriculum, Instruction, and Professional Development. This master’s degree program leads to licensure in the state of Ohio in this area. Initial licensure requires three years of teaching experience under a valid teaching certificate or license.
  - Principalship. (Ages 3–14 and Ages 8–21). The Principalship master’s degree program leads to the Educational Administrative Specialists Principal Licensure. This master’s degree program leads to principal licensure in the state of Ohio in the same level (elementary, middle, or secondary) as the individual’s teaching certificate or license. Initial licensure requires 56 quarter hours of course work and three years of teaching experience under a valid teaching certificate or license.
  - Superintendent. This program leads to licensure as Superintendent in the state of Ohio. Initial licensure requires 96 quarter hours of course work and three years of administrative experience under a valid administrative license.
  - Curriculum, Instruction, and Professional Development: Technology. This program leads to licensure in the state of Ohio in this area. Initial licensure requires three years of teaching experience under a valid teaching certificate or license. This program is designed for individuals wishing to perform in a district-level leadership role in technology.
  - Teacher Leader. This master’s degree program is designed primarily for teachers who wish to remain in the classroom and combine an instructional improvement focus with leadership and curriculum development skills. The program is offered off campus to cohort groups. Forty-eight quarter hours are required for the M.Ed. successful completion of a professional portfolio is required. This program may be used as a basis for further work in educational leadership.
Student Affairs in Higher Education—Administration. This master's degree program was developed to provide education and training for individuals interested in careers in student services. The emphasis of this program is student affairs and development from an administrative perspective.

Educational Specialist (Ed.S.) in Educational Leadership. This program is an advanced degree program for individuals who have career interests in school administration, higher education, and adult development. It leads to the Educational Specialist degree. A planned program of study requires a minimum of 45 quarter hours of graduate work beyond the master's degree. The Ed.S. degree is an intermediate degree between the M.Ed. and the Ph.D. degree.

Classroom Teacher: Library Media. This program leads to the Multi-Age License in library media for teachers who wish to work in Pre-K-12 library media centers.

Classroom Teacher: Computer/Technology Education. This program leads to a computer/technology endorsement that can be added to a teaching credential. It is designed for teachers who wish to focus on current and emerging technologies for instruction.

Educational Leadership Department Programs

Educational Leadership: Educational Administrative Specialist: Teacher Leader

<table>
<thead>
<tr>
<th>Teacher Leader Course Work</th>
<th>48</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDL 771 Educational Leadership Behavior</td>
<td>4</td>
</tr>
<tr>
<td>EDL 782 School Law</td>
<td>4</td>
</tr>
<tr>
<td>EDL 712 Philosophical and Curricular Foundations</td>
<td>4</td>
</tr>
<tr>
<td>EDL 751 Statistics and Research for Education</td>
<td>4</td>
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<tr>
<td>EDL 713 Applied Psychological Learning Theory</td>
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<tr>
<td>EDL 730 Research on Teaching</td>
<td>4</td>
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<tr>
<td>EDL 775 Instructional Management and Evaluation for School Leaders</td>
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<tr>
<td>EDL 773 Curriculum Development for School Leaders</td>
<td>4</td>
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<tr>
<td>EDL 774 Analysis of Instruction for School Leaders</td>
<td>4</td>
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<tr>
<td>EDL 733 Seminar: Professional Development for Teachers</td>
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<tr>
<td>EDT 786 Applications of Computers in Education</td>
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<tr>
<td>EDL 792 Professional Development and Change: From Theory to Practice</td>
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</tbody>
</table>

Total (minimum) 48

After satisfactorily completing the above requirements, students will be awarded a master's degree in Educational Leadership.

Educational Administrative Specialist: Curriculum, Instruction, and Professional Development

Core Courses (any sequence) 12

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>EDL 712 Applied Psychological Learning Theory</td>
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<tr>
<td>EDL 713 Philosophical and Curricular Foundations</td>
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</tr>
<tr>
<td>EDL 751 Statistics and Research for Education</td>
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Leadership Courses 36

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>EDL 771 Educational Leadership Behavior</td>
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<tr>
<td>EDL 773 Curriculum Development for School Leaders</td>
<td></td>
</tr>
<tr>
<td>EDL 774 Analysis of Instruction for School Leaders</td>
<td></td>
</tr>
<tr>
<td>EDL 775 Instructional Management and Evaluation for School Leaders</td>
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<tr>
<td>EDL 776 Supervision of Instruction and Personnel</td>
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<tr>
<td>EDL 780 Ethics and Politics in Education</td>
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</tr>
<tr>
<td>EDL 782 School Law</td>
<td></td>
</tr>
<tr>
<td>EDL 790 Practicum in Instructional Leadership</td>
<td></td>
</tr>
<tr>
<td>EDL 792 Professional Development and Change: From Theory to Practice</td>
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</tbody>
</table>

Total 48

After satisfactory completion of the above requirements, students will be awarded a master's degree in Educational Leadership.

Courses Required for Completion of Licensure Requirements after Master's Degree 8

<table>
<thead>
<tr>
<th>Course</th>
<th>4</th>
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</thead>
<tbody>
<tr>
<td>EDT 895 Administration and Supervision of Educational Technology</td>
<td></td>
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<tr>
<td>EDL 985 Organizational Dynamics: The Individual and the Organization</td>
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</tr>
</tbody>
</table>

Total for EAS: C&I:PD Licensure 56

Educational Leadership: Principalship (This program leads to the Educational Administrative Specialist: Principal Ages 3–12 and 8–21 license)

Core Courses 12

<table>
<thead>
<tr>
<th>Course</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDL 712 Philosophical and Curricular Foundations</td>
<td></td>
</tr>
<tr>
<td>EDL 713 Applied Psychological Learning Theory</td>
<td></td>
</tr>
<tr>
<td>EDL 751 Statistics and Research for Education</td>
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</table>
**Leadership Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDL 771</td>
<td>Educational Leadership Behavior for School Leaders</td>
<td>4</td>
</tr>
<tr>
<td>EDL 773</td>
<td>Curriculum Development for School Leaders</td>
<td>4</td>
</tr>
<tr>
<td>EDL 775</td>
<td>Instructional Management and Evaluation for School Leaders</td>
<td>4</td>
</tr>
<tr>
<td>EDL 776</td>
<td>Supervision of Instruction and Personnel</td>
<td>4</td>
</tr>
<tr>
<td>EDL 780</td>
<td>Ethics and Politics in Education</td>
<td>4</td>
</tr>
<tr>
<td>EDL 781</td>
<td>School Finance</td>
<td>4</td>
</tr>
<tr>
<td>EDL 782</td>
<td>School Law</td>
<td>4</td>
</tr>
<tr>
<td>EDL 790</td>
<td>Practicum in Instructional Leadership</td>
<td>4</td>
</tr>
<tr>
<td>EDT 895</td>
<td>Administrative Support of Technology</td>
<td>4</td>
</tr>
</tbody>
</table>

**Total** 36

After satisfactory completion of the above requirements, students will be awarded a master's degree.

**Courses Required for Completion of Principal Licensure after Master's Degree**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDL 871</td>
<td>Management of the School</td>
<td>4</td>
</tr>
<tr>
<td>EDL 872</td>
<td>Staff Personnel Administration</td>
<td>4</td>
</tr>
<tr>
<td>EDL 874</td>
<td>School Business Management and Facilities</td>
<td>4</td>
</tr>
<tr>
<td>EDL 890</td>
<td>Practicum in School Administration</td>
<td>4</td>
</tr>
<tr>
<td>EDL 941</td>
<td>Planning Educational Futures</td>
<td>4</td>
</tr>
<tr>
<td>EDL 873</td>
<td>Pupil Personnel Services in the School and Community Resources</td>
<td>4</td>
</tr>
<tr>
<td>EDL 993</td>
<td>School District Business Management</td>
<td>4</td>
</tr>
<tr>
<td>EDL 971</td>
<td>Superintendent/Staff/Board Relations</td>
<td>4</td>
</tr>
<tr>
<td>EDL 987</td>
<td>Administrative Leadership Skills</td>
<td>4</td>
</tr>
<tr>
<td>EDL 986</td>
<td>Organizational Behavior in Education and Human Services</td>
<td>4</td>
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</tbody>
</table>

**Total** 20

**Electives** 8

**Total for Principal Licensure Program** 68

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**Superintendent Licensure**

**Core Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDL 712</td>
<td>Philosophical and Curricular Foundations</td>
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</tr>
<tr>
<td>EDL 713</td>
<td>Applied Psychological Learning Theory</td>
<td>4</td>
</tr>
<tr>
<td>EDL 751</td>
<td>Statistics and Research for Education</td>
<td>4</td>
</tr>
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</table>

**Leadership Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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</tr>
</thead>
<tbody>
<tr>
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<td>Educational Leadership Behavior</td>
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<td>EDL 773</td>
<td>Curriculum Development for School Leaders</td>
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<tr>
<td>EDL 776</td>
<td>Supervision of Instruction and Personnel</td>
<td>4</td>
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<tr>
<td>EDL 780</td>
<td>Ethics and Politics in Education</td>
<td>4</td>
</tr>
<tr>
<td>EDL 781</td>
<td>School Finance</td>
<td>4</td>
</tr>
<tr>
<td>EDL 782</td>
<td>School Law</td>
<td>4</td>
</tr>
<tr>
<td>EDL 790</td>
<td>Practicum in Instructional Leadership</td>
<td>4</td>
</tr>
<tr>
<td>EDT 895</td>
<td>Administrative Support of Educational Technology</td>
<td>4</td>
</tr>
</tbody>
</table>

**Total** 36

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**Total** 48

After satisfactorily completing the above requirements, students will be awarded a master's degree in Educational Leadership.

**Courses required for completion of Superintendent Licensure after completion of master's degree**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDL 871</td>
<td>Management of the School</td>
<td>4</td>
</tr>
<tr>
<td>EDL 872</td>
<td>Staff Personnel Administration</td>
<td>4</td>
</tr>
<tr>
<td>EDL 874</td>
<td>School Business Management and Facilities</td>
<td>4</td>
</tr>
<tr>
<td>EDL 890</td>
<td>Practicum in School Administration</td>
<td>4</td>
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<tr>
<td>EDL 941</td>
<td>Planning Educational Futures</td>
<td>4</td>
</tr>
<tr>
<td>EDL 873</td>
<td>Pupil Personnel Services in the School and Community Resources</td>
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</tr>
<tr>
<td>EDL 993</td>
<td>School District Business Management</td>
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<td>EDL 971</td>
<td>Superintendent/Staff/Board Relations</td>
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</tr>
<tr>
<td>EDL 987</td>
<td>Administrative Leadership Skills</td>
<td>4</td>
</tr>
<tr>
<td>EDL 986</td>
<td>Organizational Behavior in Education and Human Services</td>
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</table>

**Total for Superintendent Licensure 96**

At publication time, the program above is in review. Please see advisor for assistance with planning for this program. Some requirements may be changed.

**Educational Administration Specialist: Curriculum, Instruction and Professional Development—Technology**

**Introductory Course Work**

- To be taken in any sequence during the first 24 credit hours of graduate education course work: (select one from each category)

**Foundations (select one)**
- EDL 712 Philosophical and Curricular Foundations
- EDL 713 Applied Psychological Learning Theory

**Statistics and Research (select one)**
- EDL 751 Statistics and Research for Education
- EDL 852 Advanced Seminar in Educational Research Design and Analysis

**Curriculum**
- EDL 773 Curriculum Development for School Leaders

**Total** 14

To be taken as a prerequisite to other EDT course work:
- EDT 700 Entry Seminar for Educational Technology
Program Concentration—Administrative Specialist/Curriculum and Technology** 43

Technology
EDT 786 Applications of Computers in Education 4
EDT 817 Issues and Implications of Telecommunications 3
EDT 839 Instructional Design and Development 4
EDT 895 Administration and Supervision of Education Technology 4
EDT 975 Directed Study 4

Educational Leadership
EDL 771 Educational Leadership Behavior 4
EDL 774 Analysis of Instruction for School Leaders 4
EDL 776 Supervision of Instruction and Personnel 4
EDL 782 School Law 4
EDL 874 School Business Management and Facilities 4
EDL 985 Organizational Dynamics: The Individual and the Organization 4

Required Exit Course
To be taken at the end of the program of study. EDT 799 Exit Seminar in Educational Technology 2

A department comprehensive portfolio will be required during the final quarter of course work on the program of study.

Total 63

Advanced training requires evidence of leadership in the identification, selection, installation, maintenance, and management of computing hardware and software and the uses of computers and related technologies throughout the curriculum.

Educational Leadership: Student Affairs in Higher Education—Administration
The Student Affairs in Higher Education program was developed to provide education and training for individuals interested in careers in student services. The emphasis of this program is student affairs and development from an administrative perspective. The primary mission of this program is to prepare students for leadership roles in higher education student affairs. Integrating theory and practice, maintaining strong interdisciplinary relationships, fostering high-quality research, and sponsoring activities that enhance the development of professionals are high priorities of the program.

Foundation Course Work 25
EDL 760 Introduction to Student Affairs in Higher Education 4
EDL 761 Theories of Student Development and Assessment 4
EDL 763 Campus Ecology 4
EDL 751 Statistics and Research for Education 4
EDL 765 Practicum in Student Affairs in Higher Education 4
EDL 767 Internship in Student Affairs in Higher Education 5

Professional Requirements 25–33
EDL 762 Student Affairs Administration in Higher Education 4
EDL 764 Process Consultation in Student Affairs in Higher Education 4
EDL 766 Advanced Seminar in Student Affairs in Higher Education 4
EDL 920 History and Philosophy of Higher Education in the U.S. 4
EDL 922 Law of Higher Education 4
EDL 986 Organizational Behavior in Education and Human Services 4
EDL 999 Thesis (Credit Variable) 1–9

Electives 10

Total 60–68

After satisfactorily completing the above requirements, students will be awarded a master's degree in Educational Leadership.

Educational Specialist Programs
The growing complexity of the educational enterprise has created a need for persons with additional training for public and private schools, federally and state-funded programs, higher education, and adult development programs. This Ed.S. program is designed to enhance individual capabilities for leadership in the roles of superintendents, supervisors, principals, higher education staff, and adult development personnel.

The program emphasizes the achievement of competence in such areas as leadership, institutional change, decision making, organizational structure and theory, and communication processes. Further, the program focuses upon the development of broad understanding and experiences across the professional field, the acquisition of in-depth knowledge in a specific area of educational leadership, the acquisition of concepts from related fields of knowledge, and a planned field experience which will integrate the concepts, skills, and attitudes acquired in formal course settings.
Admission to the education specialist degree program is based on the following criteria:
1. Three letters of recommendation from persons who know your work
2. Graduate Record Examination*
3. Appropriate professional experience
4. Interview with members of the Education Leadership faculty
5. A grade point average of 3.5 in previous graduate work
6. Earned master's degree from regionally accredited post-secondary institution.

*Miller Analogies Test is accepted for students not planning to apply to a doctoral program.

**SAMPLE** Ed.S. Superintendent Program

The planned program of study will be individually arranged and will consist of a minimum of 45 quarter hours of graduate work beyond the master's degree. Successful defense of the thesis constitutes the comprehensive examination for this program.

**Required Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDL 852</td>
<td>Statistical Analysis and Research Design</td>
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<tr>
<td>EDL 871</td>
<td>Management of the School</td>
<td>4</td>
</tr>
<tr>
<td>EDL 872</td>
<td>Staff Personnel Administration</td>
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</tr>
<tr>
<td>EDL 873</td>
<td>Pupil Personnel Administration</td>
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</tr>
<tr>
<td>EDL 874</td>
<td>School Business Management and Facilities</td>
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<tr>
<td>EDL 890</td>
<td>Practicum in School Administration</td>
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<td>EDL 941</td>
<td>Planning Educational Futures</td>
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</tr>
<tr>
<td>EDL 971</td>
<td>Superintendent/Staff/Board Relations</td>
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<tr>
<td>EDL 986</td>
<td>Organizational Behavior in Education and Human Services</td>
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<tr>
<td>EDL 987</td>
<td>Administrative Leadership Skills</td>
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<tr>
<td>EDL 999</td>
<td>Thesis</td>
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<tr>
<td>URS 650</td>
<td>Ethics in Public Service (select one)</td>
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<tr>
<td>HPR 740</td>
<td>Administration of Interscholastic Athletics</td>
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<tr>
<td>URS 670</td>
<td>Urban Leadership</td>
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<tr>
<td>URS 710</td>
<td>Environment of Public Administration</td>
<td>4</td>
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</tbody>
</table>

**Total** 47

**Total with master's degree minimum 90**

**SAMPLE** Ed.S. Advanced Curriculum and Instruction Program

The Ed.S. curriculum and instruction concentration is designed for students who are preparing for leadership positions requiring curriculum and instruction expertise.

**Major**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDL 852</td>
<td>Statistical Analysis and Research Design</td>
<td>4</td>
</tr>
<tr>
<td>EDL 941</td>
<td>Planning Educational Futures</td>
<td>4</td>
</tr>
<tr>
<td>EDL 986</td>
<td>Organizational Behavior in Education and Human Services</td>
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<tr>
<td>EDL 987</td>
<td>Administrative Leadership Skills</td>
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<tr>
<td>EDT 895</td>
<td>Administration and Supervision of Educational Technology</td>
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<tr>
<td>Research</td>
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<td>EDL 988</td>
<td>Research and the Educational Leader</td>
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<tr>
<td>EDL 999</td>
<td>Thesis</td>
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<tr>
<td>Cognates/Electives</td>
<td></td>
<td>14</td>
</tr>
</tbody>
</table>

**Total** 45

**SAMPLE** Ed.S. Higher Education/Adult Continuing Education Program

The Ed.S. Higher Education concentration is designed for students who are preparing for leadership positions in post secondary settings.

**Major**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDL 920</td>
<td>History and Philosophy of Higher Education in the United States</td>
<td>4</td>
</tr>
<tr>
<td>EDL 921</td>
<td>Curriculum in Higher Education</td>
<td>4</td>
</tr>
<tr>
<td>EDL 922</td>
<td>Law of Higher Education</td>
<td>4</td>
</tr>
<tr>
<td>EDL 923</td>
<td>Instruction in Higher Education</td>
<td>4</td>
</tr>
<tr>
<td>EDL 924</td>
<td>Administration in Higher Education</td>
<td>4</td>
</tr>
<tr>
<td>EDL 926</td>
<td>The Community College</td>
<td>4</td>
</tr>
<tr>
<td>EDL 928</td>
<td>Internship In Higher Education</td>
<td>4</td>
</tr>
<tr>
<td>EDL 929</td>
<td>Role of Intercollegiate Athletics in Higher Education</td>
<td>4</td>
</tr>
<tr>
<td>EDL 986</td>
<td>Organizational Behavior in Education and Human Services</td>
<td>4</td>
</tr>
<tr>
<td>Research</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>EDL 988</td>
<td>Research and the Educational Leader</td>
<td>3</td>
</tr>
<tr>
<td>EDL 999</td>
<td>Thesis</td>
<td>3</td>
</tr>
<tr>
<td>Cognates/Electives</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

**Total** 45

*Students must complete Educational Statistics prior to enrolling in EDL 999-Thesis.*
Educational Leadership Classroom Teacher Programs

Classroom Teacher: Library/Media

Introductory Course Work 14
To be taken in any sequence during the first 24 credit hours of graduate education course work: (select one from each category)

**Foundations (select one)** 4
EDL 712 Philosophical and Curricular Foundations
EDL 713 Applied Psychological Learning Theory

**Statistics and Research** 4
EDL 751 Statistics and Research for Education

EDL 773 Curriculum Development for School Leaders
To be taken as a prerequisite to other EDT course work:
EDT 700 Entry Seminar for Educational Technology 2

**Program Concentration—Library/Media** 32
*additional hours needed for Multi-Age licensure
EDT 711 Small Library Media Collection Development 4
EDT 721 Cataloging and Classification 4
EDT 746 Teaching Information and Research Skills 4
EDT 751 Educational Use of Video Technology 4
EDT 786 Applications of Computers in Education 4
EDT 791 Organization and Administration of School Media Centers 4
EDT 890 Internship 4
EDT Electives 4

**Required Exit Course** 2
To be taken at the end of the program of study:
EDT 799 Exit Seminar in Educational Technology 2

A Department comprehensive portfolio will be required during the final quarter of course work on the program of study.

**Total** 48

*Multi-Age Library/Media licensure requires 57 hours of course work. Library/Media concentration course work can be applied toward these hours.

Classroom Teacher: Computer/Technology Education

Introductory Course Work 14
To be taken in any sequence during the first 24 credit hours of graduate education course work: (select one from each category)

**Foundations (select one)** 4
EDL 712 Philosophical and Curricular Foundations
EDL 713 Applied Psychological Learning Theory

**Statistics and Research** 4
EDL 751 Statistics and Research for Education

EDT 786 Applications of Computers in Education 4
EDT 782 Developing Multimedia Productions 4
EDT 751 Educational Use of Video Technology 4
EDT 756 Advanced Television Production 4
EDT 890 Internship 4
EDT Electives** 12

**Required Exit Course** 2
To be taken at the end of the program of study:
EDT 799 Exit Seminar in Educational Technology 2

A Department comprehensive portfolio will be required during the final quarter of course work on the program of study.

**Total** 48

*All candidates seeking endorsement in computer/technology must provide evidence that the following foundations have been attained: basic technology operations and concepts (use computer operating systems and user interfaces to run programs, access, generate, and manipulate data, and to report results; evaluate performance of hardware and software components of computer systems and apply basic troubleshooting strategies as needed); personal and professional use of technology (apply tools for enhancing productivity and professional growth, use technology in communicating, collaborating, conducting research, and solving problems; includes equitable, ethical, and legal use of computer/technology resources); and application of technology in instruction (teach computer/technology applications and to use technology to support content areas).
**EDT Electives**
- EDT 714 Online Communication (1)
- EDT 715 Information Retrieval Through Technology (4)
- EDT 716 Building Online Applications (2)
- EDT 817 Issues of Telecommunications in Education (3)
- EDT 839 Instructional Design and Development (4)
- EDT 895 Administration and Supervision of Educational Technology (4)
- EDT 670 Workshops—special topics (limit 4 hours)

### Vocational Workforce Teacher Education (VOE)

**Educational Administrative Specialist: Vocational Education Administration (Master’s Degree and Licensure Program)**

**Note:** Must have or be eligible for a Professional five-year Vocational License to enter this program.

#### Required Course Work 70

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDL 713</td>
<td>Applied Psychological Learning Theory</td>
<td>4</td>
</tr>
<tr>
<td>EDL 751</td>
<td>Statistics and Research for Education</td>
<td>4</td>
</tr>
<tr>
<td>EDL 771</td>
<td>Educational Leadership Behavior</td>
<td>4</td>
</tr>
<tr>
<td>EDL 776</td>
<td>Supervision of Instruction and Personnel</td>
<td>4</td>
</tr>
<tr>
<td>EDL 780</td>
<td>Ethics and Politics in Education</td>
<td>4</td>
</tr>
<tr>
<td>EDL 782</td>
<td>School Law</td>
<td>4</td>
</tr>
<tr>
<td>EDL 871</td>
<td>Management of the School</td>
<td>4</td>
</tr>
<tr>
<td>EDL 872</td>
<td>Staff Personnel Administration</td>
<td>4</td>
</tr>
<tr>
<td>EDL 873</td>
<td>Pupil Personnel Services Administration</td>
<td>4</td>
</tr>
<tr>
<td>EDL 890</td>
<td>Practicum in School Administration</td>
<td>4</td>
</tr>
<tr>
<td>EDL 993</td>
<td>School District Business Management</td>
<td>4</td>
</tr>
<tr>
<td>*EDT 795</td>
<td>Administrative Support of Educational Technology</td>
<td>4</td>
</tr>
</tbody>
</table>

#### Total 48

*At the time of publication, this course was under development.*

#### Courses required for completion of licensure requirements after completion of master's degree 23

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>VOE 618</td>
<td>Historical and Philosophical Foundations of Vocational Education</td>
<td>4</td>
</tr>
<tr>
<td>VOE 706</td>
<td>Survey of Workforce Education</td>
<td>3</td>
</tr>
<tr>
<td>VOE 725</td>
<td>Administration and Supervision in Workforce Education</td>
<td>3</td>
</tr>
<tr>
<td>VOE 726</td>
<td>Adult Workforce Education</td>
<td>4</td>
</tr>
<tr>
<td>VOE 824</td>
<td>Curriculum for Workforce Education</td>
<td>3</td>
</tr>
<tr>
<td>VOE 825</td>
<td>Facilities and Management of Workforce Education</td>
<td>3</td>
</tr>
<tr>
<td>VOE 826</td>
<td>Program Development Techniques for Workforce Education</td>
<td>3</td>
</tr>
</tbody>
</table>

#### Total 71

### Classroom Teacher: Career, Technical, and Adult Education: Vocational Teacher Licensure

**Section I, Option I—Vocational Teacher Licensure**

#### Core Courses

- ED 704 Inquiry into Foundations of Education 4
- ED 820 Seminar in Secondary Education 4
- EDL 751 Statistics and Research in Education 4

#### Professional Education

*(Select the following nine hours, or the eight-hour course)*

- VOE 670 Vocational Teaching Competencies I 3
- VOE 670 Vocational Teaching Competencies II 3
- VOE 670 Vocational Teaching Competencies III 3

*or*

- VOE 671 Instructional Design of Workforce Education 8

*then add*

- VOE 651 Strategies, Techniques in Workforce Education 3
- VOE 621 Student Behavioral Management in Workforce Education 3
- VOE 631 Student Performance Assessment in Workforce Education 3
- VOE 672 Supervised Teaching in Workforce Education I 3
- VOE 673 Supervised Teaching in Workforce Education II 3
- VOE 674 Supervised Teaching in Workforce Education III 3
- VOE 675 Workforce Education Integration 4
- VOE 669 Coordination Techniques in Workforce Education 3
- VOE 611 Workforce Classroom/Laboratory Management 3
- VOE 824 Curriculum for Workforce Education 3
- EDT 782 Developing Multimedia Production 4

#### Total 55-56
Workforce Education Endorsements

The endorsement programs reflect the philosophy of continuous quality education in a changing world in its response to current and emerging strategies in education reform as applied in workforce education. The program adopts the mission statement prepared by the Ohio Department of Education, Division of Career-Technical Vocational and Adult Education, and is crafted to provide quality programs and services to meet the lifelong career and training needs of a diverse range of citizens and the ever-changing needs of the present and future workplace.

The endorsement of a teacher license, valid for teaching the subject or learners named, shall be issued to an individual who holds a baccalaureate degree; who is deemed to be of good moral character; who has successfully completed an examination prescribed by the State Board of Education; and who has been recommended by the dean or head of teacher education at an approved institution. The endorsement shall be limited to the age and grade levels listed on the license.

Workforce Education Endorsement: Adult Education—Full-Time

The adult education—full-time endorsement program will offer instruction on workforce education programs for adults, including curriculum, special methods, and the development of curriculum materials suitable to such programs. Additional focus will be placed on information about adult learners in terms of development, learning capabilities, learning needs, and planning and implementing a marketing effort for adult programs. Various methods of determining individual training needs and planning instruction for adults will be discussed, along with instructional techniques effective with at-risk students to help the instructor manage the instructional process while evaluating the at-risk students' progress in meeting specified objectives.

Required Course Work

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>VOE 726</td>
<td>Adult Workforce Education</td>
<td>4</td>
</tr>
<tr>
<td>VOE 727</td>
<td>Preparing to Work with Adult Learners and Marketing Adult Education Programs</td>
<td>4</td>
</tr>
<tr>
<td>VOE 728</td>
<td>Determining Individual Training Needs and Planning Instruction for Adults</td>
<td>4</td>
</tr>
<tr>
<td>VOE 729</td>
<td>Managing the Instructional Process and Evaluating the Performance of Adults</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>16</td>
</tr>
</tbody>
</table>

Workforce Education Endorsement: OWE/OWA

The OWE/OWA endorsement program will offer instruction on workforce education for at-risk students, including curriculum, special methods, and the development of curriculum materials suitable to such programs. Additional focus will be placed on information about at-risk learners in terms of development, learning capabilities, learning needs, and planning and implementing a marketing effort for at-risk programs. Various methods of determining individual training needs and planning instruction for at-risk students will be discussed, along with instructional techniques effective with at-risk students to help the instructor manage the instructional process while evaluating the at-risk students' progress in meeting specified objectives.

Required Course Work

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>VOE 613</td>
<td>Organization and Operation of a Cooperative Education Program for At-Risk Students</td>
<td>3</td>
</tr>
<tr>
<td>VOE 614</td>
<td>Teaching in a Cooperative Education Program I</td>
<td>3</td>
</tr>
<tr>
<td>VOE 615</td>
<td>Teaching in a Cooperative Education Program II</td>
<td>3</td>
</tr>
<tr>
<td>VOE 616</td>
<td>Teaching in a Cooperative Education Program III</td>
<td>3</td>
</tr>
<tr>
<td>VOE 642</td>
<td>Science Content in the OWA/OWE Classroom</td>
<td>3</td>
</tr>
<tr>
<td>VOE 643</td>
<td>English/Language Arts Content in the OWA/OWE Classroom</td>
<td>3</td>
</tr>
<tr>
<td>VOE 644</td>
<td>Mathematics Content in the OWA/OWE Classroom</td>
<td>3</td>
</tr>
<tr>
<td>VOE 645</td>
<td>Social Studies Content in the OWA/OWE Classroom</td>
<td>3</td>
</tr>
<tr>
<td>VOE 646</td>
<td>English/Literature Arts Methods in the OWA/OWE Classroom</td>
<td>3</td>
</tr>
<tr>
<td>VOE 647</td>
<td>Mathematics Methods in the OWA/OWE Classroom</td>
<td>3</td>
</tr>
<tr>
<td>VOE 648</td>
<td>Social Studies Methods in the OWA/OWE Classroom</td>
<td>3</td>
</tr>
<tr>
<td>VOE 649</td>
<td>Science Methods in the OWA/OWE Classroom</td>
<td>3</td>
</tr>
<tr>
<td>VOE 664</td>
<td>Methods and Strategies for At-Risk Students</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>39</td>
</tr>
</tbody>
</table>

Transition to Work Endorsement

Transition to Work Endorsement may be earned or added to either an intervention specialist or vocational license. The endorsement training has adopted the transition standards from the Council of Exceptional Children (CEC) as the model curriculum for transition specialists in Ohio. The training is interdisciplinary with involvement of the departments of educational leadership and human services.

Contact (937) 775-3086, College of Education and Human Services, student services, to obtain an application to have your transcripts evaluated for participation in the endorsement training. Specific questions about the endorsement process can be answered by calling (937) 775-3270.
### Required Course Work

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDS 645</td>
<td>Career and Occupational Training for Students Needing Educational Intervention</td>
<td>3</td>
</tr>
<tr>
<td>EDS 651</td>
<td>Nature and Needs of Students with Moderate to Intensive Educational Needs</td>
<td>3</td>
</tr>
<tr>
<td>EDS 655</td>
<td>Nature and Needs of Students with Mild to Moderate Educational Needs</td>
<td>2-4</td>
</tr>
<tr>
<td>EDS 659</td>
<td>Communication and Consultation Skills for Educators</td>
<td>3</td>
</tr>
<tr>
<td>RHB 711</td>
<td>Vocational Evaluation and Job Placement Techniques</td>
<td>4</td>
</tr>
<tr>
<td>VOE 706</td>
<td>Survey of Workforce Education</td>
<td>3</td>
</tr>
<tr>
<td>*RHB 873</td>
<td>Internship</td>
<td>8</td>
</tr>
</tbody>
</table>

*2 hours per quarter for a total of 8

### Workforce Education Licensure Program: Workforce Education—Teachers Recruited from Business and Industry (Professional Education License)

This teacher licensure, valid for teaching the subjects or learners named, shall be issued to an individual who holds a baccalaureate degree, who is deemed to be of good moral character; who has successfully completed an examination prescribed by the School Board of Education; and who has been recommended by the dean or head of teacher education at an approved institution.

### Required Course Work

<table>
<thead>
<tr>
<th>Choose a minimum of 42 hours from the following:</th>
</tr>
</thead>
<tbody>
<tr>
<td>VOE 611 Workforce Classroom Laboratory Management</td>
</tr>
<tr>
<td>VOE 621 Student Behavior Management in Workforce Education</td>
</tr>
<tr>
<td>VOE 631 Student Performance Assessment in Workforce Education</td>
</tr>
<tr>
<td>VOE 651 Strategies and Techniques in Workforce Education Teaching</td>
</tr>
<tr>
<td>VOE 652 Assessment of Workforce Teacher Performance (PRAXIS Preparation)</td>
</tr>
<tr>
<td>VOE 669 Coordination Techniques in Workforce Education</td>
</tr>
<tr>
<td>VOE 671 Instructional Design of Workforce Education</td>
</tr>
<tr>
<td>VOE 672 Supervised Teaching in Workforce Education I</td>
</tr>
<tr>
<td>VOE 673 Supervised Teaching in Workforce Education II</td>
</tr>
<tr>
<td>VOE 674 Supervised Teaching in Workforce Education III</td>
</tr>
<tr>
<td>VOE 675 Workforce Education Integration Workshop</td>
</tr>
<tr>
<td>VOE 824 Curriculum for Workforce Education</td>
</tr>
</tbody>
</table>

*Students must also demonstrate proficiency in technology or take one of the following:*

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDT 756</td>
<td>Advanced Television Production</td>
<td>4</td>
</tr>
<tr>
<td>EDT 782</td>
<td>Developing Multimedia Productions in Education</td>
<td>4</td>
</tr>
<tr>
<td>EDT 786</td>
<td>Applications of Computers in Education</td>
<td>4</td>
</tr>
</tbody>
</table>

### Total

54-55

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### Health, Physical Education, and Recreation Programs

#### Classroom Teacher: Physical Education (HPR)

#### Master of Education (M.Ed.)

This degree is appropriate for physical education teachers and others who desire to enhance their effectiveness in teaching motor skills, in working with students with special needs, and in understanding various methods of physiological conditioning. This program can benefit those who wish to learn new techniques for assessing physical activity through the use of educational technology such as the computer. It can also aid in applying current research findings to daily teaching practices. These courses can also help coaches who wish to improve their ability to administer interscholastic athletic programs or to apply athletic training procedures. Physical education teachers, coaches, and others who currently have a master's degree may want to take individual courses to meet special needs. Successful completion of a written departmental comprehensive examination is required at the end of the program of study.

#### Introductory Course Work

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDL 713</td>
<td>Applied Psychological Learning Theory</td>
<td>4</td>
</tr>
<tr>
<td>EDL 751</td>
<td>Statistics and Research for Education</td>
<td>4</td>
</tr>
<tr>
<td>EDL 771</td>
<td>Educational Leadership Behavior</td>
<td>4</td>
</tr>
<tr>
<td>EDT 786</td>
<td>Applications of Computers in Education</td>
<td>4</td>
</tr>
</tbody>
</table>

#### Professional Requirements

Eleven hours of electives or

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDL 775</td>
<td>Instructional Management and Evaluation for School Leaders</td>
<td>4</td>
</tr>
<tr>
<td>EDL 791</td>
<td>Curriculum Design and Evaluation</td>
<td>4</td>
</tr>
<tr>
<td>EDL 782</td>
<td>School Law</td>
<td>4</td>
</tr>
</tbody>
</table>

#### Program Concentration

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>HPR 710</td>
<td>Physical Education for Children with Special Needs</td>
<td>4</td>
</tr>
<tr>
<td>HPR 720</td>
<td>Motor Development and Acquisition of Motor Skills</td>
<td>4</td>
</tr>
<tr>
<td>HPR 750</td>
<td>Scientific Foundations for Conditioning</td>
<td>4</td>
</tr>
<tr>
<td>HPR 753</td>
<td>Assessment of Physical Activity</td>
<td>4</td>
</tr>
<tr>
<td>HPR 740</td>
<td>Administration of Interscholastic Athletics or</td>
<td>4</td>
</tr>
<tr>
<td>HPR 760</td>
<td>Advanced Athletic Training Techniques</td>
<td>4</td>
</tr>
</tbody>
</table>

### Total

48
Master of Arts (M.A.)

The Master of Arts in education degree may be obtained in the physical education area also. This program allows an individual without a teaching certificate to earn a master's degree in a specialized area of interest. The M.A. degree requires a thesis with a minimum of 45 credit hours, including nine hours of thesis credit. Each graduate student will be assigned an advisor upon admission as a degree student. The student is required to consult with the advisor to plan the program of study during the first quarter of graduate study and to review the procedure for admission to candidacy. Successful completion of a written departmental comprehensive examination is required at the end of the program of study.

Introductory Course Work

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDL 751 Statistics and Research for Education</td>
<td>4</td>
</tr>
<tr>
<td>EDL 988 Research and the Educational Leader</td>
<td>3</td>
</tr>
<tr>
<td>EDT 786 Applications of Computers in Education</td>
<td>4</td>
</tr>
</tbody>
</table>

Professional Requirements

Six hours of approved electives in a specialized area

Program Concentration

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>HPR 710 Physical Education for Children</td>
<td>4</td>
</tr>
<tr>
<td>HPR 720 Motor Development and Acquisition of Motor Skills</td>
<td>4</td>
</tr>
<tr>
<td>HPR 750 Scientific Foundations for Conditioning</td>
<td>4</td>
</tr>
<tr>
<td>HPR 753 Assessment of Physical Activity</td>
<td>4</td>
</tr>
<tr>
<td>HPR 740 Administration of Interscholastic Athletics</td>
<td>4</td>
</tr>
<tr>
<td>HPR 760 Advanced Athletic Training Techniques</td>
<td>4</td>
</tr>
<tr>
<td>Thesis</td>
<td>9</td>
</tr>
<tr>
<td>ED 899</td>
<td>9</td>
</tr>
<tr>
<td>Total</td>
<td>46</td>
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</tbody>
</table>

School Nurse Licensure Program

The purpose of Wright State University's Professional Pupil Services School Nurse Licensure Program is to prepare highly qualified school nurses. These future school nurses must first complete a baccalaureate degree with course work in growth and development, psychology, sociology, and/or anthropology. Each candidate must also have course work in community health and a current license to practice as a registered nurse issued by the Ohio Board of Nursing.

This postbaccalaureate School Nurse Licensure Program is designed to build upon an undergraduate education and to prepare the school nurse to be a collaborative team member within the school and community system. A 22-credit, graduate-level program, with courses taught by both the College of Nursing and Health and the College of Education and Human Services, requires course work in school nurse related topics. In addition, students must successfully complete an all-day, 10-week, Monday through Friday practicum in the school under the supervision of a university supervisor and a licensed school nurse.

Prerequisites

1. Baccalaureate degree with course work in growth and development, psychology, sociology, and/or anthropology.
2. License to practice professional nursing in the State of Ohio.
3. Course work in community health.

Professional Requirements

HPR 640 The Role of the Nurse in Schools       5
HPR 643 Practicum in School Nursing            5
NUR 640 School Nursing                         5
NUR 642 Assessment of Children and Adolescents in Schools | 2
NUR 643 Practicum in School Nursing            5

Total                                           22

Approved Course Substitutions

NUR 766 or NUR 762 for NUR 642
NUR 744 for NUR 643

*The HPR 643/NUR 643 Practicum in School Nursing courses are reserved for students who have been officially admitted to the School Nurse Licensure program and have successfully completed the prerequisite course work (HPR 640, NUR 640, 641, 642). Written permission of the instructor is required to register.

Teacher Education Programs

The Teacher Education Department offers programs that lead to licensure as a teacher, to master's degrees, or to both. Each program has a brief description before the requirements. The list below represents the programs available from the Teacher Education department:
Master's Degree Programs for Initial Teacher Licensure (for those who are not teachers)

Classroom Teacher: Middle Childhood Education
Classroom Teacher: Adolescent to Young Adult Education
Classroom Teacher: Multi-Age Education

Master's Degree Programs for Initial Teacher Licensure and for Current Teachers Seeking Advanced Study and/or Additional Teaching Credentials

Classroom Teacher: Early Childhood Education
Early Childhood Intervention Specialist (a non-degree program)
Classroom Teacher: Intervention Specialist: Mild to Moderate Educational Needs
Classroom Teacher: Intervention Specialist: Moderate to Intensive Educational Needs
Classroom Teacher: Intervention Specialist: Gifted Educational Needs

Master's Degree Programs for Teachers Seeking Advanced Study and/or Additional Teaching Credentials (Not Initial Teacher Licensure Programs)

Classroom Teacher: General
Classroom Teacher: Mathematics
Classroom Teacher: Modern Languages
Classroom Teacher: Reading
Classroom Teacher: Science

Teacher Licensure Advisors and Faculty Advisors

The college's Office of Student Services is referred to in many areas of this catalog. Persons considering becoming a teacher and teachers who have questions about adding a new licensure area are encouraged to visit the Office of Student Services and consult with a licensure advisor. The office is located in 378 Allyn Hall and employs full-time professional licensure advisors for consultation. Advisors are available without an appointment during regularly scheduled walk-in advising times. Daytime and evening walk-in advising is available; please consult the office's Web site for current information regarding advising times at www.ed.wright.edu/ss.

These advisors are charged by the college to audit student's programs for compliance with state of Ohio teacher licensure standards. Working with these advisors as you begin your studies will greatly increase the probability that you will select and take the appropriate courses for any given licensure area. Your application for the teaching license is filed with this office, and the licensure advisors assist the faculty by auditing your program at various stages of your program.

Many of our teacher licensure programs are also degree programs. We also offer advanced programs of study that provide current teachers with the opportunity for an in-depth study of an area, and the program does not include a new teaching license. Faculty advisors are assigned to each degree-seeking student at the point of acceptance to develop a separate plan for the degree. This formal program of study should be completed during the first term of a student's program. The faculty advisor will determine course substitutes, transfer of credit, and other appropriate modifications of the published degree curriculum as it appears in this catalog. The faculty advisor provides professional advising regarding current research, career development, and professional organizations. Any questions regarding the degree portion of your program will be directed to this faculty advisor. The licensure advisors will consult with this faculty person when needed.

Admissions and Program Information

Entry requirements vary by program. All students will be required to pass a standardized test, have a 2.7 grade point average as an undergraduate, submit a sample of writing, and have an admissions interview. All students who seek to attain a teaching license will be required to meet Ohio standards on a Praxis II Principles of Learning and Teaching exam and a criminal background check at the end of the licensure portion of the program.

Praxis II Specialty (Content Area) exams will serve as the entrance exam for the Middle Childhood, Multi-Age, and Adolescent to Young Adult initial licensure programs. The Early Childhood program and the Intervention Specialists programs require the Graduate Record Exam (a combined score of 800 or more on the Quantitative and Verbal portion of the exam) or the Miller Analogy Test (a score of 30 or better) as the entrance exam. All candidates for an initial licensure program (in any licensure area) must complete the college's application process concurrent with the School of Graduate Studies application. The college’s initial teacher applications are found on the Office of Student Services Web site at www.ed.wright.edu/ss. Please contact the college’s Office of Student Services if you have any questions about the requirements of a particular program.

Please note that the initial licensure programs in Middle Childhood (MC), Multi-Age (MA), and Adolescent to Young Adult (AYA) programs currently require students to be full-time students in order to complete both course work and meet the Ohio Department of Education requirements for field experiences in schools. At the time of publication of this catalog, the faculty of the
teacher education department is discussing the implementation of a part time option to the program model described below. The current planning is to offer a two-year, part time version of the current model. The target implementation date will be the fall of 2002. Contact the college's Office of Student Services if you are interested in this option at (937) 775-3086.

Middle Childhood Education (Grades 4 through 9 and ages 8 through 14)

Middle Childhood teachers will teach two of the following subject (content) areas: language arts, mathematics, science, and social studies. This is a full time program of study currently requiring your commitment Monday through Friday. Students from Wright State University's Bachelor of Education program in Middle Childhood Education and others with a bachelor’s degree who meet the content requirements (two content concentrations) of Wright State's educator program will be enrolled in this program in a cohort group. Prerequisite content requirements are described on the college's Web site at www.ed.wright.edu/ss.

Students will serve as interns in school settings throughout the school year. Therefore, this program operates on a different calendar than the university. Upon successful completion of the licensure portion of this program and passing the Praxis II exam in the Principles of Learning and Teaching 5-9, the student may apply for a provisional license in Middle Childhood Education. A Master of Education degree in classroom teaching may be earned with the successful completion of an Inquiry Project. This program may be completed in 15 months of full time study and internship.

Classroom Teacher: Middle Childhood

ED 600 Classroom Management: Middle Childhood Level 3
ED 602* Education in a Pluralistic Society: Middle Childhood Perspective 4
ED 606 Reading and Literacy Instruction I: Middle Childhood Level 4.5
ED 607 Reading and Literacy Instruction II: Middle Childhood Level 4.5
ED 612 Practicum I: Middle Childhood Level 1
ED 614 Practicum II: Middle Childhood Level 1
ED 616 Practicum III: Middle Childhood Level 1
ED 621* Human Development and Learning: Middle Childhood Perspective 4
ED 622 Technological Instruction and Integrated Methods: Middle Level 3
ED 641 Internship/Seminar: Middle Childhood Level (Student Teaching) 12
ED 645 Inquiry and Assessment: Middle Childhood Level 3
ED 709 Diagnosis and Assessment of Reading Performance 4.5
ED 717 Word Study: Phonics Middle Level 4.5
ED 732 Principles and Practices of Middle Schools 3
EDS 624* Addressing Learning Differences Methods courses specific to the Program of Study (see below) 4

Total: 63

Methods Courses: Choose Two

ED 610 Middle Childhood Mathematics: Philosophy and Curriculum 3
ED 624 Middle Childhood Literature, Speech, and Drama 3
ED 629 Middle School Social Studies Methods 3
ED 636 Integrated Middle Childhood Level Science Methods 3

Total 6

Option 1

To complete licensure, 63 graduate hours are required (only 51 graduate hours if Phase I course work is not needed).

Option 2

To complete the M.Ed. the following graduate courses are required, for a total of 67 graduate hours (only 55 graduate hours if Phase I courses are not needed):

ED 646 Inquiry and Prospectus 3
ED 771 Inquiry Project Completion 1

* Phase I courses consists of ED 602 (4), ED 621 (4), and EDS 624 (4). Phase I courses are not needed if the equivalent courses were completed as part of the undergraduate program.

At the time of publication of this catalog, the above program was being revised. Please contact the college's Office of Student Services for current information.

Adolescent Young Adult (Grades 7 through 12, ages 12 through 21)

The holder of an AYA license will teach a single subject such as language arts, social sciences, mathematics, or science in grades 7 through 12. To learn more about the approved AYA teaching (content) areas of study that Wright State offers, please visit our college's Office of Student Services.

This is currently a full-time program of study requiring your commitment Monday through Friday. Students from Wright State University and others with a bachelor's degree who meet the content requirements of Wright State's educator program will be enrolled in this program in a cohort group. Prerequisite content requirements are described on the college's Web site at www.ed.wright.edu/ss.
Students will serve as interns in school settings throughout the school year. Therefore, this program operates on a different calendar than the university. Upon successful completion of the licensure portion of this program and passing the Praxis II exam in the Principles of Learning and Teaching 7–12, the student may apply for a provisional license in Adolescent to Young Adult Education. A Master of Education degree in classroom teaching may be earned with the successful completion of an Inquiry Project. This program may be completed in 15 months of full time study and internship.

**Classroom Teacher: Adolescent Young Adult**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ED 600</td>
<td>Classroom Management</td>
<td>3</td>
</tr>
<tr>
<td>ED 602*</td>
<td>Education in a Pluralistic Society</td>
<td>4</td>
</tr>
<tr>
<td>ED 612</td>
<td>Practicum I</td>
<td>2</td>
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<tr>
<td>ED 614</td>
<td>Practicum II</td>
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<tr>
<td>ED 616</td>
<td>Practicum III</td>
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<tr>
<td>ED 621*</td>
<td>Human Development and Learning</td>
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<tr>
<td>ED 622</td>
<td>Instructional Technology and Integrated Methods</td>
<td>3</td>
</tr>
<tr>
<td>EDS 624*</td>
<td>Addressing Learning Differences</td>
<td>4</td>
</tr>
<tr>
<td>ED 631</td>
<td>Literacy Skills Through Adolescence</td>
<td>3</td>
</tr>
<tr>
<td>ED 635</td>
<td>Secondary Issues and Leadership</td>
<td>3</td>
</tr>
<tr>
<td>ED 645</td>
<td>Inquiry and Assessment</td>
<td>3</td>
</tr>
<tr>
<td>ED 646</td>
<td>Inquiry and Prospectus</td>
<td>3</td>
</tr>
<tr>
<td>ED 651</td>
<td>Internship/Seminar: Adolescent</td>
<td>12</td>
</tr>
<tr>
<td>C RN 662</td>
<td>Problems in Student Personality and Development</td>
<td>4</td>
</tr>
<tr>
<td>ED 664</td>
<td>Evaluation</td>
<td>3</td>
</tr>
<tr>
<td>ED 670</td>
<td>Curriculum and Instructional Workshop: Research Methods</td>
<td>3</td>
</tr>
<tr>
<td>ED 771</td>
<td>Internship Project Completion</td>
<td>1</td>
</tr>
</tbody>
</table>

**Methods course specific to the Program of Study (see below)**

59 hours, plus the methods course specific to the program of study to complete master’s degree.

**Methods Course: Choose One**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ED 623</td>
<td>Adolescence English: Curriculum and Materials</td>
<td>5</td>
</tr>
<tr>
<td>ED 639</td>
<td>Adolescence Social Studies: Curriculum and Materials</td>
<td>5</td>
</tr>
<tr>
<td>ED 638</td>
<td>Adolescence Mathematics: Curriculum and Materials</td>
<td>5</td>
</tr>
<tr>
<td>ED 731</td>
<td>Adolescent Young Adult Science: Curriculum and Materials</td>
<td>5</td>
</tr>
</tbody>
</table>
| *Phase I courses consist of ED 602 (4), ED 621 (4), and EDS 624 (4). Phase I courses are not needed if the equivalent courses were completed as part of the undergraduate program.*

At the time of publication of this catalog, the above program was being revised. Please contact the college’s Office of Student Services for current information.

**Multi-Age (Grades pre-kindergarten through 12, ages 3 through 21)**

Wright State is approved to endorse candidates for the Multi-Age license for those persons who wish to teach a modern language (French or Spanish), health education, physical education, and visual arts. (Music education is only available on the undergraduate level through the university’s College of Liberal Arts.)

This is currently a full-time program of study requiring your commitment Monday through Friday. Students from Wright State University and others with a bachelor’s degree who meet the content requirements of Wright State’s educator program will be enrolled in this program in a cohort group. Prerequisite content requirements are described on the college’s Web site at [www.ed.wright.edu/ss](http://www.ed.wright.edu/ss).

Students will serve as interns in school settings throughout the school year. Therefore, this program operates on a different calendar than the university. Upon successful completion of the licensure portion of this program and passing any one of the Praxis II exams in the Principles of Learning and Teaching, the student may apply for a provisional license in Multi-Age Education. A Master of Education degree in classroom teaching may be earned with the successful completion of an Inquiry Project. This program may be completed in 15 months of full time study and internship.

**Classroom Teacher: Multi-Age**

<table>
<thead>
<tr>
<th>Course Code</th>
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</tr>
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<tbody>
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</tr>
<tr>
<td>ED 771</td>
<td>Internship Project Completion</td>
<td>1</td>
</tr>
</tbody>
</table>

**Methods course specific to the Program of Study (see below)**

59 Hours, plus the methods course specific to the program of study to complete the master’s degree.
Methods Courses: Select One

AED 638 Multi-Age Visual Arts Media 5
ED 625 Modern Foreign Language: Curriculum and Materials 3
*Phase I courses consists of ED 602 (4), ED 621 (4), and EDS 604 (4). Phase I courses are not needed if the equivalent courses were completed as part of the undergraduate program.

At the time of publication of this catalog, the above program was being revised. Please contact the college’s Office of Student Services for current information.

Early Childhood Programs (Grades prekindergarten to 3rd grade, ages 3 through 8)
The Early Childhood graduate programs are designed to address the needs of three different audiences: (1) current early childhood teachers who seek a master’s degree; (2) holders of an elementary teaching certificate or license, or (3) individuals with a bachelor’s degree in a different area who wish to obtain an initial teaching license.

Initial teacher licensure candidates (#3 above) are subject to the admissions criteria described above in the Admissions and Programs section. Initial teacher licensure candidates must complete the college’s application process concurrent with the School of Graduate Studies application. The college’s initial teacher applications are found on the Office of Student Services Web site at www.ed.wright.edu/ss. The college requires the GRE or MAT exam as the entrance exam for this program. Please contact the college’s Office of Student Services if you have any questions about the requirements of a particular program.

Current teachers wishing a master’s degree should follow the program described in this catalog. Others should contact the Student Services office of the College of Education and Human Services for current information.

Classroom Teacher: Early Childhood Education

This program is for those individuals with a valid certificate or license in Early Childhood or Elementary Education. Students not certified in ECE may need additional courses in order to achieve licensure first or concurrently.

Required Course Work 50

EDL 751 Statistics and Research for Education 4
EDT 786 Applications of Computers in Education 4
EDE 702 Constructive Guidance and Discipline in Early Childhood Education 3
EDE 703 Language Development, Social Development, and Play in Early Childhood Education 3
EDE 707 Language Development and Communication Disorders in Early Childhood Education 3
EDE 712 Advanced Study of Child Development: Typical and Atypical 3
EDE 715 Young Children with Special Needs 3
EDE 717 Meeting the Individual Needs of Young Children 3
EDE 730 Developmentally Appropriate Assessment in Early Childhood Education 3
EDE 731 Developmentally Appropriate Programming in Early Childhood Education: Infants and Toddlers (0–3 years old) 3
EDE 735 The Anti-bias Curriculum in Early Childhood Education 3
EDE 745 Comparative Theories of Early Childhood Education 3
EDE 750 Designing and Administering Family-Centered Early Childhood Programs 3
EDS 659 Communication and Consultation for Educators 3
EDE 744 Conducting Research in Early Childhood Education 3
EDE 810 Early Childhood Education: Master’s Seminar 2

Total 49

*At the time of publication, this course was under development.

At the time of publication of this catalog, the above program was being revised. Please contact the college’s Office of Student Services for current information.

Early Childhood Education Intervention Specialist
This is not a master’s degree program. This enables a teacher to work with children 3–5 years old with special needs.

Intervention Specialist Programs (Grades Kindergarten through 12, ages 5 through 21)
The Intervention Specialist Programs in Gifted, Mild to Moderate, and Moderate to Intensive Educational Needs are available for the currently practicing teacher as well as those persons who are not currently holding a teaching license. These are separate, individual programs. Because of the high demand for intervention specialists, it is not uncommon for persons to be employed by a school district on a special, temporary license pending completion of an Intervention Specialist licensure program. These programs are designed to serve both of those
populations. Candidates, who are not currently licensed, will be required to complete prerequisite coursework prior to entering the professional course sequence. Please consult with a licensure advisor in the college's Office of Student Services regarding prerequisite coursework.

As stated in the Admissions and Program Information section above, initial teacher licensure candidates must complete the Teacher Education Department's application process concurrent with the School of Graduate Studies application. The college's initial teacher applications are found on the Office of Student Services Web site at www.ed.wright.edu/ss. The college requires the GRE or MAT exam as the entrance exam for this program. Please contact the college's Office of Student Services if you have any questions about the requirements of a particular program.

Upon successful completion of the licensure portion of this program and passing any one of the Praxis II exams in the Principles of Learning and Teaching and passing the Praxis II Specialty (Content) exams in special education, the student may apply for a provisional Intervention Specialists license valid for teaching students in the program area the student completed (Mild to Moderate, Moderate to Intensive, Gifted). A Master of Education degree in classroom teaching may be earned with the successful completion of the balance of the programs.

Classroom Teacher: Intervention Specialist: Mild to Moderate Educational Needs

EDS 700 Special Education Entrance Seminar 2
ED 704 Introduction to the Foundations of Education 4
EDL 771 Leadership Skills for School Improvement 3
EDL 751 Statistics and Research for Education 4
EDT 786 Application for Computers in Education 4
EDS 655 Nature and Needs of Students with Mild to Moderate Educational Needs 4
EDS 651 Nature and Needs of Students with Moderate to Intensive Educational Needs 3
EDS 654 Assessment Skills: The Intervention Specialist Role 3
EDS 642 Curriculum Methods and Materials to Teach Students with Mild/Moderate Educational Needs 4
EDS 644 Instructional and Behavioral Management Skills for Intervention Specialists 3
EDS 645 Transition of Students with Special Needs 3
EDS 659 Communication and Consultation Skills for Educators 3
HPR 710 Physical Education for Children with Special Needs 4

or

HPR 712 Motor Development for Low Incidence Disabilities 4
ED 716 Foundations of Reading Instruction 3
ED 717 Instruction in Word Study: Phonics 5
ED 709 Diagnosis and Assessment of Reading Performance 4
EDS 656 Clinical Practice in Remediation 4
ED 799 Content Reading Instruction Grades 4-12 3
ED 661 Practicum in Special Education Mild/Moderate 5-12
EDS 799 Special Education Exit Seminar 2

Total (M.Ed.) 70-77

EDL 752 Statistical Analysis and Research Design, 4 hours, and ED 899 Thesis, 1-9 hours, required for the Master of Arts option. The M.A. option removes EDT 786, EDS 700, and EDS 799 from this program of study.

Total (M.A.) 62-82

Classroom Teacher: Intervention Specialist: Moderate to Intensive Educational Needs

EDS 700 Special Education Entrance Seminar 2
ED 704 Introduction to the Foundations of Education 4
EDL 771 Leadership Skills for School Improvement 3
EDL 751 Statistics and Research for Education 4
EDT 786 Application for Computers in Education 4
EDS 655 Nature and Needs of Students with Mild to Moderate Educational Needs 4
EDS 651 Nature and Needs of Students with Moderate to Intensive Educational Needs 3
EDS 652 Education of Individuals with Physical Sensory and Motor Disorders 3
EDS 653 Curriculum Methods, Materials and Adaptive Equipment 3
EDS 643 Introduction to Augmentative Communication 3
EDS 644 Instructional and Behavioral Management Skills for Intervention Specialists 3
EDS 645 Transition of Students with Special Needs 3
EDS 654 Assessment Skills: The Intervention Specialist's Role 3
EDS 659 Communication and Consultation Skills for Educators 3
HPR 710 Physical Education for Children with Special Needs 4

or

HPR 712 Motor Development for Low Incidence Disabilities 4
ED 716 Foundations of Reading Instruction 3
ED 717 Instruction in Word Study: Phonics 5
ED 709 Diagnosis and Assessment of Reading Performance 4
EDS 656 Clinical Practice in Remediation 4
ED 769 Content Reading Instruction: Grades 4–12 3
ED 661 Practicum in Special Education: Moderate/Intensive 5–12
EDS 799 Special Education Exit Seminar 2

Total (M.Ed.) 75–82

EDL 752 Statistical Analysis and Research Design, 4 hours, and ED 899 Thesis, 1–9 hours, required for the Master of Arts option. The M.A. option removes EDT 786, EDS 700, and EDS 799 from this program of study.

Total (M.A.) 71–87

Note: The following Classroom Teacher programs are not initial licensure programs. They are available solely for advanced study by current teachers.

Classroom Teacher: General

The general classroom teacher program is designed for teachers who desire additional preparation in a field or area not offering a specialized program or certificate/licensure. This program offers a more flexible option for highly motivated persons who seek a master’s degree with a specific professional objective, such as additional course work to update knowledge or skills in the content field. 12 hours may be taken either in advanced professional studies or in courses offered outside the College of Education and Human Services in a teaching discipline.

Introductory Course Work 12

ED 704 Inquiry into Foundations of Education 4
EDL 771 Educational Leadership Behavior 4
EDL 751 Statistics and Research for Education 4

Professional Requirements 22

ED 701 Advanced Educational Psychology 3
EDL 791 Curriculum Design and Evaluation 4
ED 710 Teaching Strategies in Culturally Diverse Settings 4
EDL 740 Legal and Professional Issues 4
EDT 749 Introduction to Instructional Media 4
ED 820 Seminar in Secondary Education 4
*ED 810 Seminar in Elementary Education 3

Program Electives 12

12 hours to be chosen by student and advisor. Electives may be selected from courses offered by the College of Education and Human Services or one of the other colleges offering appropriate graduate courses. For example, courses may be chosen in the areas of English, mathematics, religion, science, social studies, student learning and behavior, or other special-interest fields.

Total 46

*To be taken near the end of the program
### Classroom Teacher: Mathematics

This program enables teachers to take substantial advanced graduate course work in mathematics in order to update skills and strengthen knowledge in their major teaching field. This is not an initial licensure program to become a mathematics teacher. (See CT: AYA)

#### Introductory Course Work

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ED 704 Inquiry into Foundations of Education</td>
<td>4</td>
</tr>
<tr>
<td>EDL 751 Statistics and Research for Education</td>
<td>4</td>
</tr>
<tr>
<td>EDL 771 Educational Leadership Behavior</td>
<td>4</td>
</tr>
</tbody>
</table>

#### Professional Requirements

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ED 701 Advanced Educational Psychology</td>
<td>3</td>
</tr>
<tr>
<td>EDT 749 Introduction to Instructional Media</td>
<td>4</td>
</tr>
<tr>
<td>*ED 820 Seminar in Secondary Education</td>
<td>3</td>
</tr>
</tbody>
</table>

#### Program Electives

24 hours to be chosen by student and advisor. Electives may be selected from courses offered by the College of Education and Human Services, the Modern Languages Department of the College of Liberal Arts, or one of the other colleges offering appropriate graduate courses.

### Classroom Teacher: Modern Languages

This program enables teachers to take substantial advanced graduate course work in Modern Languages in order to update skills and strengthen knowledge in their major teaching field. This is not an initial licensure program to become a Spanish or French teacher. (See CT: MA)

#### Introductory Course Work

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDL 751 Statistics and Research for Education</td>
<td>4</td>
</tr>
<tr>
<td>EDL 771 Educational Leadership Behavior</td>
<td>4</td>
</tr>
<tr>
<td>ED 701 Advanced Educational Psychology</td>
<td>3</td>
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</table>

#### Professional Requirements

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
</tr>
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<tbody>
<tr>
<td>EDT 749 Introduction to Instructional Media</td>
<td>4</td>
</tr>
<tr>
<td>ED 810 Seminar in Elementary Education</td>
<td>3</td>
</tr>
<tr>
<td>ED 820 Seminar in Secondary Education</td>
<td>3</td>
</tr>
<tr>
<td>ED 627 European Languages: Children’s Literature, Music, and Art</td>
<td>3</td>
</tr>
<tr>
<td>ED 625 Modern Foreign Languages: Curriculum and Materials</td>
<td>6</td>
</tr>
</tbody>
</table>

### Classroom Teacher: Reading

The reading program is designed to aid the classroom teacher in helping students improve reading and thinking skills. The program leads to a validation of a standard certificate for a reading teacher. Opportunities for graduates of this program include classroom teaching, tutoring in a variety of settings, and work in training departments in business and industry. This major could also lead to supervisory positions for the coordination and improvement of school or district-wide reading programs.

#### Electives

24 hours to be chosen by student and advisor. Electives may be selected from courses offered by the College of Education and Human Services, the Modern Languages Department of the College of Liberal Arts, or one of the other colleges offering appropriate graduate courses.

#### Classroom Teacher: Science

This program enables teachers to take substantial advanced graduate course work in the sciences in order to update skills and strengthen knowledge in their major teaching field. This is not an initial licensure program.

### Total

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDL 751 Statistics and Research for Education</td>
<td>4</td>
</tr>
<tr>
<td>EDL 771 Educational Leadership Behavior</td>
<td>4</td>
</tr>
<tr>
<td>ED 701 Advanced Educational Psychology</td>
<td>3</td>
</tr>
</tbody>
</table>

#### Total

51
Human Services (Counseling) Programs

The Department of Human Services' programs share a common curriculum of courses associated with five different counseling concentrations. Students may choose to obtain a M.A. or M.S. degree in counseling with a specialization in mental health counseling; business and industrial management counseling; community counseling; marriage and family counseling; or exceptional child; or students may choose to obtain either a M.R.C. degree with a specialization in severe disabilities or chemical dependency, or a M.Ed. in school counseling.

Students entering the Human Services Department must complete a program of study that includes a general core curriculum and requirements specific for their area of concentration. Students plan their program of study in consultation with their advisor and elective courses may be chosen as appropriate.

Students must pass a written comprehensive examination at the conclusion of their plan of study. Students may or may not be endorsed in their program concentrations by the Department of Human Services for showing competence in academic ability, professional ability, and ethical commitment to the field of counseling.

The Council for Accreditation of Counseling and Related Educational Programs (CACREP) has conference accreditation to the following program areas in the department: school counseling (M.Ed.) and community counseling. The Council on Rehabilitation Education (CORE) has accredited both rehabilitation counseling programs: severe disabilities and chemical dependency.

Licensure Requirements for Professional Counselors (PC)

Students seeking to pursue eligibility for licensure as a professional counselor (PC) must complete a minimum of 90 hours. These 90 hours of courses must meet the state minimum requirement of 11 core areas of counselor training and five clinical areas. The 11 core areas include Counseling Theory and Practice (RHB 701); Techniques of Counseling (CNL 863); Counseling Practicum (CNL 864, 865 or RHB 865); Social and Cultural Foundations in Counseling (CNL 973); Counseling for Life-Span Development (CNL 971); Group Background and Theory, or Group Processes in Counseling and Guidance (CNL 667 or 767); Career Development and Information Services (CNL 762); Behavioral Assessment (RHB 705); Statistics and Assessment for Education (EDL 751); Legal, Professional, and Ethical Issues in the Human Services (CNL 972); and Counseling Internship (CNL 867, 954 or RHB 801).

Licensure Requirements for Professional Clinical Counselors (PCC)

Students seeking to pursue eligibility for licensure as a professional counselor with the clinical endorsement (PCC) must complete 90 hours of counseling credits. These 90 hours of courses must meet the state minimum requirement of 11 areas of counselor training and five clinical areas. The five clinical areas include personality theory and psychopathology (CNL 950); clinical assessment (CNL 951); methods of intervention and prevention of mental and emotional disorders (CNL 779, 664, 773); and treatment of mental and emotional disorders (CNL 953, 954). It is important to note that there may be additional courses that also satisfy the clinical areas; please call the Department of Human Services for information. Currently, the Mental Health Counseling concentration meets all state requirements for counseling licensure. All other concentrations require additional course work to meet the 90 hours minimum requirement. In addition to completing the 90 hours of course work, PCC applicants must also complete two years of clinical supervision after the awarding of PC licensure.

Counseling: Business and Industrial Management

Introductory Course Work 12

RHB 701 Counseling Theory and Practice 4
CNL 863 Techniques of Counseling 4
EDL 751 Statistics and Research for Education 4
Community Counseling

Courses recommended in the first phase of the program 13

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>RHB 701 Counseling Theory and Practice</td>
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<tr>
<td>*CNL 663 Techniques of Counseling</td>
<td>4</td>
</tr>
<tr>
<td>EDL 751 Statistics and Research for Education</td>
<td>4</td>
</tr>
<tr>
<td>*Unless permission is granted, you must take RHB 701 prior to or concurrent with CNL 663</td>
<td></td>
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</tbody>
</table>

Courses recommended in the second phase of the program 56

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>CNL 663 Mental Health I</td>
<td>4</td>
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<tr>
<td>CNL 664 Crisis Intervention Counseling</td>
<td>4</td>
</tr>
<tr>
<td>CNL 667 Group Background and Theory or CNL 767 Group Process in Counseling and Guidance</td>
<td>4</td>
</tr>
<tr>
<td>CNL 762 Career Development and Information Services</td>
<td>4</td>
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<tr>
<td>CNL 773 Mental Health II</td>
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</tr>
<tr>
<td>CNL 779 Marriage and Family Counseling</td>
<td>4</td>
</tr>
<tr>
<td>CNL 865 Individual and Group Practicum (10 hours per week minimum)</td>
<td>4</td>
</tr>
<tr>
<td>CNL 867 Internship: Community Counseling (Minimum 200 hours with 80 direct client contact hours per each 4-hour unit. This has a minimum total of 600 hours with 240 direct client contact hours. A minimum total of 41 direct client contact hours will be spent leading a group.)</td>
<td>12</td>
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<tr>
<td>CNL 971 Counseling for Life-Span Development</td>
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<tr>
<td>CNL 972 Legal, Professional, and Ethical Issues in Human Services</td>
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<td>CNL 973 Social and Cultural Foundations in Counseling</td>
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<td>RHB 705 Behavioral Assessment</td>
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Advised Electives 4

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<th>Course</th>
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<tr>
<td>CNL 670 Counseling Workshop: Human Sexuality I &amp; II</td>
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</tr>
<tr>
<td>CNL 670 Counseling Workshop: Counseling Older Adults</td>
<td>1-3</td>
</tr>
<tr>
<td>CNL 770 Independent Study and Minor Problems</td>
<td>1-3</td>
</tr>
<tr>
<td>CNL 778 Techniques of Play Therapy</td>
<td>4</td>
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<tr>
<td>CNL 780 Systems Theory and Family Counseling</td>
<td>4</td>
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<tr>
<td>CNL 781 Advanced Techniques of Family Counseling</td>
<td>4</td>
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<tr>
<td>CNL 782 Techniques of Marital Counseling</td>
<td>4</td>
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<tr>
<td>CNL 961 Counseling the Gifted</td>
<td>3</td>
</tr>
<tr>
<td>RHB 730 Epidemiology of Chemical Dependency</td>
<td>4</td>
</tr>
<tr>
<td>RHB 731 Treatment Approaches in Chemical Dependency</td>
<td>4</td>
</tr>
</tbody>
</table>

Total 68-71

*Unless permission is granted, you must take RHB 701 prior to or concurrent with CNL 663.

Exit Requirements: A written comprehensive exam. Thesis: Students may also choose to complete a thesis. This involves nine hours of thesis credit and also EDL 852.
Counseling: Marriage and Family

Introductory Course Work 12
RHB 701 Counseling Theory and Practice 4
*CNL 863 Techniques of Counseling 4
EDL 751 Statistics and Research for Education 4

Professional Requirements 55
CNL 762 Career Development and Information Services 4
CNL 779 Marriage and Family Counseling 4
CNL 780 Systems Theory and Family Counseling 4
CNL 781 Advanced Techniques of Family Counseling 4
CNL 782 Techniques of Marital Counseling 4
CNL 670 Counseling Workshop: Human Sexuality and Counseling 3
CNL 663 Mental Health I 4
CNL 971 Counseling for Life-Span Development 4
CNL 972 Legal, Professional, and Ethical Issues in the Human Services 4
CNL 973 Social and Cultural Foundations in Counseling 4
CNL 867 Internship: Marriage and Family Counseling 12
RHB 705 Behavioral Assessment 4

Electives† 8

Total 71

*Unless permission is granted, you must take RHB 701 prior to or concurrent with CNL 863.

Mental Health Counseling

Meets all state requirements for Professional Counseling (PC) licensure.

Introductory Course Work 12
RHB 701 Counseling Theory and Practice 4
*CNL 863 Techniques of Counseling 4
EDL 751 Statistics and Research for Education 4

Professional Requirements 72
CNL 663 Mental Health I 4
CNL 664 Crisis Intervention Counseling 4
CNL 667 Group Background and Theory or CNL 767 Group Process in Counseling and Guidance 4
CNL 762 Career Development and Information Services 4
CNL 773 Mental Health II 4
CNL 779 Marriage and Family Counseling 4
CNL 865 Individual and Group Practicum 4
CNL 867 Internship: Mental Health Counseling 12

CNL 950 Personality Theory and Psychopathology 4
CNL 951 Clinical Assessment in Counseling Practice 4
CNL 952 Diagnosis and Clinical Counseling Practice 4
CNL 953 Case Formulation and Clinical Intervention 4
CNL 971 Counseling for Life-Span Development 4
CNL 972 Legal, Professional, and Ethical Issues in the Human Services 4
CNL 973 Social and Cultural Foundations in Counseling 4
RHB 705 Behavioral Assessment 4

Electives† 8

Total 92

*Unless permission is granted, you must take RHB 701 prior to or concurrent with CNL 863.

Rehabilitation Counseling: Chemical Dependency

Introductory Course Work 12
RHB 701 Counseling Theory and Practice 4
*CNL 863 Techniques of Counseling 4
EDL 751 Statistics and Research for Education 4

Professional Requirements 61
CNL 663 Mental Health I 4
CNL 779 Marriage and Family Counseling 4
CNL 667 Group Background and Theory or CNL 767 Group Processes in Counseling and Guidance 4
CNL 973 Social and Cultural Foundations in Counseling 4
RHB 700 Counseling: Severe Disability Foundations of Vocational Rehabilitation 4
RHB 704 Psychological Adjustment: Severe Disability 4
RHB 705 Behavioral Assessment 4
RHB 707 Medical Assessment: Chemical Dependency 3
RHB 711 Vocational Evaluation and Job Placement Techniques 4
RHB 720 Counseling: Severe Disability Case Management in Vocational Rehabilitation 4
RHB 730 Epidemiology of Chemical Dependency 4
RHB 731 Treatment Approaches in Chemical Dependency 4
*RHB 865 Rehabilitation Counseling Practicum 4
*RHB 801 Internship: Chemical Dependency 10

Total 73

*Unless permission is granted, you must take RHB 701 prior to or concurrent with CNL 863.
The students are required to complete a 100-hour practicum in a rehabilitation agency or a human services agency that works with people with disabilities. Students enrolled in the Chemical Dependence Concentration will complete their practicum in a vocational rehabilitation setting and a 600-hour internship in a chemical dependency treatment program.

**Exit Requirements:** Students must pass a written comprehensive examination.

**Thesis:** Completion of the thesis is optional, and is intended for students wishing to research a specific topic related to chemical dependency. In addition to their regular course work, students must complete nine hours of thesis credit and EDL 752. All these proposals must be approved by the program advisor and the thesis committee prior to continuing with the project. The thesis committee will consist of a faculty member who will serve as the major advisor, and two additional faculty members.

**Rehabilitation Counseling: Severe Disabilities**

<table>
<thead>
<tr>
<th>Introductory Course Work</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>RHB 701 Counseling Theory and Practice</td>
<td>4</td>
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<tr>
<td>*CNL 863 Techniques of Counseling</td>
<td>4</td>
</tr>
<tr>
<td>EDL 751 Statistics and Research for Education</td>
<td>4</td>
</tr>
</tbody>
</table>

**Professional Requirements**

| CNL 667 Group Background and Theory | 4 |
| or CNL 767 Group Processes in Counseling and Guidance | 4 |
| CNL 762 Career Development and Information Services | 4 |
| CNL 971 Counseling for Life-Span Development | 4 |
| CNL 972 Legal, Professional, and Ethical Issues in the Human Services | 4 |
| CNL 973 Social and Cultural Foundations in Counseling | 4 |
| RHB 700 Counseling: Severe Disability Foundations of Vocational Rehabilitation | 4 |
| RHB 702 Medical Assessment | 4 |
| RHB 704 Psychological Adjustment: Severe Disability | 4 |
| RHB 705 Behavioral Assessment | 4 |
| RHB 711 Vocational Evaluation and Job Placement Techniques | 4 |
| RHB 720 Counseling: Severe Disability Case Management in Vocational Rehabilitation | 4 |
| RHB 801 Internship: Severe Disability | 10 |
| RHB 865 Rehabilitation Counseling Practicum | 4 |

**Electives**

| Students' choice | 4 |

**Total**

| 74 |

*Unless permission is granted, you must take RHB 701 prior to or concurrent with CNL 863.*

**Pupil Personnel Services Program**

The pupil personnel services program, leading to the Master of Arts or Master of Education degree, offers a concentration in school counseling. This program is designed for students with professional backgrounds in education.

Students are expected to take electives in areas other than counseling and guidance. Elective courses are mutually decided upon by the student and the advisor. Graduate courses in the behavioral sciences (anthropology, psychology, sociology) are suggested electives. Depending upon the student's background and educational objectives, other electives may be more appropriate.

Students entering the program for counselor preparation must complete both the admission procedures and the appropriate graduate core requirements for their area of concentration and complete an exit evaluation, which is a written comprehensive examination.

The following requirements and procedures must be met by students applying for the M.Ed. or M.A. degrees within student personnel services:

- Complete appropriate graduate core requirements for area of concentration;
- Complete an interview with the assigned advisor and file a planned program of study;
- Demonstrate proficiency with specified counseling behaviors during CNL 863;
- Complete the application for a counseling practicum during the first week of the term preceding the quarter in which the practicum is offered, except for fall quarter for which application is made during the first two weeks of spring quarter.

**School Counseling**

<table>
<thead>
<tr>
<th>Introductory Course Work</th>
<th>12</th>
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</thead>
<tbody>
<tr>
<td>RHB 701 Counseling Theory and Practice</td>
<td>4</td>
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<tr>
<td>*CNL 863 Techniques of Counseling</td>
<td>4</td>
</tr>
<tr>
<td>EDL 751 Statistics and Research for Education</td>
<td>4</td>
</tr>
</tbody>
</table>

**Professional Requirements**

<p>| CNL 662 Problems in Student Personality and Development | 4 |
| CNL 667 Group Background and Theory or CNL 767 Group Processes in Counseling and Guidance | 4 |</p>
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CNL 762</td>
<td>Career Development and Information Services</td>
<td>4</td>
</tr>
<tr>
<td>CNL 765</td>
<td>Pupil Personnel Services in the School and Community Resources</td>
<td>4</td>
</tr>
<tr>
<td>CNL 779</td>
<td>Marriage and Family Counseling</td>
<td>4</td>
</tr>
<tr>
<td>CNL 971</td>
<td>Counseling for Life Span Development</td>
<td>4</td>
</tr>
<tr>
<td>CNL 972</td>
<td>Legal, Professional and Ethical Issues in Human Services</td>
<td>4</td>
</tr>
<tr>
<td>CNL 973</td>
<td>Social and Cultural Foundations in Counseling</td>
<td>4</td>
</tr>
<tr>
<td>EDS 655</td>
<td>Nature and Needs of Students with Mild to Moderate Educational Needs</td>
<td>2-4</td>
</tr>
<tr>
<td>EDL 773</td>
<td>Curriculum Development for School Leaders</td>
<td>4</td>
</tr>
<tr>
<td>RHB 705</td>
<td>Behavioral Assessment</td>
<td>4</td>
</tr>
<tr>
<td>CNL 865</td>
<td>Individual and Group Practicum</td>
<td>4</td>
</tr>
<tr>
<td>CNL 867</td>
<td>Internship: School Counseling</td>
<td>10</td>
</tr>
<tr>
<td>Electives</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>73</strong></td>
</tr>
</tbody>
</table>

*Unless permission is granted, you must take RHB 701 prior to or concurrent with CNL 863.

**Exit Requirement:** A written comprehensive exam. **Thesis:** Students may also choose to complete a thesis. This involves nine hours of thesis credit and EDL 752.
Electrical Engineering

The Department of Electrical Engineering offers a program of graduate study leading to a Master of Science in Engineering (M.S.E.) degree with a major in electrical engineering. The M.S.E. program is broad in scope and emphasizes portable concepts in the design and analysis of complex physical systems using modeling, synthesis, and optimization techniques; and bridges interdisciplinary engineering areas such as controls, robotics, electronics, and communications. A Ph.D. in engineering with a major in electrical engineering is also available. For details, see Engineering Ph.D. Program.

Faculty in the Department of Electrical Engineering have active research programs in robotics and control systems, power electronics, control of robot manipulators and robot calibration, computer integrated manufacturing, radar systems, and many others.

The Graduate Faculty

Professors

James E. Brandeberry (dean and acting chair), circuit and interface design, microprocessors, digital control, robotics and computer-aided design
Chien-In Chen, VLSI design, design testability, computer-aided design automation
Lang Hong, stochastic control systems, computer vision, image processing and pattern recognition, robotics, multiple sensor integration and target tracking
Marian K. Kazimierczuk, electronic circuit analysis, high-frequency tuned power amplifiers, power electronics
William S. McCormick (Emeritus), communication theory, bioengineering, electromagnetics, electrooptics
L. Rai Pujara, multivariable control systems, systems analysis, robust control theory
Kuldip S. Rattan, computer-aided design, digital signal processing and control, bioengineering, robotics
Arnab K. Shaw, communication theory and stochastic processes, estimation and detection, signal modeling and signal processing, simulation of communication systems

Belle A. Sheno, network theory, active and digital filters, communication circuits, digital signal processing
Raymond E. Siferd (Emeritus), integrated circuits, signal processing, microelectromechanical systems

Associate Professors

Fred Garber, decision theory and pattern recognition with applications to automatic target recognition, communication theory with emphasis on modulation techniques for multipath fading channel communications
Russell A. Hannen (Emeritus), electronic systems, control theory, stochastic processes
Pradeep Misra, multivariable control theory, decentralized system theory, robotics and applied numerical analysis, two-dimensional discrete-time systems and robust control theory
Kelu Xue, image processing and computer vision, stochastic processes and filtering, computer and communication systems, control and estimation theory

Assistant Professor

John M. Emmert, physical VLSI design, reconfigurable systems, VHSLC hardware description language (VHDL), verilog, physical design automation for VLSI

Admission

To be considered for admission to the M.S.E.-Electrical Engineering program, students must first satisfy basic requirements of the School of Graduate Studies. This includes having a bachelor's degree in engineering or a related area with an overall undergraduate grade point average of at least 2.7 (on a 4.0 scale) or an overall undergraduate grade point average of at least 2.5 with an average of 3.0 or better for the last 90 quarter hours (60 semester hours) earned toward the undergraduate degree. International students must have a TOEFL score of at least 550 on the paper-based exam or 213 on the computer-based exam. In addition, the program requires students from non-ABET accredited undergraduate programs to submit general GRE test scores. Program admission decisions are based on complete application information including overall academic performance and standardized test scores where applicable.
Facilities

Graduate students have access to a wide range of computer systems interconnected by local and wide-area networks. Access is available to DEC Alpha servers and workstations, a Silicon Graphics (SGI) Onyx 2 and SGI, DEC and Sun Workstations, as well as numerous networked PC's and x-windowing terminals. Access is also available to the Ohio Supercomputer via the Ohio Academic and Research Network (OARNET).

Research

Research in electrical engineering includes the following areas: robotics and control systems, signal and image processing, power electronics, very large scale integrated (VLSI) circuits, and microwaves and antenna theory.

In the areas of robotics and control, faculty members are involved in conventional and fuzzy control of robot manipulators and calibration, robust control of uncertain systems, and computer-aided control design. Related research in system identification, multisensor integration, multidimensional filter design, and computer integrated manufacturing is also being conducted.

A number of faculty members are involved in research programs in the areas of signal and image processing, communications, and radar systems. Topics under investigation include real-time spectrum estimation, radar system analysis, real-time frequency and angle of arrival estimation, parametric modeling techniques, neural network based speech processing, color image processing, and automatic target recognition.

The activities in electronics include design of research in radio frequency power conditioning circuits involving hybrid circuit technology and power electronics.

VLSI research includes design of integrated circuits for signal processing and computer architecture using CMOS technologies as well as developing methods for built-in self-test of VLSI circuits. There is an associated research program in microelectromechanical systems (MEMS).

The research effort in microwaves and antennas is focused on CAD models for millimeter wave integrated circuits (MMIC), and analytical and numerical techniques for arbitrarily shaped, high-frequency printed circuits and conformal antennas.

Research at Wright State is not limited to the laboratory facilities on campus. Several industrial companies, laboratories, and Wright-Patterson Air Force Base are involved in joint research efforts with the university and have unique facilities that are available for faculty and graduate research.

Collaboration

The Dayton Area Graduate Studies Institute provides collaboration opportunities through the graduate engineering courses, faculty, and research resources of the Air Force Institute of Technology, the University of Dayton, The Ohio State University, and the University of Cincinnati.

Graduate Assistantships

Assistantships are available to students on a competitive basis. Students awarded assistantship support are eligible for stipends and remission of tuition fees. Interest in financial support should be indicated at the time of application.

Degree Requirements

Students should plan a program of study in consultation with a faculty advisor. The program of study should be finalized by the time the student completes 12 credit hours of graduate study.

The following requirements must be met for the Master of Science in Engineering degree with a major in electrical engineering:

1. Completion of 45 graduate credit hours (in courses numbered 600 or above) in a program of study approved by the Electrical Engineering department chair or the Electrical Engineering Graduate Program Director.

2. At least 33 of the total 45 graduate credit hours must have an EE (electrical engineering) prefix.

3. At least 24 of the 45 graduate credit hours must be courses numbered 700 or above. Of these 24, 700-level credit hours, at least 16 must have an EE prefix.

4. At least 3 of the total 45 graduate credit hours must be from the following:
   EE 701, EE 702, EE 761, EGR 703, or any 600-700 level math/statistics class approved by the graduate advisor. A grade of "B" or better must be earned in the above class.

5. Students may choose either a thesis option or a 45 credit hours graduate coursework option. Students employed as teaching or research assistants through the School of Graduate Studies must choose the thesis option. The thesis option consists of a research project satisfying all requirements of the School of Graduate Studies. The final report (thesis) must be completed and successfully defended in an oral examination before a faculty committee. Up to 12 credit hours of 699, Thesis, may count toward degree requirement of 45 graduate credit hours.
6. No more than nine credit hours of "C" grade may be applied toward the program of study. A maximum of four credit hours of independent study (EE 890) may be used toward the degree requirements.

Note: In any given quarter, a minimum of 50 percent of total registered credit hours must have an EE prefix.

Engineering Ph.D. Program

Interested in doing doctoral research in engineering that is geared specifically to solving real-world problems? If so, Wright State's College of Engineering and Computer Science has a very special Ph.D. program for you—one that crosses traditional boundaries of engineering and includes the resources of several universities and research facilities.

This interdisciplinary program is special for a couple of reasons. First, it includes a core curriculum that spans the commonality of various engineering fields including electrical, mechanical, materials, biomedical, and human factors engineering. The program also provides for specialization in a particular engineering major and significant research in one of six focus areas where both regional demand and collaborative resources are available.

Second, the Ph.D. in engineering is special because it is a collaborative program that exploits the strengths and resources of five major regional institutions. In addition to Wright State University, classes and research can be conducted using the faculty and facilities at the Air Force Institute of Technology (AFIT), the University of Dayton (UD), the University of Cincinnati (UC), and The Ohio State University (OSU). In fact, classes taken by WSU Ph.D. in engineering students at AFIT and UD are treated seamlessly as residence courses at WSU. Classes at UC and OSU are readily transferable.

Participating Faculty

The program faculty at Wright State University reside in the College of Engineering and Computer Science. In addition, faculty from the Air Force Institute of Technology, the University of Dayton, The Ohio State University, and the University of Cincinnati also participate in the program.

Admission

Students must satisfy the requirements of the School of Graduate Studies. All applicants for the Ph.D. in engineering must submit scores on the quantitative and analytical parts of the Graduate Record Examinations (GRE). International students must have a TOEFL score of at least 550/213. The minimum admission requirements for the Ph.D. in engineering program are a B.S. from an ABET-accredited program with a minimum 3.0 grade point average, or an M.S. from an engineering program with a minimum 3.5 grade point average.

Facilities

Graduate students have access to a wide range of computer systems interconnected by local and wide-area networks. Equipment includes an NCR WorldMark 4800 Data Warehouse, DEC Alpha servers, Silicon Graphics (SGI) servers, and SGI and Sun workstations, as well as numerous networked PC's and X-Windowng terminals. Access is also available to the Ohio Supercomputer via the Ohio Academic and Research Network (OARNET) and Internet 2.

Research

The Ph.D. program supports research in the following six focus areas: computational design and optimization; electronic and microwave circuits; humans interaction with complex systems; modern control and robotics; processing and properties of high-temperature and lightweight materials; and sensor signal and image processing.

Collaboration

Wright State's Ph.D. in engineering provides for doctoral research efforts in six focus areas. These areas are not intended as disciplinary boundaries; rather, they are intended to focus and help define research efforts across disciplinary boundaries in a way that exploits collaborative opportunities.

The Dayton Area Graduate Studies Institute (DAGSI) provides collaboration opportunities through the graduate engineering courses, faculty, and research resources of the Air Force Institute of Technology (AFIT), the University of Dayton (UD), The Ohio State University (OSU), and the University of Cincinnati (UC). Students enrolled in Wright State's Ph.D. in engineering program are effectively considered resident students of both AFIT and UD. Additionally, WSU engineering Ph.D. students have the courses, faculty, and research resources of OSU and UC available to them on a transfer credit basis.
Graduate Assistantships

Assistantships are available to students on a competitive basis. Students awarded assistantship support are eligible for stipends and remission of tuition fees. Interest in financial support should be indicated at the time of application.

Degree Requirements

To obtain the Ph.D. degree in engineering, the student must complete an approved program of study containing at least 135 quarter graduate credit hours beyond the bachelor's degree in engineering, or equivalent degree, or 90 quarter graduate credit hours beyond a master's degree in engineering. At least 30 of these credit hours must be for graduate course work beyond a master's degree.

General Requirements

1. Complete at least three courses from the following interdisciplinary core courses.
   - EGR 701-4 Linear Systems
   - EGR 702-4 Systems Engineering and Analysis
   - EGR 703-4 Computational Engineering Analysis
   - EGR 704-4 Design Optimization
   - EGR 705-4 Design and Analysis of Engineering Experiments
2. Pass a written qualifying exam on three of the five interdisciplinary core courses.
3. Complete a major course specialization area of at least 24 credit hours of 700 level and above courses in electrical, mechanical, materials, biomedical, or human factors engineering, or a focus area.
4. Complete a breadth course specialization area of at least 12 credit hours outside of the major program area.
5. Complete at least eight hours of graduate credit in mathematics (MTH) or statistics (STT) courses. A minimum of four hours of graduate mathematics or statistics courses is required for students entering the program with a master's degree.
6. Complete six credit hours of seminar courses.
7. Complete at least 12 credit hours of course work in the focus area selected for the dissertation research. Note: This requirement might not involve additional hours since these hours could be included in the major or breadth requirements.
8. Satisfy the collaboration requirement. At least 10 percent of the courses in a student's program of study will come from other Dayton Area Graduate Studies Institute (DAGSI) member institutions unless waived by the DAGSI Operating Committee at the request of the student.
9. Satisfactorily complete a candidacy exam and research proposal defense as defined and judged by the student's dissertation committee. The dissertation research must fall into one of the following areas of focus:
   - Sensor signal and image processing
   - Modern control and robotics
   - Electronic and microwave circuits
   - Processing and properties of high temperature/lightweight materials
   - Computational design and optimization
   - Humans interactions with complex systems
10. Complete at least 45 credit hours of dissertation research and submit a doctoral dissertation. A maximum of 60 credit hours of dissertation research may be applied toward fulfilling the degree requirements.
11. Submit at least one substantial, original paper based on the dissertation research to a refereed, archival journal before approval is granted for the final defense of the dissertation.
12. Successfully defend the doctoral dissertation as judged by the student's dissertation committee.

Dissertation Committee Composition

1. The committee will have a minimum of five graduate faculty and be approved by the dean of the Graduate School and the dean of the College of Engineering and Computer Science.
2. The committee will have at least one member from the graduate faculty of one of the four collaborating partner institutions (University of Dayton, Air Force Institute of Technology, University of Cincinnati, Ohio State University).
3. The chair of the dissertation committee must be a doctoral qualified member of the WSU graduate faculty.
4. WSU graduate faculty must constitute a majority of the committee's membership.

Elementary Education

See Education and Human Services
The Department of English Language and Literatures offers a flexible M.A. program designed to meet various needs, including those of prospective or practicing high school or college English teachers, ESL specialists, professional writers, and predoctoral students. The program is structured around work in language, literature, and writing. Courses are regularly available in the standard areas of literature, linguistics, composition/rhetoric, professional writing, and gender studies, as well as in nontraditional and interdisciplinary studies. Elective options allow students to design programs to meet their educational goals. In addition to the course and thesis options, special options allow students to combine courses in literature or language with work in creative writing, professional writing, technical writing, women's studies, or the teaching of writing and literature. The program in TESOL (Teaching English to Speakers of Other Languages), which includes linguistics and which may be pursued as an option, as an endorsement for certified public school teachers, or as a concentration in itself, prepares students to teach English to nonnative speakers. Details about the different offerings in the TESOL program are available in the departmental office. Interdisciplinary options allow work in programs like reading, communications, religion studies, or history. Internships within the various options prepare students for professional writing careers, for college teaching, or for positions in special collections, archives, and private and rare book libraries by offering on-the-job experience at appropriate sites. Full-time or part-time study is possible.

The Department of English Language and Literatures hosts the annual Institute on Writing and Teaching, a set of summertime workshops for English teachers based on the premise that "Effective teachers of writing and reading are themselves writers and readers." During the Institute, teachers can also engage in "The Experience of Writing," a six-day workshop during which teachers improve their skills by working closely with published writers and teachers, focusing on poetry, fiction, or the personal essay.

The Graduate Faculty

Professors

William D. Baker (Emeritus), American literature, creative writing
Peter S. Bracher (Emeritus), Victorian literature, English novel
Richard H. Bullock, director of writing programs
Eugene B. Canteloupe (Emeritus), Renaissance literature, iconography
Norman R. Cary (Emeritus), world literature in English, non-Western literature
Robert M. Correa, Chaucer, Middle English literature
John F. Fleischauer (Emeritus), Renaissance literature, classical rhetoric
O. Elizabeth Harden (Emerita), English romantic literature, English novel
Lillie P. Howard, African-American literature, eighteenth-century novel, Jane Austen
James M. Hughes (Emeritus), American literature, American studies, popular culture
Lawrence E. Hussman (Emeritus), American literature, naturalism
Martin Maner, eighteenth-century English literature
Gary B. Pacernick, creative writing, modern poetry
Mary Beth Pringle, modern novel; women's literary studies; professional, business, and technical writing
Martha C. Sammons, technical writing
Donald R. Swanson (Emeritus), nineteenth- and twentieth-century English literature, English novel
Thomas R. Whissen (Emeritus), modern British literature, comparative literature, English novel

Associate Professors

Cecile W. Cary (Emerita), Shakespeare, Renaissance studies
Frank Dobson, African American literature, creative writing, modern American literature
James J. Gleason (Emeritus), American literature, twentieth-century British literature
James R. Guthrie, technical writing, desktop publishing, American literature
Chris Hall, director of ESL and Graduate Studies, English, ESL composition, computers and writing
Joe Law, composition and rhetorical theory, Victorian literature
Henry S. Limouze (chair), Milton, seventeenth-century literature, linguistics
Carol S. Loranger, twentieth-century American literature, critical theory
Marguerite G. MacDonald, director of TESOL/ESL
Nancy Mack, English education, writing theory
Barry Milligan, nineteenth-century British literature, Romantic literature
Annette Oxindine, twentieth-century British literature, feminist criticism

Assistant Professors
Deborah Crusan, TESOL, ESL assessment, applied linguistics
Angela Beumer Johnson, English education, integrated language arts
Alex Macleod, Shakespeare, sixteenth-century literature, early modern drama
David Seitz, composition studies, rhetorical theory
Alphana Sharma, postcolonial literature and theory, feminist literature and theory, critical theory, U.S. multi-ethnic literature

Admission

Regular

In addition to meeting the admission requirements of the School of Graduate Studies, applicants for regular standing in the M.A. program in English must present either an undergraduate major in English from an accredited college or university with a major average of 3.2 or better (on a 4.0 scale), or five appropriate upper-division courses in English with an average of 3.5 or better in those classes. Applicants must also present an academic paper on a subject in English using secondary sources and an overall undergraduate grade point average of 3.0 or better. Applicants with deficiencies in their undergraduate preparation may be required to take additional courses.

Conditional

Applicants whose overall grade point average is between 3.0 and 2.7 will be admitted to conditional standing by action of the English department graduate committee if they meet the other requirements above. To attain regular standing, students must be reviewed by the graduate committee, and must earn a grade of B or better in each of the first three graduate courses (12 credit hours) taken.

Upon petition of the student seeking admission, reasonable exceptions to these requirements may be made for sufficient cause.

International Students

It is essential that applicants for an M.A. in English be able to demonstrate their proficiency in written and spoken English. In addition to a minimum TOEFL score of at least 600 on the paper-based exam or 250 on the computer-based exam, applicants should submit (1) a sample of written English in the form of one or two school papers, one that the applicant regards as his or her best effort and perhaps a second showing a professor’s marks and grade, and (2) a score on the Test of Spoken English of 250 or above (old test) or 55 or above (new test); the Test of Spoken English can be taken on the same date as the TOEFL test.

Nondegree students enrolled in English graduate courses are subject to review and approval by the English department graduate committee.

Advising

No student should take graduate work without departmental advisement. Both full- and part-time students should consult regularly each quarter with the director of graduate studies in English, the department’s graduate advisor. Students taking graduate English courses who are not enrolled in the M.A. program should also consult the director of graduate studies to determine the courses that will best meet their needs.

Graduate Handbook

The department publishes a handbook for graduate students. It provides detailed information on all aspects of the M.A. program. No student should pursue graduate work in English without obtaining a copy from the departmental office.

Financial Assistance

The Department of English Language and Literatures awards a limited number of graduate assistantships annually to qualified students. Assistants are usually assigned teaching responsibilities. Assistantships may be renewed for a second year, and assistants can complete the requirements for a degree in two academic years.

International students who wish to apply for teaching assistantships must demonstrate near-native proficiency in English by scoring 600 on TOEFL and 300 (old test) or 60 (new test) on the Test of Spoken English.
**Degree Requirements**

The master’s program in English comprises three concentrations. The concentration in literature enables students to increase their knowledge of English and American literature and to improve their critical skills and their grasp of scholarly method. The concentration in composition and rhetoric provides training in writing theory and pedagogy. The concentration in TESOL provides those who wish to teach ESL with thorough grounding in linguistics, language acquisition theory, and classroom practice. To meet these goals, the program uses three groups of courses:

- **The 600-level courses** offer widely varied topics in literature and language and are especially suitable for students wishing to extend their knowledge of English and American literature, critical theory, writing pedagogy, and linguistics.

- **The 700-level core courses** provide students with the necessary scholarly and critical skills for graduate-level work. All students in the concentration in literature are required to take both ENG 701 and 702; all students in the concentration in composition and rhetoric and the concentration in TESOL are required to take both ENG 700 and 711.

- **The 700-level seminar courses** offer opportunities for intensive and specialized scholarly and critical study on a broad range of specific literary and linguistic topics; three seminars are required of all students in the program.

Additional elective courses are available in literature, language, and writing. All students are required to submit a graduate portfolio.

**Program of Study: Concentration in Literature**

**Core Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENG 701</td>
<td>Methods and Materials of Research in Literature</td>
<td>4</td>
</tr>
<tr>
<td>ENG 702</td>
<td>History of Literary Criticism</td>
<td>4</td>
</tr>
</tbody>
</table>

**Additional Courses**

- Five 700-level courses, at least three of which must be seminars; ENG 720, 730, 740, 750, 760 (prerequisite ENG 701)

**Elective Options (see below)**

**Total** 48–50

**Program of Study: Concentration in Composition and Rhetoric**

**Core Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENG 700</td>
<td>Methods and Materials of Research in Writing and Language</td>
<td>4</td>
</tr>
<tr>
<td>ENG 711</td>
<td>Rhetoric</td>
<td>4</td>
</tr>
</tbody>
</table>

**Additional Courses**

- Five 700-level courses: at least three must be seminars, and at least two must be seminars in writing and/or language: ENG 770, 780 (prerequisite ENG 700)

**Elective Options (see below)**

**Total** 48–50

**Program of Study: Concentration in TESOL**

**Core Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENG 700</td>
<td>Methods and Materials of Research in Writing and Language</td>
<td>4</td>
</tr>
<tr>
<td>ENG 711</td>
<td>Rhetoric</td>
<td>4</td>
</tr>
</tbody>
</table>

**700-level Courses**

- ENG 770 TESOL Listening and Speaking | 4
- ENG 780 TESOL Reading and Writing | 4
- Three additional 700-level courses in writing or language, at least one of which must be a seminar (prerequisite ENG 700) | 12

**600-level Courses in TESOL**

- ENG 681 Theory of ESL | 4
- ENG 682 Grammatical structures of English | 4
- ENG 683 Sociolinguistics | 4
- ENG 684 TESOL Methods and Materials | 4
- ENG 687 TESOL Assessment | 4
- ED 660 or 658* Practicum | 4

**Total** 52

*ED 658 is required for Endorsement in TESOL. Details about adding a TESOL endorsement to the M.A. in TESOL are available in the departmental offices. The endorsement in TESOL enables the recipient to teach English as a second language to students in grades for which the candidate is licensed. It is attached to the existing state of Ohio teaching licensure in a related field.

**Elective Options**

Students may satisfy the Elective Option requirement in either emphasis above by taking any one of the following groups of courses:
Course Option

Five additional courses at the 600 or 700 level 20

Interdisciplinary Option

One or two additional courses at the 600 or 700 level 4-8
Four or five graduate courses from outside the department 12-16

Communication Options

Organizational Communication Option
This track is designed to develop or enhance applied communications skills appropriate to work in organizations in the public and private sectors.

Required 16
COM 741 Principles and Application of Communication Theory
COM 643 Interviewing
COM 647 Organizational Communication
COM 651 Communication Consulting and Training

Elective(s) 4-6
One or two communication courses chosen by the student and approved by the departmental advisor.

Mass Communication Option
This track is designed to develop or enhance applied communication skills appropriate to work in the mass media of radio, television, print journalism, cable, and videotape.

Required 16
COM 741 Principles and Application of Communication Theory
COM 654 Feature Story Writing
COM 658 Editing for the Media
COM 662 Mass Media Law and Regulation

Elective(s) 4-6
One or two communication courses chosen by the student and approved by the departmental advisor.

Communications Studies Option
This track is designed to allow students to design a program of study that coherently complements the English curriculum and allows for the development of applied communication skills or the enhancement of theoretical sophistication in the communicative arts.

Required 4
COM 741 Principles and Application of Communication Theory

Elective(s) 16-18
Communication courses chosen by the student and approved by the departmental advisor.

Option in Teaching Writing and Literature

ENG 716 The Study of Literature 4
One of the following:
ENG 703/704 Teaching College Composition
ENG 717 The Study of Writing

ENG 711 Rhetoric
ENG 712 Style in Writing
ENG 717 The Study of Writing

ENG 721 Teaching Gender Studies
ENG 731 Teaching Major Writers
ENG 741 Teaching Literary Genres
ENG 751 Teaching Cultural Periods
ENG 761 Teaching Literary Problems
Supervised Classroom Teaching Experience 4
ENG 795 Internship in Teaching
or another course chosen in consultation with the graduate director

Thesis Option
Three additional courses at the 600 or 700 level 12
ENG 799 Thesis (total of 8 credits required) 8

Creative Writing Option
ENG 692 or 693 Creative Writing Seminar 4
ENG 799 Thesis (total of 8 credits required) 8
Two other courses chosen in consultation with the thesis director (e.g., ENG 694, ENG 710, ENG 712, contemporary literature, literary criticism, aesthetics) 8

Archival/Library Option
HST 710, 714 Archival Administration 6
HST 712, 713 Historical Administration 6
HST 711 State and Local History 2
ENG 795 Internship and Apprenticeship 5
MBA 551 Survey of Management
OR MKT 720 Service and Nonprofit Organization Marketing 2-3
One of the following: EDT 721 Cataloging; EDT 735 or 749 Instructional Materials; MBA 511 or MBA 531 Graduate Survey of Accounting 4

Professional Writing Option
ENG 718 The Study of Professional Writing 4
Three of the following courses:
ENG 600 Advanced Technical Writing
ENG 602 Technical Editing
ENG 605 Topics in Technical Writing
ENG 654 Feature Story Writing
(also COM 654) 9-12
ENG 658 Editing for the Media
Certificate Programs in English

Wright State University offers graduate certificate programs in professional writing, technical writing, and Teaching English to Speakers of Other Languages (TESOL). For more information about these certificates, contact the Department of English, or visit http://philos.wright.edu/Dept/ENG/eng.htm.

Graduate Endorsement in TESOL

For information about the endorsement in TESOL, which enables the recipient to teach English as a second language to students in grades for which the candidate already holds or plans to earn a state of Ohio teaching licensure, students should contact the director of TESOL, the College of Education and Human Services, or visit http://philos.wright.edu/Dept/ENG/tesol.htm.

Language Requirement

A reading knowledge of a modern foreign language is not required of any student but is strongly recommended for students contemplating additional graduate work at the doctoral level. An adequate reading knowledge can be demonstrated either by course work or an examination that certifies competence at the third year level.

Visit the Web site for more information about the Department of English Language and Literatures:

Environmental Sciences Ph.D. Program

A new Environmental Sciences Ph.D. program greatly expands upon graduate opportunities previously available at the master's level in the departments of Biology, Chemistry, and Geological Sciences (see departmental listings for Environmental Sciences Core option at the master's level). For updated information on the Environmental Sciences Ph.D., please call the Environmental Sciences Ph.D. Program Office at (937) 775-2201, or consult our Web site at www.wright.edu/academics/ieg.

This program leads to the Doctor of Philosophy degree in environmental sciences. This program is unique in its focus, building on a core group of program faculty with recognized expertise. The interdisciplinary Ph.D. program consists of three areas of excellence: 1) Environmental Chemistry and Toxicology; 2) Environmental Stressors; and 3) Environmental Geophysics. These areas of excellence will provide students with high-
demand environmental skills that are specialized in several applied environmental areas, yet well grounded in more traditional areas of environmental biology, chemistry, toxicology, and environmental geophysics.

**Participating Faculty**

The program is a cooperative effort between departments within the College of Science and Mathematics. Program faculty at Wright State reside in the departments of Biological Sciences, Chemistry, Geological Sciences, and Mathematics and Statistics.

**Biological Sciences Department**

James P. Ammon, microbial ecology, including molecular biology, cell biology, and electron microscopy
Larry G. Arian, medical entomology, immunoparasitology, physiology
Hunting W. Brown, environmental management, environmental law
G. Allen Burton, ecotoxicology
Wayne W. Carmichael, aquatic biology/toxicology, isolation, culture, toxicology of toxic algae, biotechnology
Donald Cipollini, Jr., plant physiological ecology
David L. Goldstein, comparative physiology of osmoregulation, physiological ecology, ornithology
Keith A. Grasman, wildlife toxicology and immunotoxicology
Dan E. Krane, molecular and genome evolution; human population substructuring
James R. Runkle, plant ecology, general ecology
Thomas Van't Hof, comparative physiology, endocrinology, physiological ecology and chronobiology
Michele G. Wheatly, crustacean physiology, calcium transport
Timothy S. Wood, invertebrate ecology, biology of freshwater bryozoans

**Chemistry Department**

Roger K. Gilpin, Mead Endowed Chair of Environmental Sciences, analytical chemistry
Steven R. Higgins, environmental chemistry, surface-solute interactions, contaminant transport dynamics
Audrey E. McGowin, analytical and environmental chemistry
Paul G. Seybold (chair), physical and biophysical chemistry

Thomas O. Tiernan (Emeritus), physical, analytical, and environmental chemistry

**Geological Sciences Department**

Abinash Agrawal, contaminant hydrogeology, site remediation
Cindy Carney, carbonate petrology, carbonate sedimentology, diagenesis
Songlin Cheng, hydrogeochemistry, isotope hydrology, geographic information systems
David Dominic, elastic sedimentology, stratigraphy
Ernest C. Hauser, near surface geophysics, subsurface imaging
Robert W. Ritz Jr., hydrogeology, hydrogeological modeling
Doyle Watts, seismic data acquisition and processing, astrogology, remote sensing
Paul J. Wolfe (chair), exploration geophysics

**Admission Information**

**Entrance Requirements**

A student will be admitted to the Environmental Sciences Ph.D. program if with a baccalaureate degree or a master's degree from a supporting discipline (e.g., biology, chemistry, or geology); satisfaction of the admission requirements as set forth by the School of Graduate Studies, and a record that indicates potential for a career in environmental sciences, as evaluated by the program's Admissions Committee (consisting of program faculty from each participating department). Students should enter the program with knowledge of one of the supporting sciences and having successfully completed biology, inorganic and organic chemistry, physics, statistics, and calculus. If a student is deficient in one of these areas, the Admissions Committee may require the undergraduate courses that should be completed during the first year. Determining deficiencies will be dependent on the student's area of focus. Admitted students will be expected to demonstrate strong academic ability. Submission of Graduate Record Examination (GRE) scores is required. International students must have a TOEFL score of at least 600/250.

**Financial Assistance**

Graduate assistantship and fellowship support is available to students on a competitive basis. Students awarded support are eligible for stipends and remission of tuition fees. Students with financial assistantships must register as a full-time student each quarter (at least 15 credit hours of relevant graduate courses).
Degree Requirements

Students are asked to master a series of core courses, advanced content courses, seminars, and laboratory rotations. These serve as an interdisciplinary base for the development of dissertation research. The institution awards the degree when the student satisfactorily completes the required work.

Waiver of Program Requirements

Students may petition to be exempted from all or part of the core curriculum, usually by scoring a passing grade on an appropriate proficiency examination. Students with a master's degree in a relevant field of study will be exempted from appropriate course requirements.

Students may also petition for waiver of credit for previous graduate courses taken in another accredited program. Advanced course credit of up to 12 credit hours may be waived providing (a) the grade attained in each course is a B or better, (b) the course was taken within four years of the actual waiver, and (c) the course relates to the area of concentration chosen in this program.

Petitions for obtaining credit for laboratory experiences may be made, subject to the same credit hour limitations and time constraints as for courses.

Petitions for exemption or waiver should be submitted to the program director, who will make the final decision, and who may, if necessary, seek a recommendation from the Curriculum Committee.

The Curriculum

The following is an example of a program of study for a full-time student. Students establish the details of their program of study in conjunction with their supervisory committee.

Year 1

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integrated Risk Assessments</td>
<td>4</td>
</tr>
<tr>
<td>Watershed Processes</td>
<td>4</td>
</tr>
<tr>
<td>Subsurface Processes</td>
<td>4</td>
</tr>
<tr>
<td>Introduction Statistical Modeling for</td>
<td>4</td>
</tr>
<tr>
<td>Environmental Data</td>
<td></td>
</tr>
<tr>
<td>Geological and Environmental</td>
<td></td>
</tr>
<tr>
<td>Applications of GIS</td>
<td>4</td>
</tr>
<tr>
<td>Remote Sensing: Geologic and</td>
<td>4</td>
</tr>
<tr>
<td>Environmental Applications</td>
<td></td>
</tr>
<tr>
<td>Lab Rotation I</td>
<td>4</td>
</tr>
<tr>
<td>Lab Rotation II</td>
<td>4</td>
</tr>
</tbody>
</table>

Year 2

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statistical Modeling for Environmental</td>
<td>8</td>
</tr>
<tr>
<td>Data I and II</td>
<td></td>
</tr>
<tr>
<td>Environmental Resource Sustainability</td>
<td>3</td>
</tr>
<tr>
<td>Environmental Stressor Identification</td>
<td>4</td>
</tr>
<tr>
<td>Environmental Policy and Regulation</td>
<td>3</td>
</tr>
</tbody>
</table>

All Years Combined

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seminars</td>
<td>2</td>
</tr>
<tr>
<td>Environmental and Research Ethics</td>
<td>2</td>
</tr>
<tr>
<td>Environmental Management and Economics</td>
<td>2</td>
</tr>
<tr>
<td>Environmental Problem Solving</td>
<td>2</td>
</tr>
<tr>
<td>Internship Option (min. 200 contact hrs.)</td>
<td>5</td>
</tr>
<tr>
<td>Electives* and Dissertation Research</td>
<td>74-83</td>
</tr>
</tbody>
</table>

Total 135

*Two electives must be from outside the home department.

Dissertation

Each student chooses a faculty member to guide and direct the dissertation research on a daily basis. In addition, a supervisory committee is formed to periodically review the student's progress. The relationship between the student, the faculty advisor, and the committee is central to the program. The committee determines when the research may be considered complete and must approve the written dissertation, as well as the student's public defense of it. The committee certifies to the program director the competency and achievement of the dissertation.

Master's Degrees with Environmental Concentrations

For information on opportunities for earning a master's degree with an environmental concentration, see individual listings under Biological Sciences, Chemistry, and Geological Sciences.

Geological Sciences

The Department of Geological Sciences offers two master's degree programs—the Master of Science and Master of Science in Teaching (Earth Science). The Master of Science program prepares students for careers as professional geoscientists in industry, government, or education, or for continued graduate study. Current program concentrations are in geological sciences, geophysics, environmental geochemistry, environmental geology, environmental sciences, and hydrogeology. The department maintains a strong emphasis on practical applications, a distinction nationally recognized. The Master of Science in Teaching (Earth Science) program is designed for K-12 educators seeking to add content and education courses in earth science that may lead to Ohio Early Childhood Education, Middle childhood Education, or AYA licensure in Earth/Space science; or for presently certified or licensed K-12 teachers seeking to improve their knowledge of earth sciences. A nonthesis option
is available for individuals seeking to gain expertise in geological sciences who already have a M.S. or Ph.D. degree in science or engineering from an accredited university, and who have completed a research thesis or dissertation.

The Graduate Faculty

Professors
C. Bryan Gregor, geochemical cycles, mass age distribution of sediments
Byron R. Kulander, structural geology, geophysics
Benjamin H. Richard (Emeritus), field geology, exploration geophysics
Paul J. Wolfe (chair), exploration geophysics

Associate Professors
Abinash Agrawal, contaminant hydrogeology, site remediation
Cindy Carney, carbonate petrology, carbonate sedimentology, diagenesis
Songlin Cheng, hydrogeochemistry, isotope hydrology, geographic information systems
David Dominic, clastic sedimentology, stratigraphy
Ernest C. Hauser, near surface geophysics, subsurface imaging
Robert W. Ritzi Jr., hydrogeology, hydrogeological modeling
William Slattery, teacher education, sequence stratigraphy

Assistant Professors
Roderic Brame, science education, Appalachian stratigraphy
Doyle Watts, remote sensing, seismic data acquisition and processing, astrogeology

Admissions
A candidate for the Master of Science degree (geological sciences) must possess a Bachelor of Science degree or Bachelor of Arts degree from a recognized institution. Students must have a strong background in geological sciences with appropriate courses in support sciences, mathematics, and computer science. Students not meeting these requirements may be admitted with deficiencies. A candidate for the Master of Science in Teaching degree (earth science) must possess a Bachelor of Arts or Bachelor of Science degree from a recognized institution.

Facilities and Research
The Department of Geological Sciences is housed in the Brehm Laboratory. Department facilities include 12 teaching and research laboratories and a wide variety of specialized facilities. The department's research facilities and equipment are outstanding and lend critical support to its applied programs.

In addition to the laboratory facilities described here, the department has an exceptional array of field equipment for faculty and student use. This equipment includes truck-mounted drilling rigs, trucks, vans, and other vehicles for extensive field research. Two technicians are employed to maintain and improve equipment capability of both field and laboratory equipment.

The mineralogy/crystallography/petrology laboratories feature reference and display collections of minerals and rocks, Zeiss universal microscopes, and several student model microscopes. A Logitech thin-sectioning machine and facilities for mineral separations are available.

The sedimentology and sedimentary petrology laboratory is equipped with a Wild stereomicroscope with drawing attachment, Nuclide Cathodoluminescence Luminoscope, Zeiss Universal petrographic microscopes, Nikon 35mm macrophotography equipment, an interactive video-computer microscope system, UV luminescence equipment, complete darkroom facilities, an air abrasive unit, and the petrologic equipment listed previously. Both PC- and Macintosh-based software are available for creating maps and cross-sections and for statistical analysis. Current research projects include the study of Mississippian oolitic limestones in the central Appalachian Basin, Pleistocene and Holocene carbonate rocks and sediments in the Bahamas, facies analysis of Paleozoic fluvial sandstones as well as Pleistocene glacial sediments, and the effects of sedimentary structures, and facies distributions on ground water flow.

Several laboratories serve the needs of hydrogeology and environmental geology. The field laboratory supports equipment for sampling or in situ determination of both the physical and the chemical properties of hydrogeologic systems, including drilling rigs with numerous support vehicles, sample extraction apparatus, in situ sampling probes with automated digital data acquisition systems, and downhole geophysical logging tools. Two field sites with dedicated hydrogeological monitoring equipment are maintained. Through the hydrogeochemistry laboratories, access is possible to a complete line of analytical instrumentation for the analysis of aqueous chemical parameters, including ion chromatography, VIS/UV spectrophotometry, gas chromatography, and facilities and vacuum extraction lines for stable isotope sample
processing. An organic geochemistry lab is equipped with the latest Hewlett-Packard 6890 series gas chromatograph, and a Hewlett-Packard 6890 series automatic sampler, managed by a HP VL3 pentium computer system and HP GC ChemStation software.

Current research includes the theory and the application of ground-water flow and pollution modelling, hydrogeochemical modelling, theory and application of environmental isotopes for ground-water age dating and for the investigation of hydrologic systems, organic contaminant fate and transport, insular water resource planning and management, ground-water buffering of acid precipitation, acid-mine drainage, hydrogeology and diagenesis of carbonates, non-point source pollution (Sycamore Farms Experimental Watershed), wetland hydrogeology and hydrogeochemistry, hydraulics of fractured rocks, and the characterization of hazardous waste repositories.

The facilities and equipment supporting the geophysics concentration include a 120-channel truck-mounted seismic reflection system, geophysical work stations for seismic modeling, Sun stations running PROMAX for seismic data processing and Paradigm for seismic interpretation, three gravity meters (LaCoste-Romberg and Worden), and a magnetic gradiometer system, a ground-penetrating radar system, a 2D/3D resistivity imaging system, a 48-channel engineering seismograph, an elastic wave generator, and a precision GPS survey system.

Research on near surface geophysical studies related to environmental and engineering problems is active. Additional research includes gravity, magnetic, and seismic refraction and reflection studies relating to the geology of Ohio and West Virginia. Field work in tectonics and structural geology is concentrated in the Appalachian Mountains, Western Ohio, and the Ohio River Region.

The Department of Geological Sciences has a remote sensing laboratory Sun Sparc 80 and personal computers with remote sensing data processing software and has the capability to download and process a variety of satellite image formats. The lab includes a large format plotter suitable for large scale mosaics.

The Geological Sciences computer room provides PCs and Macs for GIS, geological, hydrological, geophysical, and remote sensing applications.

Excellent cooperative academic and research relationships exist with other departments on campus and with surrounding colleges and universities in southwestern Ohio. The department has wide-ranging capabilities and can accommodate through its facilities a very broad range of research ideas.

Financial Assistance

Graduate teaching assistantships and graduate assistantships carrying stipends and fee remissions are awarded. Additional research assistantships connected with supported research projects and research contracts are also available. Tuition scholarships are available in special cases.

Degree Requirements

Master of Science in Geological Sciences

In addition to the requirements of the School of Graduate Studies, the following requirements of the Department of Geological Sciences must be met:

1. Completion of 45 or more graduate credit hours apportioned in the following way: at least nine hours of thesis credit and at least 36 additional hours of graduate credit in an instructional program approved by the candidate's graduate committee, including colloquia or seminars as required by the department.

2. Submission of an approved thesis based on original research.

3. Satisfactory performance in a final thesis defense near the end of the degree program.

Individual programs of study tailor course work, seminars, and research guided by faculty to the professional and educational goals of each student. Each graduate student is advised by a committee of three faculty members. Ultimate responsibility for fulfilling all requirements rests with the student.

Environmental Sciences

The Environmental Sciences concentration was developed by the College of Science and Mathematics to promote interdisciplinary research. Students working toward an M.S. degree in the Department of Geological Sciences under this concentration are required to complete 45 graduate quarter hours, including environmental sciences core courses and additional geology and supporting science courses. A student in the Department of Geological Sciences can elect to pursue an environmental sciences concentration that combines courses and research in geology, biology, and chemistry. When selecting this option, a student's advisory committee includes a member from outside the department, e.g., a member of the biology or chemistry faculty. And, in addition to meeting the general requirements for the Master of Science degree in geological sciences, course requirements for the environmental core include:
- Environmental chemistry
- Geologic and environmental applications of geographic information systems
- Environmental statistics
- Risk assessment
- Environmental sciences seminar
- Two environmental sciences electives outside the geological sciences department

**Environmental Sciences Ph.D. Program**

In addition, students in geological sciences can pursue an interdisciplinary Ph.D. in Environmental Sciences. See the separate listing for that program on page 125.

**History**

The purpose of the Master of Arts program in history is to provide broad but intensive training for students who intend to pursue careers as professional historians, whether in teaching, research, or archival or historical preservation fields, or for those who desire strong historical backgrounds for other vocational or avocational objectives. The program offers opportunities for specialized study and research, but without neglecting the breadth that characterizes historical work at its best. In recognition of the fact that students' interests and goals are varied, the program provides a choice of three plans (see the following details), all of which lead to a Master of Arts degree. This program is approved by the Ohio Board of Regents.

*Founded in 1974, Wright State's public history program is one of the oldest in the nation. Students have completed internships at the Smithsonian Institution, the U.S. Air Force Museum, the Montgomery County Historical Society, and the Ohio Historical Society.*

**The Graduate Faculty**

**Professors**
- Carl Becker (Emeritus), United States: Ohio, Civil War, World War II
- Jacob H. Dorn, United States: 20th century, intellectual, religious
- Edward F. Haas, United States: South, urban and public history, Civil War, 20th century
- Allan Spetter, United States: diplomatic

**Associate Professors**
- Martin Arbagi, Roman, Medieval, and Byzantine
- Susan B. Carrafiello, modern Europe: Italy
- Nancy Garner, United States: Women's, West
- Barbara Green, United States: African American, South, Reconstruction
- Paul D. Lockhart, early modern Europe: Scandinavia
- Edgar Melton, Modern Europe: Russia, World Wars
- John W. Sherman, Latin America: Mexico, 20th century
- Robert Sumser, modern Europe: intellectual, Germany

**Health Care Management**

See Business and Administration
Degree Requirements

The Master of Arts degree can be earned through one of three plans. The Thesis Plan is intended primarily for those students who expect to continue graduate work or who need or desire the full range of professional experience, including intensive research and writing. It assures training in research techniques and the preparation of scholarly papers, culminating in the submission of a thesis. The Examination Plan is intended primarily, but not exclusively, for students not expecting to pursue doctoral studies. The Public History Plan is a program designed for graduate students who are primarily interested in careers in historical or archival administration, or in museum management. It provides students with both theoretical and practical training in these areas.

For the purpose of planning advanced courses and seminars, each student should consult a graduate director regularly. A student receiving two Cs will be placed on academic probation and will be required to appear before the graduate studies committee to justify his or her continued participation in the program. Upon review of the student’s progress, the graduate studies committee may dismiss the student from the program.

Thesis Plan Requirements

Students must meet all requirements of the School of Graduate Studies, show a reading knowledge of a foreign language when deemed necessary for thesis research as determined by their thesis advisor, and successfully defend a thesis.

Students select two fields of concentration, totaling 40 credit hours. Each field of concentration will have a minimum of 16 hours of course work, with a minimum of two 700-level courses. A minimum of 20 hours must be 700-level course work, including the required HST 700 (Historical Methods).

In addition, near the end of their studies, and after submitting a prospectus approved by the student’s thesis committee, students will register for 4–12 hours of HST 799 (thesis). HST 799 will conclude with a successful oral defense of the thesis before a panel of three professors, chaired by the thesis advisor. Students may petition the graduate studies committee to grant exceptions to field of concentration or 700-level course requirements.

Possible fields of concentration are as follows:
1. United States to 1877
2. United States since 1877
3. Ancient World and Europe to 1600
4. Europe since 1600
5. Africa, Asia, and Latin America
History Courses Numbered
700–709 20 (minimum)

History Courses Numbered 600 20

History 799 Thesis 4–12

Total 52

Examination Plan Requirements

Students must meet all requirements of the School of Graduate Studies.

Students select two fields of concentration (see above), totaling 52 hours. There must be a minimum of 20 hours in each field of concentration; there should be a minimum of 12 hours of 700-level courses in each field of concentration as well as the required HST 700 (Historical Methods).

Students must seek the consent of a graduate director before taking course work outside their fields of concentration. Students may petition the graduate studies committee to grant exceptions to field of concentration or 700-level course requirements.

The student will be examined on the two fields of concentration in a Written Comprehensive Examination, generally administered in the seventh week of the student's final quarter.

History Courses Numbered
700–709 28 (minimum)

History Courses Numbered 600 24

Total 52

Public History Plan Requirements

The Public History Plan Program at Wright State University integrates a traditional American history curriculum with courses taught by professionals in archives, museum studies, and historic preservation, an internship, and a project leading to a Master of Arts degree in history with a specialization in public history.

Required Academic Core Courses
(24 credits)

Public historians are historians who apply their skills and knowledge outside of academic or classroom settings. Public history students are required to complete 24 hours of American history courses including at least 12 hours of seminar and 12 hours of 600-level courses in American history. Students completing a public history program must complete a course that introduces historical research methods (HST 700). Public history students will complete 56–58 credit hours.

Public History Courses 18

Public history students must complete the following core requirements:

HST 687 Introduction to Public History 4
HST 710 Introduction to Archives and Manuscripts 4
HST 712 Museum Administration and Collections 4
HST 715 Historical Management Internship 5
HST 720 Project 1

Advanced Public History Course Requirements 8

Students must complete eight credit hours in advanced Public History courses. Students may choose breadth over specialization by taking four credits each in Museum Studies and Archives and Records Management. Students will also have the option to specialize and take eight advanced credit hours in either Archives or Museum Studies.

HST 714 Advanced Problems in Archival Work 4
HST 730 Archival Records Technologies 2
HST 740 Information Management 2
HST 713 Museum Interpretation and Exhibits 4
HST 725 Topics in Public History: Decorative Arts 4

Electives 6–8

Students may select from additional public history or academic history courses including the following Public History electives. With the approval of the Public History Program director, students may take courses in an outside discipline such as art, anthropology, urban and geography, English, education, and business.

HST 711 State and Local History 2
HST 716 Historic Preservation 4
HST 725 Topics in Public History 4
HST 717 Practicum: Archives and Museums 1–2
HST 688 History and New Media 4

Total 56–58

Certificate in Museum Studies or Archives and Records Management

Students admitted to selected graduate programs at Wright State University and students who have received a graduate degree in history or in selected disciplines may choose to complete a certificate in either museum studies or archives and records management. Students who have previously earned a graduate degree must be admitted to the School of Graduate Studies with nondegree status. Students wishing to pursue either certificate program must fill out a certificate application with the director of public history.
Human Factors Engineering/Programs 133

Required Courses for a Certificate in Museum Studies
HST 687 Introduction to Public History 4
HST 712 Museum Administration and Collections 4
HST 713 Museum Interpretation and Exhibits 4
HST 725 Topics in Public History: Decorative Arts 4
HST 715 Historical Management Internship 5
HST 720 Project 1
Total 22

Required Courses for a Certificate in Archives and Records Management
HST 687 Introduction to Public History 4
HST 711 Introduction to Archives and Manuscripts 4
HST 714 Advanced Problems in Archival Work 4
HST 730 Archival Records Technologies 2
HST 740 Information Management 2
HST 715 Historical Management Internship 5
HST 720 Project 1
Total 22

Human Factors and Industrial/Organizational Psychology
See Psychology

Human Factors Engineering
The Department of Biomedical, Industrial, and Human Factors Engineering offers a program of graduate study leading to a Master of Science in Engineering (M.S.E.) degree with a major in human factors engineering. The M.S.E. program is broad in scope and emphasizes portable concepts in the design and analysis of complex physical systems using modeling, synthesis, and optimization techniques, and bridges interdisciplinary engineering areas such as controls, robotics, electronics, and communications. The M.S.E. in Human Factors Engineering can also be obtained through E*Course classes. Additional information for the E*Course program can be found at www.cs.wright.edu/bie/dl.

A Ph.D. in engineering with a major in human factors engineering is also available. For details, see Engineering Ph.D. program.

Human factors engineering provides graduates with the tools, knowledge and problem solving skills to design, develop, implement and improve integrated systems that include people, materials, information, equipment, and energy.

The Graduate Faculty
Professors
Jennie Gallimore, visualization, virtual environments, spatial orientation, adaptive displays, aviation human factors
Chandler Phillips, mathematical modeling of biomechanics, fuzzy decision making in rehabilitation, functional electrical stimulation
Malcolm L. Ritchie (Emeritus), human factors engineering, engineering psychology

Associate Professor
S. Narayanan (interim chair), modeling, interactive systems, simulation, decision aiding

Assistant Professors
Craig Harvey, distributed engineering collaboration, advanced technology systems usability
Ling Rothrock, human performance modeling, real-time discrete-event simulation

Admission
To be considered for admission to the M.S.E.-Human Factors Engineering program, students must first satisfy basic requirements of the School of Graduate Studies. This includes having a bachelor's degree in engineering or a related area with an overall undergraduate grade point average of at least 2.7 (on a 4.0 scale) or an overall undergraduate grade point average of at least 2.5 with an average of 3.0 or better for the last 90 quarter hours (60 semester hours) earned toward the undergraduate degree. International students must have a TOEFL score of at least 550. In addition, the program requires students from non-ABET accredited undergraduate programs to submit general GRE test scores. Program admission decisions are based on complete application information including overall academic performance and standardized test scores where applicable.
Facilities
Graduate students have access to a wide range of computer systems interconnected by local and wide-area networks. Access is available to three DEC Alpha AXP 4000/610's; numerous Sun, DEC, and Silicon Graphics file servers and workstations; X-windowing terminals; and personal computers. Access is also available to the Ohio Supercomputer via the Ohio Academic and Research Network (OARNET). In addition, each graduate faculty member has a well equipped research laboratory.

Research
Faculty research interests focus on three primary areas. Typical activities within these areas include:

**Ergonomics and Occupational Biomechanics**
- Biomechanical modeling in the context of human-machine system design
- Analysis and modeling of human movement, including kinematics and underlying strategy
- Computer-aided ergonomics and biomechanical analysis

**Human-Computer Interaction, Systems Modeling, and Usability**
- Interactive optimization and logistics systems analysis
- Design of information retrieval systems using cognitive modeling techniques
- Biologically inspired adaptive aiding
- Models and multi-model interfaces for supervisory control
- Development of a model for implementing usability early in the design process
- Study of engineering design process when collaborating over distances
- Creating a model for predicting skill requirements of advanced manufacturing personnel
- Modeling human performance through soft computing techniques

**Interactive Visualization**
- Visual information presentation
- Three-dimensional displays
- Spatial orientation and optokinetic collic reflex
- Virtual environments
- Adaptive displays
- Display measurement

Research at Wright State is not limited to the laboratory facilities on campus. Several industrial companies, laboratories, and Wright-Patterson Air Force Base are involved in joint research efforts with the university and have unique facilities that are available for faculty and graduate research.

Collaboration
The Dayton Area Graduate Studies Institute provides collaboration opportunities through the graduate engineering courses, faculty, and research resources of the Air Force Institute of Technology, the University of Dayton, The Ohio State University, and the University of Cincinnati.

Graduate Assistantships
Assistantships are available to students on a competitive basis. Students awarded assistantship support are eligible for stipends and remission of tuition fees. Interest in financial support should be indicated at the time of application.

Degree Requirements
Students should plan a program of study in consultation with a faculty advisor. The program of study should be finalized by the time the student completes 12 credit hours of graduate study.

The following requirements must be met for the Master of Science in Engineering degree:

1. Completion of 45 graduate credit hours in courses that have prior approval by an engineering graduate advisor.
2. At least 36 of the total 45 graduate credit hours must be engineering or computer engineering courses. At least 24 of these hours must be human factors engineering courses.
3. At least 24 of the 45 graduate credit hours must be courses numbered 700 or above.
4. At least 6 of the total 45 graduate credit hours must be courses in mathematics, statistics, or computer science.
5. Students may choose either a thesis option or a 45 credit hours graduate advanced course work option. The thesis option consists of a research project satisfying all requirements of the School of Graduate Studies. The final report (thesis) must be completed and successfully defended in an oral examination before the major committee. Up to 12 credit hours of 899, Thesis, may count toward degree requirement of 45 graduate credit hours.
Humanities

The Master of Humanities program in the College of Liberal Arts provides opportunities for interdisciplinary study for students who wish to pursue individually designed curricula in the humanities. Study leads to a Master of Humanities (M.Hum.) degree.

The program's primary goal is scholarly, intellectual development, and thus serves diverse personal and professional needs. High school teachers who want a content-emphasis graduate degree, persons who seek a career change or a post-retirement graduate degree, and persons who seek a second master's degree in a complementary or even a contrasting field are among the many people who may find this program uniquely suited to their needs.

Graduates of specialized undergraduate programs may welcome the breadth provided by this master's degree. Part-time study is the norm; full-time study is also possible.

At the core of the program are three seminars that introduce students to the scope and methodologies of scholarly research in the humanities. In cooperation with the program director, students design a personal program of study to meet their individual academic goals. The program thus has both a specific focus on the humanities and wide flexibility within the broad curriculum of the College of Liberal Arts. While anchored in the humanities, the program encourages selection of courses from supplemental areas of study.

The range of possible programs of study is intentionally wide. A student might choose to study the role of music in African American culture or the status of women in American religion. Another student might study the interrelations of art and philosophy in modern German (or French) culture or the politics and rhetoric of Cicero. The only expectation is that students pursue an interdisciplinary program of study having a focus in the humanities.

Students are encouraged to participate in specialized programs available at the university. For example, students may design a Master of Humanities degree in conjunction with the Women's Studies Program or the African and African American Studies Program. It is also possible for a student to receive a certificate in Women's Studies in conjunction with a Master of Humanities degree. For more information on the Women's Studies certificate, see Women's Studies Graduate Programs.

Additional information about the Master of Humanities Program and a program handbook detailing policies and requirements are available upon request in the Master of Humanities Office. For more information, see our Web site at http://www.cola.wright.edu/hum/humnf.html

Projects completed by students in the Master of Humanities program include research on the ethics of decision-making, Christian higher education in the late Roman Empire, whether domestic violence leads children to criminal behavior, and many others.

The Graduate Faculty

Participating faculty are drawn from departments throughout the College of Liberal Arts. A list of affiliated faculty and their respective areas of expertise is available upon request in the Humanities Office, and from the internet address listed in the paragraph above.

Director

Ava Chamberlain, associate professor of religion

Admission

Applicants for admission to the Master of Humanities program must present a bachelor's degree from an accredited college or university with a minimum of 30 semester or 45 quarter hours in liberal arts disciplines and a minimum grade point average of 3.0 (on a 4.0 scale) in their undergraduate work. Students who have deficiencies in their undergraduate work may be asked to take additional courses.

Additionally, all prospective students are asked to submit an essay containing the following: 1) a description of their academic background both within the humanities and beyond, 2) a description of their professional background, 3) an explanation of their reasons for pursuing a graduate degree, and 4) an explanation of why they wish to pursue graduate study in the humanities.

Students who do not meet requirements for regular admission may be admitted to the program on conditional status. A maximum of three courses, normally not to exceed 12 quarter hours of credit, may be accepted in transfer for work completed at the master's level at other accredited institutions. Such transfer credits are subject to approval by the program as well as to the regulations of the School of Graduate Studies.

Advising

Upon admission to the program, each student is advised by the director of the program. While enrolled in the program, all students need to consult with the director at least once each term.
In consultation with the director, students will select courses consistent with their programs of study, develop preliminary ideas for their capstone projects, and choose faculty to direct those projects.

Financial Assistance

The university awards a limited number of graduate assistantships annually to qualified students. Prospective students may apply to the School of Graduate Studies or to the program director.

Degree Requirements

The program is designed primarily for part-time students, therefore, it incorporates a minimum of prerequisites and sequences and a variety of options. As a result, it is flexible enough to accommodate students who must balance graduate education with the demands of a full-time job.

Program of Study

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HUM 700 and 720</td>
<td>8</td>
</tr>
<tr>
<td>HUM 710 or MUS 701</td>
<td>4</td>
</tr>
<tr>
<td>Music Theory</td>
<td>6</td>
</tr>
<tr>
<td>Music History and Literature</td>
<td>6</td>
</tr>
<tr>
<td>Other Studies in Music</td>
<td>8</td>
</tr>
<tr>
<td>Electives</td>
<td>8</td>
</tr>
<tr>
<td>Project (HUM 730)</td>
<td>8</td>
</tr>
</tbody>
</table>

The culminating project can be either a traditional thesis or a creative project. This project must follow the same general guidelines required of all Humanities projects. As a third option, students concentrating in music may give a recital as their culminating project. Those choosing the recital option must follow the guidelines specified by the Department of Music.

A student handbook detailing the policies and requirements of the Master of Humanities degree is available in both the Department of Music and Humanities Office.

Institute for Environmental Quality

Reflecting its commitment to the environment, the university in 1994 established the Institute for Environmental Quality. The mission of the institute is to oversee the environmental courses, research, and outreach activities that serve the diverse interests of Wright State graduate students, as well as undergraduate students and the community at large. Institute staff work closely with faculty in the Departments of Biological Sciences, Chemistry, and Geological Sciences to ensure that WSU environmental programs at all levels (BS, MS, and Ph.D.) are current, stimulating, interdisciplinary, and career directed.

A master’s student in the Departments of Biological Sciences, Chemistry, or Geological Sciences can elect to pursue an environmental sciences concentration within the home department. For information on opportunities for a master’s degree with an environmental concentration, see individual departmental listings under Biological Sciences, Chemistry, and Geological Sciences. In addition, these departments also serve as a home for students pursuing a Ph.D. in environmental sciences. See departmental listings and/or the separate listing for this new program under Environmental Sciences Ph.D. Program on page 125.
WSU has a very active and successful environmental research program. It has received national research and service grant awards that address public education and assess water and wildlife quality.

Interdisciplinary Science and Mathematics

The Graduate Faculty

Associate Professors
Beth Basista, Physics Education
Ann Farrell, Mathematics Education
Susann Mathews, Mathematics Education
William Slattery, Geological Sciences Education
James Tomlin, Biological Sciences Education

Assistant Professors
Roderick Brame, Geological Sciences Education
Susan Kirsch, Biological Sciences Education
Suzanne Lunsford, Chemistry Education
Tracy Rusch, Mathematics Education

Program Description

The Interdisciplinary Master of Science in Teaching (M.S.T.) in Science and Mathematics Program is designed for K-12 teachers who wish to increase their science and/or mathematics content and pedagogical knowledge in a program specifically designed for teachers. Pre-certified elementary and secondary teachers holding a bachelor's degree are eligible, as well as early, middle, and adolescent age provisionally and fully licensed teachers. The program content is geared toward middle childhood (grades 4-9) topics. All of the science and mathematics courses are specially designed for teachers and are inquiry-based and integrated with pedagogical issues.

Students can choose from three emphases (Science Emphasis, Mathematics Emphasis, or Integrated Science and Mathematics Emphasis). Each emphasis requires 48 quarter credit hours of courses, 36 quarter credit hours in the College of Science and Mathematics, and 12 quarter credit hours in the College of Education and Human Services. The programs require a pedagogical research project which typically will involve research within a teacher's own classroom. The types of projects can involve curriculum development and piloting, assessment of student understanding, and research into new pedagogical methods among other activities.

Each student, upon admission to the program, will be assigned an advisor from the science and mathematics faculty. The Science and Mathematics Education Committee in collaboration with the student, will develop a program of study. With an advisor's approval, students may substitute the following courses: SM 645, 646, 647 and 648. All Master's Projects must have prior approval of the Science and Mathematics Education Committee.

Although many of the courses in the program will count towards obtaining science and/or mathematics Middle School Licensure, other reading courses are necessary for Licensure. Students interested in obtaining Middle School Licensure in the science and/or mathematics areas should contact either Beth Basista (Science Education), Ann Farrell (Mathematics Education), and/or Janet Frederick (Teacher Education) to determine which additional courses would be necessary.

Although the starting date of the program was fall 2001, many of the courses are being developed as this catalog goes to press. Questions concerning this program should be referred to Dr. Beth Basista beth.basista@wright.edu or (937) 775-2954.

Interdisciplinary M.S.T. Tracks

Science Emphasis
- Two Physics courses 8
- Two Chemistry courses 8
- Two Earth Science courses 8
- Two Life Science courses 8
- Pedagogical Research Project 4
- Education courses listed as 600 or above 12

Total 48

Integrated Science and Mathematics Emphasis
- Integrated Science and Mathematics course 4

Select three science courses from the following 12
- Physics 4
- Chemistry 4
- Earth science 4
- Life Science 4
Select four mathematics courses from the following:

Mathematical Reasoning and Processes
Quantitative Reasoning
Algebra and Functions
Problem solving
Geometry
Concepts in Calculus
Mathematical Modeling
Probability and Statistics
History of Mathematics
Pedagogical Research Project

Education courses listed as 600 or above

Total: 48

Mathematics Emphasis
Two Integrated Science and Mathematics courses

Four Mathematics courses chosen from the following:

Mathematical Reasoning and Processes
Quantitative Reasoning
Algebra and Functions
Problem solving
Geometry
Concepts in Calculus
Mathematical Modeling
Probability and Statistics
History of Mathematics
Pedagogical Research Project

Education courses listed as 600 or above

Total: 48

International Business
See Business and Administration

Logistics Management
See Business and Administration

Management
See Business and Administration

Management Information Systems
See Business and Administration

Marketing
See Business and Administration

Materials Science and Engineering

The Department of Mechanical and Materials Engineering offers graduate programs leading to a Master of Science in Engineering (M.S.E.) and a Ph.D. in Engineering with a major in materials science and engineering. The graduate programs are broad in scope, emphasizing the interdisciplinary nature of the field of materials science and engineering. The program is focused around processing, structure, properties, performance of advanced lightweight, and high temperature materials. For more information, see our Web site at http://www.cs.wright.edu/mme/.

The Graduate Faculty

Professors
Raghavan Srinivasan, materials engineering, high-temperature deformation, materials behavior modeling.
Joseph F. Thomas Jr., materials engineering, mechanical behavior.

Associate Professors
Richard J. Bethke (chair), signal and systems modeling, analysis and control, stochastic processes.
Sharmila Mukhopadhyay, composites, surface engineering, high temperature electronic devices.

Assistant Professor
Maher S. Amer, Raman spectroscopy, polymers, composites, micromechanics of multi-phase materials.

Admission

To be considered for admission to the M.S.E.-Materials program, students must first satisfy basic requirements of the School of Graduate Studies. This includes having a bachelor's degree in engineering or a related area with an overall undergraduate grade point average of at least 2.7 (on a 4.0 scale) or an overall undergraduate grade point average of at least 2.5 with an average of 3.0 or better for the last 90 quarter hours (60 semester hours) earned toward the undergraduate degree. International students must have a TOEFL score of at least 550/213. In addition, the program requires students from non-ABET accredited.
undergraduate programs to submit general GRE test scores. Program admission decisions are based on complete application information including overall academic performance and standardized test scores where applicable.

Facilities
Graduate students have access to a wide range of modern facilities including classrooms, laboratories, and computer systems interconnected by local and wide area communication networks. Computational facilities include numerous Sun, DEC, and Silicon Graphics file servers and workstations; X-windowing terminals; and personal computers. Access is also available to the Ohio Supercomputer via the Ohio Academic and Research Network (OARNET).

Research
Research in materials science and engineering is focused around processing, structure, properties, and performance of metals, ceramics, polymers, and composites. Current programs include studies of super conducting ceramics, polymer, ceramic, titanium, carbon matrix composites, and nickel and titanium based alloys, as well as advanced nano- and meso-systems.

The department hosts a variety of sophisticated materials and research equipment. This includes a scanning transmission electron microscope with associated specimen preparation equipment, state-of-the-art micro-Raman spectroscopy, high resolution x-ray photo electron spectroscopy (XPS), and unique controlled-atmosphere high temperature deformation testing facilities. The department also has standard laboratory equipment for fabrication and testing of materials such as mechanical testing machines, scanning electron microscopes, an x-ray diffractometer, furnaces, microhardness testers, and optical microscopes.

Research at Wright State University is not limited to the laboratory facilities on campus. Several industrial companies, laboratories, and Wright-Patterson Air Force Base are involved in joint research efforts, making available their unique facilities for faculty and graduate research.

Collaboration
The Dayton Area Graduate Studies Institute provides collaboration opportunities through the graduate engineering courses, faculty, and research resources of the Air Force Institute of Technology, the University of Dayton, The Ohio State University, and the University of Cincinnati.

Graduate Assistantships
Assistantships are available to students on a competitive basis. Students awarded assistantship support are eligible for stipends and remission of tuition fees. Interest in financial support should be indicated at the time of application.

Degree Requirements
Students should plan a program of study in consultation with a faculty advisor. The program of study should be finalized by the time the student completes 12 credit hours of graduate study.

The following requirements must be met for the Master of Science in Engineering degree:
1. Completion of 45 graduate credit hours in courses that have prior approval by an engineering graduate advisor.
2. At least 36 of the total 45 graduate credit hours must be engineering or computer engineering courses. At least 24 of these must be engineering courses.
3. At least 12 of the 36 graduate credit hours of engineering and computer engineering must be courses numbered above 700, excluding 899, Thesis.
4. At least 6 of the total 45 graduate credit hours must be courses in mathematics, statistics, or computer science.
5. Students must choose either a thesis option or advanced course work option. Students employed as teaching or research assistants through the School of Graduate Studies at any time during their degree candidacy must choose the thesis option.

Thesis Option: A thesis satisfying all requirements of the School of Graduate Studies must be completed and successfully defended in an oral examination before the major committee. Up to 12 credit hours of 899, Thesis, may count toward degree requirements of 45 total graduate credit hours and 36 graduate credit hours in engineering or computer science.

Course Option: Students must complete 12 credit hours of courses numbered 700 or above in addition to the 12 hours specified in requirement 3.

Math Education
See Education and Human Services
Mathematics

The Department of Mathematics and Statistics offers the Master of Science degree in mathematics. The graduate program is designed to provide a solid foundation for further professional training or careers in teaching, industry, or government. Degree requirements are flexible, allowing considerable latitude in tailoring the course of study to individual preferences. Two concentrations are available: mathematics and applied mathematics. The mathematics concentration is designed for students with an undergraduate degree in mathematics or the equivalent. The applied mathematics concentration is designed not only for persons with undergraduate training in mathematics, but also for those with degrees in related disciplines, such as engineering and science, who want a solid foundation in mathematics. The department makes provision for part-time degree candidates by offering all required courses in the late afternoon or evening. The department also awards the Master of Science degree in applied statistics (see Statistics).

Graduate students are assigned an advisor from the graduate faculty on the basis of their proposed area of study. Early consultation with the advisor is recommended since the advisor works closely with the student in every phase of the program.

The Graduate Faculty

Professors
K. T. Arasu, combinatorics
Joanne M. Dombrowski, functional analysis
Anthony B. Evans, finite geometry, graph theory
Terry A. McKee, graph theory, logic
David F. Miller, optimization
Steen Pedersen, operator theory
Manley Perkel (chair), algebra, combinatorics
Edgar A. Rutter, algebra

Associate Professors
Ann M. Farrell, mathematics education
Lop-Fat Ho, optimal control, duality theory
Xiang-Dong Hou, algebra, coding theory
Chaocheng Huang, partial differential equations
Alexander J. Kaplan, functional analysis
Phan Loi, operator theory
Susann Mathews, mathematics education
Richard Mercer, operator algebras, mathematical physics
Thomas P. Svobodny, applied mathematics
Larry Turyn, differential equations, applied analysis
James T. Vance Jr., Fourier analysis

Assistant Professors
Robert Craighead, complex analysis
Tracy Rusch, mathematics education

Admission

Applicants for admission are expected to meet the general requirements for admission to graduate study as established by the School of Graduate Studies. All applicants should also have completed a calculus sequence. In addition, applicants must present postcalculus courses in mathematics, as well as related course requirements appropriate for the intended program of study. The specific undergraduate preparation required for each of the department's two degree options forms part of the description of each option. Applicants with insufficient preparation may be admitted on the condition that they complete certain prerequisite work to be specified by the department at the time of admission.

Financial Assistance

The department awards a limited number of graduate teaching assistantships annually to qualified applicants. Assistantships may be renewed for a second year; assistants can complete the requirements for a degree in two years. The duties of an assistant normally include classroom teaching, which is a meaningful aspect of the education of graduate students in the mathematical sciences.

Applicants should inquire about the availability of tuition fellowships. (See fellowships and financial aid).

Degree Requirements

The Master of Science degree may be earned by satisfying the requirements of the mathematics or the applied mathematics option. The mathematics option is a flexible program emphasizing sound, fundamental, and mathematical training. Students may either complete a traditional curriculum in mathematics or develop, with a graduate advisor, a plan of study that is tailored to their individual needs. The applied mathematics option is more structured but still allows students considerable latitude in designing a course of study. This option focuses on the computational tools of modern applied mathematics and the mathematical theory underlying these tools. Either option can provide a solid foundation for doctoral study in mathematics or for a career in teaching, industry, or government.
All master’s degree candidates are required to pass a comprehensive written examination which must be taken at least one quarter before the expected date of graduation.

Mathematics Concentration

This program offers sound mathematical training in the traditional areas of mathematics, yet is flexible enough to allow students to pursue interests in related areas of mathematics. Students may select courses in algebra, analysis, combinatorics, and geometry, as well as differential equations, graph theory, numerical analysis, probability, and statistical theory. Individual interests and future goals determine the actual course of study, within the guidelines given below.

Applicants for this program should have completed a minimum of 21 quarter hours (14 semester hours) in mathematics beyond calculus. Courses in analysis (advanced calculus), linear algebra, and modern algebra are particularly important. However, courses in other areas of mathematics may also provide the foundation needed for graduate work in mathematics.

In addition to the requirements of the School of Graduate Studies, the following departmental requirements must be met to earn a degree under this option:

1. The student must complete a minimum of 45 credit hours of courses that have prior approval of the department. Departmental approval is normally given by the student’s advisor. At least 24 of these hours must be in mathematics or statistics courses numbered 701 or above and may not include MTH 792 or STT 786.
2. The 24 credit hours at the 700 level must include at least one full-year sequence in mathematics.

The writing of a thesis is optional. Students who elect a thesis may count it for not more than 10 hours of credit. The thesis must be approved by the student’s advisor and must be prepared to conform to the standards established by the School of Graduate Studies. A thesis defense will be required.

Applied Mathematics Concentration

The applied mathematics option provides training in mathematical techniques applicable to a wide range of real-world problems. The objectives of this program are two-fold: to develop the ability to analyze and solve a variety of mathematical problems and to increase the understanding of specific problems encountered in other fields. To this end, the curriculum includes course sequences in pure and applied mathematics and advanced courses in related areas such as engineering, computer science, or physics. This option is designed for those who have completed a bachelor’s degree in engineering, science, mathematics, or statistics, and who wish to acquire a solid foundation in applied mathematics.

Applicants for this program should have completed undergraduate courses in multivariable calculus, linear or matrix algebra equivalent to MTH 355, and ordinary differential equations. Students should also have knowledge of a high-level programming language. Courses in complex analysis, partial differential equations, and physics are recommended.

In addition to the requirements of the School of Graduate Studies, the following departmental requirements must be met to earn a degree under this option. Students who have not, prior to admission, completed two quarters or one semester of real variables course work comparable to MTH 431 and 432 are required to take MTH 631 and 632 as program electives. Full-time students normally take two years to complete this program.

The following is the traditional program. For a project-based program, as well as more information on the Applied Mathematics program, see http://www.math.wright.edu/ms/appliedmath.

Advanced Courses

Two of the following pairs of courses, at least one chosen from Group I.

Group I


Advanced Analysis: MTH 730 Principles of Analysis, and MTH 731 Real Analysis I, or MTH 777 Applied Analysis I.

Group II

Advanced Algebra: MTH 751 Algebra I, and MTH 752 Algebra II


Applied Analysis: MTH 777 Applied Analysis I, and MTH 778 Applied Analysis II, if MTH 730 and 731 are chosen from Group I.
Applied Mathematics Courses 15–17

Three courses from one of the following groups:

Continuous Applied Mathematics
MTH 606 Mathematical Modeling
MTH 607 Matrix Computations
MTH 680 Methods of Applied Mathematics: Geometric Methods
MTH 681 Methods of Applied Mathematics: Differential Equations
MTH 682 Methods of Applied Mathematics: Integral Methods

Discrete Applied Mathematics
MTH 607 Optimization Techniques
MTH 616 Matrix Computations*
MTH 619 Cryptography and Data Security
MTH 650 Discrete Algebraic Structures
MTH 658 Applied Graph Theory
MTH 659 Combinatorial Tools for Computer Science

Probability and Stochastic Processes
STT 661 Theory of Statistics I
STT 662 Theory of Statistics II
STT 611 Applied Time Series
STT 702 Applied Stochastic Processes

At least one additional course chosen from the following and the courses in advanced and applied mathematics listed above.

MTH 633 Real Variables III
MTH 634 Introduction to Complex Analysis
MTH 732 Real Analysis II

Electives 12–14

Additional approved graduate courses, other than MTH 655, including one of the following:
At least 8 hours of courses from outside the Department of Mathematics and Statistics.
Two MTH/STT courses, other than MTH 631 and 632, at least one of which must be taken at the 700 level.

Total 45

*Credit not permitted for both MTH 616 and MTH 716. Students should contact the Department of Mathematics and Statistics for possible alternative programs for the applied mathematics concentration.

Mechanical Engineering

The Department of Mechanical and Materials Engineering offers a program of graduate study leading to a Master of Science in Engineering (M.S.E.) degree with a major in mechanical engineering. The M.S.E. program is broad in scope and emphasizes portable concepts in the design and analysis of complex physical systems using modeling, synthesis, and optimization techniques, and bridges interdisciplinary engineering areas such as controls, robotics, and communications. A Ph.D. in engineering with a major in mechanical engineering is also available. For details, see Engineering Ph.D. program. For more information about the mechanical and materials engineering programs, see our Web site at http://www.cs.wright.edu/mme/

The Graduate Faculty

Professors
Parviz Dadras (Emeritus), solid mechanics, manufacturing processes, carbon-carbon composites
Ramana V. Grandhi, structural optimization, finite element methods, uncertainty quantification
Willbur L. Hankey (Emeritus), computational fluid dynamics, aerodynamics, aerothermodynamics

Associate Professors
Richard J. Bethke (chair), signal and systems, modeling, analysis and control, stochastic processes
Kenneth C. Cornelius, fluid mechanics, turbulent flow, aerodynamics, compressible flow
Junghsen Lieh, dynamite and controls of mechanical systems
Joseph C. Slater, structure dynamics, vibration and control
Scott K. Thomas, experimental heat and mass transfer, computational fluid dynamics
J. Mitch Wolff, fluid mechanics, turbomachinery, computational fluid dynamics, unsteady aerodynamics, MEMS

Assistant Professors
Billy W. Friar (Emeritus), thermodynamics, heat transfer, fluid mechanics
Nathan W. Klingbeil, solid mechanics, fracture mechanics, fatigue of engineering materials and structures
James A. Menard, thermal sciences, heat transfer
Admission

To be considered for admission to the M.S.E.—Mechanical program, students must first satisfy basic requirements of the School of Graduate Studies. This includes having a bachelor's degree in engineering or a related area with an overall undergraduate grade point average of at least 2.7 (on a 4.0 scale) or an overall undergraduate grade point average of at least 2.5 with an average of 3.0 or better for the last 90 quarter hours (60 semester hours) earned toward the undergraduate degree. International students must have a TOEFL score of at least 550/213. In addition, the program requires students from non-ABET accredited undergraduate programs to submit general GRE test scores. Program admission decisions are based on complete application information including overall academic performance and standardized tests scores where applicable.

Facilities

Graduate students have access to a wide range of modern facilities including classrooms, laboratories, and computer systems interconnected by local and wide area communication networks. Computational facilities include numerous Sun, DEC, and Silicon Graphics file servers and workstations; X-windowing terminals; and personal computers. Access is also available to the Ohio Supercomputer via the Ohio Academic and Research Network (OARNET).

Research

Research in mechanical engineering spans several exciting areas. There is a large program in design optimization addressing large structures, die shapes, flight trajectories, and other applications. Work is also being done in structural dynamics areas including vehicle suspensions and turbine blades. Mechanical design studies include the characterization of carbon-carbon composites. Fluid dynamics research is being conducted both experimentally and via computer computation (CFD). Projects include study of flows in turbine engines and reciprocating compressors. There is also a large thermal science program in the analysis and application of heat pipes and related devices.

Research at Wright State is not limited to the laboratory facilities on campus. Several industrial companies, laboratories, and Wright-Patterson Air Force Base are involved in joint research efforts with the university and have unique facilities that are available for faculty and graduate research.

Collaboration

The Dayton Area Graduate Studies Institute provides collaboration opportunities through the graduate engineering courses, faculty, and research resources of the Air Force Institute of Technology, the University of Dayton, The Ohio State University, and the University of Cincinnati.

Graduate Assistantships

Assistantships are available to students on a competitive basis. Students awarded assistantship support are eligible for stipends and remission of tuition fees. Interest in financial support should be indicated at the time of application.

Degree Requirements

Students should plan a program of study in consultation with a faculty advisor. The program of study should be finalized by the time the student completes 12 credit hours of graduate study.

The following requirements must be met for the Master of Science in Engineering degree:

1. Completion of 45 graduate credit hours in courses that have prior approval by an engineering graduate advisor.
2. At least 36 of the total 45 graduate credit hours must be engineering or computer engineering courses. At least 24 of these must be engineering courses.
3. At least 12 of the 36 graduate credit hours of engineering and computer engineering must be courses numbered above 700, excluding 899. Thesis.
4. At least 6 of the total 45 graduate credit hours must be courses in mathematics, statistics, or computer science.
5. Students must choose either a thesis option or advanced coursework option. Students employed as teaching or research assistants through the School of Graduate Studies at any time during their degree candidacy must choose the thesis option.

Thesis Option: A thesis satisfying all requirements of the School of Graduate Studies must be completed and successfully defended in an oral examination before the major committee. Up to 12 credit hours of 899, Thesis, may count toward degree requirements of 45 total graduate credit hours and 36 graduate credit hours in engineering or computer science.

Course Option: Students must complete 12 credit hours of courses numbered 700 or above in addition to the 12 hours specified in requirement 3.
Programs/Microbiology and Immunology

Medicine
Contact the School of Medicine Office of Student Affairs and Admissions at (937) 775-2934 for more information.

Microbiology and Immunology

The program leading to the Master of Science degree in microbiology and immunology prepares students for careers as professional microbiologists/immunologists in industry, government, education, and research organizations, or for further professional training.

Areas of specialization in the Microbiology and Immunology program include molecular genetics, microbial physiology, immunology, human neutrophils, host immunology/parasite relationships, microbial ecology, algal toxins, immunotoxicology, immunoparasitology, DNA and conventional vaccine development, retrovirology (HIV), environmental microbiology, indoor allergens, inflammation, and virology. Seminars and journal clubs concentrate on each of these areas, exposing the students to the entire discipline.

The M.S. degree in microbiology and immunology requires the submission and oral defense of either a research-based or literature-based thesis. Candidates are required to obtain a major advisor and an advisory committee. For the research-based thesis, the advisory committee will help formulate a study program to include a minimum of 20 quarter credits of graduate-level coursework and 25 quarter credits of research (which could include journal clubs, seminars, or special topics). For the literature-based thesis, the student, with assistance of the advisory committee, will select the additional courses required to fulfill the 45 credit hour limit. The advisory committee will also provide counseling and evaluate student progress. If a student is uncertain of a major area of concentration, the program director will serve as a temporary advisor until the student selects an area and is accepted by an advisory professor.

Students in microbiology and immunology may conduct cutting-edge research in immunology and infection. Research opportunities include indoor allergies, basic and clinical immunology, vaccine development, cardiovascular disease, and others.

The Graduate Faculty

Microbiology and Immunology

Faculty members for the Departments of Anatomy, Biological Sciences, Biochemistry and Molecular Biology, and Physiology and Biophysics with interests in microbiology and immunology constitute the program faculty.

Professors
Larry G. Ariian, immunoparasitology, medical entomology
Nancy J. Bigley, immunology, DNA vaccines
G. Allen Burton, ecotoxicology
Wayne W. Carmichael, algal toxins, biotechnology
David J. Giron, virology
Barbara E. Hull, immunology, viral pathogenicity

Associate Professors
Jim P. Amon, microbial ecology, wetlands biology
Thomas L. Brown, cell signaling, apoptosis
Julian Gomez-Cambronero, human neutrophils, inflammation and cardiovascular diseases
Keith A. Grasman, immunotoxicology
Dawn P. Wooley, virology, HIV

Admission

Applicants must fulfill the requirements for admission established by the School of Graduate Studies. Preference is given to students with a grade point average of 3.0 or better on a 4.0 grading scale. Letters of recommendation and GRE scores are also considered.

Facilities

The Microbiology and Immunology program has excellent ancillary facilities which include cold rooms, constant temperature rooms, animal rooms, and darkroom capabilities. Major available research equipment includes scintillation counters; spectrophotometers; ultracentrifuges; flow cytometry; electrophorator; PCR thermocycler; Laminar flow safety cabinets; computer services: light, transmission, and scanning electron microscopes; specialized cell and tissue culture facilities; and mass spectrometer.

Financial Assistance

Two graduate teaching assistantships are available on a competitive basis. These carry a waiver of most tuition and instructional fees. Appointments are made for one year and may be renewed for a second year.


Degree Requirements

1. Candidates must complete a minimum of 45 quarter credits and must participate in graduate seminars for at least six credit hours.
2. Candidates must maintain a 3.0 cumulative average with no more than nine credit hours of C grades applicable to the degree.
3. A maximum of 10 credits of graduate courses may be transferred from other institutions.

Music

The Department of Music offers two graduate degree programs, the Master of Music in Music Education, and, in conjunction with the College of Liberal Arts Humanities Program, the Master of Humanities with an emphasis in music. The National Association of Schools of Music accredits both programs.

The Master of Music in Music Education degree is a professional-oriented program. It is designed to serve music educators from primary to postsecondary levels. Though all courses are pertinent to terminal degree programs, they are equally valuable for students who plan to study at the doctoral level. A variety of program options allows students to design programs that suit their professional goals and take into account their backgrounds and experience.

The Department of Music offers three major options in program planning that lead to the Master of Music in Music Education degree. The options include the Thesis Option, the Project Option, and the Recital Option. Each contains requirements in music education, music history and literature, and music theory, as well as opportunities for performance. For the Thesis Option, the student prepares a thesis under the supervision of the thesis director; the Project Option requires one project under the supervision of a project director; and for the Recital Option, the student presents a full-length public recital and a research paper.

The Master of Humanities degree is a flexible degree program within the College of Liberal Arts. The course of study may be designed to serve the needs of the student interested in pursuing a career as a professional musician in a variety of areas including conducting, solo performance, musicology, theory, composition, and others. Courses are equally valuable for students who plan to study at the doctoral level. A variety of curricular options allows students to design programs that suit their professional goals and take into account their backgrounds and experience. Several options are available including a thesis, recital, or creative project. Students interested in the Master of Humanities program should also consult that program entry in the catalog.

The Graduate Faculty

Professor
Leland D. Bland, music theory, music history and literature
Herbert Dregalla (chair), music education

Associate Professors
David M. Booth, instrumental conducting, music education
Henry N. Dahlman (director), music education, music history and literature, choral conducting
Brenda Ellis, music education
Charles S. Larkowski, musicology, music history and literature, music theory
Jackson Leung, musicology, music history and literature, applied piano
Sharon H. Nelson (associate dean, College of Liberal Arts), music education
James W. Tipps, music education
Kimberly J. Warrick, applied voice

Assistant Professors
Shelley M. Jagow, applied saxophone, music education
Randall S. Paul, music education, applied clarinet/saxophone

Admission

In addition to meeting the admission requirements of the School of Graduate Studies, applicants for admission to the Graduate Studies in Music program (both Master of Music in Music Education and Master of Humanities with an emphasis in music) must present an undergraduate major in music from an accredited college or university with a minimum grade point average of 3.0 (on a 4.0 scale) in undergraduate course work in music. In addition to the application and transcripts sent to the School of Graduate Studies, the applicant must submit the following to the Department of Music: resume; three recommendations from teachers, administrators, or colleagues; and other supporting material the applicant may deem appropriate.

The applicant must also schedule an admissions interview with the director of Graduate Studies in Music prior to admission.
Upon admission, placement examinations in Music Theory and Music History must be taken no later than the third week of the first quarter of study and passed prior to enrollment in the applicable courses.

Students admitted to the Graduate Studies Program in Music will be classified as regular, conditional, probationary, or non-degree seeking, as defined in the WSU Graduate Catalog. Moreover, any changes in status will be in accordance with policies outlined in the Graduate Catalog. In addition to the requirements of the School of Graduate Studies, removal of the conditional status requires achieving a cumulative GPA of 3.0 or better in the first 12 hours of academic study in the program. Only regularly organized academic classes at the 700 level may be included in this average. Applied music, ensembles, chamber music, workshops, and independent study of any type may not be counted in the 12 hours needed to remove conditional status.

Students who wish to apply to study applied music must audition for the appropriate Applied Music Board.

Exceptions may be made for reasonable cause, such exceptions may require action by the Department of Music Graduate Committee.

### Advising

No student will take graduate work in music without departmental advising. Full- and part-time students enrolled in the program must consult with their advisors each quarter. Students who are not candidates for the degree must have departmental permission as outlined for the particular area of study.

Each regularly enrolled student will be assigned an advisor appointed by the director of Graduate Studies in Music. The advisor will be assigned according to the student's program emphasis. Full- and part-time students enrolled in graduate courses must consult with their advisor each quarter. The advisor, the director of Graduate Studies in Music, and the student will plan the student's program. The plan will be made and filed with the School of Graduate studies no later than mid-term of the second quarter of the student's enrollment in the program.

The student will be assigned a committee of three faculty members who will design and evaluate the oral comprehensive examination.

The Department of Music publishes the Wright State University Graduate Studies in Music Handbook, which provides detailed information about all aspects of the graduate program in music. All graduate students in music should obtain a copy from the departmental office.

In addition to a Department of Music advisor, students in the Master of Humanities program will also be assigned an advisor in the Humanities Program of the College of Liberal Arts. Given the flexible nature of this degree program, it is essential that Master of Humanities students meet at the beginning of their program with both advisors. It is also critical that Master of Humanities students meet regularly (at least once per quarter) with their assigned advisors. In addition to policies and procedures outlined in the Department of Music Graduate Studies in Music Handbook, students in the Master of Humanities Program must also follow policies and procedures in the Master of Humanities Handbook provided by the Humanities Program. Students interested in the Master of Humanities program should also consult that program entry in this catalog.

### Degree Requirements

#### Master of Music in Music Education

<table>
<thead>
<tr>
<th>Program of Study</th>
<th>45</th>
</tr>
</thead>
<tbody>
<tr>
<td>MUS 701, 702, 703, 704</td>
<td>15</td>
</tr>
<tr>
<td>Music Theory (700 level)</td>
<td>6</td>
</tr>
<tr>
<td>Music History and Literature (700 level)</td>
<td>6</td>
</tr>
<tr>
<td>Elective Courses in Music (600-700 level)</td>
<td>12-18</td>
</tr>
<tr>
<td>Thesis, Recital, or Project Option*</td>
<td>1-6</td>
</tr>
</tbody>
</table>

*For a culminating experience, the candidate may choose one of three options. These include a traditional thesis; a performance recital in the candidate's applied area with supporting written document, or a creative project. Further details are outlined below and in the Department of Music Graduate Studies in Music Handbook.

During the last quarter in the program, a candidate for a degree must pass an oral comprehensive examination covering the areas of music education, music history, and music theory. The student who elects the thesis option will also be prepared to defend the thesis. The examination will be designed and evaluated by the candidate's committee.

#### Thesis Option

Course work will be distributed in the areas of music education, music history and literature, music theory, performance (12 to 18 credit hours), and thesis (maximum of 6 credit hours) for a minimum total of 45 credit hours. Students will prepare a thesis under the supervision of a thesis director, who is approved by the director of Graduate Studies in Music. The thesis will be read and approved by the candidate's committee.
Recital Option

Course work will be distributed in the areas of music education (24 to 30 credit hours), music history and literature, music theory, and performance (15 to 21 credit hours) for a minimum total of 45 credit hours. If approved by the appropriate Applied Music Board for the recital option, the student will present a full-length public recital. The recital performance will be heard and judged on a pass-fail basis by the appropriate Applied Music Board. For specifications as to length, content, and procedures for the graduate recital, students should consult the departmental Applied Music Policy Statement, Section IX, Graduate Study in Applied Music. This policy statement is available in the office of the Department of Music.

In addition, students will present a research paper related to the recital literature. The paper, equivalent in scope to a term paper, will be read and approved by a permanent member of the music history and literature or music theory faculty.

Master's Project Option

Course work will be distributed in the areas of music education (24 to 30 credit hours), music history and literature, music theory, and performance (15 to 21 credit hours) for a minimum total of 45 credit hours. In addition, students will present a project. Students may revise, refine, and extend a paper written for a course, or may elect to present a new paper. The project paper will be read and approved by the student's project director and a second reader.

Note: In any of the options the student may, with the approval of the director of Graduate Studies in Music and the advisor, elect a maximum of two courses outside the Department of Music. The courses may be substituted for music electives if the student can show the courses are in cognate areas that contribute substantially to the preparation of a teacher in the arts.

Master of Humanities with an Emphasis in Music

All students in the Master of Humanities program may take advantage of the resources of the Department of Music. Students with a primary interest in music may design a specialized program of study in consultation with the director of Graduate Studies in Music and the director of the Humanities Program. Students choosing to concentrate in music are required to follow the general parameters of the Master of Humanities degree; within these parameters they may design a program of study with a focus in music history, music, composition, performance, or other musical specialty.

Program of Study  48

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>HUM 700 and 720</td>
<td>8</td>
</tr>
<tr>
<td>HUM 710 or MUS 701</td>
<td>4</td>
</tr>
<tr>
<td>Music Theory</td>
<td>6</td>
</tr>
<tr>
<td>Music History and Literature</td>
<td>6</td>
</tr>
<tr>
<td>Other Studies in Music</td>
<td>8</td>
</tr>
<tr>
<td>Electives</td>
<td>8</td>
</tr>
<tr>
<td>Project (HUM 730)</td>
<td>8</td>
</tr>
</tbody>
</table>

The culminating project may be either a traditional thesis or a creative project. This project must follow the same general guidelines required of all Humanities projects. As a third option, students concentrating in music may give a recital as their culminating project. Those choosing the recital option must follow the guidelines specified by the Department of Music. Further details are outlined below, in Graduate Studies in Music Handbook, and in the Master of Humanities Handbook.

During the last quarter in the program, a candidate for a degree must pass an oral comprehensive examination covering the areas music history, music theory, and the students area of musical emphasis. The student who elects the thesis option will also be prepared to defend the thesis. The examination will be designed and evaluated by the candidate's committee.

A student handbook detailing the policies and requirements of the Master of Humanities degree with an emphasis in music is available in both the Department of Music and the Humanities Office.

Thesis Option

Course work will be distributed in the areas of music theory, music history and literature, research in music, the humanities, performance, and thesis (maximum of eight credit hours) for a minimum total of 48 credit hours. Students will prepare a thesis under the supervision of a thesis director, who is approved by the director of Graduate Studies in Music and the director of the Humanities program. The thesis will be read and approved by the candidate's committee.

Recital Option

Course work will be distributed in the areas of music theory, music history and literature, research in music, the humanities, and performance for a minimum total of 40 credit hours. In the case of the recital option, the final recital and paper described below fulfills the thesis requirement (maximum of eight credit hours) of the Master of Humanities curriculum.

If approved by the appropriate Applied Music Board for the recital option, the student will present a full-length public recital. The recital performance will be heard and judged on a pass-fail basis by the appropriate Applied Music Board. For specifications as to length, content, and
procedures for the graduate recital, students should consult the Music Department's Applied Music Policy Statement, Section IX, Graduate Study in Applied Music. This policy statement is available in the office of the Department of Music.

In addition, students will present a research paper related to the recital literature. The paper, equivalent in scope to a term paper, will be read and approved by a permanent member of the music history and literature or music theory faculty.

**Master's Project Option**

Course work will be distributed in the areas of music theory, music history and literature, research in music, the humanities, and performance for a minimum total of 40 credit hours. In the case of the master's project option, the final project described below fulfills the thesis requirement (maximum of eight credit hours) of the Master of Humanities curriculum.

For the project, students may revise, refine, and extend research done during the course of study, or may elect to present a new paper. Projects may also be approved in creative activity such as musical composition, conducting, and other areas. In such cases the student will present a research paper related to the project. The paper, equivalent in scope to a term paper, will be read and approved by the student's committee, including one full-time member of the music faculty.

**Students Not Enrolled in the M.M. Program**

A graduate student enrolled in another degree program (e.g., Master of Arts, Master of Humanities, or Master of Education) or a nondegree graduate student may, with the approval of his or her department, elect certain graduate courses in music. The requirements for courses in each area of music are listed below.

**Music Education**

All courses in music education require an undergraduate degree in music. Permission of the director of Graduate Studies in Music and permission of the instructor are required.

**Theory of Music, Music History, and Literature**

All courses in music theory and music history and literature require a substantial background in music. Permission of the director of Graduate Studies in Music and permission of the instructor are required.

**Performance**

MUS 705, Chamber Music, and MUS 715, Ensemble require an audition and approval of the instructor. Private study in any area of applied music requires a successful audition before the appropriate Applied Music Board.

For further information, consult the departmental Applied Music Policy Statement, Section IX, Graduate Study in Applied Music. This policy statement is available in the office of the Department of Music.

**Nursing**

The College of Nursing and Health offers a graduate program leading to a Master of Science degree with a major in nursing or a dual degree program leading to a Master of Science and a Master of Business Administration in administration of nursing and health care systems. Students may complete the requirements for two concentrations while pursuing a Nursing Masters degree. A third program enables the registered nurse student with a bachelor's degree in a traditional discipline outside of nursing to enroll in a bridge program leading to one of the master's degrees listed above. The program prepares nurses for advanced leadership roles in practice and administration, as well as for doctoral study in nursing. The curriculum offers students the opportunity to individualize the nursing major by selecting from areas of clinical specialization and roles (clinical specialist, nurse practitioner, nurse administrator, or school nurse). Nurses already possessing a master's degree with a major in nursing may earn a second M.S. degree in nursing. The programs accommodate both full-time and part-time students, with most classes offered in the late afternoon and evening. The sequence of course offerings is flexible. Full-time students may complete the program within one or two calendar years, depending on the major. Part-time students must complete all requirements for the degree within five years.

**The Graduate Faculty**

**Professors**

Barbara Fowler, community health, adolescent health, nursing education, health policy, cultural diversity, vulnerable populations

Margaret Clark Graham, community health, issues in advanced practice, primary care, prevention, nurse practitioner education, health policy, adolescent issues, families, outcome research, evidenced-based practice
Patricia Martin, maternal/child, community health, organizational behavior, research environments, evaluation
Susan G. Praeger, school nursing, adolescent health, nursing education, maternal-child nursing

Associate Professors
Janice Belcher, nursing administration, nursing informatics, psychiatric nursing
Donna Miles Curry, children and families, developmental screening, pain in children, pediatric critical care, separation anxiety, infancy
Jan Fulton, oncology care, venous access devices, qualitative research designs
Elizabeth Lipp, family centered nursing care of children, adolescents in families, adolescent health
Virginia Nehring, clinical nursing practice, community/public health, spirituality, clinical instruction, psychiatric nursing practice
Barbara O'Brien, child health, family nursing, chronic illness
Kristine Scordo, adult cardiology, acute care, MVPS, health promotion, cardiac rehabilitation, informatics

Assistant Professors
Candace Cherrington, cardiac nursing, critical/intensive care, nursing research, research methods
Bobbe Gray, cognitive models, design/methods, high-risk pregnancy, hope, maternal childbearing, mother/baby care, nursing research, teen pregnancy, parenting, stress and coping
Carol Holdcraft, stress and coping, subjective experience, cognitive models, recovery from MI, psychiatric nursing practice, hope, hardness, informatics and technology
Yue-Feng (Yvonne) Lu, gerontology
Gail Moddeman, gerontology, adult health, pain management
Patricia Vermeersch, clinical studies, dementia, gerontology, instrument development

Clinical Assistant Professor
Martha Teter, diabetes

Clinical Instructor
Lisa Dalton, family nurse practitioner

Admission
The College of Nursing and Health has several admission requirements in addition to the minimum requirements of the School of Graduate Studies. All prospective students must have:

- A baccalaureate degree in nursing from a school of nursing that is accredited by a nationally recognized body for nursing education accreditation or be a registered nurse with a bachelor's degree in a traditional discipline other than nursing, which will require selected support and professional nursing bridge courses in addition to regular graduate curriculum requirements.
- An overall grade point average in undergraduate work of 3.0, or 2.7 with 3.0 or better in the upper division course work in the major.
- Submission of a goal statement with application to the program.
- Complete a statistics course, required on admission or prior to enrollment in NUR 707.
- Documented expertise in physical/health assessment or completed course.
- Computer literacy.
- Evidence of registered nurse licensure in Ohio.
- Evidence of liability insurance, health insurance, CPR certification, and other necessary health information as required by clinical agencies, prior to clinical courses and practice.

All students are required to adhere to the policies and procedures set forth in the Wright State University Graduate Catalog and the College of Nursing and Health Graduate Student Handbook.

The college has a rolling admission policy to provide flexibility for students wishing to start in any quarter. Please note that some concentrations have specific deadlines. Please contact the college for details.

Facilities
The College of Nursing and Health is located in WSU's newest building, University Hall—a state-of-the-art educational facility. Clinical instructional facilities are abundant and varied. Since June 1984, the school has had a collaborative agreement with the Division of Nursing at Miami Valley Hospital to form a Center for Excellence in Nursing. This agreement affords opportunities for research, clinical practice, and education for students and faculty. In addition, the school has contracts with over 200 agencies in the area including hospitals, rehabilitation centers, county health departments, nursing homes, school systems, senior citizen centers, and day care centers which can be used for clinical experiences and/or research.

For research, the Dunbar Library and the Fordham Health Sciences Library are available. The Dunbar Library provides media production
services and facilities. The university's Statistical Consulting Center provides support for data analysis.

Degree Requirements

The program is divided into core and advanced practice options. The core includes courses in theoretical foundations, research, concepts of advanced practice, and thesis or scholarly project. Core courses are required of all students.

Advanced practice specialty options include the choice of clinical or organizational systems. Students interested in administration of nursing and health care systems would select organizational systems. Students who select clinical systems choose a client focus with individuals or community. Current available clinical specialties include adult health, child/adolescent health, community health nursing, school nursing, the family nurse practitioner program, and the acute care nurse practitioner program.

Candidates for the master's degree must meet all of the following requirements:
1. Completion of a minimum of 51 credit hours
2. Completion of the program within five years
3. Maintenance of a 3.0 cumulative grade point average with no more than nine hours of C grades applicable to the degree
4. Successful defense of a thesis or successful completion of a scholarly project

Program of Study

Summary of Requirements 51*

Core Courses 19.5
Thesis or scholarly project 3
Advanced Practice Options 28–44
Electives 0–5

*Some specialty tracks require additional credit hours.

School Nurse Licensure

In addition to the Master of Science nursing major with a concentration in School Nursing, the College of Nursing and Health collaborates with the College of Education and Human Services to provide a postbaccalaureate program of study leading to Professional Pupil Services School Nurse Licensure though the Ohio Department of Education. Interested individuals must first complete a baccalaureate degree with course work in growth and development, psychology, sociology, and/or anthropology. Each candidate must also have course work in community health and a current license to practice as a registered nurse issued by the Ohio Board of Nursing.

Operations Management

See Business and Administration

Pharmacology and Toxicology

The program leading to the Master of Science degree in the Department of Pharmacology and Toxicology will prepare students for careers in industry, government, education, and research organizations or for further professional training. It is offered in close cooperation with the U.S. Air Force and Navy Toxicology Laboratories located at Wright-Patterson Air Force Base.

This program differs from other undergraduate major or master's-level program currently offered at Wright State University both conceptually and with respect to employment and career options. It provides a comprehensive introduction to the broad range of theoretical concepts that comprise these disciplines, providing both historical context and state-of-the-art technical approaches to solving pharmacological and toxicological problems. This goal of providing students with a career-oriented yet theoretically based education will be accomplished within the core curriculum through the combination of text and literature-based lectures, complemented by laboratory instruction and journal club type seminars, and culminating with a thesis research project.

Degree Requirements

To qualify for the Master of Science degree, students must satisfy the requirements of the School of Graduate Studies, as well as the program requirements. During the first three quarters, students will be required to enroll in 26–30 hours of didactic course work supplemented by laboratory rotations and research activities. During the second year, students will focus on developing a research-based thesis culminating with an oral thesis defense. PTX 990 (Seminar) is required each academic year quarter.

The program will include two tracks for student specialization: Pharmacology or Toxicology.

Common core course requirements are:

- PTX 700 Research Techniques 3
- STT 630 Biostatistics 4
- PTX 710 Principles of Biokinetics I 4
- PTX 750 Principles of Biodynamics II 4
- PTX 990 Seminar 3

Total 18
Toxicology specialization would also include:
PTX 751 Molecular Toxicology 4 Electives

Total 4 + Electives

Pharmacology specialization would also include:
PTX 879 Molecular Pharmacology 4 Electives

Total 4 + Electives

Administrative Organization of the Program
Responsibility for program administration lies within the Department of Pharmacology and Toxicology, School of Medicine. The program director will coordinate all aspects of the M.S. program and serve as ex-officio member of all committees. A program advisor will initially advise new program entrants until such time as a research advisor is selected by the student and approved by the program director. A thesis committee consisting of two graduate faculty members in addition to the research advisor will be selected by the student in consultation with the research advisor.

Admission
Applicants must fulfill the requirements for admission established by the School of Graduate Studies. A baccalaureate degree in physical, chemical, or life sciences with undergraduate level courses in biochemistry, molecular biology, molecular genetics, and cell biology is generally required. Preference is given to applicants with a GPA of 3.0 or greater. The Graduate Record Examination scores and three letters of recommendation are required. For international students, a TOEFL score of at least 600/250 will also be required.

Facilities
The Department of Pharmacology and Toxicology occupies the second floor of the Health Sciences Building on the main campus of Wright State University. Resources include seven well-equipped biomedical research laboratories and common equipment facilities. Wright-Patterson Air Force Base (WPAFB) is located immediately adjacent to Wright State University, where the facilities of the Air Force and Naval Toxicology laboratories are available to students in the program. In addition to providing a training site for thesis research, these sites also serve as a window to potential career opportunities for graduates of this program. The laboratories at WPAFB conduct research on the health effects of a wide variety of agents for military and other government agencies including the National Institute of Occupational Safety and Health (NIOSH), the U.S. Environmental Protection Agency (USEPA), and the Agency for Toxic Substances and Disease Registry (ATSDR). The university has an agreement of cooperation with WPAFB promoting educational and research interactions applicable to this M.S. program.

Molecular Biology and Imaging Research Facilities
Students will have the opportunity to utilize state-of-the-art equipment in this core facility maintained within the Department of Pharmacology and Toxicology. The core facility contains a sophisticated protein SELDI-TOF mass spectrometer, a laser scanning confocal microscope (Leica SP-2), an epifluorescence microscope (Leica DM-5), a phosphorimager (Fuji FLA-2000), and a multi-functional microplate reader (Packard Fusion). Computer workstations for storage, quantification, and analysis of data, and high-resolution printers for making images are available.

Integrative Pharmacology Facility
Students will also have the opportunity to utilize computerized behavioral and cardiovascular monitoring equipment to monitor the effects of stress, drugs, and toxicants on these physiological parameters in mice.

Faculty Research Areas
The program faculty have active research projects in overlapping areas, reflecting a multidisciplinary approach to investigating cardiovascular, toxicological, behavioral, and neuroscience problems. Specific areas of research include: cellular ion transport, prohormone processing and sorting in neurodegeneration, predictive toxicokinetics/hepatic toxicology, protein degradation/myocardial blow flow regulation, neurochemical/behavioral response to toxins, dermal toxicokinetics, neuroendocrinology/cardiovascular function, and electrophysiological studies on peptide control of neuroendocrine/autonomic system.

The Graduate Faculty
Professors
Norma C. Adragna, regulation of endothelial cell ion transport
James N. McDougal, dermal toxicology, pharmacokinetic modeling
Mariana Morris (chair), neuroendocrinology, hypertension

**Associate Professors**
Robert D. Grubbs, signal transduction, neuropharmacology
John M. Frazier, predictive toxicokinetics
James B. Lucot, neurobehavioral pharmacology, stress-toxicity interactions
Thomas D. Lockwood, regulation of cellular proteolysis, control of cardiac blood flow

**Assistant Professors**
David R. Cool, neuroendocrinology, intracellular protein sorting
Javier E. Stern, neurophysiology/neuroanatomy, peptidergic regulation of ion channels

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**Physics**

The Department of Physics offers two programs of graduate study leading either to the Master of Science or to the Master of Science in Teaching degrees. The program leading to the Master of Science degree is a research master’s program with a required thesis and prepares graduates for employment in private or government laboratories or for further graduate work. This program includes a medical physics concentration, which deals with diagnostic radiology and magnetic resonance aspects. The Master of Science in Teaching program is designed to enable high school physics teachers to upgrade their knowledge of physics by providing a thorough treatment of those areas of physics that form the basis of our modern knowledge.

In addition to these degree programs, the Selected Graduate Studies format may be used to develop an individual interdisciplinary course of study. It has been used, for example, to provide an electro-optics option through a combination of engineering and physics courses.

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**The Graduate Faculty**

**Professors**
Gust Bambakidis (chair), theoretical physics, solid state
Thomas N. Hangartner, medical physics
Paul J. Wolfe, geophysics

**Research Professor**
David C. Look, semiconductor and device physics

**Associate Professors**
Beth Basista, physics education
Jerry D. Clark, atomic physics, quantum electronics
Gary C. Farlow, solid state, ion implantation
Jane L. Fox, atmospheric physics
Brent D. Foy, medical physics
Thomas W. Listerman (Emeritus), solid state
Nicholas V. Reo, medical physics
Thomas E. Skinner, magnetic resonance spectroscopy

**Research Associate Professors**
Zhaoqiang Fang, semiconductor and device physics
Naum I. Gershenzon, geophysics and mathematical physics

**Assistant Professor**
Gregory Kozlowski, superconductivity and materials

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**Facilities and Research**

The Department of Physics is involved in four major areas of research: solid state physics and materials, optical and laser spectroscopy, geophysics and atmospheric physics, and medical physics.

Research interests in the solid state physics/materials science area center around the properties of metals, metal alloys, superconductors, semiconductors, and thin films. Typical physical properties of interest are effects of radiation damage on mechanical and electrical properties, and superconductor growth and critical currents. The work in semiconductor physics concerns the electrical, thermal, and optical properties of semiconductors of group IV, III-V, and II-VI systems. Correlative studies of defects introduced by growth, heat treatment quenching, ion implantation, or irradiation are made using deep-level transient spectroscopy (DLTS), Rutherford backscattering (RBS), channeling and proton-induced x-ray excitation (PIXE), and transmission electron microscopy (TEM).

The research in superconductors is focused on the processing and preparation of high-temperature superconducting materials. It involves the enhancement of the critical current density and the study of pinning mechanisms and relaxation effects and their dependence on the microstructure of the material. This work is done in collaboration with researchers at Wright-Patterson.
Air Force Base. Facilities available include a sputtering rig, a SQUID magnetometer, a vibrating-sample magnetometer, an electrical transport measurement station, a rotating stage, x-ray spectrometer, and a scanning electron microscope.

Other facilities for experimental work include a 2 MeV electron Van de Graaff accelerator, a 120 keV ion implanter, a 400 keV positive ion Van de Graaff accelerator, a Polaron modular DLTS system, a photo reflectance system, cryostats, an automatic internal friction data acquisition system, and electronics for monitoring and controlling the electrical and thermal parameters of the samples. Metallurgical and tensile testing equipment is also available. Theoretical studies are directed toward understanding metal-hydrogen systems and defects in solids.

Research in the Optical and Laser Spectroscopy Laboratory focuses on temporal- and wavelength-resolved spectroscopy. The laboratory is equipped with a high-resolution spectrometer and detection systems that include photographic, intensified CCD, and photon counting systems. Several laser sources are available, including a six-watt argon ion laser, a nitrogen laser, a pulsed dye laser, and diode lasers. Specific research areas include absorption and stimulated fluorescence from solid-state materials, time-resolved absorption and laser-induced fluorescence in gas discharge plasmas, and high-resolution spectroscopy of solid-state laser emissions.

Geophysics research is conducted in cooperation with the Department of Geological Sciences. The emphasis is on seismelectromagnetism, and on using seismic reflection, seismic refraction, and gravity to study the earth's structure in southern Ohio and neighboring regions. Much of this work is related to petroleum, water, and coal resources and earthquake precursors.

Research in atmospheric physics includes the physics, chemistry, and evolution of planetary atmospheres. Mathematical and computational methods are used, utilizing data from satellites and planetary probes to construct models of planetary atmospheres, including the earth's atmosphere.

The program in medical physics is in association with researchers at the Cox Institute of Kettering Medical Center and at Miami Valley Hospital. It includes radiological and magnetic resonance diagnostics. The facilities available include a Bruker 2.4T MR imager/spectrometer, a Bruker 8.5T MR spectrometer, a computed tomography x-ray scanner, and a dual-energy absorptiometry x-ray scanner.

Master of Science in Physics

Admission Requirements

For admission to graduate study in physics leading to the M.S. degree, candidates must:

1. Meet the requirements of the School of Graduate Studies.
2. Hold a B.S. or B.A. in physics from an accredited institution in the United States, or hold a B.S. or B.A. in an allied field and provide scores from the GRE-Physics or other comprehensive exam in physics.
3. Be recommended for admission by the graduate studies committee of the physics department.
4. Complete an orientation exam administered by the physics department for use in determining the program of study.

Degree Requirements

To be awarded the M.S. degree in physics, candidates for the degree must:

1. Meet the degree requirements of the School of Graduate Studies.
2. Complete 45 credit hours of course work listed as available for graduate credit; 36 hours must be physics courses numbered 680 and above, including PHY 680, 681, 682, 710, 711, and 712, and no more than 15 hours of PHY 899 (Research).
3. For the medical physics option, complete at least 45 credit hours, including PHY 681, 682, 710, 711, 712, BMS 762, BME 670; and no more than 15 hours of PHY 899 (Research). Suggested electives include BME 671, 732, 734, and BMS 958. In addition, the university radiation safety course is required.
4. Complete EGR 153 or demonstrate equivalent computer experience and ability.
5. Pass a thesis defense administered by the advisory committee over research work and any topics in the core physics curriculum the committee may deem appropriate.
6. Present an approved thesis to the graduate school.

Details concerning program selection, student evaluation, thesis requirements, and orientation examination may be obtained from the Department of Physics.

Performance Standards

Graduate students in good standing in physics must maintain a cumulative average of 3.0. A grade of C is considered a minimum passing grade. Candidates whose average is below 3.0 after 12 hours of graduate work will be placed on probationary status; they will be removed from this status when the average of 3.0
is earned. Students whose average is below a 3.0 after 18 hours of graduate work may be asked to withdraw from the program.

Master of Science in Teaching
This program allows secondary teachers to increase their physics background so that they may capitalize on a diversified exposure to physics in their own teaching of students at the secondary school level. Further, it provides an opportunity for optional courses in the area of professional education so that proficiency in the presentation of scientific materials can be augmented.

Admission
For admission to graduate study leading to the M.S.T. degree, candidates must:

1. Meet the requirements of the graduate school.
2. Present evidence of completion of an introductory physics sequence equivalent to the PHY 240, 242, 244, and 260 sequence at Wright State.
3. Have received certification or provisional licensure to teach. Prior teaching experience is not required but is strongly recommended.

Degree Requirements
To be awarded the M.S.T. degree in physics, the candidate must:

1. Meet the requirements of the graduate school for award of a degree.
2. Complete 45 credit hours of course work listed for graduate credit; 36 hours must be for physics courses numbered 620 and above, including PHY 646, 647, 746, 747, and no more than nine hours of 899.
3. Submit a report on a research project that was approved by an advisory committee.
4. Successfully complete an examination on the research project administered by an advisory committee.

Research Project
Each student, under the direction of the advisory committee and an advisor approved by this committee, is responsible for planning and satisfactorily completing a research project in the areas of physics or the teaching of physics. This project may consist of one of the following:

1. Research into more effective means for the presentation of physics in the classroom
2. Development of groups of classroom experiments or demonstrations
3. Writing texts or other classroom materials
4. Original experimental or theoretical research in an area of physics

Physiology and Biophysics
The Department of Physiology and Biophysics offers programs of graduate study leading to the Master of Science degree in physiology and biophysics. The programs provide students with both a broad knowledge of physiology and biophysics as well as concentrated experience in one specific area of specialization.

Wright State and Duke University are the only universities in the nation outside of laboratories at the Naval Medical Research Center who are studying how hyperbaric oxygen affects the central nervous system.

The Graduate Faculty

Professors
Jay B. Dean, neurobiology of CNS respiratory and cardiovascular control neurons
Peter K. Lauf (chair), molecular physiology and biophysics of membrane transport in erythrocytes
Robert W. Putnam, regulation of intracellular pH, cell volume regulation, neuroscience

Associate Professors
Adrian Corbett, sodium channel subtypes and subcellular targeting
Melvyn D. Goldfinger, neuroscience and biophysics of somatosensory afferents and relay nuclei
Julian Gomez-Cambronero, physiology/biochemistry of signal transduction in normal neutrophils and leukemic cells
Dan R. Halm, epithelial physiology
Noel S. Nussbaum, endocrinology of medical informatics

Assistant Professor
Thomas L. Brown, physiology, apoptosis, and immunology

Admission Requirements
The requirements for admission are:

1. B.A., B.S., or equivalent degree
2. Overall GPA of 3.00-plus, or GRE total of 1100 (minimum 500 verbal, 500 mathematics)
3. The following prerequisite courses: general biology (1 year), general chemistry (1 year)
general physics (1 year), mathematics (1 year through introductory calculus), and one year of advanced study in biology, chemistry, physics, or computer science.

Degree Requirements
In order to qualify for the Master of Science degree, students must satisfy the requirements of the School of Graduate Studies as well as program requirements. The first four quarters involve 35–37 credit hours which include required departmental and other courses determined in consultation with the student's advisor. Research activities begin in the summer of the first year. The second program year involves 18–30 credit hours with emphasis on research. Completed research is presented in written thesis form at the end of the second year, with a public oral defense.

Courses
The department offers a variety of graduate courses in cellular, transport and membrane physiology and biophysics, general systems physiology, cardiovascular physiology, endocrinology, gastrointestinal physiology, and neurophysiology, as well as seminar and special topics courses.

Residency
Full-time students generally complete a program in two years. Students may participate in the program on a part-time basis, but all requirements must be fulfilled in not more than seven years.

Professional Psychology
Program information may be obtained from the School of Professional Psychology.

Project Management
See Business and Administration

Psychology
The Department of Psychology offers programs of graduate study leading to the Master of Science (M.S.) degree and the Doctor of Philosophy (Ph.D.) degree in human factors and industrial/organizational psychology. Human factors, also called ergonomics or engineering psychology, deals with human-machine or human-computer interactions or with the design of specific tasks. It focuses on improving system performance and developing effective interfaces through the application of knowledge of the operator's perceptual and cognitive processes. It emphasizes the technical aspects of a situation, looking for ways to modify the physical environment in order to improve performance. Aerospace-related applications are common at Wright State University because it is adjacent to Wright-Patterson Air Force Base, a major center of human factors research and development.

Applications in consumer products, training, and computer systems are also important. Industrial/organizational psychology is primarily concerned with individual, group, and organizational behavior in work settings. It deals with "interfaces" of people with people (either individuals or groups). It focuses on improving system performance and improving organizational design and staffing through the application of knowledge of human personality structure and social-motivational processes. It emphasizes the social side of an environment, looking for ways to modify the set of people who interact in and with a system by selecting people who fit an environment, by training, or by designing organizational structures to motivate performance.

Students may enter a terminal M.S. degree program, specializing in either human factors or industrial/organizational psychology. Students may also enter the Ph.D. program, specializing in either human factors or industrial/organizational psychology, but the program will foster an understanding of both areas and the importance of considering both aspects in the design of industrial, aerospace, and other systems. The area of specialization will be considered the major focus area while the other area will serve as a minor focus area.

The Department of Psychology offers the only Ph.D. program in human factors and industrial/organizational psychology in Ohio, and one of only three in the United States.

The Graduate Faculty
Professors
John Flach, perceptual-motor skill, ecological psychology, human-machine systems
Helen A. Klein, developmental, applied psychology, home design for aged
Allen L. Nagy, color displays, visual science
Wayne Shebilske (chair), training complex skills, spatial orientation
Associate Professors
Kevin B. Bennett, human-computer interaction, training, graphic display design
Herbert A. Colle, mental workload, keyboard interfaces, working memory
Jean M. Edwards, personality assessment, stress
Robert H. Gilkey, binaural displays, masking, psychoacoustics, virtual environments
Debra Steele Johnson, training systems and feedback, intelligent tutoring
Pamela S. Tsang, time sharing performance, aviation, aging
Scott Watamaniuk, visual motion, eye movements
Daniel L. Weber, psychoacoustics, auditory warnings

Assistant Professors
Dragana Ivkovich, developmental neuroscience, learning and memory in humans and other mammals
Corey E. Miller, personnel psychology, legal issues, diversity management
Tamera Schneider, stress and physiology, persuading healthy behaviors
Valerie Shalin, workplace expertise and learning, aiding and training technology

Admission
Students may be admitted into either the terminal M.S program or into the Ph.D. program. Students admitted to the Ph.D. program should have a baccalaureate degree from an accredited institution with a major in psychology or at least 24 quarter credit hours of psychology, including courses in cognition or human learning, sensation and perception, social or organizational psychology, personality or test and measures or abnormal, experimental design/statistics, and experimental methods. Ideally, students should also have completed a year of physical or biological science, courses in mathematics, and computer science. Students who are missing one or more prerequisite courses will be expected to complete appropriate remedial course work at the onset of the program in addition to degree requirements. Students admitted to the terminal M.S program should have a baccalaureate degree from an accredited institution and must have completed most of the specified course work.

All prospective students must submit an official transcript from each institution attended.
Scores on Graduate Record Examination (verbal, quantitative) also must be submitted. Three letters of recommendation must be received from previous university professors or relevant professionals. Applicants also must submit an essay describing his or her professional goals and current academic interests in human factors or industrial/organizational psychology.

All admissions are competitive. Applications will be evaluated to determine the likelihood of success in the program and potential for a career in human factors or industrial/organizational psychology. Evaluation criteria will include: cumulative grade point average, verbal and quantitative Graduate Record Examination scores, performance in relevant course work, letters of recommendation, previous research experience, relevant job experience, and other information about writing and quantitative skills. Applications due by January 1 for fall consideration.

Department and Facilities
The programs in human factors and industrial/organizational psychology are a major focus of departmental activity; two-thirds of the faculty in the department specialize in one of the two program areas. Students enter a program with a critical mass of faculty and students and a wide variety of research opportunities.

The Department of Psychology has recently moved to newly renovated space, which includes modern, state-of-the-art research laboratories, well-equipped teaching laboratories, and office space for faculty and graduate assistants. Specialized equipment in dedicated research laboratories supports research on sensory processes, motor control, spatial orientation, human computer interaction and display design, flight simulation, memory, aging, expertise, teamwork, assessment, training, and stress in the workplace. Computer facilities include numerous UNIX workstations, PCs, and Macintoshes. The department is particularly proud of its facilities for virtual environment generation, including 3-D visual displays, 3-D auditory displays, and tactile/haptic displays. The Virtual Environment Research, Interactive Technology, And Simulation (VERITAS) facility, which is owned and operated by Wright State University but housed at Wright-Patterson Air Force Base, is unique in the world. The facility includes a room-sized display that surrounds the user with interactive 3-D auditory and visual images. The Department of Psychology has a Memorandum of Agreement with the U.S. Air Force Research Laboratory, which facilitates utilization of its sophisticated behavioral laboratories such as flight simulators and the Auditory Localization Facility.

The department also maintains a Psychology Computer Services facility to support research and teaching. Several general purpose laboratories also exist including two PC labs, a 17-station Macintosh lab, and a six-station perception-cognition lab.
Research is also conducted in off-campus facilities. Dayton is a major center for human factors research. The Department of Psychology has a Memorandum of Agreement with the U.S. Air Force Armstrong Laboratory which facilitates utilization of its sophisticated behavioral laboratories such as flight simulators and the Auditory Localization Facility for free field binaural research. Dayton is also an area of considerable industrial and corporate strength. Industrial/organizational research is conducted in conjunction with local firms. Faculty and students interact with many colleagues in government and the private sector.

Financial Assistance
The department awards both graduate teaching assistantships and graduate research assistantships. These appointments carry a waiver of tuition and instructional fees for both residents and nonresidents. Incoming students should express their interest as a part of the application process. Appointments are made for academic year and may be renewed. Teaching assistants will have instructional responsibilities and research assistants will be responsible for supporting research under the supervision of a faculty member. For additional information on financial aid, see the Financial Assistance Fees and Tuition chapter of the graduate catalog.

Degree Requirements

Master of Science
In order to qualify for a Master of Science degree, students must complete all of the following requirements in addition to satisfying requirements of the School of Graduate Studies. All course work and program options may be used to satisfy requirements only if officially approved on the Program of Study. Students must declare either human factors or industrial/organizational as their major focus. Additional information may be obtained from the Department of Psychology.

1. A minimum of 55 quarter-hours must be completed.
2. Complete course work in the following:
   Eight credit hours of basic science psychology courses.
   Eight credit hours of major focus courses and four credit hours of minor focus courses.
   Three-course sequence in research design, methods, and statistics.
3. Complete first-year research requirement.
4. Complete an acceptable research-based thesis, including a written proposal and thesis and a defense of both.

Doctor of Philosophy
In order to qualify for a Doctor of Philosophy degree, students must complete all of the following requirements in addition to satisfying requirements of the School of Graduate Studies. All course work and program options may be used to satisfy requirements only if officially approved on the Program of Study. Students must declare either human factors or industrial/organizational as their major focus. Additional information may be obtained from the Department of Psychology.

1. A minimum of 136 quarter-hours must be completed.
2. Complete course work in the following:
   At least three basic science psychology courses.
   Twenty-four credit hours of major focus courses.
   Twelve hours of minor focus courses.
   Three-course sequence in research design, methods and statistics; and at least one advanced course.
   Course in history and systems in psychology.
3. Complete first-year research requirement.
4. Complete an acceptable M.S. thesis, including a written proposal and thesis and a defense of both.
5. Pass the qualifying exam.
6. Meet residency requirements.
7. Meet practical experience requirements.
8. Complete a Ph.D. dissertation and successfully defend the dissertation in an oral exam conducted by a dissertation committee.

Public Administration
The Department of Urban Affairs and Geography offers the Master of Public Administration (M.P.A.) degree. The primary mission of the M.P.A. degree program is to prepare public and nonprofit managers to meet change and challenges in both the public and not-for-profit sectors in a complex urban environment. The program is composed of both part-time and full-time students. Evening classes are offered for student convenience by full-time faculty and distinguished local professionals in the Miami Valley Area who serve as affiliated faculty.

The Graduate Faculty
All M.P.A. faculty have extensive practical consulting, and research experience in public administration and urban management. The faculty serve on numerous professional boards.
both in the Dayton community and national professional associations in planning, policy, and public administration. The teaching philosophy of the faculty incorporates an applied approach to learning public and nonprofit management skills with an emphasis on written and oral expression. A list of affiliated faculty and their respective areas of expertise is available upon request.

**Professors**

Mary Ellen Mazey (dean, College of Liberal Arts), leadership, strategic planning and economic development

William J. Pammer, Jr. (M.P.A. director), budgeting, program evaluation, conflict management, organizational assessment

**Associate Professor**

Jack Dustlin (chair; director, Center for Urban and Public Affairs), environment, development, and technology

**Assistant Professors**

Jerri Killian (regional program director, Ohio Certified Public Manager Program, Southwest Region), ethics, organization theory, change management, human resource management

Jennifer Subban, nonprofit management, community development, quantitative and qualitative methods, community capacity building, race and gender issues

Mary V. Wenning (Humanics director), planning, policy analysis, housing policy, community development

**Advising**

Upon gaining acceptance into the public administration program, every student must attend a fall orientation and discuss a course plan with the M.P.A. director.

**Financial Assistance**

The Department of Urban Affairs annually awards a limited number of graduate research assistantships to qualified students. We encourage all regular and conditional degree students who carry at least eight credit hours and are not employed full time to apply for an assistantship position. Applications are available from the department.

If awarded the position, the department grants a tuition waiver and pays a biweekly stipend. Graduate research assistants are required to work 20 hours per week during the academic year. The department chair assigns graduate research assistants to projects that will develop their skills and knowledge of public administration.

**Degree Requirements**

The program curriculum for the Master of Public Administration consists of 52 credit hours of approved course work. The program requires 28 hours of core courses, four hours of a research project or capstone course, an internship, which may be repeated once, totaling four or eight hours, and elective courses totaling the remainder of the credit hours.

The core courses offer students a broad range of analytical, problem solving, and management skills. Students select electives in conjunction with the M.P.A. director or other faculty advisor. Electives may be taken to enhance knowledge areas such as planning, development, or management or to serve individual career goals. Elective hours range from 16 to 20 credit hours depending on whether an internship is completed.

The internship (URS 723) is arranged as field experience for students with no prior experience in the public and nonprofit sectors. In-service students must substitute electives for the internship.

Students have the option of completing an applied research paper (URS 724) focusing on an urban management or policy issue, a thesis (URS 799), or they may take a capstone course (URS 724) as their final requirement. These options are discussed with students during their residency in the program.
Program of Study

Core Courses 28

URS 710 Environment of Public Administration 4
URS 711 Organization Theory and Management 4
URS 712 Research Methods in Public Administration 4
URS 713 Public Planning 4
URS 715 Public and Non-Profit Budgeting 4
URS 716 Public Human Resources Administration 4
URS 720 Quantitative Analysis for Public Managers 4

Additional Requirements 4–12

URS 723 Internship 4–8
URS 724 Research Project or capstone course, URS 799 Thesis 4–8

Elective Course Options 12–20

With the M.P.A. director, students select elective course options that better serve their career and intellectual goals. Below are course options for students to consider.

Planning Electives

URS 612 Cities and Technology 4
URS 614 Urban Fiscal Management 4
URS 615 Community Development I 4
URS 616 Community Development II 4
URS 617 Urban Labor Relations 4
URS 618 Urban Public Works Administration 4
URS 620 Public Safety Administration 4
URS 623 Issues in Urban Administration 4
URS 624 Issues in Urban Planning 4
URS 625 Issues in Urban Development 4
URS 627 Urban Policy Analysis 4
URS 650 Ethics in Public Service 4
URS 670 Urban Leadership 4
URS 675 Management of Urban Nonprofits 4
URS 722 Directed Studies 4
GEO 647 GIS Principles 5
GEO 648 GIS Applications 5
GEO 655 Geography of Transportation 4
GEO 665 Cartography 5
PLS 643 Administrative Law Procedure 4
EC 730 Regional and Urban Economics 3

Total 82

Rehabilitation Counseling

See Education and Human Services

Selected Graduate Studies

Under a carefully administered program, students may develop a proposal for a master’s degree that is not available in any one existing program, but combines elements of two or more existing master’s degree programs. One-of-a-kind programs are possible in certain circumstances, and may be pursued in one of the following ways:

- A new student may develop a proposal for a master’s degree that is not available in any one existing program. The proposal must be approved by an Advisory Committee comprised of three or more members of the graduate faculty from two or more programs. The proposal must be presented to the dean of the School of Graduate Studies, who will forward it to the Policies Committee of the Graduate Council for review and approval. The proposal must be signed by the student and the faculty member who is to serve as chair of the student’s Advisory Committee; it must also be countersigned by the other faculty members of the Advisory Committee. The members of the Advisory Committee must be graduate faculty from programs that currently offer master’s degrees.

- A student in an existing Wright State University master’s program may, before having completed 24 credit hours of work, develop a proposal and follow the procedure as indicated above.

To guarantee the integrity of one-of-a-kind programs, the School of Graduate Studies will require that proposals follow these general guidelines:

1. All School of Graduate Studies requirements for degrees must be observed, such as the minimum number of credits to be earned, time limits and deadlines, the necessity of graduate faculty status for all Advisory Committee members, etc. The proposal must indicate whether the degree will be a Master of Arts or a Master of Science degree.

2. The written proposal must include three essential elements: a definition of the program, its rationale, and a list of required courses and additional suggested courses.

3. The proposed program may not be a patently device for escaping either the rigor or the specific requirements of already existing programs. The proposed program must have its own integrity and focus; it is not to be merely a survey of general knowledge in several fields of learning.
4. 500-level courses for graduate credit will be permitted in one-of-a-kind programs only in exceptional cases. If a substantial amount of lower-level work is required, it must be taken without graduate credit.

5. The program of study will contain a reasonable number of formal courses other than independent readings or independent studies from one or several departments. All required independent study courses must be outlined in the proposal.

6. A one-of-a-kind program will be approved only when the same objective cannot be accomplished by adding 12 or fewer credit hours to an existing degree program.

7. A proposal for a one-of-a-kind program that has been approved by the School of Graduate Studies will constitute the student’s graduate program from which departures will be permitted only with the approval of the chair of the student’s Advisory Committee. Those courses designated by the student’s Advisory Committee as required in the program can be altered only with the approval of the Policies Committee of the Graduate Council. Upon application for admission to candidacy for the degree, the School of Graduate Studies will monitor the courses completed against those in the approved program. Departures from the required program of courses that have not had prior approval in writing cannot be credited toward the degree.

8. All one-of-a-kind master’s degree programs must have a thesis or exit examination requirement. A School of Graduate Studies representative shall be appointed on all one-of-a-kind master’s degree thesis defenses or exit examinations. This person shall be a member of the Policies Committee of the Graduate Council. The Policies Committee serves as the graduate program committee for one-of-a-kind degree programs.

9. The student’s Advisory Committee shall meet no less than once each quarter.

10. Students pursuing these degrees will have “Selected Graduate Studies” listed on their transcripts as their major. Upon completion of the degree, the student may add a subtitle following “Selected Graduate Studies” which specifies the exact nature or title of the program undertaken.

Students interested in such a one-of-a-kind degree should contact the School of Graduate Studies for further information.

Social Work

See Applied Behavioral Science

Sociology/Anthropology

See Applied Behavioral Science

Software Engineering

See Computer Science and Engineering Certificate Programs

Software Management

See Computer Science and Engineering Certificate Programs

Statistics

The Department of Mathematics and Statistics offers the Master of Science degree in applied statistics. The graduate program is designed primarily to prepare graduates for careers in business, industry, or government, but can be tailored to provide a solid foundation for doctoral studies in statistics. The graduate program in applied statistics is open to persons with bachelor’s degrees in a variety of fields besides mathematics and statistics. The prior mathematical training needed for entrance into the program has been kept to a minimum to accommodate students with undergraduate majors in fields such as biology, business, or one of the social sciences. The department makes provision for part-time degree candidates by offering all required courses in the late afternoon or evening.

Early consultation with the statistics graduate advisor is recommended since the advisor works closely with the student in every phase of the program.

The Graduate Faculty

Professors

Harry J. Khamsi, contingency table analysis, goodness of fit tests
Barbara L. Mann, nonparametric statistics, biostatistics, medical applications
Makarand V. Ratnaparkhi, mathematical statistics, biostatistics
Munsup Seoh, mathematical statistics
Daniel T. Voss (program director), design and analysis of experiments
Admission

Applicants for admission are expected to meet the general requirements for admission to graduate study as established by the School of Graduate Studies. Applicants should have completed a calculus sequence that includes multivariable calculus and a course in linear or matrix algebra. Some experience in computer programming and enough background in probability and statistics to begin basic graduate courses in statistics is also required. This normally means one or two prior courses in probability and statistics, depending on content and level. Applicants with insufficient preparation may be admitted on the condition that they complete certain prerequisite work to be specified by the department at the time of admission. Because of course sequencing, it is best to enter the program at the beginning of fall quarter.

Financial Assistance

The department awards a limited number of graduate teaching assistantships annually to qualified applicants. Assistantships may be renewed for a second year; assistants can complete the requirements for a degree in two years. An assistant’s duties include classroom teaching, which is a meaningful aspect of the education of graduate students in the mathematical sciences. Other assistantships are sometimes available through research grants and contracts.

Degree Requirements

The Master of Science degree in applied statistics may be earned by satisfying the degree requirements described below. The applied statistics program allows students considerable latitude in designing a course of study. This program is primarily intended to prepare students for professional employment in business, industry, or government, however, it can also form a solid foundation for doctoral study.

All master’s degree candidates are required to pass a comprehensive written examination which must be taken at least one quarter before the expected date of graduation. The examination is ordinarily offered during winter quarter.

In addition to the requirements of the School of Graduate Studies, the following departmental requirements must be met to earn a degree in applied statistics. Full-time students normally take two years to complete this program.

Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STT 661, 662 Theory of Statistics I and II</td>
<td>7</td>
</tr>
<tr>
<td>STT 666, 667 Statistical Methods I and II</td>
<td>7</td>
</tr>
<tr>
<td>STT 669 Introduction to Experimental Design</td>
<td>3</td>
</tr>
<tr>
<td>STT 761 Theory of Linear Models</td>
<td>4</td>
</tr>
<tr>
<td>STT 791 Statistical Consulting</td>
<td>3</td>
</tr>
</tbody>
</table>

Elective Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STT 601 Nonparametric Methods</td>
<td>3</td>
</tr>
<tr>
<td>STT 611 Applied Time Series</td>
<td>3</td>
</tr>
<tr>
<td>STT 624 Statistical Control Methods</td>
<td>3</td>
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<tr>
<td>STT 626 Reliability and Life Data</td>
<td>3</td>
</tr>
<tr>
<td>MTH 606 Mathematical Modelling</td>
<td>3</td>
</tr>
<tr>
<td>MTH 607 Optimization Techniques</td>
<td>3</td>
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<tr>
<td>MTH 631-633 Real Variables I–III</td>
<td>9</td>
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<tr>
<td>CS 670 Systems Simulation</td>
<td>3</td>
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<tr>
<td>STT 702 Applied Stochastic Processes</td>
<td>3</td>
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<tr>
<td>STT 721 Sampling Design</td>
<td>3</td>
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<tr>
<td>STT 740 Contingency Table Analysis</td>
<td>3</td>
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<tr>
<td>STT 744 Applied Multivariate Analysis</td>
<td>3</td>
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<tr>
<td>STT 762 Topics in Linear Models</td>
<td>3</td>
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<tr>
<td>STT 764 Topics in Experimental Design</td>
<td>3</td>
</tr>
<tr>
<td>STT 767 Applied Regression Analysis</td>
<td>3</td>
</tr>
</tbody>
</table>

Total: 45

Note: With the prior approval of the statistics advisor, other appropriate courses, including courses from outside the department, may be used as electives. Credit will be allowed for STT 686 or STT 786, Independent Reading in Statistics and Probability, and STT 696 or STT 796, Topics in Probability and Statistics, only if approved in advance.

*Students who have taken STT 661, 662, 666, 667, or 669 or equivalent prior to entering the program will be required to take additional elective hours in lieu of the courses taken.

†From the 18 hours of elective courses, at least 12 hours must be chosen from among the 700-level electives.

TESOL/Teaching of English to Speakers of Other Languages

See English Language and Literatures
Women’s Studies

The Women’s Studies Program offers a 20-credit graduate certificate in Women’s Studies that can be pursued in the contexts of the Master of Humanities and the M.A. in English Programs, as a complement to any graduate or professional degree program, or by nondegree graduate students. As an interdisciplinary program made up of women’s studies-designated undergraduate and graduate courses across much of the curriculum, Women’s Studies enables students to develop a specialty or subspecialty in gender analysis and feminist perspectives as they relate to various fields of inquiry and occupations. For a list of approved courses and more information on the Women’s Studies Program, visit the Women’s Studies Web site: http://www.cola.wright.edu/wms/wmsprgms.htm. See also Humanities, English Language and Literatures, and Selected Graduate Studies.

Admission

Admission requirements are a baccalaureate degree in any field with a 3.0 average or a graduate degree in any field or enrollment in any graduate degree program at Wright State University. Nondegree students must be admitted to the School of Graduate Studies with nondegree status. Students wishing to pursue the Women's Studies graduate certificate must fill out a certificate application with the Director of Women’s Studies.

Certificate Requirements

Core course

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLS 605 Feminist Political Theory or ENG 720 Women’s Studies Through Literature or an approved equivalent feminist theory course</td>
<td>4</td>
</tr>
</tbody>
</table>

Electives

Four electives chosen from the list of graduate courses approved for Women’s Studies that must include one of the courses designated as international or cross-cultural. Students pursuing the M.A. in English or the Master of Humanities can substitute one elective from approved Women’s Studies courses with four credit hours of ENG 799 or HUM 730 provided the focus of their theses are Women’s Studies oriented.

Other Requirements

1. No more than three courses in the same discipline can be counted toward the certificate.
2. No more than two 500-level courses can count toward the certificate.
3. A minimum grade of “B” is required for each course counted toward the certificate.

Total

20
GRADUATE COURSE DESCRIPTIONS
Course Abbreviations

The following abbreviations are used in lists of degree requirements and in the course descriptions section of this catalog.

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABS</td>
<td>Applied Behavioral Science</td>
</tr>
<tr>
<td>ACC</td>
<td>Accountancy</td>
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<tr>
<td>AED</td>
<td>Art Education</td>
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<tr>
<td>ANT</td>
<td>Anatomy</td>
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<tr>
<td>ART</td>
<td>Art</td>
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<tr>
<td>AT</td>
<td>Art Therapy</td>
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<tr>
<td>ATH</td>
<td>Anthropology</td>
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<tr>
<td>BIO</td>
<td>Biological Sciences</td>
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<tr>
<td>BMB</td>
<td>Biochemistry and Molecular Biology</td>
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<tr>
<td>BME</td>
<td>Biomedical Engineering</td>
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<tr>
<td>BMS</td>
<td>Biomedical Sciences</td>
</tr>
<tr>
<td>CEG</td>
<td>Computer Engineering</td>
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<tr>
<td>CHM</td>
<td>Chemistry</td>
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<tr>
<td>CLS</td>
<td>Classics</td>
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<tr>
<td>CMH</td>
<td>Community Medicine and Health</td>
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<tr>
<td>CNL</td>
<td>Counseling</td>
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<tr>
<td>COM</td>
<td>Communication</td>
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<tr>
<td>CS</td>
<td>Computer Science</td>
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<tr>
<td>EC</td>
<td>Economics</td>
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<tr>
<td>ECO</td>
<td>Center for Economic Education</td>
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<tr>
<td>ED</td>
<td>Education</td>
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<tr>
<td>EDE</td>
<td>Education—Early Childhood</td>
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<tr>
<td>EDL</td>
<td>Educational Leadership</td>
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<tr>
<td>EDS</td>
<td>Education—Special Education</td>
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<tr>
<td>EDT</td>
<td>Educational Technology</td>
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<tr>
<td>EE</td>
<td>Electrical Engineering</td>
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<td>EGR</td>
<td>Engineering</td>
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<tr>
<td>ENG</td>
<td>English</td>
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<tr>
<td>EP</td>
<td>Engineering Physics</td>
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<td>FIN</td>
<td>Finance</td>
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<tr>
<td>FR</td>
<td>French</td>
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<tr>
<td>GEO</td>
<td>Geography</td>
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<td>GER</td>
<td>German</td>
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<tr>
<td>GL</td>
<td>Geological Sciences</td>
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<tr>
<td>HFE</td>
<td>Human Factors Engineering</td>
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<tr>
<td>HLT</td>
<td>Health</td>
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<tr>
<td>HPR</td>
<td>Health, Physical Education, and Recreation</td>
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<td>HST</td>
<td>History</td>
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<tr>
<td>HUM</td>
<td>Humanities</td>
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<tr>
<td>IB</td>
<td>International Business</td>
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<tr>
<td>LAT</td>
<td>Latin</td>
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<tr>
<td>LAW</td>
<td>Law</td>
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<tr>
<td>M&amp;B</td>
<td>Microbiology and Immunology</td>
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<tr>
<td>MBA</td>
<td>Master of Business Administration</td>
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<tr>
<td>ME</td>
<td>Mechanical and Materials Engineering</td>
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<td>MGT</td>
<td>Management</td>
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<td>MIS</td>
<td>Management Information Systems</td>
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<td>MKT</td>
<td>Marketing</td>
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<td>MS</td>
<td>Management Science</td>
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<td>MTH</td>
<td>Mathematics</td>
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<td>MUA</td>
<td>Music: Applied Music</td>
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<td>MUS</td>
<td>Music</td>
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<tr>
<td>NUR</td>
<td>Nursing</td>
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<tr>
<td>P&amp;B</td>
<td>Physiology and Biophysics</td>
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<tr>
<td>PHA</td>
<td>Environmental Toxicology</td>
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<tr>
<td>PHL</td>
<td>Philosophy</td>
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<td>PHY</td>
<td>Physics</td>
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<tr>
<td>PLS</td>
<td>Political Science</td>
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<td>PSI</td>
<td>Professional Psychology</td>
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<td>PSY</td>
<td>Psychology</td>
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<tr>
<td>PTX</td>
<td>Pharmacology and Toxicology</td>
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<tr>
<td>REL</td>
<td>Religion</td>
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<tr>
<td>RHB</td>
<td>Rehabilitation</td>
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<tr>
<td>RM</td>
<td>Rehabilitation Medicine and Restorative Care</td>
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<tr>
<td>RUS</td>
<td>Russian</td>
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<tr>
<td>SM</td>
<td>Science and Mathematics</td>
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<tr>
<td>SOC</td>
<td>Sociology</td>
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<tr>
<td>SPN</td>
<td>Spanish</td>
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<tr>
<td>STT</td>
<td>Statistics</td>
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<tr>
<td>SW</td>
<td>Social Work</td>
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<tr>
<td>TH</td>
<td>Theatre</td>
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<tr>
<td>URS</td>
<td>Urban Studies</td>
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<tr>
<td>VOE</td>
<td>Vocational Education</td>
</tr>
</tbody>
</table>

Course Numbering System

500-599 Courses that carry graduate credit only in a major field different from that of the department offering the course. Most such courses will be alternate designations of courses normally numbered 300-499.

600-699 Courses that carry graduate credit in any major field and that have alternate designations in which the first digit is 3 or 4 when taken for undergraduate credit.

700-799 Courses intended for graduate credit only.

800-999 Courses normally intended for post-master's or doctoral-level work.

The number following the hyphen in each course number indicates the number of credit hours per quarter for that course.

Policy on Dual-Listed Courses

Students who wish to take “dual listed” (e.g., PHY 420/620) courses for graduate credit (PHY 620-level) are required to perform alternate work that reflects both quantitative and qualitative advances over the undergraduate requirements (PHY 420-level), such as additional scholarly readings, more rigorous research, and/or more comprehensive examinations. The alternate work required for graduate credit will be stated in the syllabi for all “dual listed” courses.

1. When additional readings are assigned, they should involve students with scholarly literature related to the subject of the course.

2. When graduate research is assigned, it should adhere to rigorous methodological strategies, emphasize primary source material where appropriate, and conform to accepted standards of scholarly style, organization, and content.

3. Graduate examinations may require additional or different questions and should require abstract thinking and theoretical assimilation of the course material.
The course descriptions listed in this catalog represent the range of graduate courses offered at Wright State by the Colleges of Business and Administration, Education and Human Services, Engineering and Computer Science, Liberal Arts, and Science and Mathematics; the Raj Soin College of Business; the School of Professional Psychology; the Wright State University-Miami Valley College of Nursing and Health; and other graduate programs. For medical school courses see the School of Medicine Catalog, available in the medical school Office of Student Affairs/Admissions, 210 Medical Sciences. For undergraduate course descriptions see the Undergraduate Catalog, available in the Office of Undergraduate Admissions, E148 Student Union.

Not all courses described here are offered every quarter or every year. For a more detailed listing of prerequisites, enrollment restrictions, and specific courses offered in a particular quarter, consult the Wright State class schedule published each fall, winter, spring, and summer quarter.

Applied Behavioral Science/ABS

Note: See quarterly class schedule or departmental advisor for further enrollment restrictions, requirements, or special course information.

700 ELECTRONIC RESEARCH
(2 credit hours)
Emphasis is on computer software and technologies available to assist in the assembling and communication of information relevant to social research, such as e-mail, the Internet, and bibliographic databases.

701 RESEARCH METHODS I
(4 credit hours)
Emphasis on research designs, testing hypotheses, and techniques for collecting data such as questionnaire formation, sampling, surveys, scaling, interviewing, and analysis of documents and records.

702 RESEARCH METHODS II
(4 credit hours)
Analysis and interpretation of data in social research, with emphasis on multivariate statistical techniques. Prerequisite: ABS 701.

703 APPLIED METHODOLOGY
(4 credit hours)
Addresses issues pertaining to the collection and analysis of data in various settings, for the purpose of program evaluation, policy analysis, and other applied objectives. Prerequisite: ABS 702.

741 LIFE STAGES AND LIFE CHANGES
(4 credit hours)
Acquaints students with life stages, typical patterns, and problems from infancy to death. Students research a topic in one stage of the life cycle.

746 COMMUNITY DEVELOPMENT AND PLANNING (4 credit hours)
Basic concepts and theories of community development and the planning practice. Evaluation of current developments in the field of community development and planning with special emphasis on implementation strategies.

751 THEORETICAL FOUNDATIONS
(4 credit hours)
Focuses on theories of anomie, alienation, social disorganization, and social dysfunction that underlie contemporary paradigms in the study of deviance, criminology, and criminal justice.

752 EXPLAINING CRIME (4 credit hours)
Study of contemporary theories of deviant behavior from both an institutional and social-psychological perspective, with emphasis on the relationship between social change and social disorganization. Prerequisite: SOC 320 or 520 or permission of instructor.

753 SEMINAR IN CRIMINAL JUSTICE
(4 credit hours)
(Also listed as SOC 770.) An investigation of the criminal justice system in the United States and its relation to deviant adult and juvenile behavior. Prerequisite: ABS 752.

773 PROFESSIONAL EXPERIENCE: PORTFOLIO (2 credit hours)
Students with considerable job experience in their major field may develop a portfolio. Following departmental guidelines, students will assess experiences and present an evaluation detailing the skills utilized, characteristics of the setting, and processes involved in the performance of the work role.

774 APPLIED PROBLEM SOLVING
(2 credit hours)
Students currently employed in their major field may define and carry out an applied project involving their work role. The project should address a specific problem, issue, or need not currently being addressed at work. Students must obtain approval of their superior to develop a solution that can be implemented by the employer. Prerequisite: ABS 701 and 702.
775 METHODS IN HEALTH CARE RESEARCH AND EVALUATION (4 credit hours)
Seminar in the designs and methods used in health care research and evaluation. Emphasis on current and future areas of health care research and evaluation. Focus of seminar is on skill development.

777 INDEPENDENT RESEARCH (1 to 5 credit hours)
Independent laboratory or field research under the sponsorship of a faculty supervisor. Graded pass/unsatisfactory.

779 PRACTICUM IN APPLIED BEHAVIORAL SCIENCE (2 to 6 credit hours)
On-site participation of students in selected behavioral science projects. Jointly supervised by faculty and on-site personnel. May be repeated once for credit. Prerequisite: ABS 703.

781 SEMINAR ON FAMILY PROBLEMS (4 credit hours)
(Also listed as SOC 760.) Builds on the foundations of society and its institutions to examine contemporary problems facing American families.

788 GRADUATE SEMINAR IN APPLIED BEHAVIORAL SCIENCE (1 to 4 credit hours)
In-depth coverage of special topics in applied behavioral science. Topics vary. May be taken for a letter grade or pass/unsatisfactory.

789 CONTINUING REGISTRATION (1 credit hour)
Continuing Registration

798 ABS GRADUATE PROJECT (1 to 10 credit hours)
Practical application of knowledge gained through student courses is applied to a capstone experience. Graded pass/unsatisfactory. Prerequisite: ABS required courses and 24 hours of graduate credit.

799 GRADUATE THESIS RESEARCH (1 to 8 credit hours)
Research for the master's degree thesis.

853 WORKSPACE DESIGN AND ANTHROPOMETRY (4 credit hours)
Analyses of design parameters for effective use of workspace, includes seated, standing and hand-arm manipulation.

Accountancy/ACC
Note: See quarterly class schedule or departmental advisor for further enrollment restrictions, requirements, or special course information.

711 FINANCIAL ACCOUNTING CONCEPTS I (3 credit hours)
Study of financial accounting concepts and theory relating to the nature, measurement, and reporting of business income and financial condition. Emphasis on controversial areas of asset definition, recognition, and measurement. Prerequisite: MBA 531 or equivalent.

712 FINANCIAL ACCOUNTING CONCEPTS II (3 credit hours)
Continuation of ACC 711 including the definition, measurement, and reporting of liabilities and stockholder's equity. Emphasis on controversial areas in the preparation of financial statements. Prerequisite: ACC 711 or equivalent.

717 PROFESSIONAL RESEARCH METHODOLOGY (3 credit hours)
Experience in the use of various accounting research sources with emphasis on computerized sources. Prerequisite: completion of all prerequisites for the M.Acc program.

721 FEDERAL INCOME TAX ACCOUNTING (3 credit hours)
Study of the federal income tax and its effect on business decisions. Prerequisite: MBA 531.

723 MANAGERIAL AND FINANCIAL INFORMATION SYSTEMS (3 credit hours)
Fundamental concepts of information processing with emphasis on systems used by management. Covers design, implementation, and operation of systems for computer applications. Prerequisite: MIS 521(621). ACC 712.

731 CONTEMPORARY ACCOUNTING THEORY (3 credit hours)
Topics include accounting for income taxes and leases, preparation and use of the statement of cash flows, accounting for multinational corporations and international transactions, and partnership accounting. Prerequisite: accountancy 306 or equivalent.
732 RISK ANALYSIS AND ATTESTATION (3 credit hours)
Application of auditing techniques with
emphasis on the audit report and other
special reporting problems. Consideration of
management services and the auditor's
responsibility to third parties. Study of
computerized auditing techniques and audit
of computerized systems. Prerequisite: ACC
328 or equiv; ACC 421 or equiv; ACC 306 or
equiv; and ACC 717.

733 ACCOUNTING FOR NOT-FOR-PROFIT
ENTITIES (3 credit hours)
Application of accounting principles to fund
accounting for government units with
consideration given to institutional
accounting. Prerequisite: ACC 305 or
equivalent and ACC 717.

736 SYSTEMS CONTROL ASSESSMENT
(3 credit hours)
Application of accounting systems in
handling principal business transactions and
situations. Special emphasis on
computerized systems and current topics.
Prerequisite: ACC 328.

738 TAX RESEARCH AND PLANNING
(3 credit hours)
Focuses on advanced concepts, techniques,
and strategies for the individual taxpayer. An
introduction to tax research sources is also
provided. Prerequisite: ACC 442 or
equivalent.

739 APPLICATION OF PROFESSIONAL
STANDARDS (3 credit hours)
Identification and analysis of contemporary
issues and problems in the area of financial
accounting. Prerequisite: ACC 717.

753 INTERNATIONAL ACCOUNTING
(3 credit hours)
Study of accounting from an international
perspective, concentrating on differential
developments among various nations.
Accounting problems of an international
nature are analyzed. Prerequisite: MBA 531.

775 ACCOUNTING INTERNSHIP
(1 to 6 credit hours)
One quarter, faculty-supervised internship in
the area of public, industrial, or not-for-profit
accounting. Course requires written reports.
Students may register for internship twice
during their graduate programs. May be
taken for letter grade of pass/unsatisfactory.
Prerequisite: admission to the master of
accountancy program.

780 SPECIAL TOPICS IN ACCOUNTING
(3 credit hours)
Titles vary. Seminar in accounting topic of
current interest.

781 SPECIAL STUDIES IN ACCOUNTING
(1 to 6 credit hours)
Titles vary.

Art Education/AED
Note: See quarterly class schedule or
departmental advisor for further enrollment
restrictions, requirements, or special course
information.

626 CREATIVE STITCHERY
(4 credit hours)
Study of the various methods and procedures
used in stitchery and applied forms, and
exploration of ways to work with flat and
stitched fabrics that lead to wall hangings
and other art forms.

630 INDEPENDENT READING IN ART
EDUCATION (3 credit hours)
Independent work that extends and amplifies
students' knowledge of philosophy,
aesthetics, and creative and mental growth
as related to art teaching and art education
curricula. Emphasis on current books,
magazines, and research in art education.

631 ART AND THE CHILD (3 credit hours)
Develops an understanding of child growth
and development through creative
expression. Emphasis on functions and
procedures of art in the classroom, and
experiences in drawing and painting.

636 MINOR PROBLEMS IN ART
EDUCATION (1 to 4 credit hours)
Individual problems in specified areas for the
purpose of intense and concentrated work in
at least one medium and the development of
proficiency in one or more craft areas.
Prerequisite: 16 hours of art education
advanced crafts.

638 MULTI-AGE VISUAL ARTS METHODS
(5 credit hours)
Theoretical/practical methods of teaching
multi-age visual arts. Integration of artistic
and educational ideas into creative programs
as continuum of issues and skills for the
developing art education with mentorship by
master teachers. Prerequisite: accepted into
professional educators program.
770 INDEPENDENT STUDY
(1 to 3 credit hours)
Readings, project, participation/observation
clinical experiences, or other appropriate study
on an independent basis. Work is supervised
by an art therapy faculty member.
Prerequisite: nine graduate hours in
education.

Anatomy/ANT
Note: See quarterly class schedule or
departmental advisor for further enrollment
restrictions, requirements, or special course
information.

520 ANATOMY OF HUMAN MOTION (5
credit hours)
Skeletal, articular, nervous, cardiovascular,
and respiratory systems as they pertain to the
muscular system are presented. Basic
muscle actions are described; sequential
muscle actions and other concepts of
kinesiology are not discussed. Prerequisite:
BIO 101, 103.

691 FUNDAMENTALS OF HUMAN
NEUROBIOLOGY FUND (4 credit
hours)
(Also listed as BMS 913.) Development,
structure, and function of the human nervous
system as it relates to neuropathology,
clinical neurology, and behavioral science.
Completion of general biology and/or general
psychology courses and permission of
instructor required. Prerequisite: general
biology and/or general psychology.

699 SPECIAL PROBLEMS IN ANATOMY
(1 to 4 credit hours)
Maximum of 4 credit hours applicable to
degree requirements.

700 TOPICS OF INSTRUCTION IN HUMAN
ANATOMY (2 credit hours)
Overview of gross anatomy, histology,
neuroanatomy, embryology, and educational
theory that enables students to be more
effective in the teaching of undergraduate
courses in anatomy. For first-year graduate
teaching assistants in the Department of
Anatomy only.

701 SELECTED TOPICS IN ANATOMY
(1 to 5 credit hours)
Selected topics in anatomy. Topics vary.

711 HUMAN GROSS ANATOMY
(9 credit hours)
(Also listed as BMS 837.) Lectures and
dissection of human cadaver; includes
introductory embryology, 3.5 hours lecture,
9 hours lab.

715 ADVANCED HUMAN EMBRYOLOGY
(4 credit hours)
Classical and contemporary issues in
human developmental biology. Emphasis
is on the clinical relevance of developmental
processes, and on modern methods used to
study the mechanisms of development.
Prerequisite: ANT 711.

721 HUMAN MICROANATOMY
(8 credit hours)
Detailed microanatomy of human cells,
tissues, and organ systems. 3 hours lecture,
6 hours lab.

731 HUMAN NEUROBIOLOGY
(7 credit hours)
(Also listed as BMS 903.) Detailed survey
of the anatomy and physiology of the major fiber
tracts and cell groups of the human central
nervous system. 3 hours lecture, 4 hours lab.

732 CELLULAR NEUROBIOLOGY
(3 credit hours)
Correlated ultrastructure, chemistry, and
physiology of vertebrate neurons, neuroglia,
and synapses under normal conditions and
during development, degeneration, and
regeneration.

777 MEDICAL NEUROSCIENCE
(7 credit hours)
(Also listed as P&B 777 and BMS 854.)
Interdisciplinary/interdepartmental course for
graduate and medical students that
integrates basic and clinical neurosciences.
Structural and functional topics are combined
with clinical information to address major
neurological and psychiatric disorders.

800 ANATOMY SEMINAR
(1 to 2 credit hours)
Topics vary. Graded pass/unsatisfactory.

811 COMPREHENSIVE ANATOMY
(5 credit hours)
Integrates general principles and concepts of
the following systems: cardiovascular,
gastrointestinal, lymphatic, nervous,
respiratory, endocrine, integumentary,
muscular, reproductive, and urinary.
Knowledge is assessed by an oral
examination before a faculty review
committee. Graded pass/unsatisfactory.
850 SCHOLARLY PROJECT I
(3 credit hours)
Intensive analysis of scientific literature with emphasis on content and organization of anatomical journal articles. Course concludes with oral presentations of student projects involving contemporary anatomical issues based on selected journal articles.

851 SCHOLARLY PROJECT
(4 credit hours)
Project culminates in a paper on a contemporary anatomical issue in which students integrate the primary objectives, results, and significance of selected journal articles and identify areas for potential research. Prerequisite: ANT 850.

899 ANATOMY RESEARCH
(1 to 14 credit hours)
Supervised thesis research.

900 GRADUATE SEMINAR-ANATOMY
(1 credit hour)
Topics vary.

Art/ART
Note: See quarterly class schedule or departmental advisor for further enrollment restrictions, requirements, or special course information.

601 INDEPENDENT STUDY IN ART
(1 to 4 credit hours)
Special studies for qualified students. Intensive individually directed work in art with faculty consultation and supervision.

604 STUDIES IN ART HISTORY
(1 to 4 credit hours)
Titles vary.

605 STUDIES IN ART (1 to 4 credit hours)
Provides opportunities to explore special problems and approaches to art and includes cross-media and interdisciplinary studies. Titles vary.

609 STUDIES IN ART THEORY AND CRITICISM (4 credit hours)
Historical surveys and intensive studies in art theory and criticism.

610 STUDIES IN AMERICAN ART
(4 credit hours)
General surveys and intensive studies of periods, major movements, and artists in American art. Titles vary.

611 STUDIES IN ANCIENT AND CLASSICAL ART (4 credit hours)
(Also listed as CLS 540.) General surveys and intensive studies of the period, major movements, and artists of the time. Titles vary.

612 STUDIES IN MEDIEVAL ART
(4 credit hours)
General surveys and intensive studies of the period, major movements, and artists of the time. Titles vary.

613 STUDIES IN RENAISSANCE ART
(4 credit hours)
General surveys and intensive studies of the period, major movements, and artists of the time. Titles vary.

614 STUDIES IN BAROQUE ART
(4 credit hours)
General surveys and intensive studies of the period, major movements, and artists of the time. Titles vary.

615 STUDIES IN 19TH CENTURY ART
(4 credit hours)
General surveys and intensive studies of the period, major movements, and artists of the time. Titles vary.

616 STUDIES IN 20TH CENTURY ART
(4 credit hours)
General surveys and intensive studies of the period, major movements, and artists of the time. Titles vary.

697 MUSEOLOGY AND GALLERY MANAGEMENT (4 credit hours)
Supervised independent field experience and practical work in all areas of Art Museum management in the university and greater Dayton area communities. Each student to be handled as a tutorial intern. Graduate standing required with 12 hours of 400 level Museumology and Gallery Management or permission of instructor.

701 INDEPENDENT STUDY IN ART HISTORY (1 to 4 credit hours)
Intensive individually directed work in art history with faculty consultation and supervision.
Art Therapy/AT

Note: See quarterly class schedule or departmental advisor for further enrollment restrictions, requirements, or special course information.

629 WORKSHOP IN ART THERAPY
(1 to 6 credit hours)
A workshop focusing on problems, processes, and techniques for the development of art therapy in special settings with diverse populations. Work in art media, assessment strategies, and treatment plans included. Implementation procedures with populations discussed.

644 ART AND THE SPECIAL STUDENT
(3 credit hours)
Theories and methods to help those who will work with the child who has emotional, motor, perceptual or neurological problems, and who is in the classroom or clinical setting. Philosophy, art, media and therapeutic procedures included. Developmental content and approaches with specific art media discussed. Prerequisite: AED 631 or equivalent; or permission of instructor.

648 ARTS FOR THE DISABLED AND HANDICAPPED PERSON
(1 to 3 credit hours)
A multidisciplinary, integrative approach to the various creative, expressive, and performing arts, and their applications to understanding of and working with persons with emotional, perceptual, neurological and motor problems. Teaching/clinical strategies included. May be repeated. Prerequisite: AT 730 or permission of instructor.

723 ART MEDIA IN THE SPECIAL SETTING (3 credit hours)
Experiences with a variety of art media. Determination of strategies and media to use in expression, diagnostic evaluation and remediation. Application of art media to various problems and settings. Prerequisite: AT 730 or consent of instructor.

730 ART THERAPY (3 credit hours)
A study of the origin, historical development, and philosophy of the profession of Art Therapy; comparative approaches to therapy and the application of the creative art process within the therapeutic frameworks.

735 ART THERAPY I: THEORIES AND METHODS (3 credit hours)
Theories and application of art therapy in the assessment and diagnosis of developmental, neurological, psychological, and multiple disabilities. Direct clinical application of the visual arts in designing objectives and implementation of individual and group therapy sessions. Demonstration of clinical sessions and participation in therapy in on-campus and community settings.

736 ART THERAPY II: THEORIES AND METHODS (3 credit hours)
Art therapy procedures and media selection for diverse clinical populations, settings, and handicapping conditions. Emphasis on group and family therapy processes, supervision, clinical reporting, and staff presentations. Application of audiovisual instrumentations to facilitate art therapy. Demonstration of clinical sessions and participation in therapy. Prerequisite: AT 735 or permission of instructor.

738 ART THERAPY III: THEORIES AND METHODS (3 credit hours)
Art psychotherapy theories and methods for working with children, adolescents, and adults diagnosed as having emotional and psychological problems. Case studies included. Prerequisite: AT 730 or permission of instructor.

739 ART THERAPY IV: THEORIES AND METHODS (3 credit hours)
Advanced art psychotherapy theory and methods for working with children, adolescents, and adults diagnosed as having emotional and psychological problems. Understanding of symbolic structures and references to projective methods in art psychotherapy included. Prerequisite: AT 738 or permission of instructor.

743 ART WITH THE OLDER ADULT
(1 to 3 credit hours)
An orientation using art with older populations in varied settings. Study of aspects of ageing, life review, death and dying and application of appropriate media adaptations. Observation and participation experiences. Prerequisite: AT 730 or permission of instructor.
744 ART WITH EXCEPTIONAL POPULATIONS (1 to 3 credit hours)
An orientation using art with a specified population, e.g., learning disabilities; mental retardation; perceptually impaired; physically handicapped; culturally disadvantaged; multiple handicapped; persons in correctional institutions and prisons. May be repeated. Prerequisite: AT 730 or permission of instructor.

746 ART THERAPY WITH THE FAMILY (3 credit hours)
Coursework includes the systemic family therapy theory and the use of art therapy in strategic family intervention. The course focuses on experiences in the practice of art therapy with a family, investigation of existing testing tools, and creative development of new tools. Clinical hours are included. Prerequisite: AT 730, CNL 779 or equivalents, advanced graduate standing in a human services area, or permission of instructor, recommended CNL 780.

748 MULTICULTURAL DIMENSIONS OF ART THERAPY (3 credit hours)
This experiential and didactic course explores the role of the arts in healing among various cultures and examines how diverse cultural perspectives intersect in the therapeutic relationship. Includes exploration of personal and cultural values that underlie clinical work and cross-cultural implications for art evaluation and treatment. Prerequisite: AT 730 or equivalent, advanced graduate standing in a human services area, or permission of instructor.

753 RESEARCH IN ART THERAPY (1 to 3 credit hours)
Emphasis is given to the qualitative/quantitative aspects of research in art therapy with focus on the case study method, observational and phenomenological procedures, and the longitudinal study in a clinical setting.

766 PROJECT IN ART THERAPY (1 to 5 credit hours)
Independent study intended for the graduate student who elects to complete the program in art therapy with a major project. May be repeated. Prerequisite: AT 753 or permission of instructor.

770 INDEPENDENT STUDY IN ART THERAPY (1 to 3 credit hours)
Readings, project, observation, or other appropriate study on an independent basis. Work is supervised by an art therapy faculty member. May be repeated to a maximum of nine credit hours. Regular standing in the graduate school and 12 credit hours of graduate credit in art therapy. Prerequisite: AT 753 or permission of instructor.

771 ART THERAPY CLINIC I (1 to 3 credit hours)
The application of Art Therapy in the identification of emotional psychological, physical, motor, perceptual and the multiple handicaps. Study of the systems involved, causal relationships, and related problems. Various settings will be studied and observed: the educational setting, hospitals, clinics, community agencies, and nursing homes. Prerequisite: AT 735.

772 ART THERAPY CLINIC II (1 to 9 credit hours)
On campus clinical art therapy experience under supervision of a registered art therapist. Prerequisite: AT 771. Corequisite: AT 774.

773 ART THERAPY CLINIC III (1 to 5 credit hours)
Extended on-campus or off-campus clinical experiences intended for the student who elects to complete the degree with additional clinical hours. May be repeated. Prerequisite: AT 771, 772 or permission of instructor. Corequisite: AT 774.

Anthropology/ATH
Note: See quarterly class schedule or departmental advisor for further enrollment restrictions, requirements, or special course information.

542 SEX AND GENDER (4 credit hours)
Study of male and female roles and how they vary from one society to the next. Topics include sex and gender stereotypes, physical and behavioral differences, and cross-cultural differences in roles and status.

546 ANTHROPOLOGY OF RELIGION (4 credit hours)
(Also listed as REL 562.) Anthropological approach to the meaning and function of religion in social life, and the nature of the thought or belief systems that gave rise to different forms of religious life. Emphasis on primitive and peasant societies.
599 STUDIES IN SELECTED SUBJECTS (1 to 4 credit hours)
Problems, approaches, and topics in the field of anthropology. Topics vary.

600 SPECIAL TOPICS IN ARCHAEOLOGY (4 credit hours)
Advanced study of various specialized aspects of archaeology. Prerequisite: 12 hours of anthropology required.

610 SPECIAL TOPICS IN CULTURAL ANTHROPOLOGY (4 credit hours)
Examines selected topics concerning the method and theory of anthropological thought and their relationship to the allied disciplines of economics, linguistics, art, politics, and history. Emphasis on current trends influencing research in cultural anthropology. Topics vary. Prerequisite: 12 hours of anthropology or undergraduate degree in some other social science and permission of instructor.

646PEOPLES AND CULTURES OF SOUTH ASIA (4 credit hours)
Survey and analysis of cultural diversity and unity in Southern Asia, particularly India, Pakistan, Bangladesh, and Sri Lanka.

648 DEVELOPMENT OF ETHNOLOGICAL THOUGHT (4 credit hours)
Surveys historical development of ethnological thought; emphasizes theories of social and cultural change.

650 POLITICAL ANTHROPOLOGY (4 credit hours)
(Also listed as PLS 650.) Study of that part of the culture of primitive societies that is recognized as political organization. An attempt is made to show how in less complex, primitive societies, new local communities come into being through fission. Prerequisite: 12 hours of anthropology or undergraduate degree in some social science and permission of instructor.

655 BIOMEDICAL ANTHROPOLOGY (4 credit hours)
An anthropological perspective of health and illness in selected societies of the world that integrates physical, social, and cultural dimensions of disease, nutrition, fertility and population growth, health beliefs and practices, and the consequences of culture change and modernization.

658 ANTHROPOLOGY OF WOMEN'S HEALTH (4 credit hours)
Integrates biological and sociocultural dimensions of women's health throughout the world. Examines cross-cultural variation in disease and illness and the sociocultural contexts that define models of women's health.

665 SEMINAR IN WOODLAND ARCHAEOLOGY (4 credit hours)
Intensive review of the prehistoric Woodland period (600 B.C.-A.D. 900) of eastern North America. Regional cultures such as Adena and Ohio Hopewell. Trade, economy, political organization, and mortuary customs are considered.

675 HISTORICAL ARCHAEOLOGY (4 credit hours)
Focuses on the post-European discovery period of America; archaeological interpretations of colonial, plantation, industrial, frontier, and urban sites and materials are explored in seminar discussions, and through lab analysis of southwest Ohio site collections. Prerequisite: ATH 242.

692 DIRECTED STUDIES IN ANTHROPOLOGY (2 to 4 credit hours)
May be taken for letter grade or pass/unsatisfactory.

Biological Sciences/BIO
Note: See quarterly class schedule or departmental advisor for further enrollment restrictions, requirements, or special course information.

521 HUMAN GENETICS FOR HEALTH PROFESSIONALS (3 credit hours)
Describes mechanisms of inheritance and genetic diseases so that health professionals can recognize possible genetic abnormalities and make appropriate referrals, participate in genetic counseling, and consider ethical and legal implications of the "new genetics." For nonmajors only. Prerequisite: BIO 112 or equivalent.

603 DEVELOPMENTAL BIOLOGY (5 credit hours)
(Also listed as BMS 839.) Describes underlying processes that initiate, in plants and animals, the development of tissue and whole organisms. Prerequisite: recommended BIO 402, 303 or the equivalent.
606 EVOLUTIONARY BIOLOGY (3 credit hours)
Historical development and current understanding of the principles of evolution.
Prerequisite: BIO 212 or consent of instructor.

607 WETLANDS BIOLOGY (5 credit hours)
Ecological investigation of wetlands of the U.S. with emphasis on the Midwest. Primarily field oriented with some lecture. Covers soils, vegetation, hydrology, conservation, and restoration. Requires two weekend trips and written report. Prerequisite: junior or senior standing; CHM 121, one of the following: ecology, vascular plants, hydrogeology or soil biology, aquatic biology or relevant field experiences.

608 WRITING IN THE BIOLOGICAL SCIENCES (3 credit hours)
Surveys grammatical and stylistic aspects of scientific writing and teaches how to organize, write, and submit a manuscript for publication in a biological journal. Grant writing is also discussed. Prerequisite: BIO 112, 114 and 115.

611 THE AQUATIC ENVIRONMENT (6 credit hours)
Field and laboratory course concerned with the physical, chemical, and biological factors that determine biological productivity in natural waters. 3 hours lecture, 6 hours lab.

612 AQUATIC COMMUNITIES (6 credit hours)
An analysis of the functional relationships of organisms with the aquatic environment with special emphasis on species interactions.

613 BIOLOGICAL PROBLEMS OF WATER POLLUTION (5 credit hours)
Introduction to the biological aspects of water pollution. Lectures, discussions, laboratories, and field trips cover the various types of pollutants and their impact on aquatic life. 3 hours lecture, 4 hours lab, required field trips.

615 ENVIRONMENTAL TOXICOLOGY (4 credit hours)
Covers toxicological problems encountered in the field of environmental health. Emphasis on monitoring, control, and regulation of toxic substances in air and water, and in industrial environments. 3 hours lecture, 1 hour recitation. Prerequisite: a course in physiology and organic chemistry.

616 ECOTOXICOLOGY (4 credit hours)
Study of the effects of environmental contaminants on aquatic and terrestrial organisms. Effects on the biochemical and physiological levels are related to impacts on individuals, populations, and ecosystems. Current approaches for assessing ecotoxicity are presented. Prerequisite: BIO 278 and CHM 211.

620 DESIGNING BIOLOGICAL EXPERIMENTS (3 credit hours)
Principles of effective sampling design for biological experiments. Reconciling the peculiarities of biological data with the assumptions of statistical methods. Lectures and problem sets. Prerequisite: two biology courses at 300 or above level, one course in statistics.

625 MICROBIAL ECOLOGY (5 credit hours)
(Also listed as BMS 793.) Microbes in soil, water, and air. Experiments on mineral cycles, physical and biological limiting factors, and symbiosis. Natural communities of microbes and microbes of special human environments. Includes field studies. Prerequisite: BIO 252, CHM 123, CHM 211 recommended.

626 HUMAN GENETICS (4 credit hours)
(Also listed as BMS 780.) Nature of human genetic traits; methods of analysis of inheritance. Prerequisite: BIO 302, 402 or 403.

629 PLANT ANATOMY (5 credit hours)
This course will examine the internal structure of vascular plants. Special emphasis will be placed on structure-function relationships and their adaptive significance. Prerequisite: BIO 105, 106.

631 RISK ASSESSMENT (3 credit hours)
Studies the determination of quantitative risk to humans and the environment. Approaches currently used in regulatory activities are described, showing methods of hazard identification, sampling, data evaluation, exposure assessment, toxicity assessment, and risk characterization. Prerequisite: minimum of two BIO courses and completion of one year of inorganic chemistry.

632 RISK ASSESSMENT II (3 credit hours)
Follow-up course to BIO 631. Includes key components of risk assessments, such as pharmacokinetic modeling, environmental fate and transport modeling, low dose extrapolation, and risk communication. Prerequisite: BIO 631.
642 ADVANCED MOLECULAR BIOLOGY
(3 credit hours)
Emphasizes gene organization and genome organization focusing on the molecular anatomy, expression, and regulation of eukaryotic genes. Includes a thorough discussion of recombinant DNA technology. Prerequisite: BIO 212, 410, CHM 213.

651 ENVIRONMENTAL MANAGEMENT AND RISK COMMUNICATION
(3 credit hours)
Enlarges students' environmental perspective by focusing on management issues as they relate to air, water, and land resources including ethics, policy, and economics, as well as questions relating to specific resources. Titles vary.

652 ENVIRONMENTAL PROTECTION: LAW, REGULATION AND ENFORCEMENT (3 credit hours)
Reviews the American legal system, emphasizing regulatory agencies and the courts; environmental and toxic tort case law; and the complex way that the myriad environmental laws and regulations are structured and enforced. Titles vary.

653 NATURAL RESOURCE MANAGEMENT (3 credit hours)
Lecture/seminar course covering principles of wildlife, fisheries, and forestry management. Major topics include basic ecological principles, population dynamics and analysis, habitat assessment, and ecosystem and people management. Prerequisite: BIO 306.

655 PLANT SYSTEMATICS (3 credit hours)
A survey of topics and techniques encountered in studies of the relationship and evolution of the higher plants, emphasizing the flowering plants. Prerequisite: BIO 254; senior standing or consent of instructor.

660 POPULATION GENETICS (3 credit hours)
Examination of the causes of genetic differences within and among species and how molecular biology techniques can be used to identify these differences. Emphasized human genetics, anthropology, ecology and conservation implications. Prerequisite: BIO 210, 211, 212, 302.

661 MOLECULAR EVOLUTION
(3 credit hours)
Studies the evolutionary history of organisms by interpreting their genomes as historical documents. Focuses on the origins of human traits and diseases, phylogenetic reconstruction and systematics. Prerequisite: BIO 210, 211, 212, 302.

664 MICROBIOLOGY OF FOOD
(3 credit hours)
Principles of food microbiology, preservation, and handling. Major organisms of food poisoning and means of control are considered. Prerequisite: a course in microbiology.

666 FUNDAMENTALS OF OCCUPATIONAL HEALTH AND SAFETY (3 credit hours)
Introduction to accident recognition, evaluation, and control in the work environment, with emphasis on methods of hazard recognition and control management. Prerequisite: MTH 130, CHM 123.

668 ADVANCED OCCUPATIONAL HEALTH AND SAFETY (3 credit hours)
Introduction to industrial hygiene. Emphasis is on routes of entry into the human body and physiological effects of industrial pollutants. Prerequisite: MTH 130, CHM 123, 211, 215.

670 HANDS-ON SCI WORKSHOP
(1 to 3 credit hours)
Workshops to enhance science skills for Trotwood-Madison Elementary School teachers.

673 BIOLOGY OF SELECTED MARINE ENVIRONMENTS (5 credit hours)
Biological aspects of marine environments. Sampling and observation of living marine specimens during week-long trip to a marine laboratory.

676 HUMAN PARASITOLOGY
(2 credit hours)
(Also listed as BMS 799.) Study of the medical aspects of parasitology, such as pathology, symptomatology, diagnosis, and identification of parasites. Course content is divided into three major categories: human protozoology, human helminthology, and human arthropodology. Designed primarily for medical technologists, biology teachers, and environmental health students.

680 BIOLOGY OF FISHES (5 credit hours)
Introduction to the evolution, ecology, and distribution of fresh water and marine fish. 3 hours lecture, 4 hours lab, and field trips.
684 INTRODUCTION TO BIOGEOGRAPHY (3 credit hours)
Introduction to the factors affecting the distribution of plants and animals.
Prerequisite: BIO 306.

692 ENVIRONMENTAL SCIENCES SEMINAR (2 credit hours)
Seminar provides students with a more in-depth understanding of a number of environmental topics and enhances library research, writing, presentation, and advocacy skills. In addition, students will learn that there are at least two sides to any of the issues discussed.

699 SPECIAL PROBLEMS IN BIOLOGY (1 to 12 credit hours)
A maximum of 4 credits is applicable toward degree requirements.

700 PRINCIPLES OF INSTRUCTION IN BIOLOGY (1 credit hour)
Survey of available instructional materials and discussion of educational theory and techniques leading to more effective instruction.

701 SELECTED TOPICS IN BIOLOGY (1 to 5 credit hours)
Topics vary.

702 INTRODUCTION TO RESEARCH (2 credit hours)
Different research problems under investigation by the faculty are described with respect to objectives, methodology, and progress as examples of scientific methods applied to biology.

703 ADVANCED DEVELOPMENTAL BIOLOGY (4 credit hours)
Molecular mechanism of development including topics such as cell signaling, pattern formation, terminal differentiation. Prerequisite: BIO 212 or equivalent or instructor approval.

720 MAMMALIAN CELL BIOLOGY (4 credit hours)
(Also listed as BMS 835.) A comprehensive course addressing both the known and theoretical aspects of cellular organization and function. Suitable as an introductory course for graduate study.

728 PHOTOBIOLOGY (3 credit hours)
Selected topics in photobiology.

730 CELL BIOLOGY (4 credit hours)
(Also listed as BMS 778.) Provides a survey of basic concepts that are most important for understanding how cells function.

734 MOLECULAR GENETICS (3 credit hours)
(Also listed as BMS 779.) Study of the replication, organization, and function of nucleic acids with emphasis on the role of nucleic acids in protein synthesis.

737 RECOMBINANT DNA METHODS (6 credit hours)
(Also listed as BMS 790 and M&I 737.) Microbial and molecular techniques for producing, cloning, and characterizing recombinant DNA molecules; laboratory exercises in gene manipulation to give an understanding of the principles of genetic engineering. Graded pass/unsatisfactory.

740 ELECTRON MICROSCOPY LS (6 credit hours)
(Also listed as BMS 834.) Introduction to theoretical and practical aspects of transmission electron microscopy. Emphasizes interpretation and evaluation of electron micrographs. 3 hours lecture, 6 hours lab; additional lab time is required. Completion of course in histology or cell biology is required.

799 LITERATURE CRITIQUE (1 to 6 credit hours)
Independent project to write a critical review of literature on a specific topic. Graded pass/unsatisfactory.

800 GRADUATE SEMINAR (1 credit hour)
Topics vary.

899 GRADUATE RESEARCH (2 to 18 credit hours)
Supervised thesis research.

900 GRADUATE SEMINAR (1 credit hour)
Topics vary.

Biochemistry and Molecular Biology/BMB
Note: See quarterly class schedule or departmental advisor for further enrollment restrictions, requirements, or special course information.

510 INTRODUCTORY BIOCHEMISTRY (6 credit hours)
Introduction to general principles of biochemistry, especially for students interested in the allied health sciences. Topics include the chemistry of biological molecules, cellular metabolism, and the mode of action of selected chemicals at the biochemical level. Not open to graduate students in the College of Science and Mathematics. Prerequisite: CHM 102 or 141.
627 HUMAN BIOCHEMISTRY
(5 credit hours)
Metabolism of hormones and amino acids. Integration of metabolism. Aspects of human biochemistry including some metabolic disorders and nutrition.

651 RECENT DEVELOPMENTS IN BIOCHEMISTRY (3 credit hours)
Detailed consideration of major research developments in biochemistry within the past several months. Discussion will deal not only with the appropriate research papers but also with the background information such articles leave out. Prerequisite: BMB (BCH) 621, or BMB (BCH)/BMS 751 and 752, or consent of instructor.

699 SPECIAL PROBLEMS IN BIOCHEMISTRY (1 to 4 credit hours)
Graded pass/unsatisfactory.

702 RESEARCH PERSPECTIVES
(2 credit hours)
Designed to acquaint new graduate students with the research being carried out by the faculty in the biochemistry program.

703 RESEARCH ETHICS
(1 credit hour)
Research ethics emphasizes the evaluation of hypothetical ethical scenarios. Class discussion is based on integrating ethical policy and practices as they relate to research at Wright State. Graded pass/unsatisfactory.

726 BIOENERGETICS (1 to 6 credit hours)
Structure of energy transducing membranes of mitochondria, chloroplasts and bacteria. Particular emphasis placed on mechanisms of energy transduction, thermodynamics of oxidation-reduction reactions, biophysical spectroscopic methods, structure and surface topography of membrane proteins. Prerequisite: BMS 752.

727 ENZYMES (4 credit hours)
(Also listed as BMS 767.) Current concepts of the mechanism of enzyme catalysis including such topics as structure, kinetics, energetics, allosterism, coenzymes, and control of enzymes and multienzyme systems. Prerequisite: BMB (BCH) 750 or consent of instructor.

729 BIOCHEMISTRY OF PEPTIDE HORMONES (3 credit hours)
The synthesis, secretion, degradation, structure, essay, mechanism of action and function of peptide hormones are presented. Emphasis is on insulin and other hormones (e.g., glucagon, somatotropin, somatostatin) involved in diabetes mellitus. Prerequisite: BMB (BCH) 621 or equivalent.

731 BIOCHEMISTRY OF MEMBRANES
(4 credit hours)
(Also listed as BMS 769.) Examines the biochemistry of membranes and provides basic information on membrane composition and processes. Prerequisite: BMB (BCH) 421 or 423.

736 RECOMBINANT DNA METHODS
(6 credit hours)
Microbial and molecular techniques for producing, cloning and characterizing recombinant DNA molecules; laboratory exercises in gene manipulation to give an understanding of principles of genetic engineering. Prerequisite: BMS 750, BMS 752, BIO 654 or BMS 791, BIO 734 or BMS 779, or consent of instructor.

740 PHYSICAL BIOCHEMISTRY
(4 credit hours)
(Also listed as BMS 770.) Structure-function analysis of biological macromolecules (particularly proteins and polynucleotides) based on chemical and physical properties. Prerequisite: BMB (BCH) 750 or equivalent.

750 MOLECULAR BIOCHEMISTRY I
(1 to 8 credit hours)
(Also listed as BMS 750.) Survey course emphasizing an experimental and problem-solving approach to buffers, protein structure, enzymes, and carbohydrate and lipid metabolism. Completion of organic chemistry course or permission of instructor required. Prerequisite: organic chemistry or permission of instructor.

752 MOLECULAR BIOCHEMISTRY II
(1 to 8 credit hours)
(Also listed as BMS 752.) Survey course emphasizing an experimental and problem-solving approach to amino acid metabolism, nucleic-acid function, and hormones. Prerequisite: BMB (BCH) 750 or permission of instructor.

753 MOLECULAR SIGNALLING—MOLECULAR CELL BIOLOGY
(3 credit hours)
(Also listed as BMS 753.) A molecular analysis of information transfer into and within cells. Topics include visual transduction, hormones, hormone receptors, second messengers, regulation of transcription, and oncogenes. Readings from current scientific literature. Prerequisite: BMB (BCH)/BMS 750, BMB (BCH)/BMS 752.
755 CANCER: MOLECULAR ASPECTS  
(3 credit hours)  
A profile of the general properties of transformed cells and an in-depth 
extamination of the mechanisms of oncogenesis at the level of molecular 
genetics. Prerequisite: BMB 750.

760 MOLECULAR BIOLOGY OF THE 
NUCLEUS (4 credit hours)  
(Also listed as BMS 760.) A literature based 
course covering molecular events in the 
nuclues including DNA replication, repair and 
recombination and transcription. Prerequisite: 
BMB 750, BMB 752.

762 FUNDAMENTAL PRINCIPLES 
OF FOURIER TRANSFORM NMR 
(3 to 6 credit hours)  
(Also listed as BMS 762/PHY 760.) Covers the 
fundamental theory of nuclear magnetic 
resonance spectroscopy with emphasis on 
pulse Fourier transform methods. 
Prerequisite: organic chemistry, PHY 111, 
112, 113 or equivalent; MTH 229, 230 or 
equivalent; or equivalent.

763 IN VIVO NMR SPECTROSCOPY 
AND IMAGING (3 to 6 credit hours)  
(Also listed as BMS 763.) Discusses the 
applications of NMR spectroscopy to the 
study of tissue metabolism in vivo. The 
fundamental theory of magnetic resonance 
imaging, with a survey of clinical applications, 
is also presented. Prerequisite: BMB (BCH)/ 
BMS 762 or permission of instructor.

764 NMR TECHNIQUES IN 
BIOMOLECULAR STRUCTURE 
AND DYNAMICS (3 to 6 credit hours) 
(Also listed as BMS 764.) Describes the NMR 
methods used for the determination of 
biomolecular structure and dynamics. 
Emphasis on two-dimensional Fourier 
transform techniques. Prerequisite: BMB 
(BCH)/BMS 762 or permission of instructor.

765 COMPUTATIONAL TOOLS AND 
STRATEGIES IN BIOMED SCIENCES 
(4 credit hours)  
This is a survey course of modern 
computational tools and strategies used in 
sequence, 3-D structure and functional 
analysis of biomolecules. Students will gain 
hands on "laboratory" experience with key 
software and strategies.

800 BIOCHEMISTRY SEMINAR 
(1 credit hour)  
Topics vary. Graded pass/unsatisfactory.

900 SEMINAR IN BIOLOGICAL 
CHEMISTRY (1 to 2 credit hours)  
Topics vary. Graded pass/unsatisfactory.

Biomedical Engineering/BME 
Note: See quarterly class schedule or 
departmental advisor for further enrollment 
restrictions, requirements, or special course 
information.

619 BIOFLUID MECHANICS 
(3 credit hours)  
Derivation and use of the basic conservation 
laws underlying the fluid mechanical behavior 
of the cardiopulmonary system. Includes 
applications to the flows of blood, pulmonary 
air, and extracorporeal fluids. Prerequisite: 
MTH 233, ME 212, ME 515(315) or 
permission of instructor.

620 BIOMEDICAL HEAT AND MASS 
TRANSFER (3 credit hours)  
Introduces transport phenomena in 
biomedical engineering and physiological 
systems. Energy and mass balances together 
with constitutive and empirical relationships 
are used in quantifying such topics as body 
heat loss by various modes, diffusion mass 
transport and heat/mass transport in 
applicable technological systems. 
Prerequisite: BME 619.

622 ENGINEERING BIOPHYSICS 
(3 credit hours)  
Application of mathematical and engineering 
techniques toward describing biophysical 
systems. Topics include cellular transport, 
electrical properties of membranes, and 
biophysics of muscle contraction. 
Prerequisite: EE 521, or permission of 
instructor.

628 BIOMECHANICS AND 
BIOTHERMODYNAMICS 
(3 credit hours)  
Application of solid mechanics and 
thermodynamics toward describing 
physiological systems. Topics include 
mechanics of the skeletal, cardiac, and 
pulmonary systems and analysis of the 
biothermal regulation system. Prerequisite: 
ME 212, ME 515.

639 BIOTRANSPORT AND ARTIFICIAL 
ORGANS (4 credit hours)  
Introduction to transport processes vital to 
the design of medical devices for artificial 
tervention into living systems. Topics 
include circulatory system dynamics, 
mathematical modeling of physiological 
systems, membrane transport and biological/ 
artificial organ design. Prerequisite: BME 620.
640 BIOMATERIALS (4 credit hours)
Application of properties of materials and solid mechanics to problems and design of medical implants, external prostheses, and living tissues. Topics include mechanical properties of biologic and synthetic materials, stress-strain analysis, viscoelasticity, tissue response to implants and vice versa, and implant materials for interfacing with hard and soft tissues and blood. Prerequisite: ME 213, EE 521(321).

661 BIOINSTRUMENTATION I
(4 credit hours)
Principles of design and analysis of electronic instrumentation for medical applications. Topics include various electrodes/transducers for physiological measurement and electrical stimulation, biological signal acquisition and processing, various medical imaging modalities/systems, and electrical safety. 3 hours lecture, 2 hours lab. Prerequisite: EE 601, EE 602, EE 613, EE 614.

662 BIOINSTRUMENTATION II
(4 credit hours)
Continuation of principles of design and analysis of electronic instrumentation for medical applications. Topics include various electrodes/transducers for physiological measurement and electrical stimulation, biological signal acquisition and processing, various medical imaging modalities/systems, and electrical safety. 3 hours lecture, 2 hours lab. Prerequisite: BME 661.

663 BIOMEDICAL COMPUTERS I
(2 credit hours)
Digital computer applications in biomedical related fields. Use of software to solve biomedical problems and display results. Prerequisite: CEG 220, EE 501(301).

664 MICROPROCESSORS FOR BIOMEDICAL ENGINEERING
(4 credit hours)
Examines principles, hardware structure, and programming techniques of microprocessors, applications of microprocessor-based systems in hospitals, rehabilitation engineering and medical research. Prerequisite: BME 663(463).

670 PHOTON RADIATION (3 credit hours)
Introduces generation, effects, and detection of ionizing radiation and its application to medicine. Completion of this course fulfills the educational requirement to be a user of radioactive materials and radiation-producing devices. Prerequisite: PHY 242, 244, BIO 279.

671 MEDICAL IMAGING (3 credit hours)
An overview is given over the various methods used in generating images in medicine. The basic principles of the image forming process are discussed as well as the physical properties of the resultant image.

699 SPECIAL PROBLEMS IN BIOMEDICAL ENGINEERING (1 to 5 credit hours)
Special problems in advanced engineering topics. Titles vary.

711 ADVANCED BIOMECHANICS
(3 credit hours)
Covers a variety of mathematical models that have been developed to describe muscle performance in health and disease. Prerequisite: BME 428 or BME 628 or permission of instructor.

712 CARDIOPULMONARY MODELING
(3 credit hours)
(Also listed as BMS 951) Acquaints students with the analytical, numerical, and experimental methods used in modeling the quantitative behavior of physiological and artificial organ systems, particularly the circulation and the lungs. Prerequisite: BME 440, 439 or BME 640, 639.

713 BIOCOMPATIBILITY OF MATERIALS
(3 credit hours)
(Also listed as BMS 952) Acquaints students with the concept of biocompatibility of materials, including effects on biological systems. Also deals with the general problem of selection, qualification, and specification of materials. Prerequisite: BME 640(440), BIO 209 or equivalent.

731 MEDICAL ULTRASONICS
(3 credit hours)
(Also listed as BMS 956) Fundamentals of medical ultrasonics: ultrasound generation, propagation, scattering, and attenuation in biological tissue. A-mode, B-mode, M-mode, and Doppler imaging techniques. Ultrasound tissue characterization and quantitative imaging techniques. Prerequisite: PHY 244, EE 521(321).

732 COMPUTED TOMOGRAPHY
(3 credit hours)
(Also listed as BMS 957) Principles of generating images from projections. Discussion of the various scanner geometries, mathematical reconstruction, correction procedures, and qualitative and quantitative evaluation of images. Focuses on the medical application of computed tomography. Prerequisite: BME 671(471)—formerly BME 665(465).
733 NUCLEAR MAGNETIC RESONANCE IN MEDICINE (3 credit hours)
(Also listed as BMS 958.) Principles of imaging and spectroscopy of nuclear magnetic resonance in their applications to medicine. Topics include magnetization models, material encoding, spin interactions, localized spectroscopy, and relaxation. Prerequisite: BME 671(471)—formerly BME 665(465).

734 PROCESSING OF MEDICAL IMAGES (3 credit hours)
(Also listed as BMS 959.) Digital image processing in its application to medical images. Topics include image display, filtering, two-dimensional Fourier transform, restoration, enhancement, and edge detection. Some simple tools from the field of mathematical morphology are also introduced. Prerequisite: BME 671(471)—formerly BME 665(445).

735 PHOTON EMISSION IMAGING (3 credit hours)
(Also listed as BMS 960.) Principles of imaging procedures based on radioactive isotopes. Topics include radioactive isotopes, single-photon emission-tomography, and positron emission-tomography. Each topic covers instrumentation, image production, and major applications. Prerequisite: BME 671(471)—formerly BME 665(445).

736 BIOMEDICAL SIGNALS AND PROCESSING (4 credit hours)
Characteristics and measurement of various biomedical signals; time-domain and frequency-domain, continuous and discrete signal representations; application of digital and random signal processing methods to analysis of biomedical signals. Prerequisite: EE 710, STT 666 or equivalent.

740 REHABILITATION ENGINEERING DESIGN I (1 credit hour)
Presented as a three-quarter sequence to provide knowledge and experience in the rehabilitation engineering design process, research and development process, and funding issues. Limited to students enrolled in the graduate rehabilitation engineering training program.

741 NEUROMUSCULAR ENGINEERING (3 credit hours)
(Also listed as BMS 961.) Teaches the design and application of neuromuscular assistive devices. Emphasizes biomathematics modeling and control theory. Prerequisite: BME 622 (422) or permission of instructor.

742 REHABILITATION ASSISTIVE SYSTEMS (3 credit hours)
(Also listed as BMS 962.) Design and application of devices used in rehabilitation. Provides an understanding of the problems of disabled people and the variety of possible solutions to these problems.

743 INTRODUCTION TO REHABILITATION ENGINEERING (3 credit hours)
Introduces the complex structure of the rehabilitation engineering service delivery systems practiced in the United States. Covers basic disability areas, current laws, resources, and rehabilitation technology.

745 REHABILITATION ENGINEERING SERVICE DELIVERY (3 credit hours)
Introduces rehabilitation engineering design principles. Includes practical design experiences in site modification, ergonomics, and accessibility evaluations. Provides experience in technical report writing and presentation. Prerequisite: BME 743.

746 REHABILITATION ENGINEERING COMPUTERS I (3 credit hours)
Introduces object oriented programming structured around the HyperCard, HyperText, Macintosh, and ToolBook PC environments. Covers basic principles of programming using objects, cards, windows, projects, and graphics with application to rehabilitation engineering. Introduces PC hardware in detail. Concurrent enrollment in lecture and lab is required.

747 REHABILITATION ENGINEERING DESIGN II (3 credit hours)
Continuation of BME 745 and BME 746. Focuses on development of computer application programs and devices to aid the disabled. Prerequisite: BME 745 and BME 746.

748 REHABILITATION ENGINEERING INTRODUCTION TO CLINICAL PRACTICE (4 credit hours)
Introduces clinical practices and services provided to disabled patients in a rehabilitation center involving various services, testing, and evaluation. Focus is on spinal cord injury and traumatic brain injury.

750 REHABILITATION ENGINEERING (1 to 5 credit hours)
Engineering analysis and design are applied on rehabilitation tasks within a clinical setting. Provides training in rehabilitation engineering management of various disabilities. Enrollment in multiple sections is required.
751 HUMAN CONTROL ENGINEERING
(4 credit hours)
Modeling, design and analysis of the physiological and cognitive performance of the human operator. Human-environmental interactions are characterized as biothermal control systems. Human-technological interactions are characterized as informative control systems.

880 SELECTED TOPICS IN SYSTEMS ENGINEERING (1 to 5 credit hours)
Selected topics in current research and recent developments in systems theory and engineering.

890 SPECIAL PROBLEMS IN BIOMEDICAL ENGINEERING (1 to 5 credit hours)
Special problems in advanced biomedical engineering topics. Topics vary.

898 Ph.D. DISSERTATION RESEARCH
(1 to 5 credit hours)

899 THESIS (1 to 5 credit hours)
Pass/unsatisfactory.

Biomedical Sciences/BMS
Note: See quarterly class schedule or departmental advisor for further enrollment restrictions, requirements, or special course information.

655 MATRIX ALGEBRA (5 credit hours)
(Also listed as MTH 655) Matrices, systems of equations, vector spaces, inner products, linear transformations, determinants, eigenvalues, eigenvectors, quadratic forms, and symmetric matrices. Prerequisite: BMS 698.

664 BIOSTATISTICS (4 credit hours)
(Also listed as STT 664) Review of the principles underlying statistical methodology and techniques available for analyzing biomedical data. Emphasizes the necessity for careful design of experiments and the structure of data.

668 INTRODUCTION TO SAS
(2 credit hours)
Introduces the use of the statistical analysis system (SAS), a statistical computing package widely used in industry, government, and academia. Prerequisite: BMS 666 or equivalent.

698 BIOMEDICAL COMPUTER SCIENCE
(4 credit hours)
Introduces programs such as SYMVU, CSMP, and ORTEP, which create plotted output. FORTRAN is also introduced. Problems and data used are from the life sciences. Graded pass/unsatisfactory. Enrollment in Biomedical Sciences Ph.D. program required.

703 RESEARCH ETHICS (1 credit hour)
(Also listed as BMB 703.) Research ethics emphasizes the evaluation of hypothetical ethical scenarios. Class discussion is based on integrating ethical policy and practices as they relate to research at Wright State. Graded pass/unsatisfactory.

705 LINEAR SYSTEMS I (4 credit hours)
(Also listed as EE 701 and EGR 701.) Signal representation, orthonormal bases, and generalized Fourier series. Description of linear, discrete, and continuous systems. Systems analysis via classical equations, convolution, and transform methods. Prerequisite: BMS 664 and 698.

706 LINEAR SYSTEMS II (3 credit hours)
(Also listed as EE 702.) State variable representations of continuous and discrete systems. Linear vector spaces and similarity transformations; eigen-analysis, time and transform domain solutions of linear state equations; controllability, observability, and stability of linear systems. Prerequisite: BMS 705.

708 DIGITAL SIGNAL PROCESSING
(4 credit hours)

710 CONTROL SYSTEMS I (3 credit hours)
(Also listed as EE 613.) Provides students with a general control background. Major topics include block diagrams and signal-flow graphs, electromechanical modeling including state variable representation, time response, root locus, and introduction to design. Prerequisite: BMS 664 and 698. Corequisite: BMS 711.

712 CONTROL SYSTEMS II (3 credit hours)
(Also listed as EE 615.) Using Control Systems I background, course concentrates on controller design, in both the time and frequency domains, using Nyquist, Bode, root locus and state variable techniques. Digital control concepts are introduced. Prerequisite: BMS 710 and 711. Corequisite: BMS 713.
725 PHYSICAL POLYMER CHEMISTRY
(3 credit hours)
(Also listed as CHM 665.) Introduction to the structural and physical aspects of macromolecules; emphasis on the relationship of polymer structure to physical and mechanical properties. Prerequisite: CHM 213 or CHM 561.

726 SYNTHETIC POLYMER CHEMISTRY
(3 credit hours)
(Also listed as CHM 661.) Step-growth and chain-growth polymerization in homogeneous and heterogeneous media; properties of commercial polymers. Prerequisite: CHM 213 or CHM 561.

727 PHYSICAL POLYMER CHEMISTRY
LABORATORY (1 to 2 credit hours)
(Also listed as CHM 667.) Laboratory illustrations of BMS 725 lecture material and techniques of polymer science. Prerequisite: CHM 213 or CHM 561.

728 POLYMER SYNTHESIS LABORATORY
(1 to 2 credit hours)
Laboratory illustrations of BMS 726 lecture material and techniques of polymer science. Prerequisite: CHM 213 or CHM 561.

733 ADVANCED INORGANIC
CHEMISTRY I (3 credit hours)
(Also listed as CHM 720.) Study of atomic structure, modern theories of chemical bonding, and structural concepts of inorganic chemistry and their relationships to reactivity, acids and bases in aqueous and nonaqueous systems, and energetics of reactions.

734 ADVANCED INORGANIC
CHEMISTRY II (3 credit hours)
(Also listed as CHM 721.) Thorough examination of coordination chemistry of the metals stressing transition elements, crystal and ligand field approaches and molecular orbital theory as applied to organometallic systems, mechanisms of inorganic reactions, and the role of metal ions in biological systems. Prerequisite: BMS 733.

735 ADVANCED INORGANIC
CHEMISTRY III (3 credit hours)
(Also listed as CHM 722.) Survey of the applications of physical methods in the examination and characterization of inorganic compounds. Emphasis is on methods applied to transition metal complexes. Prerequisite: BMS 734.

736 CHEMICAL KINETICS (3 credit hours)
(Also listed as CHM 751.) Characterization of simple kinetic systems, experimental methods, energy distributions in molecules, the transition state method, and chain reactions in solution. Prerequisite: CHM 453 or equivalent.

737 CHEMICAL THERMODYNAMICS
(3 credit hours)
Fundamentals; first, second, and third laws; and application to solutions. Prerequisite: CHM 453 or equivalent.

738 SELECTED TOPICS IN PHYSICAL
CHEMISTRY (3 credit hours)
(Also listed as CHM 855.) Selected topics in the field of physical chemistry such as molecular spectroscopy, advanced molecular structure, magnetic resonance, X-rays and crystal structure, statistical mechanics, or precise physical-chemical measurements.

740 ADVANCED BIOANALYTICAL
CHEMISTRY (3 credit hours)
An introduction to control systems using state variables and classical analysis. Closed loop system representation, block diagrams, time response, and frequency response are treated. Prerequisite: BMS core.

741 STRUCTURAL CONCEPTS IN
ORGANIC CHEMISTRY (3 credit hours)
Study of molecular orbital theory, reactive species, theories of acids and bases, and an introduction to stereochemistry.

742 INSTRUMENTATION (3 credit hours)
Introduction to the theory and practices of modern chemical instrumentation; elementary electronics, spectrophotometry, atomic absorption, electrochemical techniques, chromatography, and other instrumental techniques.

750 BIOCHEMISTRY AND MOLECULAR
BIOLOGY I (4 to 10 credit hours)
(Also listed as BMB 750.) Survey course emphasizing an experimental and problem-solving approach to buffers, protein structure, enzymes, and carbohydrate and lipid metabolism.

752 BIOCHEMISTRY AND MOLECULAR
BIOLOGY II (3 to 10 credit hours)
(Also listed as BMB 752.) Survey course emphasizing an experimental and problem-solving approach to amino acid metabolism, nucleic acid function, and hormones. Prerequisite: BMS 750 or permission of instructor.
753 MOLECULAR SIGNALLING—MOLECULAR CELL BIOLOGY (3 credit hours)
(Also listed as BMB 753.) A molecular analysis of information transfer into and within cells. Topics include visual transduction, hormones, hormone receptors, second messengers, regulation of transcription, and oncogenes. Readings from current scientific literature. Prerequisite: BMS 750, BMS 752.

755 CANCER: MOLECULAR ASPECTS (2 to 6 credit hours)
A profile of the general properties of transformed cells and an in-depth examination of the mechanisms of oncogenesis at the level of molecular genetics. Prerequisite: BMS core.

760 MOLECULAR BIOLOGY OF THE NUCLEUS (4 credit hours)
(Also listed as BMB 760.) A literature-based course covering molecular events in the nucleus including DNA replication, repair, recombination, and transcription. Prerequisite: BMS 750, BMS 752.

762 FUNDAMENTAL PRINCIPLES OF FOURIER TRANSFORM NMR (3 to 6 credit hours)
(Also listed as BMB 762/PHY 760.) Covers the fundamental theory of nuclear magnetic resonance spectroscopy with emphasis on pulse Fourier transform methods. Prerequisite: BMS core.

763 IN VIVO NMR SPECTROSCOPY AND IMAGING (3 to 6 credit hours)
(Also listed as BMB 763.) Discusses the applications of NMR spectroscopy to the study of tissue metabolism in vivo. The fundamental theory of magnetic resonance imaging, with a survey of clinical applications, are also presented. Prerequisite: BMS core.

764 NMR TECHNIQUES IN BIOMOLECULAR STRUCTURE AND DYNAMICS (3 to 6 credit hours)
(Also listed as BMB 764.) Describes the NMR methods used for the determination of biomolecular structure and dynamics. Emphasis on two-dimensional Fourier transform techniques. Prerequisite: BMS core.

765 COMPUTATIONAL TOOLS AND STRATEGIES IN BIOMEDICAL SCIENCES (4 credit hours)
This is a survey course of modern computational tools and strategies used in sequence, 3-D structure and functional analysis of biomolecules. Students will gain hands-on "laboratory" experience with key software and strategies. Prerequisite: enrollment in BMS program or instructor permission required.

767 ENZYMES (4 credit hours)
(Also listed as BMB 727.) Mechanism of enzyme catalysis, including such topics as structure, kinetics, energetics, allosterism, co-enzymes, and control of enzymes and multienzyme systems. Prerequisite: BMS 750.

768 BIOCHEMISTRY OF PEPTIDE HORMONES (3 credit hours)
Synthesis, secretion, degradation, structure assay, mechanism of action, and function of peptide hormones are presented. Emphasis is on insulin and other hormones involved in diabetes mellitus. Prerequisite: BMS 752.

769 BIOCHEMISTRY OF MEMBRANES (4 credit hours)
(Also listed as BMB 731.) Examines the biochemistry of membranes and provides basic information on membrane composition and processes. Prerequisite: BMS 750 and 835.

770 PHYSICAL BIOCHEMISTRY (4 credit hours)
(Also listed as BMB 740.) Structure-function analysis of biological macromolecules (particularly proteins and nucleic acids) based on chemical and physical properties. Prerequisite: BMS 750.

771 SAFE USE OF RADIONUCLIDES (2 credit hours)
Principles of alpha, beta, and gamma radiation and methodology of counting with application to physical and biological problems.

775 PATHOGENIC MECHANISMS (5 credit hours)
(Also listed as M&I 675.) Expands knowledge of basic microbiology by focusing on human-microbial pathogen interactions. The molecular basis of the pathogenic mechanisms will be emphasized. In addition, the student will gain a better appreciation and understanding of the complexities of interactions between microbes and their human hosts. Prerequisite: BIO 210 or equivalent molecular biology course and BIO 252 or equivalent introductory microbiology course.
776 BIOENERGETICS (1 to 6 credit hours)
Structure of energy-transducing membranes of mitochondria, chloroplasts, and bacteria. Emphasis on mechanisms of energy transduction, thermodynamics of oxidation-reduction reactions, biophysical spectroscopic methods, and structure and surface topography of membrane proteins. Prerequisite: BMS 752.

777 GENE THERAPY (4 credit hours)
(Also listed as M&I 777.) Study of the molecular basis of gene therapy and the use of viral gene delivery systems for the treatment of human disease. Gene therapy strategies are contrasted with various diseases, including cancer and AIDS.

778 CELL BIOLOGY (4 credit hours)
(Also listed as BIO 730.) Provides a survey of basic concepts that are most important for understanding how cells function.

779 MOLECULAR GENETICS
(3 credit hours)
(Also listed as BIO 734.) Study of the replication, organization, and function of nucleic acids with emphasis on the role of nucleic acids in protein synthesis. Prerequisite: BMS core courses.

780 HUMAN GENETICS (4 credit hours)
(Also listed as BIO 626.) Nature of human genetic traits, methods of analysis of inheritance, principles of counseling, and therapy. Prerequisite: BMS 752 and 835.

785 ADVANCED SEMINAR IN GENETICS
(2 credit hours)
Review of current literature in molecular or human genetics subjects. Presentation of reviews to other students. Prerequisite: BMS 780.

786 BEHAVIOR GENETICS (3 credit hours)
Behavior is considered as a population phenomenon and as an adaptive process. Evolutionary theory is used to integrate the disparate aspects of behavioral phenomena. Prerequisite: BMS 780.

790 RECOMBINANT DNA METHODS
(6 credit hours)
(Also listed as BIO 737 and M&I 737.) Microbial and molecular techniques for producing, cloning, and characterizing recombinant DNA molecules; laboratory exercises in gene manipulation to give an understanding of principles of genetic engineering. Graded pass/unsatisfactory. Prerequisite: BMS core.

791 MICROBIAL GENETICS (3 credit hours)
Basic concepts of production of microbial mutations and their detection and analysis. The use of microbial genetics in elucidating cellular functions; the construction of plasmids and their use in genetic engineering. Prerequisite: BMS 752 and 835.

793 MICROBIAL ECOLOGY (5 credit hours)
(Also listed as BIO 625.) Microbes in soil, water, and air. Experiments on mineral cycles, physical and biological limiting factors, and symbiosis. Natural communities of microbes and microbes of special human environments. Includes field studies.

799 HUMAN PARASITOLOGY
(2 credit hours)
(Also listed as BIO 676.) Study of the medical aspects of parasitology such as pathology, symptomatology, diagnosis, and identification of parasites. Course content is divided into three major categories: human protozoology, helminthology, and arthropodology.

802 IMMUNOLOGY AND BASIC VIROLOGY (5 credit hours)
(Also listed as M&I 726.) Fundamentals of immunobiology and basic virology. Emphasis on regulatory and cellular levels of host immune responses against microbial pathogens as well as mechanisms of immunopathology. Characteristics and molecular biology of virus pathogens. Prerequisite: BMS 752 and 835.

803 PATHOGENIC MICROBIOLOGY
(5 credit hours)
(Also listed as M&I 727.) Study of microorganisms that are pathogenic for humans and animals using the organ system approach. Emphasis on mechanisms of pathogenesis and host resistance. Includes a project segment devoted to the independent study of the mechanisms of pathogenesis in the host-parasite interactions of the infectious agents used. Prerequisite: BMS 752 and 835 or equivalent.

805 INTERCELLULAR COMMUNICATION
(4 credit hours)
(Also listed as M&I 770, PHA 740, P&B 776.) Introduces concepts of intercellular communication through an interdisciplinary presentation of immune and neuroendocrine system functions. Emphasizes the similarities between the systems and the multidisciplinary approaches used to study each.
807 BASIC VIROLOGY (3 credit hours)
(Also listed as M&l 731.) Introduction to the field of virology with emphasis on animal viruses. Studies the intrinsic properties of viruses and their interaction with cells; multiplication, disease production, genetics, and tumor induction. Prerequisite: BMS core.

808 MOLECULAR VIROLOGY SEMINAR
(3 credit hours)
(Also listed as M&I 831.) Structure, infectious process, replication, maturation, release, and genetics at the molecular level of the major groups of animal viruses. Prerequisite: BMS 752 and 835.

809 VIRAL ONCOLOGY SEMINAR
(3 credit hours)
(Also listed as M&l 833.) Provides an understanding of the process involved in cell transformation by oncogenic viruses. Prerequisite: BMS 752 and 835.

812 IMMUNOBIOLOGY (5 credit hours)
(Also listed as M&I 745.) Study of the biology of the immune system, as well as its function in health and disease. Specific diseases are used as models for immunologically mediated conditions. Prerequisite: BMS 752 and 835.

813 SPECIAL TOPICS IN IMMUNOLOGY
(2 to 8 credit hours)
(Also listed as M&I 840.) Students select, present, and analyze information from the current literature in immunobiology. Prerequisite: BMS 752 and 835.

818 INFECTION AND IMMUNITY SEMINAR
(3 credit hours)
(Also listed as M&I 846.) Deals with the effects of microbial and metazoan parasites on both host resistance and immunologically mediated disease processes. Prerequisite: BMS 752 and 835.

834 ELECTRON MICROSCOPY FOR LIFE SCIENCE (6 credit hours)
(Also listed as BIO 740.) Introduction to theoretical and practical aspects of transmission electron microscopy. Emphasis on interpretation and evaluation of electron micrographs. 3 hours lecture, 6 hours lab; additional lab time is required. Prerequisite: previous course in histology or cell biology.

835 MAMMALIAN CELL BIOLOGY (4 to 10 credit hours)
(Also listed as BIO 720.) Interdisciplinary survey of cellular functions, including location of molecular events and functional compartmentation within the cell, recognition of structural and functional elements of the cell, and interaction of cells in specialized tissues. Prerequisite: BMS 750 corequisite.

837 HUMAN GROSS ANATOMY
(9 credit hours)
(Also listed as ANT 711.) Lectures and dissection of human cadaver.

838 MICROANATOMY (8 credit hours)
Introduction to basic cell structure, including membranes, nucleus, and cytoplasmic organelles. Emphasis on the detailed histological anatomy of the four basic tissues, and major organs and systems of the body. Prerequisite: BMS 751.

839 DEVELOPMENTAL BIOLOGY
(3 to 6 credit hours)
(Also listed as BIO 603.) Describes underlying processes that initiate the development of tissue and whole organisms in plants and animals. Prerequisite: recommend BIO 402, BIO 303 or the equivalent.

840 REPRODUCTIVE ANATOMY AND PHYSIOLOGY (3 credit hours)
Reproductive cycles and gametogenesis; intercourse and conception; events of pregnancy and parturition; contraception, sterility, and dysfunction. Prerequisite: BMS core.

850 BASIC HUMAN PHYSIOLOGY I
(4 to 10 credit hours)
Basic course in structure, function, and interactions of human organ systems. Subject areas include musculoskeletal, neurological, cardiovascular, and respiratory systems. Prerequisite: BMS 752 and 835.

851 BASIC HUMAN PHYSIOLOGY II
(4 to 10 credit hours)
Basic course in structure, function, and interactions of human organ systems. Subject areas include endocrine, gastrointestinal, urinary, and reproductive systems. Prerequisite: BMS 850.

852 CELL PHYSIOLOGY AND BIOPHYSICS (4 credit hours)
(Also listed as P&B 601.) Fundamentals of cellular homeostasis and the role of specialized cells in organismal homeostasis. Prerequisite: admission to the BMS program.
853 ION CHANNELS (4 credit hours)
(Also listed as P&B 722.) Explores the role of ion channels in a variety of cell types with an emphasis on both electrophysiological and biochemical methods for evaluation of channel function. Prerequisite: BMS 852 and/or permission of instructor.

854 MEDICAL NEUROSCIENCE (7 credit hours)
(Also listed as ANT 777 and P&B 777.) Interdisciplinary/interdepartmental course for medical and graduate students that integrates basic and clinical neurosciences. Structural and functional topics are combined with clinical information to address major neurological and psychiatric disorders. Prerequisite: BMS core courses.

856 GLIAL CELL PHYSIOLOGY (3 credit hours)
(Also listed as P&B 650.) Concepts of glial cell physiology based on the analysis of current primary literature. Topics include interaction between glia and other cell types and the role of glia in pathophysiology. Prerequisite: P&B 642.

859 GASTROINTESTINAL PHYSIOLOGY AND BIOPHYSICS (3 credit hours)
(Also listed as P&B 761.) Principles of gastrointestinal physiology and biophysics emphasizing cellular mechanisms of secretions, absorption, and motility. Prerequisite: BMS 852.

860 GENERAL ENDOCRINOLOGY (3 credit hours)
(Also listed as P&B 771.) Survey of endocrinological mechanisms and their role in integration of body function. Prerequisite: BMS 851 or permission of instructor.

862 HUMAN PHYSIOLOGY (5 credit hours)
(Also listed as P&B 610.) An overview of human/mammalian organ system physiology. Fundamental mechanisms and the experimental basis for current understanding are emphasized.

864 PHYSIOLOGICAL ASPECTS OF EXERCISE (5 credit hours)
(Also listed as P&B 783.) Integration of physiological mechanisms involved in exercise. Cellular, neuromuscular, cardiovascular, and respiratory changes are discussed with relationship to exercise performance. Prerequisite: BMS core.

865 INTRODUCTORY NEUROPHYSIOLOGY (4 credit hours)
(Also listed as P&B 642.) Physiological mechanisms that subserve the functions of the nervous system. Topics include the biophysics of neuronal information, intercellular communications, motor control, sensory systems, and development neurobiology. Prerequisite: BMS 852.

866 CARDIOVASCULAR PHYSIOLOGY (3 credit hours)
(Also listed as P&B 733.) Survey of the physiology of the human cardiovascular system, components and control, cell, organ, and system level. Both newborn and adult are included, as well as adjustments to exercise and non-exercise stress. Prerequisite: enrollment in the BMS ph.d. program.

867 FLUORESCENCE: THEORY AND PRACTICE (1 to 3 credit hours)
(Also listed as P&B 704.) Covers the theoretical basis for fluorescence and instrument design in this methods-oriented course. Applications of interest to the physiological and biochemical sciences are discussed. Prerequisite: BMS 750; BMS 752.

868 MOLECULAR BASIS OF SECRETION (1 to 5 credit hours)
(Also listed as P&B 751.) Explores current hypothesis for the formation, sorting, and release of secretory vesicles at a molecular level of integrating ideas from cell biology, neuroscience, and membrane biophysics. Methodology is emphasized. Prerequisite: BMS 852.

869 QUANTITATIVE ASPECTS OF MEMBRANE TRANSPORT (3 to 10 credit hours)
(Also listed as P&B 669.) Employs a quantitative approach to the properties of solutes, water, bio-electrical phenomena, transport systems that move solutes across biological membranes, and the interactions of these solutes with membranes. May be taken for letter grade or pass/unsatisfactory. Prerequisite: BMS 835 and BMS 852.

870 PHYSIOLOGY AND PHARMACOLOGY OF VASCULAR CELLS (3 credit hours)
(Also listed as PHA 870 and P&B 870.) Study of physiological steady state and pharmacological properties of vascular cells-circulating erythrocytes, endothelial cells, and smooth muscle cells in particular—as a basis of pathologic aberrations and clinical disorders. Prerequisite: cell biology, cell biophysics, or equivalent.
876 PRINCIPLES OF BIOKINETICS
(4 credit hours)
Abbreviated course describing passage of
drugs across membranes, their mechanisms
of action, distribution, biotransformation, and
elimination. Discusses dose-response
relationships, receptor-binding kinetics, and
topics of interest and importance to enrolled
students.

879 MOLECULAR PHARMACOLOGY I
(4 credit hours)
(Also listed as PHA 879.) Introduces students
to drug-receptor interactions, dose-response
relationships, physicochemical principles of
drug action and distribution,
pharmacokinetics, mechanisms of action,
and uses of drugs affecting both autonomic
and central nervous system functions.
Prerequisite: BMS core.

880 GENERAL PHARMACOLOGY II
(4 credit hours)
(Also listed as PHA 880.) Extends the
principles and theoretical considerations
learned in BMS 879 and applies them to the
action of drugs on the cardiovascular,
respiratory, endocrine, gastrointestinal, and
genito-urinary systems. Emphasis on
antibiotics, chemotherapy of infectious
diseases, antineoplasia, and immuno-
suppressants. An introduction to toxicology is
provided. Prerequisite: BMS 879.

881 RESEARCH TECHNIQUES
(3 credit hours)
Practical laboratory experience in commonly
used biological techniques including DNA
purification and manipulation, protein
expression and analysis, and the classical
pharmacological technique of measuring
receptor binding. Designed to give hands-on
experience along with a short weekly lecture
providing background on the theory behind
the topic.

886 GENERAL PATHOLOGY
(7 credit hours)
Introduces basic principles of abnormal
biological processes in the human and
subhuman vertebrate organisms. Deals with
tissue injury and degeneration, abnormal
growth, infection and host defense, selected
metabolic and congenital disorders, and
forensic problems. Complies with the
Toxicology Society’s recommended
requirements for the professional toxicologist.
Prerequisite: BMS core.

887 MOLECULAR TOXICOLOGY
(4 credit hours)
Introduction to general toxicology covering
the principles of intoxication and
detoxification, classification of poisons,
exposure characteristics, biotransformation
and biokinetics of poisons, systemic
toxicology including central nervous system,
splanchnic organs, cardiovascular,
hematopoietic, respiratory, reproductive, and
skeletal systems. Prerequisite: BMS 880.

888 GENERAL TOXICOLOGY II
(4 credit hours)
(Also listed as PHA 752.) Introduction to
general toxicology. Particular toxic agents are
studied, including teratogens, mutagens,
oncogens, heavy metals, and other
environmental contaminants and toxins.
Clinical, forensic, industrial, and agricultural
toxicology are addressed along with
regulations that apply to the field.
Prerequisite: BMS 887.

889 TOXICOLOGIC PATHOLOGY
(3 credit hours)
The pathobiology of toxic chemicals and
materials is presented with emphasis placed
on anatomic and physiologic changes
produced in common laboratory animal
species. Research methods enhancing the
pathologic evaluation of biomedical
specimens will be stressed. Prerequisite:
BMS 886.

890 PRINCIPLES OF BIODYNAMICS
(4 credit hours)
(Also listed as PHA 750.) Covers the general
basis of toxicology and therapeutics:
pharmacokinetics, xenobiotic metabolism,
and their effects on determination of the
dose-response-time relationship.
Prerequisite: core curriculum or equivalent
or permission of instructor.

898 NEUROPHARMACOLOGY
(3 credit hours)
(Also listed as PHA 898.) In-depth treatment
of the anatomy, biochemistry, physiology,
and function of neurotransmitter systems and
the effects of drugs on the nervous system.
Prerequisite: BMS core and BMS 876 or
equivalent of both, plus permission of
director.

902 NEUROPHYSIOLOGY (3 credit hours)
(Also listed as P&B 720.) Survey of
neurophysiology with emphasis on somatic
and autonomic control of body function.
Prerequisite: BMS core.
903 HUMAN NEUROANATOMY
(7 credit hours)
(Also listed as ANT 731.) Detailed survey of the anatomy and physiology of the major fiber tracts and cell groups of the human central nervous system. Prerequisite: BMS core.

905 INFORMATION PROCESSING
(4 credit hours)
(Also listed as PSY 665.) Survey of experimental findings in animal and human memory with emphasis on their implications for current theories of memory. Prerequisite: BMS core.

910 PSYCHOBIOLOGY OF STRESS
(4 credit hours)
(Also listed as PSY 619.) Detailed examination of selected areas in cognition and learning. Prerequisite: BMS core curriculum.

913 FUNDAMENTALS OF HUMAN NEUROBIOLOGY (4 credit hours)
(Also listed as ANT 691.) Development, structure, and function of the human nervous system as it relates to neuropathology, clinical neurology, and behavioral science. Prerequisite: general biology and/or general psychology.

914 BEHAVIORAL NEUROSCIENCE
(4 credit hours)
(Also listed as PSY 891.) Covers Neurobiological bases of behavior. Focuses on motor function, ingestion, mating, learning, memory, rhythmical influences, and emotion. Prerequisite: BMS core or equivalent.

925 FUNDAMENTALS OF BIOLOGICAL COMPUTATION AND MODELING
(5 credit hours)
This course will treat fundamental programming approaches, data structures and mathematical/statistical principles used in designing computational biology tools and algorithms. Students will learn theoretical principles and gain practical experience. Prerequisite: admission requirements for BMS program plus programming expertise.

950 CARDIAC MECHANICS
(1 to 6 credit hours)
This course teaches BMS Ph.D students a variety of mathematical models which have been developed to describe cardiac performance in health and disease. Prerequisite: BMS core.

951 CARDIOPULMONARY MODELING
(1 to 6 credit hours)
(Also listed as BME 712.) Acquaints students with the analytical, numerical, and experimental methods used in modeling the quantitative behavior of physiological and artificial organ systems, particularly the circulation and the lungs. Prerequisite: BMS core.

952 BIOCOMPATIBILITY OF MATERIALS
(1 to 6 credit hours)
(Also listed as BME 713.) Acquaints students with the concept of biocompatibility of materials, including effects on biological systems. Deals with the general problem of selection, qualification, and specification of materials. Prerequisite: BMS core.

953 HUMAN FACTORS ENGINEERING ADVANCED AEROSPACE SYSTEMS DESIGN (1 to 6 credit hours)
(Also listed as HFE 724.) Qualifies students to make significant human factors contributions to the design of state-of-the-art aerodynamic and space systems. Design of control-display integration, cockpit configuration, maintainability, and reliability emphasized. Prerequisite: BMS core.

954 HUMAN FACTORS ENGINEERING WORKLOAD ANALYSIS
(1 to 6 credit hours)
(Also listed as HFE 725.) Provides students with tools required to accomplish a workload analysis as a requisite to a systems design or a redesign of an existing system. Prerequisite: BMS core.

955 HUMAN FACTORS ENGINEERING: CREW STATION DESIGN
(1 to 6 credit hours)
(Also listed as HFE 726.) In-depth treatment of human factors engineering principles applicable to design of crew command centers for aerodynamics, space, and maritime systems. Prerequisite: BMS core.

956 MEDICAL ULTRASONICS
(1 to 6 credit hours)
(Also listed as BME 731.) Fundamentals of medical ultrasonics: ultrasound generation, propagation, scattering, and attenuation in biological tissue. A-mode, B-mode, M-mode, and Doppler imaging techniques. Ultrasound tissue characterization and quantitative imaging techniques. Prerequisite: BMS core.
957 COMPUTED TOMOGRAPHY
(1 to 6 credit hours)
(Also listed as BME 732) Principles of generating images from projections. Discussion of the various scanner geometries, mathematical reconstruction, correction procedures, and qualitative and quantitative evaluation of images. A major focus is the medical application of computed tomography. Prerequisite: BMS core.

958 NUCLEAR MAGNETIC RESONANCE IN MEDICINE (1 to 6 credit hours)
(Also listed as BME 733) Principles of imaging and spectroscopy of nuclear magnetic resonance in their application to medicine. Topics include magnetization models, material encoding, spin interactions, localized spectroscopy, and relaxation. Prerequisite: BMS core.

959 PROCESSING OF MEDICAL IMAGES
(1 to 6 credit hours)
(Also listed as BME 734) Digital image processing in its application to medical images. Topics include image display, filtering, two-dimensional Fourier transform, restoration, enhancement, and edge detection. Some simple tools from the field of mathematical morphology are also introduced. Prerequisite: BMS core.

960 PHOTON EMISSION IMAGING
(1 to 6 credit hours)
(Also listed as BME 735) Principles of imaging procedures based on radioactive isotopes. Topics include radioactive isotopes, single-photon emission tomography, and positron-emission tomography. Instrumentation, image production, and major applications are covered. Prerequisite: BMS core.

961 NEUROMUSCULAR REHABILITATION ENGINEERING (1 to 6 credit hours)
(Also listed as BME 741) Teaches the design and application of neuromuscular assistive devices. Biomathematics modeling and control theory are emphasized. Prerequisite: BMS core.

962 REHABILITATION ASSISTIVE SYSTEMS (1 to 6 credit hours)
(Also listed as BME 742) Design and application of devices used in rehabilitation. Provides an understanding of the problems of disabled people and the variety of possible solutions to these problems. Prerequisite: BMS core.

963 APPLICATION OF HUMAN FACTORS ENGINEERING TO REHABILITATION
(1 to 6 credit hours)
(Also listed as HFE 743) Teaches students application of human factors design concepts to the design of aids for the physically handicapped. In addition to aids for manipulation of locomotion, barrier-free designs are emphasized. Prerequisite: BMS core.

964 AEROSPACE MEDICINE HUMAN FACTORS (3 credit hours)
Designed for BMS students who are residents of the Aerospace Medicine Program. Seminar focuses on recent developments in human factors engineering. Addresses design principles, crew compartment technology and resource management, crew members performance and reliability. Prerequisite: BMS core and permission of program director.

965 HUMAN FACTORS ENGINEERING ADVANCES IN VISUAL DISPLAY DESIGN (3 credit hours)
Application of human factors engineering principles to the design of visual display systems. Discusses current display technologies, human vision, design of display parameters, and image quality metrics. Prerequisite: BMS core.

966 ADVANCED TOPICS IN HUMAN-COMPUTER INTERACTION (3 credit hours)
This graduate-level seminar exposes students to theoretical and research issues associated with human-computer interaction (HCI) and cognitive-oriented work from a human factors engineering standpoint. Prerequisite: BMS core.

967 ADVANCED DEVELOPMENT BIOLOGY (4 credit hours)
Molecular mechanism of development, including topics such as cell signalling, pattern formation, terminal differentiation. Prerequisite: BIO 210, 211, 212 or equivalent, or instructor approval.

990 BIOMEDICAL SCIENCES SEMINAR
(1 to 3 credit hours)
(Also listed as P&B 808.) Convention of student body and faculty in biomedical sciences to learn, discuss, and critique the basic and clinical biomedical literature as presented by an active and reputable scientific investigator. Student presentations required.

991 SPECIAL TOPICS (1 to 15 credit hours)
Selected topics in biomedical sciences.
994 INTRODUCTION TO RESEARCH
(1 to 6 credit hours)
Introduces BMS students to the ongoing research activities within the five program tracks; involves presentations by BMS faculty. Graded pass/unsatisfactory.

Computer Engineering/CEG
Note: See quarterly class schedule or departmental advisor for further enrollment restrictions, requirements, or special course information.

505 FUNDAMENTALS OF EXPERT SYSTEMS (4 credit hours)
Covers definitions of AI, discusses the different technologies that comprise the field, introduces the fundamental concepts and methodologies of expert systems, and provides hands-on experience developing small expert system applications. Prerequisite: any one of the following: CS 141, CS 220, CS 240, EGA 153.

520 COMPUTER ORGANIZATION AND ASSEMBLY LANGUAGE PROGRAMMING (4 credit hours)
Terminology and understanding of functional organizations and sequential operation of a digital computer. Program structure, and machine and assembly language topics including addressing, stacks, argument passing, arithmetic operations, traps, and input/output. Macros, modularization, linkers, and debuggers are used. 3 hours lecture, 2 hours lab. Prerequisite: CS 242, CEG 260.

530 OBJECT-ORIENTED PROGRAMMING IN C++ (4 credit hours)
Introduces object-oriented programming and the C++ language. Topics include functions, pointers, structures, classes, function/operator overloading, inheritance and virtual functions, template, exceptions, and file input and output. Prerequisite: CEG 220 or CS 240 or equivalent.

560 DIGITAL SYSTEM DESIGN
(4 credit hours)
(Also listed as EE 651.) Topics include flip-flops, registers, counters, programmable logic devices, memory devices, register-level design, and microcomputer system organization. Students must show competency in the design of digital systems. 3 hours lecture, 2 hours lab. Prerequisite: CEG 260.

602 INTRODUCTION TO COMPUTER COMMUNICATION DESIGN (4 credit hours)
Survey of modern digital communications techniques. Specific focus is on serial transmission over public communication channels. Topics include information content and coding, asynchronous and synchronous formats, concentrating and multiplexing, channel properties, modulation techniques, common carrier services, error sources and control, regulatory policies, networks, and their analyses. Students design both hardware and software components of computer communications systems. 3 hours lecture, 2 hours lab. Knowledge of a higher-order language required. Prerequisite: CS 600.

611 MICROPROCESSOR-BASED SYSTEM DESIGN (4 credit hours)
Introduces the design and development of software and computer interfacing hardware for effective use of microprocessors in process control, data collecting, and other special purpose computing systems. Software topics include assembly language programming, input/output, interrupts, direct memory access, and timing problems. 3 hours lecture, 2 hours lab. Prerequisite: CEG 260, EE 260, EE 501, EE 502.

616 MATRIX COMPUTATIONS
(4 credit hours)
(Also listed as MTH 616.) Survey of numerical methods in linear algebra emphasizing practice with high-level computer tools. Topics include Gaussian elimination, LU decomposition, numerical eigenvalue problems, QR factorization, least squares, singular value decompositions, and iterative methods. Prerequisite: MTH 253 or 355; and CS 142 or 241.

619 INTRODUCTION TO FUZZY LOGIC CONTROL (4 credit hours)
(Also listed as EE 619.) Foundations and philosophy of fuzzy logic and applications to control theory. Relationship between classical PID control and fuzzy rule-based control. Techniques for rule construction and adaptive fuzzy logic controllers. Case studies of applications. Prerequisite: EE 613 and 614.
620 COMPUTER ARCHITECTURE
(4 credit hours)
Introduction to Computer Architecture, computer system analysis and design, performance and cost, instruction set architecture, processor implementation techniques, pipelining, memory-hierarchy design, input/output and contemporary architectures. Prerequisite: CEG 320, CEG 360.

621 MICROCOMPUTER DESIGN PROJECTS (4 credit hours)
In-depth study of the design and use of microcomputer systems. The computer organization and interface facilities are examined. Hardware/software projects are required to develop techniques for hardware and software design of open-ended projects. 3 hours lecture, 2 hours lab. Prerequisite: CEG 520, 560.

625 VHDL HARDWARE DESCRIPTION LANGUAGE (VHDL) (4 credit hours)
Rapidly being embraced as the universal communication medium of design, VHDL is an industry standard language used to describe hardware from the abstract to the concrete level. Prerequisite: CEG 360 and CS 400.

628 LINEAR OPTICAL SYSTEMS FOR COMPUTER ENGINEERING
(4 credit hours)
Introduction to linear optical systems, transformation properties of optical systems, correlation, convolution, diffraction, applications related to optical computers, such as beam steering for optical interconnection and parallel optical algorithm for pattern search, neural network. Prerequisite: EE 522.

629 INTERNET SECURITY (4 credit hours)
Authentication, address spoofing, hijacking, SYN floods, smurfing, sniffing, routing tricks, and privacy of data en-route. Buffer overruns and other exploitations of software development errors. Hardening of operating systems. Intrusion detection. Firewalls. Ethics. Prerequisite: CEG 402.

633 OPERATING SYSTEMS (4 credit hours)
Management of resources in multi-user computer systems. Emphasis is on problems of file-system design, process scheduling, memory allocation, protection, and tools needed for solutions. Course projects use the C/C++ language and include the design of portions of an operating system. 3 hours lecture, 2 hours lab. Prerequisite: CEG 520, CS 600.

634 CONCURRENT SOFTWARE DESIGN
(4 credit hours)
Classical problems of synchronization and concurrency and their solutions are examined through course projects and through readings on operating system design. 3 hours lecture, 2 hours lab. Prerequisite: CEG 633.

635 DISTRIBUTED COMPUTING AND SYSTEMS (4 credit hours)
Covers issues such as process coordination, client-server computing, network and distributed operating systems, network and distributed file systems, concurrency control and recovery of distributed transactions, and fault-tolerant computing. Prerequisite: CEG 634 or equivalent.

653 DESIGN OF COMPUTING SYSTEMS
(4 credit hours)
Projects in the laboratory that combine engineering hardware and computer science software concepts in the design and implementation of small special-purpose computer systems. 3 hours lecture, 2 hours lab. Prerequisite: CEG 520, 560.

654 VLSI DESIGN (4 credit hours)
(Also listed as EE 654.) Introduction to VLSI system design. Topics include CMOS devices and circuit design techniques, basic building blocks for CMOS design, fabrication processing and design rules, chip planning and layout, system timing and power dissipation, simulation for VLSI design, and signal processing with VLSI. Prerequisite: EE 631, EE 632 and EE 651.

656 INTRODUCTION TO ROBOTICS
(4 credit hours)
(Also listed as EE 656 and ME 656.) Introduction to the mathematics, programming, and control of robots. Topics covered include coordinate systems and transformations, manipulator kinematics and inverse kinematics, trajectory planning, Jacobians, and control. Prerequisite: MTH 253; proficiency in pascal, c or fortran programming.

658 DIGITAL INTEGRATED CIRCUIT DESIGN WITH PLDS AND FPGAS
(4 credit hours)
(Also listed as EE 658.) Design and application of digital integrated circuits using programmable logic devices (PLDs) and field programmable gate arrays (FPGAs). A commercial set of CAD tools (Mentor Graphics and Xilinx) will be used in the lab portion of the course. Prerequisite: CEG 560 or EE 651.
### 659 INTEGRATED CIRCUIT DESIGN SYNTHESIS WITH VHDL
(4 credit hours)
(Also listed as EE 659.) Application of VHSIC hardware description language (VHDL) to the design, analysis, multi-level simulation, and synthesis of digital integrated circuits. A commercial set of CAD tools (Mentor Graphics) will be used in the lab portion of the course. Prerequisite: CS 220, c programming or equivalent and CEG 260.

### 660 INTRODUCTION TO SOFTWARE ENGINEERING (4 credit hours)
Concepts of software engineering including analysis, design, and implementation of software engineering concepts that comprise structured programming and design. Case studies serve as examples illustrating the software life-cycle model. Prerequisite: CS 600.

### 661 OBJECT-ORIENTED PROGRAMMING AND DESIGN (4 credit hours)
Topics emphasize the core concepts of encapsulation, inheritance, polymorphism, and dynamic binding. Additional topics include class organization, software maintenance, and design of reusable components. Prerequisite: CEG 660.

### 663 PERSONAL SOFTWARE DEVELOPMENT PROCESS (4 credit hours)
Discusses software development as it relates to the individual. Software process measurement, design and code reviews, software quality measurement, design and design verification. Each student will participate in the development of a software project. 3 hours lecture, 2 hours lab. Prerequisite: CEG 660 or equivalent.

### 665 INTERACTIVE SYSTEMS MODELING, ANALYSIS, AND DESIGN (4 credit hours)
(Also listed as HFE 665.) Provides experience in interactive real-time simulation and design, implementation and evaluation of interfaces to simulations. The relevant topics are explored through application in supervisory control of complex, dynamic systems. Prerequisite: CEG 220 or any one of the following: CEG 221, CS 241, 242 or instructor permission.

### 668 MANAGING THE SOFTWARE DEVELOPMENT PROCESS (4 credit hours)
Discusses software development processes, models, and techniques necessary to successfully develop large-scale software and presents the Capability Maturity Model (CMM). Students will participate in the development of a software project. 3 hours lecture, 2 hours lab. Prerequisite: CEG 660.

### 676 COMPUTER GRAPHICS (4 credit hours)
Covers raster graphics algorithms, geometric primitives and their attributes, clipping, antialiasing, geometric transformations, structures and hierarchical models, input devices, and interactive techniques. Students develop interrelated programs to design a 3-D hierarchical model, manipulate, and view it. Prerequisite: CS 600, MTH 253 or 255.

### 677 COMPUTER GRAPHICS II (4 credit hours)
Continuation of CEG 676. Covers surface rendering, hidden line and surface removal, illumination models, texture mapping, color models, advanced modeling, and interface design. Students develop programs and a final project. Prerequisite: CEG 676.

### 678 CODING THEORY (3 credit hours)
(Also listed as MTH 656/EE 678.) Introduction to the essentials of error-correcting codes, the study of methods for efficient and accurate transfer of information. Topics include basic concepts, perfect and related codes, cyclic codes, and BCH codes. Prerequisite: MTH 253 or MTH 355 (or equivalent).

### 699 SELECTED TOPICS (1 to 5 credit hours)
Selected topics in computer engineering. Topics vary. May be taken for letter grade or pass/unsatisfactory.

### 700 PRINCIPLES OF INSTRUCTION IN COMPUTER ENGINEERING (3 credit hours)
Survey of available instructional materials and discussions of educational theory and techniques leading to more effective instruction. For graduate teaching assistants only.
702 ADVANCED COMPUTER NETWORKS (4 credit hours)
This course provides an in-depth examination of the fundamental concepts and principles in communications and computer networks. Topics include: queuing analysis, ATM, frame relay, performance analysis of routings, and flow and congestion controls. Prerequisite: CEG 602 and CEG 634.

720 COMPUTER ARCHITECTURE (4 credit hours)
Review of sequential computer architecture and study of parallel computers. Topics include memory hierarchy, reduced instruction set computer, pipeline processing, multiprocessing, various parallel computers, interconnection networks, and fault-tolerant computing. 3 hours lecture, 2 hours lab. Prerequisite: CEG 633; or CEG 520 and CEG 611.

724 COMPUTER VISION I (4 credit hours)
Study of the image formation process, binary images, edge detection and image segmentation, representation of 2-D and 3-D shapes, image features, image matching, object recognition, texture analysis, line-drawing interpretation, and model-based vision. Prerequisite: CS 600, MTH 230, 253.

725 COMPUTER VISION II (4 credit hours)
Study of stereo vision, shape from shading and photometric stereo, shape from texture, motion analysis and optical flow, camera calibration, projective geometry, geometric invariance, dynamic vision, analysis of multispectral images, analysis of volumetric images. Prerequisite: CEG 724.

728 INTRODUCTION TO OPTICAL COMPUTING (4 credit hours)
Introduction to optical computing algorithms and architecture, optical logic, optical computing modules, optical CPUs, memory, interconnection, and optical devices. Prerequisite: EE 628 or EE 522.

729 OPTICAL COMPUTER ARCHITECTURES (4 credit hours)
Optics provides for new high-performance architectures including hardware and software methodologies. Optical architectures considered include: sequential, dataflow, cellular, automatic, and neural networks. Prerequisite: CEG 720 or CEG 728.

730 DISTRIBUTED COMPUTING PRINCIPLES (4 credit hours)
Communicating sequential processes, clients and servers, remote procedure calls, stub generation, weak and strong semaphores, split-binary semaphores, and distributed termination. Example languages: [Sc sl [sl Linda V. 3 hours lecture, 2 hours lab. Prerequisite: CEG 634.

750 MICROPROCESSORS (4 credit hours)
Study of microprocessors and the use of microprocessors in digital systems. Fundamentals of microprocessor software, assembly-level programming for microprocessor applications, memory and interface considerations, and systems employing microprocessors. 3 hours lecture, 2 hours lab. Prerequisite: CEG 653.

751 MICROPROCESSORS II (4 credit hours)
Interaction of microprocessors and the outside world. Data acquisition and real-time control. Bus interfacing and direct memory access. Multiple processor environment and distributed processing. Small real-time operating systems. Project management. 3 hours lecture, 2 hours lab. Prerequisite: CEG 750.

752 VLSI SUBSYSTEM DESIGN (4 credit hours)
(Also listed as EE 752.) CMOS VLSI subsystems including data path operators, counters, multipliers, memory elements, and programmable logic arrays. VLSI circuits for FIR and IIR filters. VLSI circuits for digital data exchange systems. 3 hours lecture, 2 hours lab. Prerequisite: EE 654 or CEG 654.

753 VLSI DESIGN SYNTHESIS AND OPTIMIZATION (4 credit hours)
(Also listed as EE 753.) VLSI architectural-level synthesis and optimization including data-path synthesis, control-units synthesis, scheduling, and resource sharing. Logic-level synthesis and optimization including two-level and multi-level combinational logic optimization, and sequential logic optimization. 3 hours lecture, 2 hours lab. Prerequisite: EE 654 or CEG 654.

754 VLSI TESTING AND DESIGN FOR TESTABILITY (4 credit hours)
(Also listed as EE 754.) Design for testability of VLSI circuits. Topics include importance of testing, conventional test methods, built-in test, CAD tools for evaluation testability, test pattern generators, and compressors. Prerequisite: EE/CEG 654 or EE/CEG 752.
756 ROBOTICS I (4 credit hours)
(Also listed as EE 756 and ME 756.) Detailed study of the dynamics and control of robotic systems and robot programming languages and systems. Material covered includes rigid-body dynamics, linear, nonlinear, adaptive, and force control of manipulators; and robot programming languages. Prerequisite: CEG 656.

757 ROBOTICS II (4 credit hours)
An introduction to sensing, vision, and robot intelligence and task planning. Material covered includes sensors, low-level and higher level vision techniques, task planning including obstacle avoidance and artificial intelligence and expert systems as applied to robotic systems. Prerequisite: CEG 656.

758 CMOS ANALOG INTEGRATED CIRCUIT DESIGN (4 credit hours)
(Also listed as EE 758.) Introduction to techniques, limitations, and problems in the design of CMOS analog integrated circuits. Topics include CMOS analog circuit modeling and device characterization, analog CMOS subcircuits, CMOS amplifiers, comparators, CMOS Op Amps. 3 hours lecture, 2 hours lab. Prerequisite: EE 631 and EE 634.

759 ARTIFICIAL INTELLIGENCE IN ROBOTICS (4 credit hours)
Introduction to robot intelligence and task planning. Material includes obstacle avoidance, robot planning, robotics computations, neural network computing, robot learning, and expert systems. Prerequisite: CS 600.

760 ADVANCED SOFTWARE ENGINEERING (4 credit hours)
Introduction to software engineering. Fundamentals of problem specification, program design, verification, and evaluation are explored. Students participate in team projects to apply the methods introduced. Prerequisite: CEG 660.

763 FORMAL METHODS IN SOFTWARE ENGINEERING (4 credit hours)
Introduction to formal methods in the specification, design, construction, and verification of software systems. Discrete mathematics and logic for software engineering. Formal specification and design methods; design specification languages. Prerequisite: CEG 760.

770 COMPUTER ENGINEERING MATHEMATICS (4 credit hours)
Introduction to computer arithmetic algorithms, systems theory, linear and nonlinear programming, and optimization theory for computer engineering applications. In addition to mathematical theory, appropriate engineering applications are presented. Prerequisite: CEG 616, CS 600.

776 ADVANCE COMPUTER GRAPHICS (4 credit hours)
Covers curves, surfaces, solids, animation, motion specification, morphing, image-based rendering, and volume visualization. Students develop three programs and a final project on geometric modeling and animation. Prerequisite: CEG 476/676.

790 SELECTED TOPICS IN COMPUTER ENGINEERING (4 credit hours)
Lectures on and study of selected topics in current research and recent developments in computer engineering. May be taken for letter grade or pass/unsatisfactory. Titles vary.

795 INDEPENDENT STUDY (1 to 4 credit hours)
Special problems in advanced computer engineering topics. Graded pass/unsatisfactory.

799 THESIS (1 to 8 credit hours)
Grade pass/unsatisfactory.

820 COMPUTER ARCHITECTURE II (4 credit hours)
Study of parallel architectures and parallel processing. Topics include multiprocessors, cache coherence, synchronization mechanisms, scalable architectures, and vectorization and parallelization. Prerequisite: CEG 720.

830 DISTRIBUTED COMPUTING SYSTEMS (4 credit hours)
Example languages and packages: SR and PVM, file servers, semantics of file sharing, caches and replication, log-structured file systems, remote evaluation, process migration, mobile projects, checkpointing and rollback-recovery. Prerequisite: CEG 730.

860 OBJECT-ORIENTED PROGRAMMING (4 credit hours)
Course covers data abstraction, overloading, polymorphism, inheritance binding, delegation and prototypes, and languages such as C++, Ada 95, Eiffel, and Self from a software engineering point of view. Prerequisite: CEG 760.
**890 SELECTED TOPICS (1 to 4 credit hours)**
Selected topics in computer science and engineering.

**892 Ph.D. QUALIFYING EXAM (1 to 8 credit hours)**
Examination that tests understanding of the fundamentals necessary to begin concentrated study in a chosen Ph.D. research area. Composed of written tests and an oral exam. Must be passed within two attempts. Graded pass/unsatisfactory.

**894 CANDIDACY EXAM (1 credit hour)**
Examination that tests for depth and understanding in a chosen computer science and computer engineering research area. Includes a written proposal for a Ph.D. topic and an oral examination that is open to the public. Graded pass/unsatisfactory.

**895 INDEPENDENT STUDY (1 to 8 credit hours)**
Independent study in a chosen area for Ph.D. research. Graded pass/unsatisfactory.

**896 DISSERTATION DEFENSE (1 credit hour)**
Examination on the Ph.D. dissertation. The written dissertation is submitted and must be successfully defended in the oral exam conducted by the dissertation committee. Graded pass/unsatisfactory.

**897 RESIDENCY RESEARCH (1 to 12 credit hours)**

**898 DISSERTATION RESEARCH (1 to 12 credit hours)**

**Chemistry/CHM**

**Note:** See quarterly class schedule or departmental advisor for further enrollment restrictions, requirements, or special course information.

**502 ENVIRONMENTAL CHEMISTRY (4 credit hours)**
Students study water, air, and soil chemistry, including pollutants added to these environments and how they interact to create environmental problems. 3 hours lecture, 3 hours lab. Prerequisite: CHM 123 or 193.

**512 QUANTITATIVE ANALYSIS (3 credit hours)**
Introduction to chemical methods of analysis covering traditional as well as modern techniques and equipment; emphasis on calculations and interpretation of analytical data. Prerequisite: CHM 123. Corequisite: CHM 514.

**520 INORGANIC CHEMISTRY I (3 credit hours)**
Principles and concepts of inorganic chemistry, including the periodic table, atomic structure, bonding, coordination compounds, and an introduction to group theory. Prerequisite: CHM 453 or consent of instructor.

**521 INORGANIC CHEMISTRY (3 credit hours)**
A thorough examination of the chemistry of the metals stressing the transition elements, ligand field theory and mechanisms of inorganic reactions. Prerequisite: CHM 520 or consent of instructor.

**525 ADVANCED INORGANIC SYNTHESIS AND CHARACTERIZATION (3 credit hours)**
Advanced synthesis and characterization of representative inorganic compounds, 1 hour lecture, 4 hour lab. Prerequisite: CHM 417, 420 or permission of instructor.

**535 INSTRUMENTAL ANALYSIS (3 credit hours)**
Introduction to the theory and practice of modern chemical instrumentation. Topics include elementary electronics, spectrophotometry, atomic absorption, electrochemical techniques, chromatography, and other instrumental techniques. Prerequisite: CHM 452, 312. Corequisite: CHM 536.

**545 ADVANCED ORGANIC SYNTHESIS AND CHARACTERIZATION (3 credit hours)**
Advanced synthesis and identification of organic compounds. 1 hour lecture, 4 hours lab. Prerequisite: CHM 213, 217, 417.

**551 PHYSICAL CHEMISTRY (3 credit hours)**
Theoretical aspects of chemistry including thermodynamics, chemical kinetics, molecular structure and spectra, and the structure of solids and liquids. Prerequisite: CHM 123, MTH 231, and PHY 242 or 113, or permission of instructor.
552 PHYSICAL CHEMISTRY (3 credit hours)
Theoretical aspects of chemistry including thermodynamics, chemical kinetics, molecular structure and spectra, and the structure of solids and liquids. Prerequisite: CHM 551, or permission of instructor.

553 PHYSICAL CHEMISTRY (3 credit hours)
Theoretical aspects of chemistry including thermodynamics, chemical kinetics, molecular structure and spectra, and the structure of solids and liquids. Prerequisite: CHM 552, or permission of instructor.

556 PHYSICAL CHEMISTRY FOR NONCHEMISTS (4 credit hours)
An introduction for nonchemistry majors to the ideas of physical chemistry, including thermodynamics, properties of liquids and solids, solution properties, and kinetics. Intended for biologists, geologists, physicists, premedical students and others with an interest in physical chemistry. Prerequisite: one year each of college chemistry and physics, at least one quarter of calculus.

561 THE ORGANIC CHEMISTRY OF ENGINEERING MATERIALS (4 credit hours)
Molecular structure, stereochemistry, properties, and reactivities of selected organic substances of industrial importance including fuels, lubricants, solvents, coatings, plastics, dyes, and naturally occurring engineering materials. Prerequisite: CHM 122.

602 ADVANCED ENVIRONMENTAL CHEMISTRY AND ANALYSIS (4 credit hours)
Environmental sampling and analysis using instrumental techniques. Chemical fate prediction by measurement and examination of physical and chemical properties. 3 hours lecture, 3 hours lab. Prerequisite: CHM 312/314 and chm213, or permission of instructor.

610 ENVIRONMENTAL CHEMISTRY I: AIR (4 credit hours)
A study of the earth's atmosphere including its normal composition and atmospheric reactions with emphasis on the nature, causes, effects, detection, and abatement of various types of air pollution. 2 lectures and lab or field project. Prerequisite: CHM 213, 312; or permission of instructor.

611 ENVIRONMENTAL CHEMISTRY II: WATER (4 credit hours)
A study of the earth's fresh and saline water including its normal composition and aquatic reactions with emphasis on the nature, causes, effects, detection, and abatement of various types of water pollution. 2 lectures and lab or field project. Prerequisite: CHM 213, 312; or permission of instructor.

612 ENVIRONMENTAL CHEMISTRY III: SOLIDS (4 credit hours)
Study of the problems of solid wastes, pesticides, food additives, and radioactive materials, including their chemical composition, effects, detection, disposal, and natural breakdown. 2 hours lecture, 3 hours lab or field project. Prerequisite: CHM 213 and 312, or permission of instructor.

617 APPLIED CHEMICAL SPECTROSCOPY (3 credit hours)
Practical applications of various spectrophotometric techniques (mass spectroscopy, infrared spectroscopy, ultraviolet spectroscopy, and nuclear magnetic resonance) are integrated for the explanation of the structure of organic molecules. A problem-solving approach is used. Prerequisite: CHM 213, 312, 452 or permission of instructor.

637 ELECTROANALYTICAL CHEMISTRY
Fundamental principles of electrochemistry and the application of electrochemical methods to chemistry and chemical analysis.

640 SYNTHETIC MEDICINAL CHEMISTRY I (3 credit hours)
Various chemical aspects of drugs including the synthetic design, mode of action, and uses of various pharmaceuticals. Topics include cardiovascular agents, antibiotics, antitumor agents, and central nervous system drugs. Prerequisite: CHM 213.

641 SYNTHETIC MEDICINAL CHEMISTRY II (3 credit hours)
The detailed description of conformers, geometrical and optical isomers and their effects on molecular stability and reaction mechanisms. Prerequisite: CHM 213.

643 CHEMICAL TOXICOLOGY I: DRUGS (3 credit hours)
Study of the basic principles of chemical toxicology. Chemicals that have the greatest incidence of abuse are discussed in more detail with regard to their chemical-biological interactions, symptomatology of toxicity, clinical chemistry tests, and treatment. Prerequisite: CHM 213 and CHM 312.
644 CHEMICAL TOXICOLOGY II: ENVIRONMENTAL (3 credit hours)
A study of the basic principles of chemical toxicology. Chemicals which have the greatest incidence of abuse are discussed in more detail with regard to their chemical-biological interactions, symptomatology of toxicity, clinical chemistry tests and treatment. Prerequisite: CHM 213 and 312.

645 CONCEPTS IN CHEMISTRY I (4.5 credit hours)
(also listed as CHM 246) Basic fundamental concerns of chemistry for early childhood education majors. Those concrete observable topics most appropriate for early childhood education minors will be emphasized. Course includes an in-depth study of heat and temperature.

661 SYNTHETIC POLYMER CHEMISTRY (3 credit hours)
(Also listed as BMS 726.) Step-growth and chain-growth polymerization in homogeneous and heterogeneous media. Properties of commercial polymers. Prerequisite: CHM 213 and 451; or CHM 361; or permission of instructor.

665 PHYSICAL POLYMER CHEMISTRY (3 credit hours)
(Also listed as BMS 725.) Introduction to the structural and physical aspects of macromolecules; emphasis on the relationship of polymer structure to physical and mechanical properties. Prerequisite: CHM 213 and 451; or 361; or permission of instructor. Corequisite: CHM 667.

667 PHYSICAL POLYMER CHEMISTRY LAB (1 to 2 credit hours)
(Also listed as BMS 727.) Laboratory illustrations of CHM 665 lecture material and techniques of polymer science. Corequisite: CHM 665.

668 POLYMER SYNTHESIS LABORATORY (1 to 2 credit hours)
Laboratory illustrations of CHM 661 lecture material and techniques of polymer science. Prerequisite or corequisite: CHM 661.

669 ENGINEERING PLASTICS: MATERIALS, PROCESSES, AND DESIGN (4 credit hours)
(Also listed as ME 689.) Properties and manufacturing processes of engineering plastics and the effect of these factors on plastics design. Illustrative laboratory projects are included. 2 hours lecture, 4 hours lab. Prerequisite: CHM 665.

679 MATERIALS CORROSION (4 credit hours)
A survey of principles of corrosion processes with application to metallic and non-metallic materials. Principles of electrochemistry are included. Prerequisite: ME 515 and ME 571 or corequisite CHM 513, or permission of the instructor.

698 CHEMISTRY FOR EDUCATION MAJORS
Selected topics in chemical education. Directed readings or one-time offerings of topics related to the teaching of chemistry at various levels using different pedagogical approaches. May include summer workshops or institutes.

700 PRINCIPLES OF INSTRUCTION IN CHEMISTRY (3 credit hours)
Survey of available instructional materials and discussion of educational theory and techniques leading to more effective instruction. For chemistry majors only.

720 ADVANCED INORGANIC CHEMISTRY I (3 credit hours)
(Also listed as BMS 733.) Study of the modern theories of valence, structural inorganic chemistry, and the chemistry of nonmetals. Prerequisite: CHM 453, its equivalent, or consent of instructor.

721 ADVANCED INORGANIC CHEMISTRY II (3 credit hours)
(Also listed as BMS 734.) Thorough examination of the chemistry of metals stressing the transition elements, ligand field theory, and mechanisms of inorganic reactions. Prerequisite: CHM 720, its equivalent, or consent of instructor.

722 ADVANCED INORGANIC CHEMISTRY III (3 credit hours)
(Also listed as BMS 735.) Survey of the applications of physical methods in the examination of inorganic compounds. Prerequisite: CHM 721, its equivalent, or consent of instructor.

730 INSTRUMENTATION (3 credit hours)
Introduction to the theory and practice of modern chemical instrumentation: elementary electronics, spectrophotometry, atomic absorption, electrochemical techniques, chromatography, and other instrumental techniques. Prerequisite: CHM 453 and 312 or its equivalent, or consent of instructor.
735 SELECTED TOPICS IN ANALYTICAL CHEMISTRY (3 credit hours)
A selected topic in the field of analytical chemistry such as chromatography,
electroanalytical chemistry such as trace analysis, bioanalytical chemistry, advanced instrumental analysis, analytical spectroscopy, or separation methodology.

742 STRUCTURAL CONCEPTS IN ORGANIC CHEMISTRY (3 credit hours)
Study of molecular orbital theory, reactive species, theories of acids and bases, and an introduction to stereochemistry. Prerequisite: CHM 741, its equivalent, or consent of instructor.

744 STRUCTURAL CONCEPTS IN ORGANIC CHEMISTRY (3 credit hours)
(previously listed as CHM 742) Study of molecular orbital theory, reactive species, theories of acids and bases, and an introduction to stereochemistry. Prerequisite: CHM 213 or equivalent, or permission of instructor.

746 ELEMENTS OF ORGANIC CHEMISTRY (3 credit hours)
(previously listed as CHM 740) Discussion of the more important organic reactions including their scope, limitations, and mechanisms. Prerequisite: CHM 744 or equivalent, or permission of instructor.

748 SYNTHETIC ORGANIC REACTIONS (3 credit hours)
(previously listed as CHM 741) Systematic treatment of organic reactions including, where applicable, some theoretical basis for the nature of the reaction. Emphasis on the uses of these reactions in organic synthesis. Prerequisite: CHM 746 or equivalent, or permission of instructor.

750 INTRODUCTION TO QUANTUM CHEMISTRY (3 credit hours)
Introduction to the ideas and mathematical techniques of quantum theory, including applications to some simple chemical systems. Prerequisite: CHM 453, its equivalent, or consent of instructor.

751 CHEMICAL KINETICS (3 credit hours)
(Also listed as BMS 736) Characterization of simple kinetic systems, experimental methods, energy distributions in molecules, the transition state method, and chain reactions in solution. Prerequisite: CHM 453, its equivalent, or consent of instructor.

752 THERMODYNAMICS (3 credit hours)
Fundamentals of chemical thermodynamics; first, second, and third laws; applications to solutions. Prerequisite: CHM 453, its equivalent, or consent of instructor.

760 CHEMICAL EQUILIBRIUM AND CHEMICAL MEASUREMENT (3 credit hours)
An in depth treatment of ionic equilibria. Topics include pertinent mathematical operations used in equilibrium calculations. Chemical systems discussed will include strong and weak acids and bases, polyprotic as well as monoprotic acids and bases, precipitation complex formation and oxidation-reduction equilibria. Prerequisite: CHM 312 or consent of instructor.

761 ADVANCED ANALYTICAL CHEMISTRY (3 credit hours)
Survey of the more popular and useful modern analytical methods. Topics include separation techniques, selective ion electrodes, spectroscopy, electrochemistry, mathematical techniques of data optimization, methods of sample preparation, precipitate formation, and organic analytical reagents. Prerequisite: CHM 313 or permission of instructor.

762 CURRENT TOPICS IN MASS SPECTROMETRY
Current topics in mass spectrometry are discussed with emphasis on theory and state-of-the-art instrumentation and ionization methods.

825 SELECTED TOPICS IN INORGANIC CHEMISTRY (3 credit hours)
A quarter course on a selected topic in the field of inorganic chemistry, such as the reactions of substances in nonaqueous solvents, metal chelate compounds, inorganic reaction mechanisms, ligand field theory, or the chemistry of the lanthanides and actinides.

830 NUCLEAR AND ELECTRON MAGNETIC RESONANCE SPECTROSCOPY (3 credit hours)
An examination of the theories and practices of N.M.R. and E.P.R. including examples of their applications to structural and kinetic studies of both organic and inorganic molecules.
842 ORGANIC CHEMISTRY OF HIGH POLYMERS (3 credit hours)
The chemistry and properties of high polymers including the organic chemistry of their preparation and the kinetics of polymerization. Prerequisite: CHM 740, its equivalent, or consent of instructor.

845 SELECTED TOPICS OF ORGANIC CHEMISTRY (3 credit hours)
A selected topic in the field of organic chemistry, such as organic spectroscopy, heterocyclic chemistry, organometallic chemistry, and the chemistry of natural products.

850 QUANTUM CHEMISTRY (3 credit hours)
Principles and applications of quantum theory to chemical problems. Electronic structure of molecules and its correlation with the chemical and physical properties of substances. Prerequisite: CHM 750, its equivalent, or consent of instructor.

851 STATISTICAL THERMODYNAMICS (3 credit hours)
Definition of partition function; translational, rotational, vibrational, and electronic partition functions and their calculation and application to thermodynamic problems. Calculation of thermodynamic functions from spectroscopic information. Prerequisite: CHM 752, its equivalent, or consent of instructor.

853 GROUP THEORY (3 credit hours)
Introduction to group theory stressing its application in the areas of hybridization schemes, molecular orbitals, ligand field theory, and spectroscopy. Prerequisite: CHM 750, its equivalent, or consent of instructor.

855 SELECTED TOPICS IN PHYSICAL CHEMISTRY (3 credit hours)
(Also listed as BMS 738) A selected topic in the field of physical chemistry such as molecular spectroscopy, advanced molecular structure, magnetic resonance, X-rays, crystal structure, statistical mechanics, and precision physical-chemical measurements.

899 RESEARCH (1 to 18 credit hours)
Research for the thesis.

Classics/CLS
Note: See quarterly class schedule or departmental advisor for further enrollment restrictions, requirements, or special course information.

530 STUDIES IN ANCIENT LITERATURE (4 credit hours)
Course offers a variety of topics including drama, epic, and lyric poetry, prose, selected themes in ancient literature, and literary criticism.

540 STUDIES IN ANCIENT ART AND ARCHAEOLOGY (4 credit hours)
(Also listed as ART 611) Greece in the Bronze Age, classical Greece and Rome, and selected areas of Greek and Roman art and archaeology.

550 STUDIES IN ANCIENT CULTURE AND SOCIETY (4 credit hours)
Greek and Roman civilization with evidence from art, literature, archaeology, law, and other sources.

560 STUDIES IN ANCIENT MYTHOLOGY (4 credit hours)
Greek and Roman mythology; aspects and approaches to the study of myth; archaeological and nonliterary sources.

570 STUDIES IN ANCIENT LAW, GOVERNMENT, AND POLITICS (4 credit hours)
Political problems of the ancient world; law and legal systems; and government and administration.

Community Medicine and Health/CMH
Note: See quarterly class schedule or departmental advisor for further enrollment restrictions, requirements, or special course information.

601 BIOSTATISTICS I (3 credit hours)
Presents basic statistical measures with emphasis on biomedical problems. Includes sampling techniques, making valid inferences and estimations, and testing hypotheses. Practice in use of calculations and preparation of data for machine analysis.

602 BIOSTATISTICS II (3 credit hours)
Studies advanced statistical methods for analysis of variance, multiple regression, survey methods, design of experimental investigations, vital statistics, bioassays, and sequential analysis. Prerequisite: cmh 601.
621 EPIDEMIOLOGY I (3 credit hours)
Nature of epidemiological studies; descriptive epidemiology; experimental and observational investigations; cross-sections; prospective and retrospective studies; mortality and morbidity measurements and factors affecting comparison; life tables; and introduction to demographic measurements.

622 EPIDEMIOLOGY II (3 credit hours)
Advanced techniques of epidemiological investigation. Epidemiology of specific chronic diseases such as cancer, diabetes, and cardiovascular and mental disorders. Introduction to environmental and occupational epidemiology. Students prepare research protocol on a given specific problem. Prerequisite: Epidemiology I.

641 ENVIRONMENTAL MEDICINE I
(3 credit hours)
Interaction of humans with special environments. Section one is an intensive study of respiration, the cardiovascular system, and the physics and physiology of gaseous environments. Prerequisite: human physiology, biochemistry.

642 ENVIRONMENTAL MEDICINE II
(3 credit hours)
Interaction of humans with special environments. Section two covers mineral, chemical, and drug metabolism; function of sensory systems; and the physics and physiological stresses of heat and cold, sound, and electromagnetic and ionizing radiation. Prerequisite: human physiology, biochemistry.

643 ENVIRONMENTAL MEDICINE III
(3 credit hours)
Interaction of humans with special environments. Section three studies effects of dynamic forces, biomechanics of the body, physiology of physical exercises, and engineering machines to improve human performance. Prerequisite: human physiology, biochemistry.

651 AEROSPACE MEDICINE I
(2 credit hours)
General review, discussions of research projects, guest presentations, and selected advanced topics dealing with aerospace medicine, occupational medicine, and public health. Presentation and discussion of problem clinical cases related to aerospace medicine.

652 AEROSPACE MEDICINE II
(2 credit hours)
Covers civil pilot medical case histories including presentation of the medical condition that the pilot experienced, the implications by medical certification, and the proper steps in denying or certifying the pilot. M.D. degree required. May be taken for letter grade or pass/unsatisfactory. Prerequisite: cme 651.

654 INTRODUCTION TO COMMUNITY MEDICINE
(2 credit hours)
Familiarization with activities and services encompassed by community medicine, including public health, preventive medicine, occupational medicine, geriatric health, handicapped services, and health promotion. May be taken for letter grade or pass/unsatisfactory.

655 HYPERBARIC MEDICINE
(3 credit hours)
Mechanisms of hyperbaric oxygen therapy, equipment, safety considerations, and limitations. Conditions particularly amenable to this therapy are explored: decompression sickness, air embolism, gas gangrene, CO poisoning, and elective indications. May be taken for letter grade or pass/unsatisfactory.

656 CLINICAL AEROSPACE MEDICINE
(4 credit hours)
Introduction to and familiarization with clinical activities and operational experiences in Aeromedical Services (Flight Medicine, Occupational Medicine, Environmental Health, Bioenvironmental Surveillance, and Physiological Training). Enrollment in Aerospace Medicine Residency program or department approval required.

671 PRINCIPLES OF OCCUPATIONAL HEALTH
(3 credit hours)
Presents the medical department in industry: its role, functions, administration, physical facilities, personnel, equipment, records, costs, benefits, intramural relationships and extramural relationships with professional societies, official agencies, organized labor, and paramedical occupations.

672 CLINICAL OCCUPATION HEALTH
(3 credit hours)
Principles of physical examination and diagnosis are applied to selection, placement, and return to work of industrial employees. Surveys of a variety of work environments are conducted with emphasis on potential health hazards. Course includes field experience.
700 AEROMEDICAL ASPECTS OF AEROSPACE ACCIDENTS (4 credit hours)
Overview of aerospace accident investigation procedures, concerned regulations, and interdisciplinary management from an aeromedical perspective. Selected advanced topics include the analyses of relevant aerospace accident reports, post-crash survivability, and future directions.

701 SPECIAL SEMINARS IN AEROSPACE MEDICINE (3 credit hours)
Provides the philosophy underlying each major aerospace medicine standard. It also explores the aerospace medical factors that convert safe flight into hazardous flight. M.D. degree and departmental approval required. May be taken for letter grade or pass/unsatisfactory.

721 AEROMED CONAND OP FLT ENVIR (3 credit hours)
Builds on the basics of the aeromedical concerns to advance the understanding of the relevant aeromedical aspects related to the operational flight environment. Practical experiences in the hypobaric chamber, acceleration, and life support facilities supplement course work.

731 HEALTH SERVICES ADMINISTRATION (3 to 5 credit hours)
(Also listed as MGT 755) Overview of total health care system including public and private institutions and agencies, federal and state regulations, and methods of financing. Directed study of major contemporary forces affecting the health care delivery system. Class includes seminars and on-site experiences. Prerequisite: MGT 621.

899 AEROSPACE MEDICAL RESEARCH (3 credit hours)
Under supervision of an advisor, students choose research problems, prepare bibliographical searches, plan experimental protocol, and conduct experimentation. A full report, constituting a thesis, is written and defended before a graduate committee.

Counseling/CNL
Note: See quarterly class schedule or departmental advisor for further enrollment restrictions, requirements, or special course information.

661 PRINCIPLES OF COUNSELING (4 credit hours)
Overview of major counseling theories and techniques and review of historical foundations of the mental health movement. Social, psychological, and philosophical influences are considered.

662 PROBLEMS IN STUDENT PERSONALITY AND DEVELOPMENT (4 credit hours)
Considers physical, psychological, and personality development of students in terms of the interrelationship of these factors and their effects on student functioning. Family, school, and other social-psychological environments are studied in terms of their effect on behavior.

663 MENTAL HEALTH I (4 credit hours)
Factors influencing the behavior of individuals; methods a counselor may use in observing, analyzing, and improving attitudes and behavior.

664 CRISIS INTERVENTION COUNSELING (1 to 4 credit hours)
Introduces students to the background, theory, practice, and needs of crisis intervention within the helping professions. A variety of crisis intervention models are explored, as are the various community resources available to the crisis intervention worker. Graduate standing required. Prerequisite: CNL 461 or RHB 701 or consent of instructor.

667 GROUP BACKGROUND AND THEORY (4 credit hours)
Surveys the background, theory, patterns of function, techniques of facilitating, and the uses of small groups in counseling. Prerequisite or corequisite: RHB 701.

670 COUNSELING WORKSHOP (1 to 6 credit hours)
Selected topics in the human services area on a workshop or a one-time class basis are considered. Topics and titles vary.
700 INTRODUCTION TO STUDENT AFFAIRS IN HIGHER EDUCATION (4 credit hours)
(Also listed as EDL 760.) Overview of the history, philosophy, organization, and
structure of student personnel services. Various student affairs functions, current and
future trends, and issues in student affairs are considered.

751 COUNSELING SKILLS FOR EDUCATORS (3 credit hours)
Assists teachers in developing an understanding of the counseling needs of
children. Teachers develop counseling skills needed to assist students in the classroom.
Appropriate referrals to other school professionals are discussed.

755 CAMPUS ECOLOGY (4 credit hours)
(Also listed as EDL 763.) Studies of campus ecology and the changing demography and
devolutional issues facing college students. Studies the impact of the college
environment on student development and student interaction on the environment.

761 PSYCHOMETRICS (4 credit hours)
Surveys psychological tests and measurements with emphasis on attitude,
interest, and personality tests. Understanding of basic principles and their applications
to counseling are stressed. Prerequisite: ED 751.

762 CAREER DEVELOPMENT AND INFORMATION SERVICES (4 credit hours)
Presents career development as a series of vocational/avocational choices in the process
of self-realization and considers the effect of rapid social and technological change on this
process. Prerequisite: RHB 701.

763 THEORIES OF COUNSELING (4 credit hours)
Investigation of the theoretical models that are basic to counseling function and practice
as applied to the therapeutic situation.

765 PUPIL PERSONNEL SERVICES IN THE SCHOOL AND COMMUNITY RESOURCES (4 credit hours)
Prvides theoretical aspects concerning the organization and administration of guidance services;
practical application of principles to schools and other organizations. Surveys
social agencies, both public and private, that counselors should be familiar with.
An analysis of the referral process and the methods of interagency cooperation.

766 OCCUPATIONAL AND EDUCATIONAL INFORMATION (3 credit hours)
Considers the development of an educational/occupational library for students;
the classification of the world of work and its implications for vocational counselors; the
evaluation of vocational and scholarship materials; and the use of occupational data
in career counseling.

767 GROUP PROCESSES IN COUNSELING AND GUIDANCE (4 credit hours)
Serves as an introduction to group counseling practice. Considers interaction
patterns and dynamics within small groups, and focuses on understanding of individual
and group behavior as they relate to the individuals taking the course. Evaluation
and research of group processes are also considered. May be taken for letter grade
or pass/unsatisfactory.

768 COMMUNITY RESOURCES IN COUNSELING AND GUIDANCE (3 credit hours)
Surveys social agencies, both public and private, that counselors should be familiar
with. An analysis of the referral process and the methods of interagency cooperation
and actual on-the-site visitation. Voids in services and areas of unmet human needs are
outlined, and the methods of social action essential to changing old agencies are
developed.

769 TECHNIQUES OF CHILD COUNSELING (4 credit hours)
Stresses the theories and techniques of counseling children. Discusses the
differences between counseling with adults and counseling with children. Specific
aspects considered are role and function of a child counselor, group and individual
counseling with children, vocational information for children, scholastic and
personality testing of children, and treatment methodology (including play therapy, family
counseling, and teacher collaboration). Prerequisite: RHB 701.

770 INDEPENDENT STUDY AND MINOR PROBLEMS (1 to 3 credit hours)
Planned reading and/or project under the guidance of a counselor education program
faculty member. May be taken for a letter grade or pass/unsatisfactory.
773 MENTAL HEALTH II (4 credit hours)
Acquaints students with preventive mental health, advocacy roles, legal and ethical issues, and interdisciplinary approaches to community mental health.

778 TECHNIQUES OF PLAY THERAPY (4 credit hours)
Investigation of the techniques of play therapy for children ages 3 to 12. An advanced seminar for students interested in individual and group play and its therapeutic implications for schools and agencies.
Prerequisite: ED 863, consent of instructor.

779 MARRIAGE AND FAMILY COUNSELING (4 credit hours)
Considers principles and techniques of marriage and family counseling from a variety of theoretical orientations. Laboratory and/or field experience may be required.
Prerequisite: RHB 701.

780 SYSTEMS THEORY AND FAMILY COUNSELING (4 credit hours)
Introduces family systems counseling. Covers three interacting components: systems theory, Buckley's sociocultural analysis of systems theory, and the application of a systems analysis to the major views of family counseling.
Prerequisite: RHB 701, CNL 863, CNL 779 or instructor permission.

781 ADVANCED TECHNIQUES OF FAMILY COUNSELING (4 credit hours)
Advanced technique and intervention course that focuses on family systems interventions. Emphasis on applications of family counseling, providing in-depth treatment of the major approaches to family counseling.
Prerequisite: RHB 701, CNL 863, CNL 779, CNL 780 or instructor permission.

782 TECHNIQUES OF MARITAL COUNSELING (4 credit hours)
In-depth overview of marital counseling. Focuses on techniques and interventions that emphasize the application of the major schools of marital counseling. Course is experientially and performance focused; student participation is encouraged and expected in a variety of role-playing situations.
Prerequisite: CNL 780, 779, RHB 701, CNL 863 or with instructor permission.

854 INTELLECTUAL ASSESSMENT FOR SCHOOL PSYCHOLOGISTS (4 credit hours)
Introduction to theoretical aspects of individual intelligence testing. Supervised clinical practice in the administration of the Stanford-Binet-R and the Wechsler intelligence scales. For school psychology majors only.

855 INDIVIDUAL ASSESSMENT OF EXCEPTIONAL CHILDREN AND YOUTH (4 credit hours)
Supervised clinical practice in the administration of standardized and criterion-referenced tests used in the assessment of various exceptional populations, birth to adulthood. For school psychology majors only. Prerequisite: CNL 854 or permission of the instructor.

856 INDIVIDUAL ASSESSMENT OF BEHAVIOR AND PERSONALITY DISORDERS (4 credit hours)
Introduction to the characteristics of children with behavior and personality disorders. Supervised clinical practice in the application of behavioral management techniques and selected projective tests. For school psychology majors only. Prerequisite: CNL 854 and permission of the instructor.

857 PRACTICUM IN SCH PSY (4 credit hours)
Application of assessment, consultation, and team planning skills in a school setting under the supervision of a certified school psychologist.

860 ADV SEMINAR IN COUNSELING (1 to 6 credit hours)
Provides an opportunity for students to further develop skills in counseling, appraisal, research, or other related areas under faculty direction.

861 INDIVIDUAL INTELLIGENCE TESTING I (3 credit hours)
Focuses upon theories and techniques of individual intellectual appraisal. The student learns to administer, score, and interpret the Stanford-Binet Intelligence Scale. Form L-M for individuals of varying age levels.
Prerequisite: RHB 705.
862 INDIVIDUAL INTELLIGENCE TESTING II (3 credit hours)
Focuses upon the Wechsler Intelligence Scale for Children and the Wechsler Adult Intelligence Scale. The student studies the background and learns to administer, score, and interpret the Wechsler tests for individuals of varying ages.

864 PRACTICUM I: INDIVIDUAL (1 to 4 credit hours)
Provides an experience in counseling and guidance in which students, under supervision, actually counsel individuals in educational, vocational, and personal areas. Graded pass/unsatisfactory.

865 INDIVIDUAL AND GROUP PRACTICUM (4 credit hours)
Provides an experience in counseling and guidance in which students, under supervision, actually counsel individuals in educational, vocational, and personal areas. Graded pass/unsatisfactory. Prerequisite: CNL 863, 860 and/or permission of department.

866 ADVANCED INDIVIDUAL AND GROUP PRACTICUM (4 credit hours)
Provides an experience in counseling and guidance in which students, under supervision, actually counsel individuals and groups in educational, vocational, and personal areas. Graded pass/unsatisfactory. Prerequisite: CNL 865, 866 or RHB 801, 802 or permission of instructor.

867 INTERNSHIP: (1 to 12 credit hours)
This field-based experience provides human services master’s degree students with advanced clinical practice and supervision in their major specialty areas. Graded pass/unsatisfactory. Prerequisite: CNL 865, 866 or RHB 801, 802 or permission of instructor.

868 THE ROLE AND FUNCTION OF THE SCHOOL PSYCHOLOGIST (1 to 4 credit hours)
Overview of the school psychologist’s role and function. Considers the history and ethical and legal issues of the profession. Emphasizes the consultation, teaming, assessment, in-service, and counseling aspects of the role. Course is taken concurrently with the assessment sequence and internship in the school psychology program.

869 STUDENT AFFAIRS ADMINISTRATION IN HIGHER EDUCATION (4 credit hours)
(Also listed as EDL 762.) Surveys student personnel services in colleges and universities. Consideration is given to the organization, administration, and rationale of these services. Prerequisite: CNL 700.

870 PRAC STU PERS SER HI ED (4 credit hours)
Provides opportunity to work in an area of student personnel services under supervision. Includes weekly seminar. Graded pass/unsatisfactory.

871 INTERN STU PERS SER H ED (1 to 12 credit hours)
This field-based experience provides human services master’s degree students with advanced training, supervision, and experience in student personnel services in higher education.

880 PROCESS CONSULTATION IN STUDENT AFFAIRS IN HIGHER EDUCATION (4 credit hours)
(Also listed as EDL 764.) Studies theories, models, and process techniques for collaborative consultation with other university personnel, student organizations, and community agencies. Focuses on a systems approach of consultative interaction and collaborative relationships that foster college students’ development. Prerequisite: CNL 700, CNL 863, CNL 870, EDL 869.

950 PERSONALITY THEORY AND PSYCHOPATHOLOGY (4 credit hours)
Focuses on the development of personality throughout the life span and associated difficulties that can occur for individuals. Additional emphasis will be given to adaptation and the coping process. Prerequisite: masters degree in counseling.

951 CLINICAL ASSESSMENT IN COUNSELING PRACTICE (4 credit hours)
Supervised clinical practice in the administration of mental health assessment instruments. Emphasizes advanced methods of administering and interpreting standardized tests. Includes use of assessment procedures in diagnosis and treatment planning. Prerequisite: masters degree in counseling.
952 DIAGNOSIS AND CLINICAL COUNSELING PRACTICE (4 credit hours)
Clinical course designed to introduce students to comprehensive diagnostic evaluation. Students gain familiarity with the Current Diagnostic and Statistical Manual and International Classification of Disease via lecture as well as case formulations. Prerequisite: masters degree in counseling.

953 CASE FORMULATION AND CLINICAL INTERVENTION (4 credit hours)
Focuses on treatment planning for clients. A variety of different treatment approaches will be discussed for DSM III-R disorders, syndromes, and other client problems. Prerequisite: masters degree in counseling.

954 INTERNSHIP: ADVANCED CLINICAL COUNSELING (1 to 6 credit hours)
This field-based experience provides practicing master's level counselors with the opportunity for supervised advanced clinical counseling practice. Prerequisite: masters degree in counseling.

960 ADVANCED INSTITUTE FOR HUMAN SERVICES PERSONNEL (1 to 4 credit hours)
Individual and group study of current problems and issues for counselors. Also provides a focus on the development of new skills related to counseling interventions. Topics might include professional ethics and responsibilities, crisis intervention and human sexuality. Topics vary.

961 COUNSELING THE GIFTED (3 credit hours)
Overviews the special social/emotional needs of gifted children and youth. Focuses on techniques to help gifted children experience their emotions, and to develop awareness and understanding of themselves. Prerequisite: ED 722 or permission of instructor.

971 COUNSELING FOR LIFE-SPAN DEVELOPMENT (4 credit hours)
Developmental factors influencing the behavior of individuals across the life-span and the unique counseling strategies that are employed with clients in the human services at different points on the life-span continuum. Prerequisite: RHB 701, CNL 863, ED 751.

972 LEGAL, PROFESSIONAL, AND ETHICAL ISSUES IN THE HUMAN SERVICES (4 credit hours)
Surveys the various legal, professional, and ethical concerns most often encountered by human service providers. Prerequisite: RHB 701.

973 SOCIAL AND CULTURAL FOUNDATIONS IN COUNSELING (4 credit hours)
Focuses on studies of change, ethnic groups, subcultures, changing roles of women, sexism, urban and rural populations, and differing life patterns. Involves experiential and didactic material and looks at individual attitudes and beliefs. Prerequisite: RHB 701.

Communication/COM
Note: See quarterly class schedule or departmental advisor for further enrollment restrictions, requirements, or special course information.

611 PERFORMANCE FOR THE MEDIA (4 credit hours)
Development of skills necessary for effective television and radio presentations. Study of criteria for selecting appropriate talent, and frequent practice in a wide range of media settings. Prerequisite: COM 111 or instructor permission.

621 LANGUAGE DEVELOPMENT (4 credit hours)
The development of speech and language in the preschool years.

629 URBAN COMMUNICATIONS THEORY (4 credit hours)
Processes and institutions by which individuals and groups communicate in an urban environment. Model of an urban communication system developed by interdisciplinary systems approach.

632 GENDER AND COMMUNICATION (4 credit hours)
Theoretical and pragmatic consideration of how and why men's and women's communication behaviors are similar to one another in some instances, yet different in others, and how men and women can communicate more effectively. Prerequisite: COM 102.
639 FREEDOM OF SPEECH (4 credit hours)
Study of the growth and development of free speech in the United States. Emphasis on the development of definitions of free speech and various communication strategies in different settings.

641 ADVANCED INTERPERSONAL COMMUNICATION (4 credit hours)
In-depth view of interpersonal communication skills: presenting, receiving, and challenging. A group context is used to promote self-directed changes in interpersonal style. Prerequisite: COM 102 or permission of instructor.

643 INTERVIEWING (4 credit hours)
Through a matrix organizational structure, students experience theory in selection, survey, journalistic, performance appraisal, persuasion, and counseling interviewing situations.

645 CONFERENCE LEADERSHIP (4 credit hours)
Simulation that focuses on the creation, development, and execution of a professional conference through assessment of participants' needs. Experiences include completing group tasks through assigned roles developed from current leadership theories.

647 ORGANIZATIONAL COMMUNICATION (4 credit hours)
Application of organizational communication theories and major theoretical perspectives to problems in public and private-sector organizations. Includes a simulation which focuses on conflict management, leadership, and decision making in a business context.

648 CASE STUDIES IN ORGANIZATIONAL COMMUNICATION (4 credit hours)
A critical analysis of communication issues and problems in organizations through an examination of various cases. Prerequisite: COM 446 and COM 447/647.

649 SURVEY OF COMMUNICATION RESEARCH (4 credit hours)
Provides a basic knowledge of the behavioral approach and of the current theories and experiments being conducted in communication research.

651 COMMUNICATION CONSULTING AND TRAINING (4 credit hours)
By means of a matrix structure, consulting and training theories are experienced in communication programs and processes as a methodology for human resource development. Prerequisite: COM 447 or permission of instructor.

653 COMMUNICATION AND CONFLICT (4 credit hours)
In-depth study of the function of communication in conflict/crisis situations. Emphasis on the role that communication performs in conflict resolution in intrapersonal, interpersonal, group, and international situations.

654 FEATURE STORY WRITING (4 credit hours)
(Also listed as ENG 654.) Includes finding, writing, polishing, and marketing feature material.

655 NONVERBAL COMMUNICATION (4 credit hours)
Theory, survey of research, and experimental learning in nonverbal communication. Exploration of types and forms and of methods of sending and receiving nonverbal communication.

657 INTERCULTURAL COMMUNICATION (4 credit hours)
Study of communication in intercultural environments. Emphasis on research and theory to better understand the complexity of intercultural communication interactions.

658 EDITING FOR THE MEDIA (4 credit hours)
(Also listed as ENG 658.) Editing of copy for mass media with emphasis on newspaper format, headline writing, rewriting, and general copy desk.

662 MASS MEDIA LAW AND REGULATION (4 credit hours)
Includes the study of laws and regulations affecting mass media.

664 BROADCAST CRITICISM (4 credit hours)
Analysis of contemporary programmatic and production practices including the development of critical standards for evaluation.

671 TOPICS IN COMMUNICATION (4 credit hours)
Examination of special topics in the various areas of speech communication. Titles vary.

689 COMMUNICATING WITH THE ELDERLY (4 credit hours)
Analysis of the unique communication behaviors of the elderly and the physical, social, and emotional changes that cause these behaviors. Development of interpersonal, interviewing, and reporting skills by direct interaction with this age group. 3 hours lecture, 1 hour off-campus interviewing.
741 PRINCIPLES AND APPLICATION OF COMMUNICATION THEORY
(4 credit hours)
Examines communication theory relevant to the role of the communication specialist. Special consideration given to the changing pattern of communication roles and the application of communication theory to the problems of the utilization specialist. Also focuses on the possible consequences of the diffusion of communication innovations within the business, educational, and governmental institutions of American society.

781 INDEPENDENT RESEARCH
(1 to 4 credit hours)
Supervised independent research on a specific subject.

Computer Science/CS
Note: See quarterly class schedule or departmental advisor for further enrollment restrictions, requirements, or special course information.

516 NUMERICAL METHODS FOR DIGITAL COMPUTERS (4 credit hours)
(Also listed as MTH 516, 517) Introduction to numerical methods used in the sciences. Includes methods of interpolation, data smoothing, functional approximation, integration, solutions of systems of equations, and solutions of ordinary differential equations. 3 hours lecture, 2 hours lab. Prerequisite: CS 142 or EGR 153 or CS 241; MTH 231, 253 or 255.

517 NUMERICAL METHODS FOR DIGITAL COMPUTERS (4 credit hours)
(Also listed as MTH 516, 517) Introduction to numerical methods used in the sciences. Includes methods of interpolation, data smoothing, functional approximation, integration, solutions of systems of equations, and solutions of ordinary differential equations. 3 hours lecture, 2 hours lab. Prerequisite: CS 516, MTH 233, 253 or 355.

600 DATA STRUCTURES AND SOFTWARE DESIGN (4 credit hours)
Study of the implementation of data structures and control structures in professional computer programs. Introduction to the fundamentals of complexity and analysis. Study of common standard problems and solutions (e.g., transitive closure and critical paths). Emphasis is on high-level language software design. 3 hours lecture, 2 hours lab. Prerequisite: CS 242, MTH 253, and MTH 257.

605 INTRODUCTION TO DATA BASE MANAGEMENT SYSTEMS (4 credit hours)
Survey of logical and physical aspects of database management systems. Hierarchical, network, and relational models of a database are presented. Physical implementation methods are discussed. Students are given experience creating and manipulating a database. Students must show ability to apply the concepts to the design of database systems. 3 hours lecture, 2 hours lab. Prerequisite: CS 600.

607 OPTIMIZATION TECHNIQUES
(3 credit hours)
(Also listed as MTH 607) Concepts of minima and maxima; linear programming; simplex method; sensitivity, and duality; transportation and assignment problems, dynamic programming. Prerequisite: MTH 233 and MTH 253 or 255.

609 PRINCIPLES OF ARTIFICIAL INTELLIGENCE (4 credit hours)
Problem-solving methods in artificial intelligence (AI) with emphasis on heuristic approaches. Topics include knowledge representation, search, intelligent agents, planning, learning, natural language processing, logic, inference, robotics, and case-based reasoning. 3 hours lecture, 2 hours lab. Prerequisite: CS 600, (CS 340—lisp or lisp programming experience).

610 THEORETICAL FOUNDATIONS OF COMPUTING (4 credit hours)
(Also listed as MTH 610) Turing machines; m-recursive functions; equivalence of computing paradigms; Church-Turing thesis; undecidability, intractability. 3 hours lecture, 2 hours lab. Prerequisite: CS 666.

619 CRYPTOGRAPHY AND DATA SECURITY (3 credit hours)
(Also listed as MTH 619) Introduction to the mathematical principles of data security. Various developments in cryptography are discussed, including public-key encryption, digital signatures, the data encryption standard (DES), key safeguarding schemes. Prerequisite: MTH 253 or 255.

658 APPLIED GRAPH THEORY
(3 credit hours)
(Also listed as MTH 658) Introduction to methods, results, and algorithms from graph theory. Emphasis on graphs as mathematical models applicable to organizational and industrial situations. Prerequisite: CS 142 or 241, MTH 231.
659 COMBINATORIAL TOOLS FOR COMPUTER SCIENCE (3 credit hours)
(Also listed as MTH 659.) Introduction to some of the mathematical tools needed for understanding computer programming. Topics include summations, elementary number theory, combinatorial identities, generating functions, and asymptotics. Prerequisite: MTH 280; MTH 457 recommended.

666 INTRODUCTION TO FORMAL LANGUAGES (4 credit hours)
Introduction to the theory of formal languages and automata. Emphasis is on those classes of languages commonly encountered by computer scientists, such as regular and context-free languages. 3 hours lecture, 2 hours lab. Prerequisite: MTH 257, CS 600, or MTH 257 and completion of a 600-level math or statistics course.

670 SYSTEMS SIMULATION (4 credit hours)
Introduction to simulation and comparison with other techniques: discrete simulation models; introduction to queuing theory and stochastic processes; comparison of simulation languages; simulation methodology; selected applications of simulation. Students must show ability to solve problems using simulation techniques. 3 hours lecture, 2 hours lab. Prerequisite: CS 600 and STT 560 or STT 363.

671 ALGORITHMS FOR BIOINFORMATICS (4 credit hours)
Theory-oriented approach to the application of contemporary algorithms to bioinformatics. Graph Theory, complexity theory, dynamic programming and optimization techniques are introduced in the context of application toward solving specific computational problems in molecular genetics. Prerequisites: CS 600, BIO 210, BIO 211, CHM 213 or permission of instructor.

680 COMPARATIVE LANGUAGES (4 credit hours)
Basic concepts and special purpose facilities in programming languages, examined through several representative languages. 3 hours lecture, 2 hours lab. Prerequisite: CS 600.

682 SCANNING, PARSING, AND SEMANTIC ANALYSIS (4 credit hours)
Study and use of tools for performing lexical, syntactic, and semantic analysis of computer-oriented languages. Prerequisite: CS 666, CS 680.

699 SELECTED TOPICS (1 to 5 credit hours)
Study of selected topics in computer science. Titles vary. May be taken for a letter grade or pass/unsatisfactory.

700 PRIN INSTR COMPUTER SCI (3 credit hours)
A survey of available instructional materials and discussion of educational theory and techniques leading to more effective instruction. For graduate teaching assistants in the Department of Computer Science only.

701 DATABASE SYSTEMS AND DESIGN (4 credit hours)
Introduction to basic goals and techniques in the design and implementation of information retrieval systems. Input, file organization, search strategies, output, language design, and evaluation techniques are covered. 3 hours lecture, 2 hours lab. Prerequisite: CS 605.

711 KNOWLEDGE-BASED SYSTEMS IN ARTIFICIAL INTELLIGENCE (4 credit hours)
Continuation of CS 609. Topics covered include techniques for handling judgmental knowledge, semantic networks, and frame-based systems. Useful constructs and architectures for AI systems are discussed. 3 hours lecture, 2 hours lab. Prerequisite: CS 609. (CS 340—lisp or lisp programming experience).

712 ADVANCED TOPICS IN ARTIFICIAL INTELLIGENCE (4 credit hours)
Covers advanced topics in artificial intelligence theory and applications. These are taken from such areas as natural language processing, machine learning, advanced AI programming techniques, and search and planning. Prerequisite: CS 609.

714 MACHINE LEARNING I (4 credit hours)
Reviews the development of machine learning paradigms. Introductory topics include parameter adjustment methods, signature tables, and the application of genetic algorithms to artificial intelligence problem domains. Prerequisite: CS 609.

716 NUMERICAL ANALYSIS I: APPLIED LINEAR ALGEBRA (4 credit hours)
(Also listed as MTH 716.) Topics chosen with emphasis on computational linear algebra. Systems of linear equations and Gaussian elimination; computation of eigenvalues and eigenvectors; matrix exponential; norm and condition number; and iterative methods. Prerequisite: CS 142, MTH 355 (or knowledge of a higher level language).
717 NUMERICAL ANALYSIS II: 
FINITE DIFFERENCE METHODS FOR 
PARTIAL DIFFERENTIAL EQUATIONS 
(4 credit hours) 
(Also listed as MTH 717.) Finite difference methods for partial differential equations; analysis of stability and convergence. Prerequisite: CS 716, MTH 333, 431.

718 NUMERICAL ANALYSIS III: 
FINITE ELEMENT METHODS FOR 
PARTIAL DIFFERENTIAL EQUATIONS 
(4 credit hours) 
(Also listed as MTH 718.) Finite element methods for elliptic boundary value problems; analysis of errors; approximation by finite element spaces; effects of curved boundaries, numerical integration; finite element methods for parabolic problems. Prerequisite: CS 716, MTH 333, 431.

735 EVALUATION AND PREDICTION OF SYSTEM PERFORMANCE 
(4 credit hours) 
Introduction to the modeling and analysis of computer system performance as a function of the hardware and software components of the system. 3 hours lecture, 2 hours lab. Completion of a statistics course required. Prerequisite: CEG 633, CS 670.

740 COMPUTATIONAL COMPLEXITY AND ALGORITHM ANALYSIS 
(4 credit hours) 
Time complexity analysis of algorithms; computational complexity; NP completeness. 3 hours lecture, 2 hours lab. Prerequisite: CS 610, CS 666.

765 FOUNDATIONS OF NEUROCOMPUTING (4 credit hours) 
Information processing in neural networks as a mode of computation complementary to symbolic artificial intelligence, emphasizing common ideas across different network architectures. Current applications in machine learning and spatiotemporal pattern recognition will be evaluated. CS 710 recommended. Prerequisite: MTH 232, MTH 253, CS 600. recommended: CS 710.

766 EVOLUTIONARY COMPUTING 
(4 credit hours) 
Explores evolutionary computation from a historical, theoretical, and an application viewpoint. Evolutionary search techniques, including genetic algorithms, evolutionary programming, and genetic programming applied to problems in control, optimization, and classification are presented. Prerequisite: CS 600.

767 FUZZY SET THEORY AND APPROXIMATE REASONING 
(4 credit hours) 
Provides an introduction to fuzzy set theory that serves as a basis for the study of fuzzy rule-based systems, pattern classification, function approximation, modeling, and information processing. Prerequisite: CS 600.

771 NATURAL LANGUAGE TECHNIQUES 
(4 credit hours) 
Survey of issues that arise in computer understanding of natural languages like English. Topics include significance of language structure in extracting meaning, ambiguities, parsing techniques and case studies. Prerequisite: CS 666, (lisp or CS 680).

772 ADVANCED NATURAL LANGUAGE PROCESSING CONCEPTS 
(4 credit hours) 
Continuation of CS 771. Computational methods for dealing with natural language semantics are introduced. Topics include semantic networks, conceptual dependency graphs, and formal logic as a semantic model. Prerequisite: CS 771.

774 LOGIC PROGRAMMING 
(4 credit hours) 
Theory and practice of logic programming. Application of Prolog to artificial intelligence, language analysis, and symbolic programming. Some attention to implementation issues, constraint logic programming, and concurrent logic languages. An acquaintance with Prolog is assumed. Prerequisite: CS 680 or CS 784.

776 FUNCTIONAL PROGRAMMING 
(4 credit hours) 
In-depth look at functional programming techniques, and functional languages and their implementation. Prerequisite: CS 680.

780 COMPILER DESIGN AND CONSTRUCTION (4 credit hours) 
Complete compiler for a small programming language is discussed. Topics covered are scanning, syntax analysis, and code generation. 3 hours lecture, 2 hours lab. Prerequisite: CS 666, CS 680.

781 COMPILER DESIGN AND CONSTRUCTION II (4 credit hours) 
Continuation of CS 780. Topics are covered in more depth. Project is required. 3 hours lecture, 2 hours lab. Prerequisite: CS 780.
782 COMPILER DESIGN AND CONSTRUCTION III (4 credit hours)
Continuation of CS 781. Concentration on major design project. 3 hours lecture, 2 hours lab. Prerequisite: CS 781.

784 PROGRAMMING LANGUAGES (4 credit hours)
Programming paradigms and concepts for high level programming languages. Techniques for formal specification. Prerequisite: CS 680.

790 SELECTED TOPICS IN COMPUTER SCIENCE (4 credit hours)
Lectures on and study of selected topics in current research and recent developments in computer science. 3 hours lecture, 2 hours lab.

795 INDEPENDENT STUDY (1 to 4 credit hours)
Special problems in advanced computer science topics. Graded pass/unsatisfactory.

799 THESIS (1 to 8 credit hours)
Graded pass/unsatisfactory.

801 ADVANCED TOPICS IN DATABASE SYSTEMS (4 credit hours)
Continuation of CS 701 with emphasis on relational databases and distributed systems. Current literature will be reviewed. At least one programming project bridging the gap from theory to practice. Prerequisite: CS 701.

840 ADVANCED TOPICS IN THE THEORY OF COMPUTATION (4 credit hours)
Continuation of CS 610, 666, and 740. Covers advanced topics taken from formal language theory, predicate calculus, algorithm analysis, and complexity theory. 3 hours lecture, 2 hours lab. Prerequisite: CS 666 or CS 610 or CS 740.

865 ADVANCED TOPICS IN SOFT COMPUTING (4 credit hours)
Covers advanced topics in soft computing. Soft computing paradigms include fuzzy set theory, neural networks, evolutionary computing, and probabilistic and statistical techniques. Particularly, relationships and interactions between these disciplines will be explored. Prerequisite: CS 765 or CS 766 or CS 767.

884 ADVANCED TOPICS IN PROGRAMMING LANGUAGES (4 credit hours)
Continuation of CS 784. Emphasis on formal methods for specifying and defining both the syntax and the semantics of programming languages. Prerequisite: CS 784.

890 SELECTED TOPICS (1 to 4 credit hours)
Selected topics in computer science and engineering.

892 PH.D. QUALIFYING EXAM (1 to 8 credit hours)
Examination that tests understanding of the fundamentals necessary to begin concentrated study in chosen Ph.D. research area. Composed of written tests and an oral exam. Must be passed within two attempts. Graded pass/unsatisfactory.

894 CANDIDACY EXAM (1 credit hour)
Examination that tests for depth of understanding in a chosen computer science and computer engineering research area. Includes a written proposal for a Ph.D. topic and an oral examination, that is open to the public. Graded pass/unsatisfactory.

895 INDEPENDENT STUDY (1 to 8 credit hours)
Independent study in a chosen area for Ph.D. research. Graded pass/unsatisfactory.

896 DISSERTATION DEFENSE (1 credit hour)
Examination on the Ph.D. dissertation. The written dissertation is submitted and must be successfully defended in the oral exam conducted by the dissertation committee. Graded pass/unsatisfactory.

897 RESIDENCY RESEARCH (1 to 12 credit hours)

898 DISSERTATION RESEARCH (1 to 12 credit hours)

ECONOMICS/EC

Note: See quarterly class schedule or departmental advisor for further enrollment restrictions, requirements, or special course information.

521 GRADUATE SURVEY IN PRINCIPLES OF ECONOMICS (3 credit hours)
Basic micro- and macroeconomics theory designed for persons having had no previous work in economics. Economics 521 and 522 are prerequisites for all 600- and 700-level courses. Additional requirements may be indicated for some courses.
522 GRADUATE SURVEY IN PRINCIPLES OF ECONOMICS (3 credit hours)
20th-century writers

523 SURVEY OF MICROECONOMICS (2 credit hours)
An introduction to microeconomics. Provides students with facts, theories, and modes of reasoning regarding individual and business behavior. The course is sharply focused to prepare students to succeed in the MBA program at Wright State.

524 SURVEY OF MACROECONOMICS (2 credit hours)
An introduction to macroeconomics. Enhances the student's ability to understand the aggregate economy and how it influences business decisions. The course is sharply focused to prepare students to succeed in advanced course work in the MBA program.

602 MONETARY ECONOMICS (3 credit hours)
Analysis of monetary policy development and the theory of money market behavior. Emphasizes the relationship between money and national economic conditions.

610 INTRODUCTION TO MATHEMATICAL ECONOMICS (3 credit hours)
Application of mathematical tools in the formulation of economic theory. Methods used in model construction. Prerequisite: college algebra or consent of instructor.

625 DEVELOPMENT OF ECONOMIC THOUGHT (3 credit hours)
Historical development of economic thought and philosophies. Prerequisite: EC 521 and 522 or permission of instructor.

631 FEDERAL FINANCE AND THE ECONOMY (3 credit hours)
Develops a theoretical framework and working knowledge of the economic basis for government activity, government expenditures, programs, and policies, and the financing of government expenditures through taxation.

632 STATE AND LOCAL FINANCE AND THE ECONOMY (3 credit hours)
Analysis of state and local government public service responsibilities, programs, and policies, including expenditures and taxation.

635 COMPARATIVE ECONOMIC SYSTEMS (3 credit hours)
Comparison of the institutions of various capitalist and socialist economies including economies in transition. Comparative analysis provides a basis for evaluating government policy. Prerequisite: EC 521 and 522.

641 INTERNATIONAL TRADE AND THE ECONOMY (3 credit hours)
Economic reasons for international trade. Impact of trade and trade restrictions on economic aggregates. Prerequisite: EC 521 and 522.

642 INTERNATIONAL MONETARY THEORY AND PROBLEMS (3 credit hours)
International monetary relations and problems. Focus is on the institutions and arrangements used to finance international trade. Topics discussed include balance of payments, the dollar and foreign exchange markets, Eurocurrencies, Petrodollars and OPEC, and multinational corporations. Prerequisite: EC 641.

644 ECONOMIC DEVELOPMENT AND WORLD POVERTY (3 credit hours)

645 POLITICAL ECONOMY OF WOMEN (3 credit hours)
Examines the combined historical and cultural effects of race, class, ethnicity, gender ideology, technology, education, unionism, wartime mobilization, legislation, etc. on women's evolving economic status and gender roles from colonial times to the present. Prerequisite: EC 521 and EC 522 or permission of instructor.

709 ECONOMETRICS AND ITS APPLICATIONS (3 credit hours)
Application of economic theory, mathematical modeling, and statistics to the measurement and forecasting of economic relationships. Emphasis is on specification, estimation, and hypothesis testing. Prerequisite: EC 521 &522, MBA 581 & 582 or equivalents.

712 FORECASTING ECONOMIC ACTIVITIES (3 credit hours)
Techniques and theories used in forecasting. Practical methods and problems are stressed. Prerequisite: EC 609 or permission of instructor.

715 APPLIED MICROECONOMICS (3 credit hours)
Emphasis on advanced microeconomics applications in consumption/work decisions of households, production/pricing strategies of firms, and public policy toward businesses. Special attention paid to the roles of labor unions/not-for-profit firms. Prerequisite: EC 521, 522 and MBA 581 or equivalent.
717 APPLIED MACROECONOMICS  
(3 credit hours)  
Emphasis is on modern views on fiscal and monetary policy in an open economy. Interrelationships between interest rates, unemployment, economic growth, inflation, and balance of payments are highlighted. Prerequisite: EC 521, 522 and MBA 581 or equivalent.

721 CONTEMPORARY POLITICAL ECONOMY (3 credit hours)  
History of economic policy and the evolution of contemporary institutions. Prerequisite: EC 521 and 522 or equivalent.

722 ECONOMICS FOR MANAGERS  
(3 credit hours)  
Applies economic theory and methods to business and administrative decision making. Prescribes rules for improving managerial decisions. Tells managers how things should be done to achieve organizational objectives efficiently. Also helps managers recognize how macroeconomic forces affect organizations, and describes the economic consequences of managerial behavior. Special attention is paid to the operation of the firm in a global economy. Prerequisite: EC 523, EC 524 and MBA 581 or equivalent.

723 INTERNATIONAL BUSINESS AND THE GLOBAL ECONOMY (3 credit hours)  
Theories, practices, and patterns of international business and the effect of globalization on the business environment in the U.S. Topics may include international markets, international institutions such as the World Trade Organization, multinational corporations, legal and cultural considerations in conducting international business, and global business strategies. Prerequisite: all foundation plus 7 of 9 business competency and functional area classes completed.

725 ECONOMIC AND SOCIAL SYSTEMS  
(3 credit hours)  
Exploration of the philosophical issues in the social sciences, with emphasis on the scientific analysis of value. Comparison of positivist versus instrumental approaches to the scientific analysis of human behavior and their applications to real world problem sets. Prerequisite: EC 521 and EC 522.

730 REGIONAL AND URBAN ECONOMICS  
(3 credit hours)  
Analysis of the basic forces that shape the economic, social, and physical environments of urban and nonurban regions. Emphasis on regional income determination and developmental models, location of economic activity, the structure of urban centers, intra-urban economic relationships, and economic policy.

740 COST-BENEFIT ANALYSIS AND SOCIAL PROJECT EVALUATION  
(3 credit hours)  
Measurement of benefits and costs of both public and private projects with significant public implications. Includes conceptual issues and focuses on practical application, including specific cost-benefit studies. Prerequisite: EC 521 and 522 or equivalent.

755 THE ECONOMICS OF HEALTH AND HEALTH POLICY (3 credit hours)  
Teaches students how alternative incentive systems and resource allocations affect the health services sector. Emphasis on current institutional arrangements, empirical studies, and policy alternatives. Prerequisite: MBA 523 or permission of instructor.

765 LABOR MARKET THEORY AND POLICY (3 credit hours)  
Blends theoretical analyses of the forces affecting labor market processes with empirical investigation of labor market conditions and analyses of existing and proposed labor market programs and policies. Prerequisite: intermediate microeconomics and intermediate statistics or departmental approval.

777 ECONOMIC STUDIES (3 credit hours)  
An examination of special issues.

780 ECONOMIC PROBLEMS SEMINAR  
(3 credit hours)  
Titles vary. Six hours of seminar must be selected from the following topics: economics of the workforce; regional and urban problems; environmental issues; technological change; economic development; economics of poverty; and income maintenance. Completion of introductory statistics course or equivalent 600-level survey course required. Prerequisite: introductory statistics, EC 715 and 717, or consent of instructor.
781 RESEARCH IN ECONOMICS 
(2 to 4 credit hours) 
Titles vary. Intensive reading or research in selected fields of advanced economics.

782 RESEARCH IN ECONOMICS 
(2 to 4 credit hours) 
Intensive reading or research in selected fields of economics.

783 RESEARCH IN ECONOMICS 
(2 to 4 credit hours) 
Intensive reading or research in selected fields of economics.

785 INTERNSHIP (6 to 12 credit hours) 
Titles vary. One-quarter internship working in a selected private, social, or governmental organization under the direction of a faculty advisor and work supervisor. Graded pass/unsatisfactory.

Center for Economic Education/ECO

Note: See quarterly class schedule or departmental advisor for further enrollment restrictions, requirements, or special course information.

500 CONSUMER ECONOMICS FOR K–12 TEACHERS (3 credit hours) 
An examination of consumers as they participate in the economy. Emphasis on those household roles (consumer/producer/citizen) that are teachable in the K–12 classroom. May be taken for letter grade or pass/unsatisfactory.

511 PRINCIPLES OF ECONOMICS FOR TEACHERS I (3 credit hours) 
Basic microeconomic principles for K–12 teachers. Participants study the tools of analysis and operations of the parts of the economy. May be taken for letter grade or pass/unsatisfactory.

512 PRINCIPLES OF ECONOMICS FOR TEACHERS II (3 credit hours) 
Survey of basic macroeconomic principles for K–12 teachers. Participants study the tools of analysis and operations of the whole economy. May be taken for letter grade or pass/unsatisfactory.

513 PRINCIPLES OF ECONOMICS FOR TEACHERS III (3 credit hours) 
Survey of advanced micro- and macroeconomic principles for K–12 teachers. Participants will study the tools of analysis and operations of the parts and the whole of the economy.

514 ECONOMICS IN ACTION 
(1 to 6 credit hours) 
Selected economic issues and topics for teachers, presented in dialogue with visiting resource persons. Titles vary. May be taken for letter grade or pass/unsatisfactory. Prerequisite: ECO 511, ECO 512 or equivalent.

515 ECONOMIC STUDIES FOR TEACHERS: MATERIALS AND METHODS (3 credit hours) 
Economic education materials and methods for the K–12 classroom. May be taken for letter grade or pass/unsatisfactory. Prerequisite: ECO 511, ECO 512 or equivalent.

516 ECONOMIC STUDIES FOR TEACHERS (1 to 6 credit hours) 
Selected economic issues and topics and techniques for teaching them in the K–12 classroom. May be taken for letter grade or pass/unsatisfactory. Prerequisite: ECO 511, ECO 512 or equivalent.

517 ECONOMIC APPLICATION USING THE INTERNET I (2 to 4 credit hours) 
Course teaches basic economic skills and application of these skills to K–12 teachers. Work is assigned via the Internet. Covers standards one through nine of the voluntary national content standards in economics. May be taken for letter grade or pass/unsatisfactory.

518 ECONOMIC APPLICATION USING THE INTERNET II (2 to 4 credit hours) 
Course teaches basic economic skills and application of these skills to K–12 teachers. Work is assigned via the Internet. Covers standards 10 through 20 of the voluntary national content standards in economics. May be taken for letter grade or pass/unsatisfactory. Prerequisite: ECO 517.

523 FAMILY FINANCIAL SECURITY (3 credit hours) 
Financial planning and the family, with emphasis on aspects teachable in the K–12 classroom. May be taken for letter grade or pass/unsatisfactory.
Education/ED

Note: See quarterly class schedule or departmental advisor for further enrollment restrictions, requirements, or special course information.

600 CLASSROOM MANAGEMENT: (3 credit hours)
An application of a variety of discipline models for use in diverse settings and discussion of recent research, practice, and innovation in the field of classroom management, addressing adolescence concerns. Prerequisite: ED 622, ED 602, ED 621, ED 612.

602 EDUCATION IN A PLURALISTIC SOCIETY: (4 credit hours)
Introduces students to foundational analysis of the relationship between public education in a democracy and the critical social issues and forces impacting renewal efforts. Course focuses upon curricula, materials, strategies, and techniques for instructing learners with cultural, social, economic and intellectual differences. Topics include cultural pluralism, culture, ethnicity, race, sexism, WASP ethic, U.S. Mosaic.

603 CHILD DEVELOPMENT (3 to 4 credit hours)
Factors that influence growth and development.

604 ADOLESCENT DEVELOPMENT (3 credit hours)
Examination of the period in the sequence of development known as adolescence, with emphasis on physical development and its psychological and social concomitants and to the effect upon the adolescent of social forces, especially schools.

605 CURRENT TENDENCIES IN EDUCATION (1 to 4 credit hours)
Current trends and theories in education, and the development of criteria and procedures for their evaluation and implementation.

606 READING AND LITERACY INSTRUCTION I (5 credit hours)
Assessment of current literacy levels, instructional procedures, and an overview of instructional materials. Students are expected to carry out assessment and instructional procedures within their internship classrooms and to be associate instructors to the teachers in the areas of oral language, children's literature, reading, and writing. Prerequisite: ED 622, ED 602, ED 621, ED 612.

607 READING AND LITERACY INSTRUCTION II (5 credit hours)
Course extends student knowledge of literacy instruction and addresses more advanced levels of literacy including textbook study and research. Students are expected to carry out instructional procedures within their internship classrooms and to be associate instructors to the teachers in the areas of oral language, children's literature, reading, and writing. Prerequisite: ED 606.

608 SOCIAL STUDIES EDUCATION: CURRICULUM/MATERIAL/METHODS (3 credit hours)
Objectives, principles, and trends in elementary social studies education. Students are familiarized with a variety of technological resources including the www, Web pages, e-mail, laser disks, and several social studies computer applications. Prerequisite: ED 622, ED 602, ED 621, ED 612.

610 MIDDLE CHILDHOOD MATH: PHILOSOPHY, CURRICULUM, MATERIALS (3 credit hours)
Provides developing professional educators with an introduction to the teaching/learning of middle childhood mathematics. Focuses on teaching for understanding and problem solving. Prerequisite: ED 622, ED 602, ED 621, ED 612.

611 EARLY AND MIDDLE CHILDHOOD SCHOOL MATHEMATICS (4 credit hours)
The purpose of this course is to broaden the perspectives related to issues of mathematics education of elementary and middle school teachers. Problem solving, use of manipulatives, and classroom technologies will be studied. Prerequisite: MTH 244 and graduate status.

612 PRACTICUM I: (1 to 3 credit hours)
The first PEP field practicum provides an opportunity to work in a K–12 school and human service agency in order to initiate the task of applying theory to practice. Graded pass/unsatisfactory. Prerequisite: ED 622, ED 602, corequisite ED 621.

614 PRACTICUM II: (1 to 3 credit hours)
The second PEP field practicum provides involvement in a K–12 school and/or a human service agency setting as a laboratory. Introduction to family collaboration occurs. Graded pass/unsatisfactory. Prerequisite: ED 612.
615 IMPROVEMENT OF ELEMENTARY READING INSTRUCTION
(3 credit hours)
Curriculum, methods, materials, and evaluation in reading designed to improve the teacher’s instructional skills.

616 PRACTICUM III (1 to 3 credit hours)
The third field practicum provided in the PEP promotes understanding of the total ecology of schooling collaboration with families. A human service agency setting is highlighted. Graded pass/unsatisfactory. Prerequisite: ED 614.

617 ELEMENTARY SCHOOL SOCIAL STUDIES: CURRICULUM AND MATERIALS (3 to 4 credit hours)
Objectives, principles, and trends in elementary social studies education. Prerequisite: ED 704 or permission of instructor.

618 PROBLEM SOLVING IN SCHOOL MATHEMATICS (3 to 4 credit hours)
Prepares teachers of mathematics in grades K–8 to teach problem solving as a basic mathematical skill. Emphasis on the teaching/learning of a variety of problem solving heuristics, applying problem solving strategies, and the use of both routine and nonroutine in school mathematics. Prerequisite: ED 318 or equivalent.

620 STUDIES IN ENGLISH EDUCATION
(2 to 4 credit hours)
(Also listed as ENG 685) Focuses on theoretical issues and practical problems of teaching English at all levels, including the teaching of writing and the teaching of English to speakers of other languages (TESOL). May be taken for letter grade or pass/unsatisfactory.

621 HUMAN DEVELOPMENT AND LEARNING (4 credit hours)
Apply basic research techniques and method to the study of human development, learning growth, and achievement. Engage in observational analysis of children in the classroom setting, putting theory into practice. Prerequisite: ED 602, ED 622, co-req. ED 612.

622 INSTRUCTIONAL TECHNOLOGY AND INTEGRATED METHODS
(3 credit hours)
Involves students in a spectrum of instructional technologies, techniques, and approaches appropriate for today's complex classroom. Students will utilize and integrate curriculum content with multi-media applications. Prerequisite: EDT 280 or equivalent.

623 ADOLESCENCE ENGLISH: CURRICULUM AND MATERIALS
(5 credit hours)
Provides developing professional educators with an introduction to the teaching/learning of middle childhood/adolescence language arts. Prerequisite: ED 663 or equivalent; must be in professional educator program.

624 MIDDLE CHILDHOOD LITERATURE, SPEECH AND DRAMA (3 credit hours)
Curriculum and materials for teachers using speech and drama in language arts classrooms. Emphasizes effective speech making and using and responding to drama as part of their school experience. Prerequisite: ED 663 or equivalent.

625 MODERN FOREIGN LANGUAGES: CURRICULUM AND MATERIALS
(3 credit hours)
Discusses foreign language curriculum in public schools: purposes, methods, materials. ACTFL Standards and Ohio's Competency-Based Program for the pre-K–12 classroom. Curriculum development, pre-K–5. Theories of first and second language acquisition. Prerequisite: ED 622 or equivalent.

627 EUROPEAN LANGUAGES: CHILDREN’S LITERATURE, MUSIC, AND ART (3 credit hours)
Integration of children's literature, music, and art with emphasis on selection and use of books and related activities in early childhood and pre-K–elementary education.

629 MIDDLE SCHOOL SOCIAL STUDIES: CURRICULUM & MATERIALS (3 credit hours)
Course focuses on principles, trends, resources, technology, critical thinking skills, historiography, and social science research for middle school social studies. This course will also focus on teaching in the multicultural classroom. Prerequisite: B.A. degree social science education.
631 LITERACY SKILL THROUGH ADOLESCENCE (3 credit hours)
Course provides the content area for secondary teachers with reading and writing strategies to help solve the problems encountered in grades 7–12. Reading comprehension is a key element in solving the many problems of classrooms that stress content. Writing skills and strategies are taught to help students communicate more effectively in all content areas. Prerequisite: ED 600.

632 IMPROVING READING IN SECONDARY SCHOOLS
(3 credit hours)
Surveys the teaching of reading in American secondary schools including the skills necessary to teach reading in the content subjects. Not open to reading majors.

635 SECONDARY ISSUES AND LEADERSHIP (3 credit hours)
An examination of major trends and issues facing those who work with adolescents in the education system. Such elements as school organization, curriculum, assessment, funding, and instruction are included. Prerequisite: ED 622, ED 602, ED 621, ED 612.

636 INTEGRATED MIDDLE CHILDHOOD LEVEL SCIENCE METHODS (3 credit hours)
Curriculum and materials for teaching middle level science with emphasis on using an integrated constructivist approach to science teaching. Includes development of appropriate objectives, planning, resources, and evaluation. Prerequisite: ED 622, ED 602, ED 621, ED 612.

637 ELEMENTARY SCHOOL MATHEMATICS: CURRICULUM AND MATERIALS (3 credit hours)
Instructional materials and methods of meaningful explanations of mathematics in the elementary school based on structural properties of number and numeration system studies at this level. Prerequisite: MTH 243, teacher certification candidates.

638 ADOLESCENCE MATHEMATICS: CURRICULUM AND MATERIALS
(5 credit hours)
Curriculum, materials, and instructional technology appropriate for middle school mathematics 7–12.

639 ADOLESCENCE SOCIAL STUDIES: CURRICULUM AND MATERIALS
(5 credit hours)
Provides developing professional educators instruction in objectives, principles, and trends in middle childhood/adolescence social studies.

641 INTERNSHIP/SEMINAR: MIDDLE CHILDHOOD (6 to 15 credit hours)
Interns are assigned to a middle childhood public school full-time for solo teaching under the direct supervision of an experienced classroom teacher. Includes weekly seminar.

645 INQUIRY AND ASSESSMENT
(3 credit hours)
Provides an overview of research methods and assessment. Students will develop a research proposal, complete a professional portfolio, and demonstrate assessment proficiency. Prerequisite: ED 641.

646 INQUIRY AND PROSPECTUS
(3 credit hours)
Each student will develop a research topic during the summer term and, after instructor approval, complete the research project across the coming school year. Prerequisite: ED 621, ED 641.

647 TEACHING IN THE PUBLIC SCHOOL
(4 credit hours)
Study, observation, and evaluation of practices. Offered only to students who have completed the pertinent curriculum and materials course and are seeking a waiver of all or part of student teaching on the basis of full-time teaching experience.

648 IMPROVEMENT OF SOCIAL STUDIES INSTRUCTION
(3 credit hours)
In-depth analysis of new social studies resource materials and curriculum modes with emphasis on improving instruction. Completion of a social studies methods course required. Prerequisite: completion of a social studies methods course.

650 COMPUTER SCIENCE: CURRICULUM AND MATERIALS
(3 credit hours)
Prepares teachers to teach computer science in a precollege setting. Curriculum, teaching methodology, and the computing teacher’s role in computer science, grades K–12. Prerequisite: ED 214, 216, 218, 220 or equivalent; ED 327 and ED 302.
651 INTERNSHIP/SEMINAR: ADOLESCENCE (6 to 15 credit hours) Interns are assigned to a secondary public school full-time for solo teaching under the direct supervision of an experienced classroom teacher. Includes weekly seminar. Graded pass/unsatisfactory. Prerequisite: completed professional educators program course.

658 PRACTICUM IN EDUCATION (1 to 9 credit hours) Supervised teaching experience for students who have completed student teaching or its equivalent and are seeking certification in another field. Titles vary.

660 PRACTICUM IN ENGLISH EDUCATION (1 to 4 credit hours) Students are assigned to an instructional class that focuses on the teaching of English to speakers of other languages (TESOL) for supervised practicum experience. Graded pass/unsatisfactory. Prerequisite: ED 620.

661 INTERNSHIP/SEMINAR: MULTI-AGE (6 to 15 credit hours) Students are assigned to a public school full-time for solo teaching under the direct supervision of an experienced classroom teacher. Various placements will be provided in this multi-age practicum. Includes weekly seminar. Graded pass/unsatisfactory. Prerequisite: completion of pep coursework.

662 PSYCHOLOGICAL FOUNDATIONS OF EDUCATION AND CLASSROOM MANAGEMENT (1 to 6 credit hours) Psychological theories, principles, and processes that affect teaching and learning. Focuses on learning theory, teaching behavior, student needs, and the skills necessary to maintain an optimum learning environment.

663 TEACHING SKILLS AND STRATEGIES (3 credit hours) Explores the use of basic skills in planning, motivation, and questioning, as well as the use of audiovisual equipment and production, alternative instructional strategies, and management techniques that help facilitate instruction.

664 EVALUATION (3 to 4 credit hours) Evaluation of learning, including selected forms of measurement and interpretation of data: sociometric techniques, anecdotal records, and testing.

665 SUPERVISED TEACHING: ELEMENTARY (6 to 15 credit hours) Students are assigned to a public school full time for teaching under the direct supervision of an experienced classroom teacher. Includes weekly seminar. Graded pass/unsatisfactory. Prerequisite: completion of 30 hours in approved program. Open only to students in special programs.

666 INTRODUCTION TO SCHOOLING (3 credit hours) The organization and function of schools, legal and financial aspects of schooling, and the rights and responsibilities of those involved in the educational process.

667 SUPERVISED TEACHING: SECONDARY (6 to 15 credit hours) Students are assigned to a public school full time for teaching under the direct supervision of an experienced classroom teacher. Includes weekly seminar. Graded pass/unsatisfactory.

670 CURRICULUM AND INSTRUCTION WORKSHOP (1 to 9 credit hours) Intensive study of a selected area of school curriculum designed to meet the particular needs of the participating preservice and in-service teachers, administrators, and curriculum supervisors. Titles vary.

700 GRAD ASSISTANT SEMINAR (3 credit hours) Orientation of graduate assistants to the organization and responsibility of the College of Education and Human Services. Selected topics related to specific programs, services, and procedures in the college are considered. For first-year graduate assistants only.

701 ADVANCED EDUCATIONAL PSYCHOLOGY (3 credit hours) Selected theories of learning and the relationship between the theories and instructional practice. Completion of graduate core courses required.

702 SOCIAL FOUNDATIONS OF EDUCATION (3 credit hours) Relationship between public education in a democracy and the critical social issues and social forces.
703 PHILOSOPHY OF EDUCATION (3 credit hours)
In-depth analysis of the major philosophy of education and emphasis on its implications to the teaching/learning process and the development of a personal philosophy of education.

704 INQUIRY INTO FOUNDATIONS OF EDUCATION (4 credit hours)
The past and present social, philosophical, and psychological trends and issues in education in a democratic society. Prerequisite: must be admitted to graduate education core program.

705 AFFECTIVE EDUCATION PRINCIPLES AND APPLICATIONS (3 credit hours)
Designed to enable teachers to analyze affective aspects of classroom instruction and interaction, and to facilitate utilization of affective strategies within the classroom setting. Prerequisite: ED 603 or ED 604 or instructor permission.

706 WORKSHOP IN SOCIAL FOUNDATIONS IN EDUCATION LAB (1 to 6 credit hours)
This course, through a workshop format, will enable the educator to receive immediate information and techniques to aid students in relation to specific social, legal, and philosophical aspects which directly effect the total educational offering.

707 HISTORY OF EDUCATION (3 credit hours)
Origin and development of educational institutions in the United States. Emphasis on development of early childhood, elementary, secondary, and higher education. Prerequisite: completion of graduate core and graduate standing required.

708 COMPARATIVE EDUCATION (3 credit hours)
Analysis of educational systems as related to the values and cultures of selected countries. Prerequisite: completion of graduate core and graduate standing required.

709 DIAGNOSIS AND ASSESSMENT OF READING PERFORMANCE (5 credit hours)
This course will prepare teachers to recognize variations of reading and writing performance in a classroom and clinical setting. Teachers will learn a range of assessment instruments with which to assess their students.

710 TEACHING STRATEGIES IN CULTURALLY DIVERSE SETTINGS (4 credit hours)
Focuses on curricula, materials, strategies, and techniques for instructing learners with cultural, social, economic, and intellectual differences.

711 FOUNDATIONS OF INTERNATIONAL EDUCATION (3 credit hours)
Factors influencing educational systems and practices throughout the world.

712 IMPROVING SCIENCE INSTRUCTION IN THE ELEMENTARY (3 to 4 credit hours)
Consideration of selected scientific principles that have application in the elementary school. Inquiry through a laboratory approach is emphasized. Prerequisite: graduate standing.

716 FOUNDATIONS OF READING INSTRUCTION (3 credit hours)
Development of effective reading instruction based on children's language acquisition and development. Prerequisite: core or prior permission of instructor.

717 INSTRUCTION IN WORD STUDY: PHONICS (5 credit hours)
In-depth analysis of how people learn printed words related to instructional procedures in schools. Students will apply knowledge in a tutoring situation.

718 CURRICULUM AND INSTRUCTION IN ELEMENTARY SCHOOL (3 credit hours)
Analysis of the current curriculum, techniques of instructional improvement, and classroom management strategies. Prerequisite: ED 618 or equivalent.

719 SUPERVISION OF STUDENT TEACHERS (3 credit hours)
Principles and methods of supervision, including observation, analysis, and guidance. For in-service elementary and secondary teachers who wish to prepare themselves for the responsibilities of cooperating teachers in the university student-teaching program.
721 LITERATURE FOR ELEMENTARY CHILDREN (3 credit hours)
Extension and enrichment of knowledge of children's books. Introduction to research and scholarly and critical writing about children's literature in relation to classroom practices. Application of research and criticism ideas; exploration of internationalism in children's literature. Prerequisite: core or prior permission of instructor.

731 ADOLESCENT AND YOUNG ADULT SCIENCE: METHODS, CURRICULUM AND MATERIALS (5 credit hours)
Methods, curriculum, and materials for teaching middle childhood and adolescent school science: emphasis on philosophy, planning and implementation, evaluation, resources and facilities, and historical and contemporary curricular trends in science education. Field/clinical experiences required. Prerequisite: students must attain a placement through the office of field experiences, 378 Allyn hall.

732 PRINCIPLES AND PRACTICES OF THE MIDDLE SCHOOL (3 credit hours)
The historical and underlying philosophy of the middle school concept based on the nature of the students. Current and future instructional and curricular practices are viewed in relation to this philosophy.

733 IMPROVEMENT OF TEACHING (3 credit hours)
A course in principles and practices for improving instruction. Emphasis is on alternative instructional techniques, goal oriented teaching, instructional self-analysis and improvement and research findings related to teaching affectiveness. Prerequisite: completion of core.

735 OUTDOOR SCIENCE EDUCATION (2 to 6 credit hours)
Provides teachers and leaders seeking skills in the use of the out-of-doors as a resource for program or curriculum enrichment; laboratory experiences and field work in a variety of biotic communities emphasizing ecological relationships. Prerequisite: graduate standing.

736 HISTORY OF BOOKS FOR CHILDREN AND YOUNG PEOPLE (3 credit hours)
International children's literature, primarily from the 18th century to the 20th century.

737 SURVEY OF WORLD LITERATURE FOR CHILDREN AND YOUNG PEOPLE (3 credit hours)
Students will apply the knowledge of international literature and the skills of teaching to the curriculum of schools and libraries. Prerequisite: completion of core courses.

738 SUPERVISION OF SECONDARY SCHOOL MATHEMATICS (3 credit hours)
Analysis of curriculum, materials, techniques of instruction, and classroom management strategies to improve mathematics programs of secondary schools.

739 CULTURAL STUDIES IN LITERATURE FOR CHILDREN AND YOUNG PEOPLE (3 credit hours)
Students investigate the literature for children and young people of a particular culture, and study its effect within the broad context of world literature. Titles vary. Prerequisite: completion of the core courses in the program.

745 GENRE STUDIES IN INTERNATIONAL LITERATURE FOR CHILDREN AND YOUNG PEOPLE (3 credit hours)
Students will do an in-depth study of a single genre of literature for children and young people focusing on literature of international significance. Prerequisite: completion of core courses.

748 TEACHING LITERATURE TO CHILDREN AND YOUNG PEOPLE (3 credit hours)
Students apply the knowledge of international literature and the skills of teaching to the curricula of schools and libraries. Prerequisite: completion of core.

762 FOUNDATIONS OF TEACHING MODELS (4 credit hours)
Focuses on five different models of teaching: concept; attainment; synectics; social inquiry; contingency management; and one model in terms of the model outcomes, assessment of students, and teaching/learning activities.

769 CONTENT READING INSTRUCTION GRADES 4-12 (3 credit hours)
Identifies differences between fiction and non-fiction reading. Provides a general model for content reading lessons and a wide range of activities for involving students in content learning. Includes attention to vocabulary/ concept development and critical reading. Prerequisite: ED 716 or instructor permission.
770 INDEPENDENT READING AND MINOR PROBLEMS (1 to 3 credit hours)
Planned reading and/or project under the guidance of a College of Education and Human Services faculty member.

771 INQUIRY PROJECT COMPLETE (1 credit hour)
To be taken the term PEP interns complete the inquiry project. Students complete research and write the inquiry project paper.

783 SCHOOL LAW AND FINANCE FOR EDUCATIONAL LEADERS (4 credit hours)
Procedures related to the management of school funds by the principal with special emphasis upon budgeting and accounting procedures. Statutes and judicial decisions related to legal authority of school principals. (This course does not meet state requirements for the superintendent's certificate.)

785 INTRODUCTION TO COMMUNITY EDUCATION (3 credit hours)
An introduction to the history, implementation, progress, publications, role of personnel and current status of Community Education. Prerequisite: graduate standing.

786 COMMUNITY SCHOOL (3 credit hours)
An introduction and exploration of the Community School concept. Prerequisite: graduate standing.

787 SCHOOL AND COMMUNITY (3 credit hours)
To develop an understanding of home and community factors and their relationship to the educational process.

801 CURRENT ISSUES AND PROBLEMS IN EDUCATION (3 credit hours)
Issues and problems in elementary and secondary education with special emphasis on changing needs, instructional patterns, and curricular organization.

810 SEMINAR ELEM ED (3 credit hours)
Special areas or problems in elementary education. Topics vary.

815 TEACH CHILDREN TO WRITE (3 credit hours)
Advanced study in current research theories and process of teaching writing in the elementary schools. Prerequisite: ED 316 or equivalent or instructor permission.

816 WHOLE LANGUAGE: THEORY AND CLASSROOM STRATEGIES (3 credit hours)
Focuses on theory and experiences of whole language and language in use in classrooms. Prerequisite: ED 716 and 721 or EDT 763 or equivalents.

817 ORGANIZATION AND SUPERVISION OF THE READING PROGRAM (3 credit hours)
Principles, methods, and techniques of giving leadership in improving the reading program. Emphasis on problems involved in initiating and sustaining change. Prerequisite: ED 615 or ED 632 and ED 621.

818 DIAGNOSIS AND REMEDIATION OF LEARNING (3 credit hours)
An examination of how children learn mathematics and why children have difficulty in computation. Participants organize and administer mathematics diagnostic inventories, administer standardized diagnostic tests, interpret the results, and design appropriate remedial activities. Prerequisite: completion of a curriculum and materials course in mathematics, or instructor's permission.

820 SEMINAR IN SECONDARY ED (3 to 6 credit hours)
Individual and group study of problems related to the several teaching areas in secondary school instruction.

831 READING INSTRUCTION IN JUNIOR HIGH AND MIDDLE SCHOOLS (3 credit hours)
Strategies for assessing students and materials as a basis for planning reading instruction in content areas in the middle schools.

835 SUPERVISED FIELD EXPERIENCE LABORATORY (3 credit hours)
A supervised field experience in which students apply knowledge and skills gained through the program. This course does not meet state requirements for certification in supervision.

867 VISIT TEACHER INTERNSHIP (1 to 9 credit hours)
Supervised field practice for visiting teacher certification as required by the State of Ohio. Repeated two consecutive quarters.
930 ADVANCED SEMINAR FOR CLASSROOM TEACHERS (1 to 3 credit hours)
A study of the problems related to instruction and to the teacher as a professional. Topics will vary from term to term. May be repeated twice.

960 ADVANCED SEMINAR IN SCHOOL PSYCHOLOGY (3 to 12 credit hours)
Intensive study of current issues in school psychology. Repeatable. No more than 12 hrs. can be applied to an advanced degree.

Education—Early Childhood/EDE

Note: See quarterly class schedule or departmental advisor for further enrollment restrictions, requirements, or special course information.

670 WORKSHOP IN EARLY EDUCATION (1 to 4 credit hours)
(Also listed as EDT 670.) Intensive practical study in a selected area of early education. May be taken for letter grade or pass/unsatisfactory.

702 MANAGING YOUNG CHILDREN'S BEHAVIOR IN THE EC SETTING (3 credit hours)
The study of classroom behavior management within the framework of child development, developmentally appropriate practices, and constructivist education including proactive planning and organization and appropriate expectations for young children.

703 SOCIAL DEVELOPMENT AND PLAY IN ECE (3 credit hours)
Social and emotional development and play as a purposeful behavior in young children; Curriculum, materials and assistive technology to facilitate communication and social interaction in early childhood settings.

712 ADVANCED STUDY OF CHILD DEVELOPMENT: TYPICAL AND ATYPICAL (3 credit hours)
Focuses on childbirth to eight years with emphasis on genetic and environmental factors that underlie physical, cognitive, and social/emotional development. Observational studies required as part of field placement. Field placement required.

715 YOUNG CHILDREN WITH SPECIAL NEEDS (3 credit hours)
Study of the causes and effects of various developmental disabilities, theories, and legalities of early intervention services 0-8, service delivery models, family, and agency involvement.

717 MEETING THE INDIVIDUAL NEEDS OF YOUNG CHILDREN (3 credit hours)
Covers the practices and procedures in developing activities for young children with developmental disabilities. Included will be modification and adaptations, as applied to development and implementation of the IFSP and IEP.

720 ADVANCED CURRICULUM PLANNING I: INTEGRATING LITERACY AND THE EXPRESSIVE ARTS (3 credit hours)
Detailed definition of the concept of developmentally appropriate practice applied to educational settings for children ages three through eight. Focuses on applying the concept of planning for literacy using an integrated curriculum with expressive arts visual art, poetry, music, and creative movement. Field experience required. Prerequisite: EDE 712, EDE 745 or equivalent.

721 ADVANCED PROGRAM PLANNING II: INTEGRATING MATH AND SCIENCE (3 credit hours)
Continued examination of developmentally appropriate curriculum for young children. Integrated planning for cognitive concepts including number, representation, visual/spatial skills, classification, logical thinking, and problem solving. Field experience required. Prerequisite: EDE 712, 745 or equivalent.

730 DEVELOPMENTALLY APPROPRIATE ASSESSMENT IN EARLY CHILDHOOD EDUCATION (3 credit hours)
Examination of the types and uses of assessment in early childhood. Experience in administering appropriate assessment in the field. Discusses current issues in testing relevant to early childhood. A variety of types will be discussed including formal and informal observation, play-based, authentic, and portfolio. Field experience required.
731 DEVELOPMENTALLY APPROPRIATE PROGRAMMING IN EARLY CHILDHOOD: INFANTS AND TODDLERS (3 credit hours)
A further investigation of the appropriate environment, enrichment activities, scheduling, evaluation, and interactional strategies in the Early Childhood setting with infants and toddlers (0-5 yrs).

735 THE ANTI-BIAS CURRICULUM IN EARLY CHILDHOOD EDUCATION (3 credit hours)
Examination of the sources of individual differences within the early childhood classroom including culture/ethnicity, race, language, learning style, and brain dominance. Field experience required.

744 CONDUCTING RESEARCH IN EARLY CHILDHOOD EDUCATION (3 credit hours)
Examination of current issues and trends in Early Childhood Education using traditional and contemporary electronic research technology. Develops proficiency needed to support students’ advocacy for programs that positively affect children. Prerequisite: course should be taken quarter prior to ece project (EDE 800).

745 COMPARATIVE THEORIES OF EARLY CHILDHOOD EDUCATION (3 credit hours)
Study of the history, theory, goals, programs, approaches and related research underlying early childhood education, including early intervention, and early childhood special education as well as other program models and philosophies such as Reggio Emilia, High Scope, Montessori, etc.

750 DESIGNING AND ADMINISTERING FAMILY-CENTERED EARLY CHILDHOOD PROGRAMS (3 credit hours)
Examines roles of the administrator, including hiring, training, evaluation, accreditation regulation, program planning, marketing, and budgeting. Emphasizes sensitivity to the needs of families and communities.

760 PRACTICUM IN EARLY CHILDHOOD EDUCATION OR EARLY CHILDHOOD SPECIAL EDUCATION (2 to 6 credit hours)
Supervised teaching experience for students who have completed student teaching or its equivalent and are seeking certification in pre-kindergarten or kindergarten. Number of years experience with children ages 3-6 in educational settings determines credit hours required. Prerequisite: EDE 712, EDE 745 or the equivalent and 12 additional hours of EDE coursework.

770 INDEPENDENT READING AND MINOR PROBLEMS IN EARLY CHILDHOOD EDUCATION (1 to 6 credit hours)
Planned reading and/or project under guidance of an EDE faculty member. Titles vary.

Educational Leadership/EDL
Note: See quarterly class schedule or departmental advisor for further enrollment restrictions, requirements, or special course information.

660 PROGRAMMING IN RESIDENTIAL LIFE (1 to 4 credit hours)
Provides an orientation to the university for new residence services paraprofessionals to prepare them to be effective in their roles. Participants will be exposed to the various student services available on campus as well as aspects of student development, the mission of the university, residence services, and new student orientation. Topics vary. May be taken for letter grade or pass/unsatisfactory.

661 STUDENT DEVELOPMENT FOR RESIDENCE LIFE PROGRAMS (1 to 4 credit hours)
Provides an overview of various student development concepts and functions within a residential setting. Focuses on knowledge and skills specifically for paraprofessional staff. Topics include community development, multiculturalism, peer counseling, interpersonal communication, conflict mediation and resolution, developmental programming, and developmental discipline. Topics vary. May be taken for letter grade or pass/unsatisfactory.
662 SPECIAL TOPICS IN STUDENT AFFAIRS IN HIGHER EDUCATION (1 to 4 credit hours)
Special topics in selected areas in Student Affairs in Higher Education designed to focus on management trends, theoretical frameworks, critical issues, specific professional areas within Student Affairs. Past topics have included Student Housing/Residential life and Management Issues in Student Affairs. Prerequisite: EDL 760 or CNL 700.

670 WORKSHOP IN EDUCATIONAL LEADERSHIP (1 to 4 credit hours)
Intensive study of a selected area of the school curriculum and educational administration to meet the needs of inservice teachers, administrators, and curriculum supervisors. May be taken for a letter grade or pass/unsatisfactory.

710 PROFESSIONAL GROWTH AND DEVELOPMENT (1 to 4 credit hours)
Provides students with a foundation for professional development. Emphasis on examination of belief systems, teaching styles, and teachers as learners; intra- and interpersonal communication skills needed in leadership roles; and functioning in a multicultural/pluralistic society.

711 SCHOOL LEADERSHIP SEMINAR (1 to 4 credit hours)
The development of leadership skills and abilities and the dynamics of team functioning, including decision-making models and processes, problem-solving techniques, communication skills, conflict management, and self-improvement. Prerequisite: completion of core courses.

712 PHILOSOPHICAL AND CURRICULAR FOUNDATIONS (4 credit hours)
Overview of past, present, and emerging curriculum trends. Examination of educational and curricular philosophy and how philosophy impacts school programs.

713 APPLIED PSYCHOLOGICAL LEARNING THEORY (4 credit hours)
Selected theories of learning and their value to instructional practices. Emphasis on the relationships among learning theories, learner characteristics, motivational theories, and instructional practices.

714 CONTEXT OF EDUCATION (1 to 4 credit hours)
Emphasizes the evolution of theories and the laws that underlie the free compulsory educational system as well as the organization, control, and support by the public of the educational system. Titles vary.

720 ANALYSIS OF TEACHING (4 credit hours)
Focuses on teaching methods and skills, and on classroom climate, including microteaching, interaction analysis, and collection of feedback from students.

721 CURRICULUM DESIGNING FOR THE TEACHER (1 to 4 credit hours)
Management and leadership skills as related to the development and organization of curriculum and materials; implementation of the learning program with students. Prerequisite: completion of core and general requirements.

722 INSTRUCTIONAL MANAGEMENT AND EVALUATION (4 credit hours)

730 RESEARCH ON TEACHING (4 credit hours)
Research on teaching effectiveness; culminates in the writing of a research proposal to be completed during the second year of the Teacher Leader Program.

731 STATISTICS AND APPRAISAL IN EDUCATION (4 credit hours)
Introduction to educational statistics and appraisal techniques. Emphasis on how to understand and use research data. Methods for appraising student development and progress. Enrollment limited to participants in the Teacher Leader Program.

733 SEMINAR: PROFESSIONAL DEVELOPMENT FOR TEACHERS (1 to 4 credit hours)
Issues in research related to classroom teachers. Critical and current issues relevant to the development of classroom teachers as leaders within the context of their roles. May be repeated up to four hours. Graded pass/unsatisfactory. Prerequisite: EDL 730, 732.
740 LEGAL AND PROFESSIONAL ISSUES (1 to 4 credit hours)
The legal framework of compulsion in education, the civil liberties of teachers, curriculum content, and academic freedom. Teachers rights, duties, and responsibilities to the education profession.

741 INSTRUCTIONAL DESIGN (1 to 4 credit hours)
Management and leadership skills as related to organizational patterns, staffing, utilization of space, time, and facilities at the building level. Prerequisite: completion of core and general requirements.

751 STATISTICS AND RESEARCH (4 credit hours)
Introduction to descriptive and inferential statistics and their application to assessment procedures.

755 RESEARCH PROJECTS (1 to 5 credit hours)
Conference course; individual research to satisfy requirements of research study for the Master of Education degree. Prerequisite: EDL 852 or permission of advisor.

757 STUDENT APPRAISAL METHODS (1 to 4 credit hours)
Intensive study of methods constructed and/or used by teachers for appraisal of student progress and adjustment. Includes selection, use, and interpretation of standardized instruments. Prerequisite: EDL 751 or equivalent.

760 INTRODUCTION TO STUDENT AFFAIRS IN HIGHER EDUCATION (4 credit hours)
(Also listed as CNL 700.) An overview of the history, philosophy, organization, and structure of student personnel services. Various student affairs functions and professional competencies are presented. Current and future trends and issues in student affairs are considered.

761 THEORIES OF STUDENT DEVELOPMENT AND ASSESSMENT (4 credit hours)
Studies theories of student development and their use in research and practice in student affairs, focusing specifically on college students. Prerequisite: EDL 760 or instructor permission.

762 STUDENT AFFAIRS ADMINISTRATION IN HIGHER EDUCATION (4 credit hours)
(Also listed as CNL 869.) Surveys student personnel services in colleges and universities. Consideration is given to the organization, administration, and rationale of these services. Prerequisite: EDL 760, EDL 761.

763 CAMPUS ECOLOGY (4 credit hours)
(Also listed as CNL 755.) Studies of campus ecology and the changing demographic and developmental issues facing college students. Studies the impact of the college environment on student development and the interaction between students and the environment. A combination of theory and research regarding college students and the environment are studied and applied. Prerequisite: EDL 760, EDL 761, EDL 762.

764 PROCESS CONSULTATION IN STUDENT AFFAIRS IN HIGHER EDUCATION (4 credit hours)
(Also listed as CNL 880.) Studies theories, models, and process techniques for collaborative consultation with other university personnel, student organizations, and community agencies. Focus is on a systems approach of consultative interaction and collaborative relationships which foster college students’ development. Prerequisite: EDL 760, EDL 761, EDL 762, EDL 763.

765 PRAC STU AF HIGHER ED (4 credit hours)
Provides an opportunity to work under supervision in an area of student affairs. This field work experience is accompanied by weekly on-campus seminars.

767 INTERNSHIP IN STUDENT AFFAIRS IN HIGHER EDUCATION (1 to 10 credit hours)
This field-based experience provides students with advanced practice and supervision in their major specialty area. Graded pass/unsatisfactory. Prerequisite: EDL 764, 765 or consent of instructor.

EDL 768 FINANCE AND BUDGET MANAGEMENT IN HIGHER EDUCATION/STUDENT AFFAIRS (4 credit hours)
Current and emerging trends for funding higher education and budget models utilized provide the focus of this course. University budget and financial statements will be analyzed, budget proposals developed, and budget reduction techniques explained. Prerequisite: EDL 760, 762 or permission of instructor.
771 EDUCATIONAL LEADERSHIP BEHAVIOR (3 to 4 credit hours)
Focuses on the development of a strong base of understanding in organizational structure for skill building in leadership, communication, decision-making, and problem-solving. Educational renewal, political considerations, ethical behavior, professional development, and change processes are also included. Prerequisite: completion of core recommended graduate standing required.

772 EDUCATIONAL ADMINISTRATIVE BEHAVIOR (4 credit hours)
Develops an understanding of the principles of educational administrative processes, formal school structures and organization, and an introduction to school administrative task areas. School culture, principles of democratic school administration, ethical behavior, and other educational renewal oriented processes are also studied. The inclusion of a field experience emphasizes the course focus of actively blending theory and practice. Prerequisite: EDL 771.

773 CURRICULUM DEVELOPMENT FOR SCHOOL LEADERS (3 to 4 credit hours)
Designed to improve the school leader/administrator's ability to manage and lead the development and organization of curriculum and materials. This course presents the concepts and skills of curriculum development and shows how to apply these to actual course planning.

774 ANALYSIS OF TEACHING (1 to 4 credit hours)
Provides school leaders/administrators the opportunity for analysis of teaching through an understanding of the PRAXIS III performance model and the exploration of instructional methodologies, critical theory related to teaching, and strategies for continual improvement. Prerequisite: EDL 773.

775 INSTRUCTIONAL MANAGEMENT AND EVALUATION (1 to 4 credit hours)
Focuses on the assessment of students and the evaluation of instruction. An exploration of theory, contemporary thinking, and fundamental questions and decisions related to school administration/leadership and the continual improvement of instructional processes through application of PRAXIS III criteria.

776 SUPERVISION OF INSTRUCTION AND PERSONNEL (1 to 4 credit hours)
Emphasis on general supervision practices, personnel management, and staff performance evaluation. Prerequisite: EDL 773, 774 and 775.

780 ETHICS AND POLITICS IN EDUCATION (4 credit hours)
Developing an understanding of potential structures and effective principles of school/community relations. Concepts of power, pressure groups, lobbying, potential networks, and public ethics are examined. Characteristics of effective communication, advisory bodies, and public relations programs are covered. Field experience required.

781 SCHOOL FINANCE AND ECONOMICS (1 to 4 credit hours)
The financing of public education and the economics of education. Guiding principles for developing financial programs and management procedures are covered. Prerequisite: EDL 777.

782 SCHOOL LAW (3 to 4 credit hours)
Provides an examination of the legal framework that all school personnel must function in. Emphasis on both legal precedents and statutory provisions.

790 PRACTICUM IN INSTRUCTIONAL LEADERSHIP (4 credit hours)
Provides educational leadership degree candidates an opportunity to apply concepts and skills to educational practice and to evaluate their own leadership effectiveness. Prerequisite: completion of educational administration and/or curriculum/supervision concentration.

791 CURRICULUM DESIGN AND EVALUATION (1 to 4 credit hours)
Provides curriculum and supervision students with knowledge and skills necessary to perform curriculum and instruction design and evaluation functions. Prerequisite: EDL 777.

792 PROFESSIONAL DEVELOPMENT AND CHANGE: FROM THEORY TO PRACTICE (1 to 4 credit hours)
Focuses on understanding needs and the motivation to change in self and others within the context of the school organization. Contemporary models of professional development and change theory are emphasized.
793 COMPUTER APPLICATION FOR EDUCATIONAL LEADERS
(1 to 4 credit hours)
Introduction to computers and their applications for educational leaders.
Investigation of potential uses of the computer for student learning and school management and administration. Review and evaluation of specific hardware.

796 ORGANIZATION AND ADMINISTRATION OF PUBLIC SCHOOLS (1 to 4 credit hours)
Principles of democratic school administration; management of teaching and nonteaching personnel; role of administration in facilitating teaching and learning; and school/community relations.

851 ADVANCED SEMINAR IN EDUCATIONAL RESEARCH, DESIGN AND ANALYSIS (3 credit hours)
Individual and group study of ongoing applied educational research. Prerequisite: EDL 852.

852 STATISTICAL ANALYSIS AND RESEARCH DESIGN (4 credit hours)
Study of computation and interpretation of inferential statistics as they relate to the design of educational research. Critical study of research techniques and reporting methods. Computer applications will be stressed. (Previously listed as EDL 752.)

853 ADVANCED EDUCATIONAL STATISTICS (4 credit hours)
Multivariate analysis including analysis of variance-factorial designs, repeated measures, analysis of covariance, multiple analysis of variance, multiple regression, and nonparametric techniques for 1 to k samples. Computer applications will be stressed. (Previously listed as EDL 753.)

858 ADVANCED EDUCATIONAL MEASUREMENT: THEORY AND PRACTICE (4 credit hours)
Test construction, evaluation, standardization, validation, reliability, item analysis, norm setting, criterion referencing, selection, and interpretation of standardized tests. Prerequisite: EDL 751.

871 MANAGEMENT OF THE SCHOOL (4 credit hours)
Focuses on the day-to-day operation of a school building and a school system. State requirements are emphasized in relation to operational procedures in all aspects of managing a school and a school system. Prerequisite: educational specialist degree status or permission of instructor required.

872 STAFF PERSONNEL ADMINISTRATION (4 credit hours)
Hypotheses, concepts, principles, and practices for dealing with school personnel. Areas of recruitment selection, induction, appraisal, development, compensation, and motivation are covered. Legal aspects of personnel management are also covered. Prerequisite: educational specialist degree status or special permission of instructor required.

873 PUPIL PERSONNEL SERVICES ADMINISTRATION (4 credit hours)
The development of understanding and procedures of administering pupil personnel aspects of school operation. Student accounting and attendance, guidance and counseling functions, classroom management (discipline), and extracurricular/co-curricular activities are covered. Prerequisite: educational specialist degree status or special permission of instructor required.

874 SCHOOL BUSINESS MANAGEMENT AND FACILITIES (4 credit hours)
Guiding principles for developing adequate financial programs: detailed studies of sources of local, state, and federal revenue; and procedures for management of school funds with reference to budgeting, accounting, and auditing. Operation and management of effective school plant receives equal emphasis. Prerequisite: educational specialist degree status or special permission of instructor required.

890 INTERNSHIP: SCHOOL ADMINISTRATION (1 to 4 credit hours)
Provides an experience in school administration in which students perform administrative tasks under supervision. Field experience is planned jointly by students and practicum supervisors, and includes activities in all administrative task areas. Prerequisite: completion of masters degree and all course work required by certification standards.

920 HISTORY AND PHILOSOPHY OF HIGHER EDUCATION IN THE UNITED STATES (4 credit hours)
Reviews history and development of higher and continuing education in the United States with special attention to forces that have shaped its development. Examines history of critical philosophical debates, and issues about the nature and role of higher education.
921 CURRICULUM IN HIGHER EDUCATION (4 credit hours)
Introduction to patterns of curricular organization in the four-year college and university with attention to historical development and current models. Study of the issues governing curriculum planning, including the social, economic, political, historical, and philosophical contexts of which curriculum is formed and developed. May be taken for letter grade or pass/unsatisfactory. Prerequisite: EDL 920.

922 LAW OF HIGHER EDUCATION (4 credit hours)
Examination of statute and case law that governs the operation of institutions of higher education. Issues of employment, evaluation, contracts, copyright, and student and faculty rights will form the basis of the course. Can be taken for a letter grade or pass/unsatisfactory. Prerequisite: EDL 920.

923 INSTRUCTION IN HIGHER EDUCATION (4 credit hours)
Designed to facilitate the application of theory to practice in teaching in colleges and universities. Students will explore diverse pedagogical approaches and develop an understanding of the professional role of the faculty member. May be taken for letter grade or pass/unsatisfactory. Prerequisite: EDL 920.

924 ADMINISTRATION IN HIGHER EDUCATION (4 credit hours)
Introduction to administrative, organizational, and leadership theory and practice in the two-year and four-year college and university. Participants explore historical, current, and future plans for administration in higher education. May be taken for letter grade or pass/unsatisfactory. Prerequisite: EDL 920.

926 THE COMMUNITY COLLEGE (4 credit hours)
Explores the historical roots of the most exciting, important innovation in American higher education since the Second World War, the community college. How and why did they come into being, how do they really work, and how can we make them more effective? Prerequisite: graduate status and EDL 920.

928 INTERNSHIP IN HIGHER EDUCATION (4 credit hours)
Provides opportunity for an in-depth field experience in higher education with administrative professionals. Designed to provide breadth to the students' prior experiences and be consistent with individual career goals. Prerequisite: EDL 920.

929 THE ROLE OF INTERCOLLEGIATE ATHLETICS IN HIGHER EDUCATION (4 credit hours)
Explores the role and impact of athletic programs at the intercollegiate level. Students study administrative and organizational structure, specialized functions, and professional career opportunities within the field of intercollegiate athletics. Planning, financing, programming, and management are studied, as well as the role of athletics within the educational experience. Prerequisite: EDL 920.

941 PLANNING EDUCATIONAL FUTURES (4 credit hours)
Focuses on adaptation to social, political, and educational change in the future of education. Analysis and planning procedures address the probable social, political, economic, ethical, and intellectual factors that may appear on the horizon. Strategic planning, systems theory, change theory, and processes are explored in connection to forecasting potential economic, enrollment, and demographic futures. Prerequisite: master's degree required.

971 SUPERINTENDENT/STAFF/BOARD RELATIONSHIPS (4 credit hours)
Emphasizes the strategic roles of the superintendent, staff, school board, unions, and community in light of local, state, and federal regulations and political pressure. Reviews the limits and role responsibilities of school district personnel and constituents from organizational and cultural perspectives. Addresses organizational policy formation, politics, negotiations, mediation, and problem solving. Prerequisite: education specialist degree status or special permission of instructor.

975 DIRECTED STUDY (1 to 3 credit hours)
Designed for students enrolled in the Educational Specialist degree program and/or those students admitted to a cooperative doctoral program. Course requirements are determined by students and their assigned program advisors. Minimum requirements involve an individualized set of objectives, learning strategies, and evaluation design. Titles vary.
985 ORGANIZATIONAL DYNAMICS: THE INDIVIDUAL AND THE ORGANIZATION (4 credit hours)
Focuses on the individual and the organization. The respective needs and expectations of each are investigated as they apply to educational institutions. Emphasis is on interpersonal and organizational communication, group processes, conflict resolution, and collaboration for school improvement. These concepts are explored to help participants conceptualize the interpersonal nature of organizations.

986 ORGANIZATIONAL BEHAVIOR IN EDUCATION AND HUMAN SERVICES (4 credit hours)
Focuses on role theory, leadership theory and style, and decision-making theory and practice relative to the institution of education. Emphasis on analyzing organizations and the educational institution in particular through a social systems orientation. Participants are provided with a historical analysis of organizations, the future directions of organizations, and an analysis of current and future educational institutions.

987 ADMINISTRATIVE LEADERSHIP IN COMMUNICATION (4 credit hours)
Focuses on the development of leadership skills in relationship to individual and organizational communications, group processes, conflict management, decision making, and problem solving. Participants study and practice the principles of change.

988 RESEARCH AND THE EDUCATIONAL LEADER (3 credit hours)
Focuses on the practical applications and issues in research as it relates to educational leadership. Participants focus on research design and methodology, sampling techniques, instrument development, proposal writing, and the application of these skills through a research project to be implemented within a public school setting.

991 ADV SEM ED LEADERSHIP (1 to 4 credit hours)
Three basic topics are addressed: (1) Teacher Evaluation and Staff Development offered fall quarter, (2) Issues in Leadership and Management offered winter quarter, and (3) Innovations in Education offered spring quarter.

993 SCHOOL DISTRICT BUSINESS MANAGEMENT (4 credit hours)
Guiding principles for developing adequate district fiscal programs; study of sources of revenue—local, state, and federal; procedures in management of district funds with reference to budgeting, accounting, auditing, public and governmental reporting; district cost-benefit analysis; district financial needs forecasting; and levy/income tax campaigns.

995 ADVANCED INSTITUTE FOR EDUCATIONAL LEADERS (1 to 4 credit hours)
Individual and group study of current problems and new skill development for educational leaders. Topics require multifaceted approaches and investigations. Topics might include personnel management related to negotiations, human rights, or decision making. Topics vary. Prerequisite: master's degree.

999 THESIS (1 to 9 credit hours)
Research for thesis in Educational Specialist Program. Prerequisite: EDL 852 or permission of advisor.
643 INTRODUCTION TO AUGMENTATIVE COMMUNICATION (3 credit hours)
Course introduces etiology, problems, and needs of individuals who are nonspeaking. Hands-on experiences are required using augmentative aids and devices with individuals with multiple impairments. Prerequisite: EDS 651 or experience with individuals who have multiple impairments.

644 INSTRUCTIONAL AND BEHAVIORAL MANAGEMENT SKILLS FOR INTERVENTION SPECIALISTS (3 credit hours)
Prepares special educators, Intervention Specialists, and other professionals to meet the instructional and behavioral management demands of working with exceptional individuals, including those with severe emotional disturbance. Prerequisite: EDS 655 or 651.

645 TRANSITIONS OF STUDENTS WITH SPECIAL NEEDS (3 credit hours)
Examines role of intervention specialists in shaping transition experiences for students with special needs. Emphasis on school to adult transition at early childhood, elementary, and middle school, also addressed; direct work with clients required. Prerequisite: EDS 651 or 655 or RHB 301 or 702.

651 NATURE AND NEEDS OF STUDENTS WITH MODERATE TO INTENSIVE EDUCATIONAL NEEDS (3 credit hours)
Introduces prospective intervention specialists to the etiological aspects: historical, educational, and training programs; culture, concerns, and issues related to students with moderate to intensive educational needs. Prerequisite: teaching certificate or ED 603 or 604.

652 EDUCATION OF INDIVIDUALS WITH PHYSICAL, SENSORY, AND MOTOR DISABILITIES (3 credit hours)
Overview of the etiology and educational implications of physical disabilities, sensory deficits, and communication disorders. Emphasis on psycho-educational and physical needs of children and youth, including adaptation of methods and materials. Direct work with clients required. Prerequisite: teaching certificate or ED 603 or 604.

653 CURRICULA, METHODS, MATERIALS AND ADAPTIVE EQUIPMENT FOR STUDENTS WITH MODERATE/INTENSIVE EDUCATIONAL NEEDS (3 credit hours)
Review of organizations, methods and techniques for educating and training individuals with moderate to intensive educational needs. Surveys opportunities available for recreation, leisure time, and work habitation. Participation with individuals with moderate to intense educational needs. Prerequisite: EDS 651, 652 or instructor permission.

654 ASSESSMENT: THE INTERVENTION SPECIALIST ROLE (3 credit hours)
Administering and interpreting formal and informal educational assessment instruments and communicating assessment data to parents and colleagues. Prerequisite: EDS 655 pre- or corequisite.

655 NATURE AND NEEDS OF STUDENTS WITH MILD TO MODERATE EDUCATIONAL NEEDS (2 to 4 credit hours)
Introduces prospective intervention specialists to the causes and effects of mild to moderate learning disorders. Covers cultural, social, and emotional needs of students and teaching strategies. Prerequisite: ED 603 or 604 or teaching certificate.

656 CLINICAL PRACTICE IN REMEDIATION (4 credit hours)
Supervised clinical practice in the diagnostic teaching of exceptional individuals. Emphasis on assessment, reading, and math curriculum and materials. Prerequisite: ED 637, 615 or 716, 632, EDS 655, 642, 654.

659 COMMUNICATION AND CONSULTATION SKILLS FOR EDUCATORS (3 credit hours)
Techniques of collaborative consultation needed to enhance communication with exceptional individuals, parents, and educational team members. Direct work in the field is required. Prerequisite: EDS 651 or 655 or enrollment in general educator programs.
661 INTERNSHIP: SPECIAL EDUCATION
(10 TO 12 credit hours)
Graduate student teaching assignment for graduate students seeking licensure to teach students with mild/moderate, moderate to intensive educational needs. Required for students without previous student teaching experience. May be taken for letter grade or pass/unsatisfactory. Prerequisite: all special education course requirements.

670 WORKSHOP IN SPECIAL EDUCATION
(1 to 4 credit hours)
Intensive practical study in a selected area of special education. May be taken for letter grade or pass/unsatisfactory.

720 CREATIVE PROBLEM SOLVING
(4 credit hours)
Introduction to creative problem-solving models and approaches that can be used by classroom teachers to involve students in the solutions of problems.

722 EDUCATION OF STUDENTS WITH GIFTED EDUCATIONAL NEEDS
(4 credit hours)
Overview of the characteristics of gifted children and youth. The historical and current aspects of education of the gifted, and family problems and vocational concerns. Prerequisite: teaching certification.

723 CURRICULA FOR THE GIFTED
(4 credit hours)
(Also listed as AED 741.) Study of curriculum, materials, and methods appropriate for teaching gifted individuals. Local program models are presented and observed in class. Prerequisite: EDS 722.

740 CLINIC PRACT SBH (3 credit hours)
Furthers students' knowledge of the daily operations of various SBH programs. Provides students an opportunity to apply knowledge acquired in previous course work and to assist students in the acquisition of skills needed to handle the physically aggressive client. Field/clinical work required.

771 SPECIAL EDUCATION FIELD EXPERIENCE (3 credit hours)
A supervised observation experience for students who are completing the pre-licensure sequence to teach students with mild/moderate, moderate/intensive, or gifted educational needs.

Educational Technology/EDT
Note: See quarterly class schedule or departmental advisor for further enrollment restrictions, requirements, or special course information.

607 COORDINATION TECHNIQUES
(4 credit hours)
Procedures in organizing and implementing a vocational program, including recruitment, selection, and evaluation of students and training stations; concurrent classroom instruction; and in-depth study of the duties, problems, and techniques involved in coordination. Prerequisite: EDT 633 or equivalent.

608 INTENSIVE OFFICE EDUCATION
(3 credit hours)
Qualifying course for intensive office education programs. Comprehensive study in developing procedures and principles in program construction, selection, improvement, implementation, and development of program guidelines. Prerequisite: EDT 633 or equivalent.

633 BUSINESS EDUCATION:
CURRICULUM AND MATERIALS IN BASIC BUSINESS SUBJECTS
(4 credit hours)
Business education philosophy, objectives, and curricula on the secondary level of instruction. Curriculum and materials in basic business subjects, bookkeeping, data processing, and sales communication. Prerequisite: ED 211 through 217 or equivalent. Corequisite: ED 327.

634 CURRICULUM AND MATERIALS:
OFFICE PROCEDURES AND TECHNOLOGY (4 credit hours)
Curriculum, methods, and materials in typewriting, keyboarding, word processing, and office procedures in the secondary school; current trends in teaching typewriting, keyboarding, word processing, and office procedures. Prerequisite: EDT 433, EDT 212.

635 BUSINESS EDUCATION
CURRICULUM AND MATERIALS:
SHORTHAND, TRANSCRIPTION, AND SECRETARIAL (3 credit hours)
Curriculum, methods, and materials in teaching shorthand, transcription, and secretarial procedures. Prerequisite or corequisite: ED 322, OA 320, 213. Corequisite: ED 327.
670 WORKSHOP IN EDUCATIONAL TECHNOLOGY (1 to 6 credit hours)
(Also listed as EDE 670.) Intensive, practical study in a selected area of educational or applied technology. Titles vary.

700 ENTRY SEMINAR FOR EDUCATIONAL TECHNOLOGY (2 credit hours)
Introductory seminar into educational technology programs. Students should take this class before or concurrently with their educational technology coursework.

711 SCHOOL LIBRARY MEDIA COLLECTION DEVELOPMENT
(4 credit hours)
Focuses on the process for developing school library media center collections. Includes policy development, selection, acquisition, weeding, evaluation, development and use of collections, and copyright/intellectual freedom issues.

714 ONLINE COMMUNICATION
(1 credit hour)
Introductory and extended instruction in telecommunications topics including hardware and software requirements, online etiquette, e-mail, copyright issues, file transfers, maintenance and troubleshooting. The class meets only electronically.

715 INFO RETRIEVAL THRU TECH
(4 credit hours)
Search strategies are developed and information retrieval technology is used to access sources. Instructs how to implement skills in an educational setting.

716 BUILDING ONLINE APPLICATIONS
(2 credit hours)
Provides examples and demonstrations of the advantages of using online resources with educators and children who integrate that access into the learning environment. A major project will be required on a subject area of discipline of choice. Prerequisite: EDT 714 or instructor permission.

721 CATALOG AND CLASSIFICATION
(4 credit hours)
Focuses on the process of developing library media center retrieval systems for print/nonprint resources. Students learn to establish standard bibliographic description, access points, classification, subject description, and MARC format for automated systems.

724 FOUNDATIONS OF BUSINESS EDUCATION (3 credit hours)
Philosophy and objectives of the business education and vocational business and office education curricula on the secondary and postsecondary levels of instruction. Guidance, selection, and placement of students and contemporary influences on business education and vocational business and office education are included.

727 TEACHING STRATEGIES AND CURRICULUM TRENDS IN NON-SKILLED BUSINESS EDUCATION SUBJECTS (3 credit hours)
Study of recent developments in the teaching of basic business subjects including vocational programs and the development of appropriate teaching strategies.

728 CURRICULUM AND MATERIALS IN ECONOMIC EDUCATION (3 credit hours)
Analysis of materials available, the development of appropriate teaching units, and the application of special methods for teaching economics on the elementary, secondary, and postsecondary levels.

729 TEACHING STRATEGIES AND CURRICULUM TRENDS IN ACCOUNTING AND DATA PROCESSING (3 credit hours)

730 TEACHING STRATEGIES AND CURRICULUM TRENDS IN THE SKILLED BUSINESS EDUCATION SUBJECTS (3 credit hours)
Analysis of the trends, application of new teaching media, and the development of teaching strategies in typewriting, shorthand, transcription, word processing, office procedures, and office machines.

735 ADV PRODUCTION INSTR MAT (4 credit hours)
Examines philosophy and methodology of producing instructional materials. Includes basic and advanced techniques, tools, materials, and mechanics.
745 THE ART AND TECHNIQUE OF STORY TELLING (4 credit hours)
Students learn principles of the art of story telling, as this reflects a listening/language experience. Includes a broad foundation in literature, story cycles, story telling techniques, and program planning.

746 TEACHING INFORMATION AND RESEARCH SKILLS (4 credit hours)
Major concepts covered include the application of a nonlinear information skills model across curricula, interdisciplinary and authentic curriculum design; and electronic information searching skills.

749 INTRO INSTRUCTIONAL MEDIA (4 credit hours)
Survey course in instructional media including the interpretation of visuals (projected and nonprojected), film, instructional television, gaming, audio technology, multimedia systems, computers, operation of audiovisual equipment, and media facilities. Focuses on the appropriate use of media for specific instructional outcomes.

751 EDUCATIONAL USE OF VIDEO-BASED TECHNOLOGY (4 credit hours)
Studies the potential, limitations, and techniques for effectively using ITV, radio, distance learning, telecommunications, and interactive video.

756 ADVANCED TELEVISION PRODUCTION (4 credit hours)
Designed to improve the skills, knowledge, and creativity used in television production. Planning, writing, producing, and editing for educational and informational productions are emphasized.

763 YOUNG ADULT LITERATURE (4 credit hours)
Students demonstrate applications of young adult literature for ages 12-21 using booktalks, response-centered approach techniques, literary projects, voices in young adult literature discussions, response journals, and media and young adult literature discussions.

770 INDEPENDENT STUDY (1 to 4 credit hours)
Individualized course of study under the supervision of the faculty. May include, but not limited to, extensive readings, the performance of a research project, a paper, or a production.

782 DEVELO MULTIMEDIA PROD (4 credit hours)
Students use elements of instructional design and storyboarding techniques to translate instruction into various types of multimedia presentations.

786 APPLICATIONS OF COMPUTERS IN EDUCATION (4 credit hours)
Types of educational software and applications, software evaluation, curriculum development, and lesson planning integrating computer courseware.

791 ORGANIZATION AND ADMINISTRATION OF SCHOOL MEDIA CENTERS (4 credit hours)
Administrative practices and services that relate to the school library media center. Considers problems pertaining to standards, legislation, personnel, planning facilities, materials, instruction, and management procedures. Prerequisite: nine hours in EDT.

799 EXIT SEMINAR IN EDUCATIONAL TECHNOLOGY (2 credit hours)
Individual and group study of problems related to educational technology. Enrollment is limited to department majors. Should be taken near or at the completion of master degree program.

817 ISSUES AND IMPLICATIONS OF TELECOM IN THE EDUCATION ENVIRONMENT (3 credit hours)
Students meet in seminar-fashion both in the traditional as well as virtual classroom. All will participate in an interactive, online discussion group. Topics will focus on creating virtual entities, developing a sense of community using online tools, the developing communication infrastructure, how new technologies affect children in the school, the home, and the future job market.

839 INSTRUCTIONAL DESIGN AND DEVELOPMENT (4 credit hours)
Advanced course in the development of a wide range of techniques and materials to improve instruction. Includes factors that facilitate learning, patterns for teaching and learning, the contributions of audiovisual material to improve learning, procedures for designing instruction, and the instructional design plan.

890 INTERNSHIP (1 to 4 credit hours)
Students are assigned for a maximum of 100 hours to a library, learning center, computer facility, or video operation to gain practical experience under supervised conditions. Graded pass/unsatisfactory.
895 ADMINISTRATION AND SUPERVISION OF EDUCATIONAL TECHNOLOGY (4 credit hours)
Covers leadership theory and networking, qualifications and duties of the director, planning and administering the program, preparing the budget, buying equipment and handling materials, in-service training and evaluation of the program.

899 MASTER'S THESIS (1 to 9 credit hours)
The project may be a thesis or creative production and is prepared under the guidance of the student's advisory committee.

975 DIRECTED STUDY (4 credit hours)
Designed for students enrolled in the Educational Specialist degree program with a focus on technology. Involves library research, analysis, evaluation, problem solving, and critical thinking.

Electrical Engineering/EE

Note: See quarterly class schedule or departmental advisor for further enrollment restrictions, requirements, or special course information.

501 CIRCUIT ANALYSIS I (4 credit hours)
Basic elements and laws, circuit analysis techniques and concepts, energy storage elements, first and second order circuits, sinusoidal steady state analysis. Prerequisite: MTH 233, PHY 242, corequisite or post prerequisite: EE 302.

503 CIRCUIT ANALYSIS II (3 credit hours)
Circuit review, alternating current concepts, computer-aided circuit analysis, two-port networks, power. Prerequisite: EE 301 and EE 302, corequisite or post prerequisite: EE 304.

521 LINEAR SYSTEMS I (4 credit hours)
Considers systems in a broad context including linear, nonlinear; variant, invariant; and analog and discrete. Approaches to system and signal modeling are discussed with emphasis on the Fourier transform technique. Prerequisite: EE 301 and 302.

522 LINEAR SYSTEMS II (4 credit hours)
Covers discrete time signals and systems, the z-Transform, input/output theory and discrete Fourier transform, IIR and FIR filter design, relationships, and sampling. Prerequisite: EE 321.

526 RANDOM SIGNALS AND NOISE (4 credit hours)
Provides a practical introduction to the concepts of random events, characterization of stochastic signals, first and second order moment descriptions of random processes, and input/output descriptions of random signals and noise in linear systems. Prerequisite: EE 321.

531 ELECTRONIC DEVICES (3 credit hours)
Introduction to basic solid-state electron devices. Fundamentals necessary for comprehension and further study of modern engineering electronics. Major topics include carrier flow in semiconductors, p-n junction theory, semiconductor diodes, bipolar junction transistors, field-effect transistors, biasing, and introduction to amplifiers. Prerequisite: EE 501 and EE 502.

545 ELECTROMAGNETICS (4 credit hours)
Developments in the basic concepts of vector calculus and their application to electromagnetics, electrostatics, and magnetics; induced electromotive force; and Maxwells equations and their physical interpretation and application. Prerequisite: EE 301 and 302, MTH 232.

546 TRANSMISSION LINES, WAVEGUIDES, AND RADIATING SYSTEMS (4 credit hours)
Plane waves in free space and matter. Transmission line equations and application of Smith chart. Wave propagation in rectangular waveguides. Introduces radiating systems including the dipole and loop antennas. Rudimentary design of typical systems containing transmission lines, waveguides, and antennas. Prerequisite: EE 345.

613 CONTROL SYSTEMS I (3 credit hours)
(Also listed as BMS 710.) Provides students with a general control background. Major topics include block diagrams and signal-flow graphs, electromechanical modeling including state variable representation, time response, root locus, and introduction to design. Prerequisite: ME 213 and EE 521, corequisite or post prerequisite: EE 614.

615 CONTROL SYSTEMS II (3 credit hours)
(Also listed as BMS 712.) Utilizing Control Systems I background, this course concentrates on controller design in both the time and frequency domains, using Nyquist, Bode, and root locus techniques. Prerequisite: EE 613 and EE 614.
617 DIGITAL CONTROL SYSTEMS
(3 credit hours)
Covers sampled spectra and aliasing, analysis and design of digital control systems using root locus and transform techniques; discrete equivalents of continuous controller and quantization effects, introduction to programmable logic controllers. 3 hours lecture, 4 hours lab. Prerequisite: EE 522 and EE 615.

618 CONTROL SYSTEMS DESIGN PROJECT (4 credit hours)
A project-oriented design course, integrating design methodology with the principles of controller design developed in previous courses. Topics include project planning, system specs, documentation, design reviews, written and oral reports, and system test. 2 hours lecture, 2 hours lab. Prerequisite: EE 617 and EE 620.

619 INTRODUCTION TO FUZZY LOGIC CONTROL (4 credit hours)
(Also listed as CEG 619.) Foundations and philosophy of fuzzy logic and applications to control theory. Relationship between classical PID control and fuzzy rule-based control. Techniques for rule construction and adaptive fuzzy logic controllers. Case studies of fuzzy logic control applications. (3 hours lecture and 2 hours lab.) Prerequisite: EE 613 and 614.

621 COMMUNICATION THEORY
(4 credit hours)
Analysis of communication systems using the Fourier transform and the convolution integral. Discussion of Nyquist's sampling theorem and an introduction to binary pulse code modulation (PCM). Various analog (AM, SSB, WBFM) and digital (BPSK, AK, FSK) modulation techniques are also discussed and analyzed. Prerequisite: EE 321.

625 NUMERICAL METHODS FOR ENGINEERS (4 credit hours)
Root location, polynomial interpolation, numerical methods for linear-systems analysis, matrix methods in circuit analysis, frequency domain circuit-analysis techniques. Prerequisite: EE 321, MTH 253, proficiency in "C," PASCAL or FORTRAN.

631 ELECTRONIC CIRCUITS
(3 credit hours)
Theory and application of basic engineering electronics developed for discrete and integrated circuits. Topics include bipolar and field effect transistor amplifier analysis and design, frequency response, multistage and feedback amplifiers. Prerequisite: EE 521, EE 531 and EE 532. Corequisite: EE 632.

635 DESIGN AND IMPLEMENTATION OF ANALOG AND DIGITAL FILTERS
(4 credit hours)

636 DIGITAL SIGNAL PROCESSING: THEORY, APPLICATION AND IMPLEMENTATION (4 credit hours)
Introduces principles and applications of digital signal processing (DSP) from the design and implementation perspective. Topics include analog-to-digital/digital-to-analog converters and digital filters, Fourier analysis algorithms, and real-time applications all implemented on a TMS 320C30 floating point DSP Chip. Prerequisite: EE 322, CEG 220 or CS 240.

644 LINEAR INTEGRATED CIRCUIT
(4 credit hours)
Theory and applications of linear integrated circuits. Topics include ideal and real operational amplifiers, frequency response and compensation, active filters, comparators, and waveform generators. 3 hours lecture, 2 hours lab. Prerequisite: EE 631 and 632.

645 ELECTROMAGNETIC COMPATIBILITY
(4 credit hours)
Identification of possible sources of electromagnetic interference (EMI) in an electronic device or system. Fundamental EMC design principles concerning conducted and radiated emissions, reduction of susceptibility to EMI and EMI shielding. Prerequisite: EE 545.

646 MICROWAVE CIRCUIT DESIGN
(4 credit hours)
Review of Smith chart, introduction to microstrip lines, impedance matching, power-gain equations, stability considerations, and design methods for amplifiers and oscillators. CAD (Touchstone software by EESOF) is used. Prerequisite: EE 546.

647 ANTENNA THEORY AND DESIGN
(4 credit hours)
Computer-aided design and analysis of wire antennas, feed networks, and antenna arrays using antenna CAD software. Covers linear dipole antennas, antenna arrays, thin-wire antennas, moment method analysis (see dipole, folded dipole, etc.), broadband and frequency-independent antennas. Prerequisite: EE 346.
648 RF/MICROWAVE SYSTEMS DESIGN PROJECTS (4 credit hours)
A project-oriented design course, integrating design methodology with the principles of microwave circuit analysis and electromagnetic wave propagation, developed in previous courses. Formal documentation, design reviews, and reporting are required. Prerequisite: EE 646.

649 PULSE AND DIGITAL CIRCUITS (4 credit hours)
Design, analysis, and application of pulse and switching circuits using both Field Effect Transistors (FETS) and Bipolar Junction Transistors (BJTs). Transistor level design of digital integrated circuits including NMOS, CMOS, TTL, and ECL logic families. Design of digital interface and buffer circuits. Transmission line effects in digital applications. 3 hours lecture, 3 hours lab. Prerequisite: EE 631 and EE 632.

651 DIGITAL SYSTEMS DESIGN (4 credit hours)
(Also listed as CEG 560.) Topics include flip-flops, registers, counters, programmable logic devices, memory devices, register-level design, and microcomputer system organization. Student must show competency in the design of digital systems. 3 hours lecture, 2 hours lab. Prerequisite: EE 260.

654 VLSI DESIGN (4 credit hours)
(Also listed as CEG 654.) Introduction to VLSI system design. Topics include CMOS devices and circuit design techniques, basic building blocks for CMOS design, fabrication processing and design rules, chip planning and layout, system timing and power dissipation, simulation for VLSI design, and signal processing with VLSI. Prerequisite: EE 631, EE 632 and EE 651.

655 VLSI CIRCUIT DESIGN (4 credit hours)
A project-oriented design course, integrating design methodology with principles of integrated circuit design developed in previous courses. Focus is an integrated circuit design project including the topics of project selection, planning and management, system specification, documentation, design reviews, written and oral reports, and testing. 2 hours lecture, 4 hours lab. Prerequisite: EE 654.

656 INTRODUCTION TO ROBOTICS (4 credit hours)
(Also listed as CEG 656 and ME 656.) Introduction to the mathematics, programming, and control of robots. Topics covered include coordinate systems and transformations, manipulator kinematics and inverse kinematics, trajectory planning, Jacobians, and control. Prerequisite: MTH 253; proficiency in PASCAL, C, or FORTRAN programming.

658 DIGITAL INTEGRATED CIRCUIT DESIGN WITH PLDS AND FPGAS (4 credit hours)
(Also listed as CEG 658.) Design and application of digital integrated circuits using programmable logic devices (PLDs) and field programmable gate arrays (FPGAs). A commercial set of CAD tools (Mentor Graphics and Xilinx) are used in the lab portion of the course. Prerequisite: EE 651.

659 CIRCUIT DESIGN WITH VHDL (4 credit hours)
(Also listed as CEG 659.) Application of VHSIC hardware description language (VHDL) to the design, analysis, multi-level simulation, and synthesis of digital integrated circuits. A commercial set of CAD tools (Mentor Graphics) are used in the lab portion of the course. Prerequisite: CEG 220, EE 260.

673 COMMUNICATION SYSTEMS DESIGN (4 credit hours)
Probability concepts are reviewed and extended to treat random process theory. Probability techniques are then used to introduce the essential ideas of information theory. The baseband digital PCM technique is covered in detail and the most important digital RF modems are also considered. Brief introduction to communication networks provided. 3 hours lecture, 2 hours lab. Prerequisite: CEG 220 and EE 621.

675 INTRODUCTION TO RADAR SYSTEMS (3 credit hours)
Introductory study of the radar equation, antenna patterns, target cross sections and system losses, radar measurements, pulse doppler and coherent techniques, detection probability and signal-to-noise ratio, sidelobe clutter, synthetic arrays, and pulse compression techniques. Prerequisite: EE 522.
676 COMMUNICATION/SIGNAL PROCESSING DESIGN PROJECTS
(4 credit hours)
A project-oriented communication and signal processing design course involving a problem definition stage, an analysis and design stage, and a final implementation stage. Specific topics include project selection, planning and management, system specification, design reviews, written and oral reports, and final system testing. 2 hours lecture, 4 hours lab. Prerequisite: EE 636 and either EE 635 or EE 673.

678 CODING THEORY (3 credit hours)
(Also listed as MTH 656 and CEG 678.) Introduction to the essentials of error-correcting codes, the study of methods for efficient and accurate transfer of information. Topics covered include basic concepts, perfect and related codes, cyclic codes, and BCH codes.

680 SELECTED TOPICS IN ELECTRICAL ENGINEERING (1 to 4 credit hours)
Topics and prerequisites vary.

699 SPECIAL PROBLEMS IN ELECTRICAL ENGINEERING (1 to 5 credit hours)
Special problems in advanced engineering topics. Titles vary. May be taken for a letter grade. Pass/fail.

700 PRINCIPLES OF INSTRUCTION IN ENGINEERING (3 credit hours)
Survey of available instructional materials and discussion of educational theories and techniques leading to more effective instruction. For first-year graduate teaching assistants only. Graded pass/fail.

701 LINEAR SYSTEMS (4 credit hours)
(Also listed as EGR 701 and BMS 705.) Signal representation, orthonormal bases, and generalized Fourier series. Description of linear, discrete, and continuous systems. Systems analysis via classical equations, convolution, and transform methods. Prerequisite: EE 521.

702 LINEAR SYSTEMS II (3 credit hours)
(Also listed as BMS 706.) State variable representations of continuous and discrete systems. Linear vector spaces and similarity transformations; eigen-analysis, time and transform domain solutions of linear state equations; controllability, observability, and stability of linear systems. Prerequisite: familiarity with linear algebra.

710 DIGITAL SIGNAL PROCESSING
(4 credit hours)
Data acquisition and quantization, unitary transforms, circular convolution, Hilbert transform, FIR/IIR filter design and realization, analysis of finite-precision numerical effects, spectral estimation, and Cepstrum analysis. Prerequisite: EE 701.

711 MULTIDIMENSIONAL DIGITAL SIGNAL PROCESSING (3 credit hours)
Topics of EE 710 extended to multidimensional systems and signals. Provides the theoretical and applied basis for analysis and synthesis of discrete systems and operations used in digital images, transducer arrays, and other multidimensional signals. Prerequisite: EE 710.

715 DIGITAL IMAGE PROCESSING
(4 credit hours)
Image representation, sampling/quantization, spatial/frequency concepts, image enhancement, color image theory, unitary image transforms, image data compression, image models, image coding, image restoration, feature extraction and description, and computer implementation of concepts and algorithms introduced. Prerequisite: EE 710.

716 KALMAN FILTERS AND APPLIED ESTIMATION (4 credit hours)
Least square estimation, minimum mean square error estimation, maximum likelihood estimation, maximum a posteriori estimation, consistency testing, Kalman filters, extended Kalman filters, iterated extended Kalman filters, a posteriori estimates, adaptive estimation, Monte Carlo simulations and case studies. Prerequisite: EE 702 and EE 761.

717 MULTISENSOR/DATA FUSION
(4 credit hours)
718 MULTITARGET TRACKING AND DATA ASSOCIATION (4 credit hours)

720 ADVANCED DIGITAL CONTROL (3 credit hours)
Analysis and design of digital control systems using the state approach. Multirate digital control systems, and digital state observer and microprocessor control. Prerequisite: EE 617, 702.

725 PRINCIPLES OF MODERN CONTROL THEORY (3 credit hours)

733 MODERN RADAR THEORY (4 credit hours)
Application of probability and random process to the performance characterization of range/doppler radar. Development of the concepts of resolution, S/N, ambiguity function, and pulse compression, and their applications to radar systems design. Consideration is also given to coherent imaging radar. Prerequisites: EE 621, EE 675, STT 563 or equivalent.

738 ANALYSIS AND SIMULATION OF COMMUNICATION NETWORKS (4 credit hours)
Analysis and simulation of networks, including both LANs and WANs. Dependence of network throughput, latency, average delay, robustness on network protocol, routing, flow control, and traffic dynamics as modeled by queuing theory. Required design project based on COMNET III software. Prerequisite: EE 521 and STT 363 or equivalent.

740 INFORMATION THEORY (4 credit hours)
Development of communication channel model and use of information theory as means of quantifying that model. Investigation of various error correcting and detecting codes. The popular Viterbi coding algorithm is also considered. Prerequisite: EE 761.

741 POWER SEMICONDUCTOR DEVICES (4 credit hours)
General-purpose, fast-recovery, and Schottky diodes; performance parameters: power BJTs, MOSFETs, and MOSIFTs; static and dynamic characteristics, drivers, pulse transformers, and optocouples; thyristor characteristics, SGR, and GTO parameters; cooling, snubbers, voltage and current protection, and varistors. Prerequisite: EE 631 and EE 634.

742 POWER ELECTRONICS II (4 credit hours)
AC-to-DC converters, natural and forced thyristor commutations, controlled rectifiers, power factor improvements, static AC and DC switches, AC voltage controllers, output harmonic reductions, DC choppers, characteristics of DC-to-AC inverters, PWM and FM control. Prerequisite: EE 741.

743 POWER ELECTRONICS III (4 credit hours)
Power factor correction under nonlinear load conditions, harmonic reduction, utility line disturbances, uninterruptible power supplies, international standards on electromagnetic pollution, low-frequency inverters, residential and industrial applications of power electronics, and characteristics of electric energy storage components. Course includes an independent project. Prerequisite: EE 742.

745 SYNCHRONOUS COMMUNICATION THEORY (4 credit hours)
Investigation of various digital modems: consideration of TDMA, FDMA, and CDMA multiple access techniques; coherent and differential transmission techniques; carrier frame, and bit synchronization techniques; convolution codes and the Viterbi decoder, and baseband encoding techniques. Introduction to spread spectrum. Prerequisite: probability theory, linear systems.

746 EM SIMULATION METHOD I: FINITE DIFFERENCE TIME DOMAIN METHOD (4 credit hours)
Direct solution of Maxwell's differential equations in the time domain using the finite-difference time-domain (FDTD) method. Absorbing boundary conditions and waveguide or plane wave excitation methods. Application to the solution of problems relevant to radiation, radar cross section (or scattering) and microwave circuit design. Prerequisite: equivalent of EE 545 and 546.
747 ELECTROMAGNETIC SIMULATION METHODS II: MOM (4 credit hours)
Wave equation and integral formulations for electromagnetic (EM) problems. Methods of moments (MoM) and its implementation. Application of one-and two-dimensional EM problems. Comparison with the finite element method. Prerequisite: equivalent of EE 545 and 546.

752 VLSI SUBSYSTEM DESIGN (4 credit hours)
(Also listed as CEG 752.) CMOS VLSI subsystems including data path operators, counters, multipliers, memory elements, and programmable logic arrays. VLSI circuits for FIR and IIR filters. VLSI circuits for digital data exchange systems. 3 hours lecture, 2 hours lab. Prerequisite: EE 654 or CEG 654.

753 VLSI DESIGN SYNTHESIS AND OPTIMIZATION (4 credit hours)
(Also listed as CEG 753.) VLSI architectural-level synthesis and optimization including data path synthesis, control-units synthesis, scheduling, and resource sharing. Logic-level synthesis and optimization including two-level and multi-level combinational logic optimization, and sequential logic optimization. 3 hours lecture, 2 hours lab. Prerequisite: EE 654 or CEG 654.

754 VLSI TESTING AND DESIGN FOR TESTABILITY (4 credit hours)
(Also listed as CEG 754.) Design for testability of VLSI circuits. Topics include importance of testing, conventional test methods, built-in test, CAD tools for evaluating testability, test pattern generators and compressors. Prerequisite: EE/CEG 654 or EE/CEG 752.

756 ROBOTICS I (4 credit hours)
(Also listed as CEG 756 and ME 756.) Detailed study of the dynamics and control of robotic systems and robot programming languages and systems. Material covered includes rigid-body dynamics; linear, nonlinear, adaptive, and force control of manipulators; and robot programming languages. Prerequisite: EE/CEG/ME 656.

758 CMOS ANALOG INTEGRATED CIRCUIT DESIGN (4 credit hours)
(Also listed as CEG 758.) Introduction to the techniques, limitations, and problems in the design of CMOS analog integrated circuits. Topics include CMOS analog circuit modeling and device characterization, analog CMOS subcircuits, CMOS amplifiers, comparators, and CMOS Op Amps. 3 hours lecture, 2 hours lab. Prerequisite: EE 631 and EE 634.

761 ANALYTICAL TECHNIQUES OF STOCHASTIC ANALYSIS (4 credit hours)
Probability and random variable, distributions and density functions, random processes, strict-sense and wide-sense stationarity, auto-correlation and power spectral density, ergodicity, response of linear systems with stochastic inputs, discrete linear models, and Gaussian processes. Prerequisite: familiarity with Fourier theory.

762 DETECTION, ESTIMATION, AND OPTIMAL FILTER THEORY (3 credit hours)
Binary detection with single/multiple observations, linear minimum mean-square error filtering, Wiener and Kalman filters, MLE and MAP estimators, histogram, tests of hypotheses, regression analysis, model-free and model-based parameter estimation of random processes. Prerequisite: EE 761.

763 CLASSICAL AND MODERN SPECTRAL ANALYSIS (3 credit hours)
Linear and matrix algebra, periodogram and Blackman-Tukey estimators, moving average, auto regressive and auto-regressive moving-average methods, fast techniques, statistics of estimators, model order selection, and minimum variance and high-resolution techniques. Prerequisite: EE 761.

831 ROBUST CONTROLS (3 credit hours)
Study of several important topics from recent research in robust-control design. Topics include review of LQR and state feedback designs; Khronostov's theorem; Barmish's theorem; Wei-Yedavalls theorem; edge theorem, and elements of H control. Prerequisite: EE 615, EE 616, and EE 702.

861 ADAPTIVE FILTERS (4 credit hours)
Introduction to adaptive systems, adaptation with stationary signals, and to adaptive algorithms and structures. Applications to systems identification, deconvolution, equalization, control systems, interference canceling, adaptive arrays, and beam forming are considered. Prerequisite: EE 701.

880 SELECTED TOPICS IN SYSTEMS ENGINEERING (1 to 4 credit hours)
Selected topics in current research and recent developments in systems theory and engineering. Titles vary.

890 SPECIAL PROBLEMS IN ELECTRICAL ENGINEERING (1 to 4 credit hours)
Special problems in advanced engineering topics. Titles vary.
898 Ph.D. DISSERTATION RESEARCH
(1 to 5 credit hours)
Graded pass/unsatisfactory.

899 THESIS (1 to 5 credit hours)
Graded pass/unsatisfactory.

Engineering/EGR

Note: See quarterly class schedule or departmental advisor for further enrollment restrictions, requirements, or special course information.

535 TECHNICAL COMMUNICATION
FOR ENGINEERS AND COMPUTER
SCIENTISTS (3 credit hours)
A modular approach to oral and written communication of complex technical information to an expert audience. Course includes describing technical mechanisms, processes designing, and using tables, graphs, charts, and figures; producing technical proposals, progress reports, feasibility reports, and formal reports; and doing technical briefings. Prerequisite: graduate standing in the college of engineering and computer science.

699 SPECIAL PROBLEMS IN
ENGINEERING (1 to 5 credit hours)
Special problems in advanced engineering topics. Prerequisite: instructor approval. Graded pass/unsatisfactory.

701 LINEAR SYSTEMS (4 credit hours)
(Also listed as EE 701 and BMS 705.) Signal representation, orthonormal bases, and generalized Fourier series. Description of linear, discrete, and continuous systems. Systems analysis via classical equations, convolution, and transform methods. Prerequisite: EE 521.

702 SYSTEMS ENGINEERING AND
ANALYSIS (4 credit hours)
Exposes students to the design of systems and tools for the analysis of complex technological systems. Prerequisite: STT 361, MTH 232, MTH 233.

703 COMPUTATIONAL ENGINEERING
ANALYSIS (4 credit hours)
Course is designed to expose students to practical and efficient computational techniques that are routinely encountered in modeling, simulation, and analysis of engineering problems. Prerequisite: programming, linear algebra, differential equations.

704 DESIGN OPTIMIZATION (4 credit hours)
Concepts of minima and maxima; linear, dynamic, integer and nonlinear programming, variational methods. Interdisciplinary engineering applications are emphasized.

705 DESAND ANAL OF EGR EXPERIMENT
(4 credit hours)
Introduction to planning and analysis of engineering experiments. Topics include basic statistics review, linear models, regression, analysis of variance, experiment designs, response surface methods, and engineering applications.

891 Ph.D. SEMINAR (1 credit hour)
Ph.D. seminar course required of all students seeking the Ph.D. in Engineering. Graded pass/unsatisfactory.

899 THESIS (1 to 5 credit hours)
Graded pass/unsatisfactory.

English/ENG

Note: See quarterly class schedule or departmental advisor for further enrollment restrictions, requirements, or special course information.

530 BUSINESS WRITING (4 credit hours)
Written business and organizational communication; attention to various forms including short reports and informal oral presentations.

533 FUNDAMENTALS OF TECHNICAL
WRITING (4 credit hours)
Survey of the fundamental principles and skills used in scientific and technical writing.

543 ADVANCED COMPOSITION
(4 credit hours)
Emphasis on sophisticated techniques of expository writing and the refinement of style.

544 RESEARCH WRITING (4 credit hours)
Instruction in organization, documentation, and writing of research papers. Research projects based not only on primary and secondary sources but also on experiment and investigation.

547 DESKTOP PUBLISHING
AND TECHNICAL GRAPHICS
(4 credit hours)
Introduction to the design and illustration of technical documents through labs requiring use of word processing and desktop publishing systems.
600 ADVANCED TECHNICAL WRITING (4 credit hours)
Reviews the fundamentals of technical writing with attention to reports, proposals, manuals, technical articles, and style manuals. Emphasis on writing for specific fields with opportunity for independent writing projects in the student’s major field. Prerequisite: ENG 333 or 533 and 347 or 547.

602 TECHNICAL EDITING (4 credit hours)
Experience in various elements of technical editing—grammar, style, and content; editing for consistency of format and adherence to standards; and preparing a document for printing. Prerequisite: ENG 400 or 600.

605 TOPICS IN TECHNICAL WRITING (1 to 6 credit hours)
Courses, seminars, or workshops in specialized topics relating to technical writing. Prerequisite: ENG 400 or 600 or permission of the instructor.

610 STUDIES IN BRITISH LITERATURE (4 credit hours)
Intensive study of British literary history and/or the work of individual British writers. Intended to develop an understanding of literature within the contexts of the author’s life, literary production, or historical background.

620 STUDIES IN AMERICAN LITERATURE (4 credit hours)
Intensive study of American literary history and/or the work of individual American writers. Intended to develop an understanding of literature within the contexts of the author’s life, literary production, or historical background.

630 STUDIES IN LITERATURE, GENDER AND SEXUALITY (4 credit hours)
Intensive study of literature from the perspectives of gender theory. Intended to develop an understanding of gender and sexuality as important both to literature and to its critical appreciation.

640 STUDIES IN ETHNIC AND REGIONAL LITERATURE (4 credit hours)
Intensive study of literature from different regions of America or reflecting the experiences of different ethnic groups. Intended to develop an understanding of race, region, and ethnicity as important both to literature and to its critical appreciation.

650 STUDIES IN LITERARY THEORY (4 credit hours)
Intensive study of literary theory in order to develop an understanding of critical questions and approaches.

654 FEATURE STORY WRITING (4 credit hours)
(Also listed as COM 654.) Includes finding, writing, polishing, and marketing feature material. Prerequisite: requires permission of the instructor.

658 EDITING FOR THE MEDIA (4 credit hours)
(Also listed as COM 658.) Editing copy for mass media with emphasis on newspaper format, headline writing, rewriting, and general copy desk. Prerequisite: requires permission of the instructor.

660 STUDIES IN LITERARY GENRES AND THEMES (4 credit hours)
Intensive study of literary genres (e.g., poetry, the novel, satire) or of literary themes. Intended to develop an understanding of formal and structural aspects of literature.

670 STUDIES IN WORLD LITERATURE (4 credit hours)
Intensive study, in English, of non-European literature, focused nationally, regionally, cross-culturally, thematically, or generically.

677 WORKSHOP (1 to 6 credit hours)
Intensive study of selected special topics or problems designed to meet the needs of participating students. Titles vary.

678 INTRODUCTION TO LINGUISTICS (4 credit hours)
Presents a survey of the scientific study of language and focuses on describing and explaining languages in their natural environment. Includes phonetics, phonology, morphology, syntax, semantics, pragmatics, and sociolinguistics.

679 HISTORY OF THE ENGLISH LANGUAGE (4 credit hours)
Study of the ancestry and early growth of English, the history of English sounds and inflections, the development of the English vocabulary, and variations in pronunciation and usage in Modern British and American English.
680 STUDIES IN LANGUAGE AND LITERACY (4 credit hours)
Intensive study of linguistic and/or rhetorical approaches to language. Intended to develop an understanding of language history, structure, theory, pedagogy, and context. Prerequisite: ENG 478 or 678.

681 THEORY OF ESL (4 credit hours)
Presents a theoretical foundation for the study of second language acquisition, including first language acquisition, interlanguage, contrastive analysis, error analysis, language universals, communicative competence, and learning theory. Prerequisite: ENG 478 or 678.

682 GRAMMATICAL STRUCTURES OF ENGLISH (4 credit hours)
Develops linguistic analysis skills to help students recognize, analyze, and remediate written and spoken grammatical errors in ESL/EFL instructional contexts. Also focuses on pedagogical aspects of grammar instruction to nonnative speakers of English. Prerequisite: ENG 478 or 678.

683 SOCIOLINGUISTICS (4 credit hours)
Examines the sociology of language, the ethnography of speaking, the variation in language structures, the social varieties of English, with their political and educational implications, and the relationship of these to second language acquisition. Prerequisite: ENG 340 or 478 or 678.

684 TESOL METHODS AND MATERIALS (4 credit hours)
Develops skills in designing curricula through creating and adapting appropriate materials and activities, as well as evaluation and effectively using existing methodologies and materials available to the teacher of ESL/EFL. Prerequisite: ENG 340 or 478 or 678.

685 STUDIES IN ENGLISH EDUCATION (2 to 4 credit hours)
(Also listed as ED 620.) Focuses on theoretical issues and practical problems of teaching English at all levels, including the teaching of writing and teaching of English to speakers of other languages (TESOL). Titles vary. Prerequisite: ENG 340 or 478 or 678.

687 TESOL ASSESSMENT (4 credit hours)
Investigates key concepts and underlying theories in the field of language assessment. Looks at purposes and types of assessment with a focus on the development and use of authentic assessment for English Language learners.

700 METHODS AND MATERIALS OF RESEARCH IN LANGUAGE AND WRITING (4 credit hours)
Introduction to research in language and writing. Emphasis on finding and using library resources, surveying research designs, and understanding and reporting research in the human sciences.

701 METHODS AND MATERIALS OF RESEARCH IN LITERARY STUDIES (4 credit hours)
Examination of the aims and approaches of scholarly study of literature and the tools and methods of literary research. Emphasis on the problems of collecting, evaluating, and reporting the findings of scholarly study.

702 THEORY AND PRACTICE OF LITERARY CRITICISM (4 credit hours)
Examines literary criticism and theories of textuality that are being applied to literature. Emphasis is placed on understanding the development and application of contemporary theories of literature and their effect on the study of literature.

703 TEACHING COLLEGE COMPOSITION I (4 credit hours)
Introduction to the theory and pedagogy of college-level writing courses. Requires concurrent teaching or tutorial experience. Required of all first-year English teaching assistants.

704 TEACHING COLLEGE COMPOSITION II (2 credit hours)
Introduction to the theory and pedagogy of college-level writing courses. Requires concurrent teaching or tutorial experience. Required of all first-year English teaching assistants. Prerequisite: ENG 703.

707 THE NATURE OF LANGUAGE (4 credit hours)
Consideration of the sources and processes of language and its relationship to thought, imagination, and symbolic form. Emphasis on the contributions of anthropology, linguistics, philosophy, psychology, and sociology to our understanding of language.

710 THE CREATIVE PROCESS (4 credit hours)
Survey of the theoretical and practical aspects of literary creativity including such considerations as the creative imagination and writers' practice of their craft. Includes practice in the creation of original work.
711 RHETORIC (4 credit hours)
Introduction to rhetoric as related to the written word. Covers the history of rhetoric, current rhetorical theory, and the application of rhetorical theory to the study of literature and composition.

712 STYLE IN WRITING (4 credit hours)
Introduction to the theoretical and practical study of style in writing, with emphasis on the development of English prose style and practice in stylistic analysis.

716 THE STUDY OF LITERATURE
(4 credit hours)
Current approaches to the study of literature in the classroom. Topics include literary types, analysis, evaluation, and the relationship of literature to other disciplines.

717 THE STUDY OF WRITING
(4 credit hours)
Current approaches to writing and the study of composition in the classroom. Topics include whole language, invention, revision, stylistics, editing, the analysis of student writing, and effective pedagogical practice. Titles vary.

718 THE STUDY OF PROFESSIONAL WRITING (4 credit hours)
Current approaches to the study of technical, business, and other specialized writing. Critical and historical analyses are supplemented by assignments in writing the studied forms. Prerequisite: any two of the following three courses: ENG 330 or 530, ENG 333 or 533, ENG 347 or 547 or permission of the instructor.

721 TEACHING LITERATURE AND GENDER (4 credit hours)
Study of materials, topics, texts, and methodology appropriate to teaching gender studies in literature. Includes an assigned lesson and a research project. Prerequisite: ENG 700 or 701 or HUM 710 and ENG 716.

731 TEACHING MAJOR WRITERS
(4 credit hours)
Study of materials, topics, texts, and methodology appropriate to teaching a single writer or two closely related ones. Includes an assigned lesson and a research project. Prerequisite: ENG 700 or 701 or HUM 710 and ENG 716.

741 TEACHING LITERARY GENRES
(4 credit hours)
Study of materials, topics, texts, and methodology appropriate to teaching a single literary genre. Includes an assigned lesson and a research project. Prerequisite: ENG 700 or 701 or HUM 710 and ENG 716.

751 TEACHING CULTURAL PERIODS
(4 credit hours)
Study of materials, topics, texts, and methodology appropriate to teaching the literature and culture of particular historical periods or teaching literary movements. Includes an assigned lesson and a research project. Prerequisite: ENG 700 or 701 or HUM 710 and ENG 716.

761 TEACHING SPECIAL LITERARY PROBLEMS (4 credit hours)
Study of materials, topics, texts, and methodology appropriate to teaching special problems such as literary themes, literary conventions, literature in relation to other disciplines. Includes an assigned lesson and a research project. Prerequisite: ENG 700 or 701 or HUM 710 and ENG 716.

791 INDEPENDENT STUDY
(1 to 4 credit hours)
Faculty-directed independent study in literature or language usually requiring reports and conferences with the instructor. A maximum of four credits may be applied to the M.A. degree.

793 CLASSROOM RESEARCH IN ENGLISH (1 to 4 credit hours)
Study, discussion, and application of techniques of observational research in the English/language arts classroom. Students will design, carry out, and write a research project. May be taken for letter grade or pass/unsatisfactory.

795 INTERNSHIP AND APPRENTICESHIP
(4 to 8 credit hours)
Supervised college-level teaching, archival work, or professional writing. Graded pass/unsatisfactory.
**Engineering Physics/EP**

**Note:** See quarterly class schedule or departmental advisor for further enrollment restrictions, requirements, or special course information.

**600 PROPERTIES OF SEMICONDUCTOR MATERIALS (3 credit hours)**
(Also listed as PHY 600.) Study of crystal and electron band structure; selected topics in quantum theory; charge carriers in semiconductors; electrical and optical properties; and the structure and characteristics of p-n junctions. Also, the generation, recombination, and motion of charge carriers. Prerequisite: PHY 242, PHY 244 and CHM 121.

**601 SEMICONDUCTOR DEVICE PHYSICS (3 credit hours)**
(Also listed as PHY 601.) Study of the structure and characteristics of bipolar transistors, field effect transistors, and other selected devices. Also covers design and computer modeling of devices. Prerequisite: PHY 600 or ep 600.

**602 SEMICONDUCTOR DEVICE PROCESSING (3 credit hours)**
(Also listed as PHY 602.) Survey of the individual processes used in fabricating semiconductor devices. Integration of these processes to produce MOS and bipolar structures. Computer design aids. Prerequisite: PHY 601, ep 601 or ME 370.

**622 APPLIED OPTICS (4 credit hours)**
(Also listed as PHY 622.) Study of optical instruments by means of both geometric and physical optics. Theory and applications of interferometry and light detection devices. Brief introduction to lasers and holography. 4 hours lab for five weeks, 3 hours lecture. Prerequisite: PHY 244.

**632 LASERS (3 credit hours)**
Introduction to the physics of lasers including emission and absorption processes in lasing, the factors controlling laser gain, the properties of optical resonators, and a survey of salient features for principal types of lasers. Prerequisite: PHY 260, MTH 233 or permission of instructor.

**Finance/FIN**

**Note:** See quarterly class schedule or departmental advisor for further enrollment restrictions, requirements, or special course information.

**702 MANAGEMENT OF FINANCIAL INSTITUTIONS (3 credit hours)**
Analysis of issues relating to the financial management of financial institutions. Prerequisite: EC 717, MBA 532.

**710 INVESTMENT MANAGEMENT (3 credit hours)**
Concepts, theories, and techniques underlying the development of investment policies and strategies. Prerequisite: MBA 731.

**711 SEMINAR IN INVESTMENTS (3 credit hours)**
Advanced treatment of selected topics in investments including options, futures, and portfolio theory. Prerequisite: FIN 710.

**742 SEMINAR IN FINANCIAL MANAGEMENT (3 credit hours)**
Advanced treatment of the theory and practice of long-term financial management. Topics include dividends, leasing, hybrid financing, derivatives and risk management, mergers and acquisitions, and divestitures. Prerequisite: MBA 731.

**743 SEMINAR IN WORKING CAPITAL MANAGEMENT (3 credit hours)**
Advanced treatment of the theory and practice of working capital management, including cash management, credit policy, inventory policy, and short-term financing strategies. Extensive use of outside readings. Prerequisite: MBA 731.

**750 FINANCIAL MANAGEMENT OF HEALTH SERVICE ORGANIZATIONS (3 credit hours)**
Overview of the financial management function in health care organizations. Topics include budgeting, control, capital expenditure analysis, and rate settings. Prerequisite: MBA 532.

**760 SPECIAL TOPICS IN FIN (3 credit hours)**
In-depth analysis of a current trend in finance. Titles vary.

**780 FINANCE INTERNSHIP (6 credit hours)**
One-quarter internship in a selected private or governmental organization under the direction of a faculty advisor and employment supervisor. Prerequisite: completion of at least 7 core courses.
781 SPECIAL STUDIES IN FINANCE
(1 to 3 credit hours)
Intensive reading or research in a
selected field of advanced finance.

790 SEMINAR IN INTERNATIONAL
FINANCIAL MANAGEMENT
(3 credit hours)
Advanced treatment of the concepts
and techniques of international financial
management.

French/FR
Note: See quarterly class schedule or
departmental advisor for further enrollment
restrictions, requirements, or special course
information.

531 SURVEY OF FRENCH LITERATURE
(4 credit hours)
Middle ages, to the present.

590 FOREIGN LANGUAGE INSTITUTE
(8 credit hours)
For teachers of French. Intensive experience
designed, through total immersion, to
improve language skills (conversation and
composition) and increase awareness of
French civilization and contemporary culture.

603 ADVANCED STUDIES: LANGUAGE/
CIVILIZATION (4 credit hours)
Course content will vary. Topic chosen
by instructor. Conducted in French.

622 VILLON TO CHENIER (4 credit hours)
Three centuries of French poetry: Villon,
Sceve, Marot, Du Bellay, Ronsard, d’Aubigné,
Malherbe, La Fontaine, Boileau, Voltaire,
Chenier.

623 17TH AND 18TH CENTURY NOVEL
(4 credit hours)
Mme. de La Fayette, Scarron, Forumon,
Montesquieu, Lesage, Privost, Diderot, and
Laflart. Graduate standing and instructor
permission required.

641 LIBERTINES AND MORALISTS:
RABELAIS TO VOLTAIRE
(4 credit hours)
Libertines and Moralists. From Rabelais
to Voltaire: Currents of skepticism and
humanism in the intellectual history of France.
Major authors: Rabelais, Montaigne, Cyrano
de Bergerac, Saint-Evremond, La Bruyere, La
Rochefoucauld, Bayle, Fontenelle, Diderot,
Voltaire. Prerequisite: language competence.

642 17TH AND 18TH CENTURY THEATRE
(4 credit hours)
Works of Corneille, Moliere, Racine, Marivaux,
Diderot, Voltaire, Beaumarchais.

643 THE ENLIGHTENMENT (4 credit hours)
History of political and social ideas in
18th-century France. Based principally on
works of Montesquieu, Diderot, Voltaire, and
Rousseau.

650 INDEPENDENT GRAD RESEARCH
(1 to 4 credit hours)
Independent graduate research.

651 FRENCH ROMANTICISM
(4 credit hours)
From Rousseau to Hugo. Includes Bernardin
de St. Pierre, Chateaubriand, Mme de Stael,
Nodier, Lamartine, Vigny, Musset, Nerval.

652 19TH CENTURY NOVEL
(4 credit hours)
Chateaubriand, Constant, Stendhal, Balzac,
Flaubert, Zola, and France.

653 POETRY FROM BAUDELAIRE
TO BRETON (4 credit hours)
Symbolists, Decadents, and Surrealists.

654 19TH CENTURY SHORT STORY
(4 credit hours)
Intensive study of such authors as Balzac,
Stendhal, Nodier, Mme de Stael, Flaubert,
Maupassant, and Huysmans.

662 20TH CENTURY LITERATURE
(4 credit hours)
The novel. Prerequisite: consent of instructor.

663 20TH CENTURY LITERATURE:
DRAMA (4 credit hours)
Study of modern French theatre including:
Cocteau, Giraudoux, Anouilh, Beckett,
Ionesco. Prerequisite: language competence,
graduate standing.

665 PROBLEMS IN FRENCH LITERATURE
(4 credit hours)
Examination of selected topics in French
literature to investigate various themes,
myths, genres, literary movements, or
characters. Titles vary.

681 INDEPENDENT READING
FOR GRADUATE STUDENTS
(4 credit hours)
Independent reading for graduate students.

682 INDEPENDENT READING
FOR GRADUATE STUDENTS
(4 credit hours)
Independent reading for graduate students.
Geography/GEO

Note: See quarterly class schedule or departmental advisor for further enrollment restrictions, requirements, or special course information.

531 METEROLOGY (4 credit hours)
Development and application of first principles governing the atmosphere at rest and in motion. Examination of the general circulation. Applied meteorology. Prerequisite: MTH 131 or permission of instructor.

534 CLIMATOLOGY FOR EARTH SCIENCE TEACHERS (4 credit hours)
Interaction of weather and climate with the various earth systems. Includes observation, measurement, and analysis of meteorological elements and controls.

534 CLIMATOLOGY FOR EARTH SCIENCE TEACHERS (4 credit hours)
Interaction of weather and climate with the various earth systems. Includes observation, measurement, and analysis of meteorological elements and controls.

560 SYSTEMATIC GEOGRAPHY (4 credit hours)
Geographic factors of various topics will be analyzed. Specific topic of field of concentration announced each time course is offered. A maximum of 15 credits is permitted.

570 REGIONAL GEOGRAPHY (4 credit hours)
Physical and cultural analysis of major and minor world regions. Topics vary.

599 STUDIES IN SELECTED SUBJECTS (1 to 4 credit hours)
Examination of the influence of selected physical characteristics of the atmosphere in determining the range of vision of remote sensors and the effect of these atmospheric factors on remotely sensed imagery.

612 URBAN PLANNING II: PRINCIPLES OF PLANNING (4 credit hours)
The role of planning in urban and regional structures and duties and responsibilities of planning commissions are discussed. The process of preparing comprehensive plans is pursued. Study items include population change, the economic base, and employment change. The determinants of future urban structure are evaluated.

613 URBAN PLANNING II: THE LAND USE PLAN (4 credit hours)
Process of preparing comprehensive urban plans. Methods for assessing land-use conditions, housing patterns, and urban deterioration. Students participate in the development of a land-use plan for a selected area. Prerequisite: GEO 576 or permission of instructor.

614 URBAN PLANNING SEMINAR (4 credit hours)
Examination of urban plans and planning proposals. Includes future land use plans, community facilities and public utility plans, and traffic and circulation plans. Considers modern theories of planning and the planning and design of new communities.

630 CLIMATOLOGY I (4 credit hours)
Covers observation, measurement, and analysis of climatic elements/controls, classifications, and relationship to human economic and social activities.

632 CLIMATOLOGY II (4 credit hours)
Principles of physical and dynamical climatology. Evaluation of local and regional transports and conversions of energy in the earth-atmosphere system. Prerequisite: GEO 531 or permission of instructor.

635 GISON APPLICATIONS (5 credit hours)
Students apply GIS techniques to solve public/private sector information and development problems. Solutions entail data analysis and forecasting, using ARC/INFO geographic information system. Prerequisite: GEO 647.

647 GEOGRAPHIC INFORMATION SYSTEMS (5 credit hours)
Principles, structures, and applications of geographic information systems and use of data from topographic, remotely sensed, and photogrammetric sources. Prerequisite: GEO 365 or permission of instructor.

655 GEOGRAPHY OF TRANSPORTATION (4 credit hours)
Analysis of spatial aspects and structural characteristics of transport networks, the movement of goods, and their relationship to regional structures. Prerequisite: GEO 203 or GEO 353 or permission of instructor.

658 HUMAN PERCEPTION IN RESOURCE MANAGEMENT (4 credit hours)
A study of the spatial factors influencing human response and decision making in resource use schema. Attention is given to the manner in which man perceives environmental elements and appreciates resources and natural hazards such as floods and droughts.

662 REMOTE SENSING OF THE ENVIRONMENT (4 credit hours)
Application of remote sensing techniques to environmental and resource problems. Emphasis on optimizing sensor selection to enhance image information content.
663 GEOGRAPHIC APPLICATIONS FOR REMOTELY SENSED DATA (4 credit hours)
Application of geographic methodology to problems employing photographic and machine-processed multispectral scanner data that are used in academic research, environmental analysis, and planning. Prerequisite: GEO 362 or permission of instructor.

666 SEMINAR IN URBAN GEOGRAPHY (4 credit hours)
A consideration of the geographic perspective in the study of cities. Through review of the literature, recent developments in theory, method, and techniques in urban geographic research are examined, with particular emphasis on the behavioral approach.

681 SPECIAL PROBLEMS IN GEOGRAPHY (1 to 4 credit hours)
Research and problems designed for specific needs and talents of the students. Titles vary.

684 BIOGEOGRAPHY (3 to 4 credit hours)
Introduction to factors affecting the geographical distribution of plants and animals. Offered jointly with the Department of Biological Sciences. Students registering for GEO 684 for three credits attend lectures only; registration for GEO 684 for four credits requires an additional laboratory section.

German/GER
Note: See quarterly class schedule or departmental advisor for further enrollment restrictions, requirements, or special course information.

551 GERMAN CULTURE AND CIVILIZATION (4 credit hours)
Survey of cultural influences and of political, social, economic, religious, educational, and cultural institutions.

599 INTRODUCTION TO GERMAN LITERATURE (4 credit hours)
Problems, approaches, and topics in the field of German. Topics vary.

603 ADVANCED STUDIES: LANGUAGE AND CIVILIZATION (4 credit hours)
Course content varies. Topic chosen by instructor. Conducted in German.

Geological Sciences/Courses

616 GERMAN LITERATURE OF THE 18TH CENTURY: GOETHE AND SCHILLER (4 credit hours)
Representative works of Goethe and Schiller. Prerequisite: language competence, graduate standing.

625 GERMAN LITERATURE OF THE 19TH CENTURY: PROSE (4 credit hours)
Representative works of Eichendorff, Hoffmann, Keller, Meyer, Storm, Fontane, and others.

631 GERMAN LITERATURE OF THE 20TH CENTURY: PROSE (4 credit hours)
Readings and reports in 20th-century literature. Representative works of Hesse, Mann, Kafka, and others.

632 GERMAN LITERATURE OF THE 20TH CENTURY: DRAMA (4 credit hours)
Readings and reports in 20th-century literature. Representative works of Schnitzler, Hofmannsthal, Kaiser, Toller, Brecht, and others. Prerequisite: graduate standing.

650 INDEPENDENT GRADUATE RESEARCH (1 to 4 credit hours)
Titles vary.

681 INDEPENDENT READING FOR GRADUATE STUDENTS (4 credit hours)
Independent reading for graduate students.

682 INDEPENDENT READING FOR GRADUATE STUDENTS (4 credit hours)
Independent reading for graduate students.

599 SPECIAL PROBLEMS (1 to 6 credit hours)
Research and problems designed for specific needs and talents of the students.

601 ROCKS AND MINERALS (5 credit hours)
Study of the structure, symmetry and composition of minerals. The composition, classification, and origin of rocks. Lab emphasizes mineral and rock identification.
604 EARTH RESOURCES AND ENVIRONMENTAL QUALITY
(3 credit hours)
Study of Earth Resources as the economic base of civilization. Natural geologic processes and geochemical cycles of global change are compared with human-induced impact on the environment. Emerging trends in technology and policy matters and their influence on environmental quality are analyzed. Prerequisite: GL 105 and 106 or equivalent.

605 GROUND-WATER MONITORING AND REMEDIATION (4 credit hours)
Study of the principles of ground water monitoring and cleanup system design. Theory and field practices for monitoring well drilling/installation, lysimeter installation for natural and contaminated groundwater, etc. Field visits of sites with contaminated aquifers undergoing remediation. Graded pass/unsatisfactory.

606 EARTH SCIENCE FOR TEACHERS
(5 credit hours)
Sources and forms of energy operating on the earth and the effects of these operations on the origin, history, and evolution of the earth. 3 hours lecture, 3 hours lab.

607 EARTH SCIENCE BY INQUIRY
(5 credit hours)
The sources and forms of energy operating on the earth and the effects of these operations on the origin, history, and evolution of the earth. 3 hours lecture, 3 hours lab. This course cannot be applied toward the M.S. degree in Geology.

608 EARTH SCIENCE FOR TEACHERS
(5 credit hours)
The sources and forms of energy operating on the earth and the effects of these operations on the origin, history, and evolution of the earth. 3 hours lecture, 3 hours lab. This course cannot be applied toward the M.S. degree in Geology.

609 GEOLOGIC HAZARDS AND ENVIRONMENTAL QUALITY
(4 credit hours)
Hazardous geologic materials: reactive minerals, the asbestos controversy, radioactive and toxic gasses. Hazards from geologic processes: earthquakes, volcanic eruptions, slope processes, subsidence, floods, coastal hazards. Geologic hazards monitoring, mitigation, and avoidance. Risk evaluation. 3 hours lecture, 3 hours lab.

611 STRUCTURAL GEOLOGY
(5 credit hours)
Geometry of the structural features of rocks, their geographic distribution, and possible causes. 3 hours lecture, 3 hours lab.

615 GLOBAL CHANGE FOR TEACHERS
(5 credit hours)
Analysis of the impact of geologic phenomena (earthquakes, volcanoes, sea-level changes, etc.) on the earth's atmosphere, lithosphere, biosphere, and hydrosphere; development of classroom applications in earth system science.

617 THEORETICAL HYDROLOGY
(3 credit hours)
Introduction to mathematical and physical concepts in hydrology; equations of flow of ground water; mathematical modeling of boundary value problems in hydrology; and steady state and unsteady state behavior. Prerequisite: MTH 333 or permission of the instructor.

620 REGIONAL TECTONICS
(3 credit hours)
Study of the structure of the Earth as revealed by solid earth geophysics and dynamics of internal geologic processes, and of the large-scale tectonic structure of the North American continent obtained through the Decade of North American Geology Project. Prerequisite: GL 311 or permission of the instructor.

621 GROUND WATER LAW AND MANAGEMENT PRINCIPLES
(3 credit hours)
A case study approach to understanding current federal, state, and local ground water laws and regulations.

622 INTRODUCTION TO APPLIED GEOPHYSICS (5 credit hours)
Introduction to gravity, magnetic, seismic, and electrical methods of subsurface investigation.

623 SEISMIC EXPLORATION
(4 credit hours)
Theory, observation, and analysis of seismic phenomena as applied to geologic exploration. 2 hours lecture, 4 hours lab. Prerequisite: GL 422 or permission of instructor.
624 GRAVITY AND MAGNETIC EXPLORATION (4 credit hours)
Study of the theory of the earth's gravitational and magnetic fields and the application of these principles to resource exploration. 3 hours lecture, 2 hours lab. Prerequisite: GL 422 or permission of instructor.

625 TOPICAL CONCEPTS IN GEOPHYSICS (4 credit hours)
Special topics in geophysics. 3 hours lecture, 2 hours lab. Prerequisite: GL 400 or 422 or permission of instructor.

626 GEOPHYSICS SEMINAR (1 credit hour)
Literature survey and student presentations on selected topics in geophysics. Graded pass/unsatisfactory. Prerequisite: GL 422 or GL 400.

627 REGIONAL STRUCTURAL SYNTHESIS (4 credit hours)
Synthesis of diverse structural, geophysical, and remote sensing data and their application to regional tectonic interpretation and natural resource evaluation. 3 hours lecture, 2 hours lab. Prerequisite: GL 311, 511, 312, 643.

628 GEOLOGY COLLOQUIUM (1 to 2 credit hours)
Selected geological topics discussed by students, guest speakers, and faculty. May be taken for letter grade or pass/unsatisfactory.

629 ROCK FRACTURES AND FRACTURED RESERVOIRS (3 credit hours)
Covers controls on inception and growth of rock fractures; elements of fractography and applications; characterizations of fractures in outcrop and core; and fractures as a reservoir anisotropy. Exercises include fracture logging in actual core. May be taken for a letter grade or pass/unsatisfactory. Prerequisite: GL 311, introduction to structural geology.

631 ELECTRICAL METHODS IN ENVIRONMENTAL GEOPHYSICS (4 credit hours)
The principles and practices of acquisition and interpretation of data from electrical and electromagnetic geophysical techniques. Prerequisite: GL 622 or permission of instructor.

632 SEDIMENTARY SYSTEMS AND SEQUENCES: CARBONATES (5 credit hours)
Interpretation of ancient and modern carbonate systems using sequence stratigraphic principles. Carbonate facies models as predictive tools for hydrocarbon exploration and aquifer modeling. Composition, origin, and diagenesis of carbonate rocks. Prerequisite: GL 487 or equivalent.

633 GEOPHYSICAL FIELD RESEARCH (1 to 6 credit hours)
Geophysical research participation in a project of the department. Content and techniques will depend on the particular project, but will normally have an extensive component of field data acquisition. May be taken for letter grade or pass/unsatisfactory.

634 FIELD GEOLOGY (SUMMER FIELD CAMP) (9 credit hours)
Geologic phenomena illustrated in the field. Introduction of mapping techniques and the application of many geologic disciplines to geologic analysis.

636 DIAGENESIS OF SEDIMENTARY ROCKS (3 credit hours)
Theory and application of petrographic techniques to studies of carbonate and clastic rocks, with emphasis on diagenesis and porosity development. 2 hours lecture, 2 hours lab. Prerequisite: GL 429 or equivalent.

637 SUBSURFACE DIGITAL IMAGING AND PROCESSING (4 credit hours)
Digital processing and visualization of seismic reflection and ground penetrating radar data. 2 hours lecture, 4 hours lab. Prerequisite: GL 623.

638 SEISMIC INTERPRETATION (3 credit hours)
Interpretation methods for seismic reflection data are studied with emphasis on structural and stratigraphic interpretation for petroleum traps. Prerequisite: GL 623 or permission of instructor.

641 ADVANCED FACIES ANALYSIS (4 credit hours)
Facies models as prediction tools in oil and gas exploration, interpretation of seismic 2D and 3D data, and resolving ground water and environmental problems in non-regolith aquifers. Prerequisite: GL 251, 253, 487 or equivalents, or permission of instructor.
642 FOSSIL VERTEBRATES AND PLANTS
(5 credit hours)
Morphology, geologic record, and geographic distribution of major vertebrate
and plant groups characterized by significant fossil representation. 3 hours lecture, 3 hours
lab. Prerequisite: recommended preparation. GL 255 (historical geology), GL 256
(historical geology lab).

643 ADVANCED STRUCTURAL GEOLOGY
(4 credit hours)
Development of the theory of rock behavior. Finite strain and gravity tectonics are
discussed. 3 hours lecture, 2 hours lab. Prerequisite: GL 311.

644 FORMATION ANALYSIS (4 credit hours)
Theory, application, and interpretation of geophysical logs with emphasis on their use
in correlation and determining porosity, permeability, and fluid content of subsurface
formations. 3 hours lecture, 2 hours lab.

645 PETROLEUM GEOLOGY (4 credit hours)
Hydrocarbon source rocks, maturation and migration, and reservoir rocks and traps.
Fluids in the reservoir: gas, oil, water, and their relationships. Exploration for and
production of hydrocarbons. Review of major petroleum basins and deposits.

646 SEQUENCE STRATIGRAPHY
(3 credit hours)
Provides a firm grounding in: the mechanisms that produce sea-level
change, how sediments respond to these
changes, and how the architecture of basins
develop over time.

650 HYDROGEOLOGY (4 credit hours)
Provides a fundamental understanding of basic hydrological principles including
ground water flow and chemistry, surface water hydrology, unsaturated flow, and
meteorology.

653 GEOLOGIC AND ENVIRONMENTAL
APPLICATION OF REMOTE
SENSING—AERIAL PHOTOGRAPHS
(4 credit hours)
The use of aerial photographs for geological mapping, exploration of mineral resources,
hydrogeology, hazard monitoring, environmental problems, and land use
monitoring and analysis.
668 GROUND WATER CONTAMINATION (4 credit hours)

669 SITE REMEDIATION (3 credit hours)
Study of chemical and microbiological degradation of pollutants in the subsurface. Diagnosis and assessment of contaminated sites. Concepts and techniques for LNAPL and DNAPL remediation: pump-and-treat, soil vapor extraction, bioventing/airsparging, chemical treatment, solvent extraction, and bioremediation. Prerequisite: GL 468/668.

670 ENVIRONMENT GEOCHEMISTRY (4 credit hours)

675 APPLIED HYDROGEOLOGY (1 to 9 credit hours)
Interactive Remote Instructional System (IRIS) program in groundwater hydrology.

681 MINERALOGY AND CRYSTALLOGRAPHY (6 credit hours)
Study of crystal properties and crystal classes including approximately 100 important minerals. Laboratory includes stereoscopic and gnomic projections to identify crystal forms; physical properties to identify minerals in hand sample. 3 hours lecture, 6 hours lab.

683 SEDIMENTARY PETROLOGY (5 credit hours)
Introduction to the optical properties of common minerals. Survey of sedimentary rocks in hand specimen, thin section, and field occurrence. 3 hours lecture, 3 hours lab. Prerequisite: GL 681 or GL 601.

684 IGNEOUS AND METAMORPHIC PETROLOGY (5 credit hours)
Study the origin of igneous and metamorphic rocks. Thin sections and hand specimens are used in the laboratory for mineral identification, rock structures, and classification. 3 hours lecture, 3 hours lab. Prerequisite: GL 383/683.

685 STRATIGRAPHY (5 credit hours)
Principles, rules, and techniques of correlation. Relationships between surface and subsurface correlation. Geologic and geophysical correlation techniques are emphasized in the laboratory. 3 hours lecture, 3 hours lab.

686 INVERTEBRATE PALEONTOLOGY (5 credit hours)
Morphology, geologic record, and geographic distribution of major invertebrate groups characterized by significant fossil representation. 3 hours lecture, 3 hours lab. Prerequisite: GL 255 (historical geology), GL 256 (historical geology laboratory).

687 SEDIMENTOLOGY (4 credit hours)
Clastic rocks, their mineralogy, texture, provenance, and classification; nonclastic carbonates and other nonclastic rocks; and depositional environments and sedimentary structures. 3 hours lecture, 2 hours lab. Completion of an undergraduate course in stratigraphy is required.

699 SPECIAL PROBLEMS (1 to 6 credit hours)
Research and problems designed for specific needs and talents of the students. May be taken for a letter grade or pass/unsatisfactory.

700 PRINCIPLES OF INSTRUCTION IN GEOLOGY (1 to 5 credit hours)
A survey of available instructional materials and discussion of educational theory and techniques leading to more effective instruction. For graduate teaching assistants only.

711 CHEMICAL GEOLOGY (4 credit hours)
Development of atomic models consistent with laws of thermodynamics and application of these models to the solution of geochemical problems. Individual research projects are pursued in the laboratory. 3 hours lecture, 2 hours lab. Prerequisite: GL 413 or equivalent.

712 ADVANCED HYDROGEOCHEMISTRY (4 credit hours)
Case studies of hydrogeochemistry in regional aquifer systems and current topics of interest, such as organic geochemistry of natural and contaminated waters, acidic mine water, wetland geochemistry, and hydrogeochemistry of non-point source pollutants. Prerequisite: GL 653 or equivalent.
714 NUCLEAR GEOCHEMISTRY  
(3 credit hours)  
The examination of the different types of atomic species and the reactions they undergo. The use of radioactive isotopes and of daughter isotopes produced therewith to measure ages of geologic events and as geochemical traces. The study of the distribution and formation of the different isotopes in the earth and the solar system. Prerequisite: GL 613 or equivalent.

715 NUCLEAR GEOCHEMISTRY  
(3 credit hours)  
The examination of the different types of atomic species and the reactions they undergo. The use of radioactive isotopes and of daughter isotopes produced therewith to measure ages of geologic events and as geochemical traces. The study of the distribution and formation of the different isotopes in the earth and the solar system. Prerequisite: GL 613 or equivalent.

720 ISOTOPE HYDROLOGY (4 credit hours)  
Theories and applications of environmental isotopes to hydrologic studies. Both stable isotopes (oxygen, hydrogen, carbon, strontium, nitrogen, sulfur) and radioactive nuclides (H-3, C-14, Cl-36) will be discussed. Prerequisite: CHM 121, 122.

740 SEDIMENTARY BASIN ANALYSIS  
(3 credit hours)  

749 ADV GRND WATER FLOW TRANS  
(3 credit hours)  
Second-level course in subsurface fluid flow, providing the theoretical background necessary to solve problems involving ground water flow, well hydraulics, aquifer characterization, and contaminant transport. Prerequisite: GL 450/650.

750 NUMERICAL ANALYSIS OF GROUND WATER FLOW AND CONTAMINANT TRANSPORT (5 credit hours)  
Use of numerical modeling methods, including finite differences and finite elements in solving problems related to ground water flow and mass transport. Emphasis is on the theory including development of well-posed boundary-value problems, development of the numerical scheme, and choice of solution algorithms. Students write explicit and implicit finite difference codes, as well as a finite element code to solve two-dimensional flow problems.

751 GROUNDWATER FLOW MODELING  
(3 credit hours)  
The first half of the course introduces the techniques used in constructing and applying mathematical models of ground water flow. The second half features the use of the USGS 3-D flow model. 3 hours lecture, 2 hours lab.

754 HYDROGEOCHEMICAL MODELING  
(4 credit hours)  
Introduces students to several computer programs that have been developed to aid in the understanding of ground water geochemistry. Includes programs for mass balancing, speciation, and ground water simulation. 3 hours lecture, 2 hours lab. Prerequisite: GL 453/653.

759 ADVANCED GROUNDWATER MANAGEMENT (3 credit hours)  
Study of ground water management case histories and special topics. Prerequisite: GL 650.

760 HYDROGEOLOGY RESEARCH SEMINAR (1 to 3 credit hours)  
Advanced seminar that addresses current research and special topics in hydrogeology. May be taken for letter grade or pass/unsatisfactory. Prerequisite: GL 450/650.

762 GROUNDWATER EXPLORATION AND EVALUATION (4 credit hours)  
Exploration and delineation of aquifers; interpretation of hydrologic tests; and case studies. 3 hours lecture, 2 hours lab. Prerequisite: GL 102.

799 SPECIAL PROBLEMS  
(1 to 6 credit hours)  
Titles vary. May be taken for letter grade or pass/unsatisfactory.
898 GEOLeGIC FIELD RESEARCH
(3 to 9 credit hours)
Specific areas in a region are studied using a specific area of specialization in the geologic sciences. Data are collected under close supervision and analyzed independently. Formal report of results to be prepared. Field experience included.

Human Factors Engineering/HFE
Note: See quarterly class schedule or departmental advisor for further enrollment restrictions, requirements, or special course information.

501 GROUNDWATER EXPLORATION AND EVALUATION I (4 credit hours)
Presentation of statistical techniques as applied to engineering testing, development, and manufacturing. Introduces and applies probability distributions, measures of association, inferences on responses, and basic experimental design. Emphasis is on application of statistical tools. Prerequisite: MTH 230 or equivalent.

502 STATISTICAL METHODS FOR TESTING, DEVELOPMENT AND MANUFACTURING II (4 credit hours)
A continuation of HFE 501. Focuses on analysis techniques for multiple variables, including ANOVA and multiple regression, as applied to engineering testing, development, and manufacturing. Process analysis and improvement techniques presented, along with tools for reliability analysis. Prerequisite: HFE 501.

506 HUMAN FACTORS IN ENGINEERING AND DESIGN (4 credit hours)
(Also listed as PSY 502.) Introduction to the study of human factors in the design and operation of machine systems. Prerequisite: PSY 105, PSY 110, MTH 230.

507 INDUSTRIAL ERGONOMICS (4 credit hours)
Introduces students to the application of ergonomic principles to the industrial environment. Includes subject matter on ergonomic planning and implementation, the work environment, NIOSHA work factors, and workstation and equipment design. Prerequisite: HFE 506(306), ME 212.

606 HUMAN FACTORS ENGINEERING
(4 credit hours)
Fundamentals of human factors engineering tools and processes as applied to systems development. Emphasis is placed on user-centered design principles. Material is presented through lectures and application-oriented projects.

631 HUMAN FACTORS ENGINEERING OF VISUAL DISPLAYS (4 credit hours)
Introduction to the design of visual display systems. Topics include radiometry and photometry, visual perception, linear systems analysis, color displays, colorimetry, 3D displays, standards and guidelines. Prerequisite: HFE 506, EE 521.

650 HUMAN FACTORS AND ENGINEERING ANALYSIS METHODS
(3 credit hours)
Covers a variety of engineering and behavioral analytic techniques critical to the study of work performance. Prerequisite: PSY 105, 110, STT 560(360).

651 HUMAN FACTORS ENGINEERING IN COMPUTER SYSTEMS DESIGN
(4 credit hours)
Theoretical paradigms in human-computer interaction and their application to interface design are examined. Emphasis is placed on advanced interface technologies such as multimodal input/output, hypertext, and knowledge-based systems. Prerequisite: CS 220, STT 561(361), HFE 650(450).

665 INTERACTIVE SYSTEMS MODELING, ANALYSIS AND DESIGN
(4 credit hours)
(Also listed as CEG 665.) Provides students with experience in interactive real-time simulation and design, implementation, and evaluation of interfaces to simulations. The relevant topics are explored through application in supervisory control of complex, dynamic systems. Prerequisite: CEG 220 or any one of the following: CEG 221, CS 241, 242 or instructor permission.

670 DETERMINISTIC OPERATIONS RESEARCH MODELS (4 credit hours)
Introductory course of Deterministic Models in Operations Research and their Applications in Industrial and Systems Engineering. Students will formulate appropriate models, and obtain and interpret analytical results in the context of ISE problems. Prerequisite: MTH 253 and MTH 231.
252 Courses/Human Factors Engineering

671 SYSTEMS PERFORMANCE MODELING (4 credit hours)
Studies quantitative techniques to analyze and predict systems performance. Topics include queuing models, system simulation, model validation, data collection, quantitative analysis of system performance, and system design evaluation. Prerequisite: HFE 650(450), STT 561(361).

676 HUMAN FACTORS ENGINEERING IN AEROSPACE SYSTEM DESIGN (4 credit hours)
Application of human factors engineering concepts to aerospace systems design. Develops human factors engineering influence on aerospace system dynamics, structure, and control as well as impact on reliability and maintainability. Prerequisite: HFE 671(471).

680 ENGINEERING IN OCCUPATIONAL SAFETY AND HEALTH (4 credit hours)
Discusses and demonstrates the role and responsibility of engineers in occupational safety and health related issues. Focuses on the application of human factors engineering design principles as a proactive approach for controlling occupational injuries. Prerequisite: HFE 506(306), 507(307), 650(450).

681 ENGINEERING ECONOMY (4 credit hours)
Introduction to analytical methods and techniques for optimizing the economic outcome of technical and managerial decisions. Topics include economic decision criteria, discounted cash flow, risk, depreciation, break-even analysis and tax considerations. Prerequisite: MTH 229.

682 OPERATIONS AND FACILITIES DESIGN (3 credit hours)
Provides a fundamental understanding of techniques for the layout and organization of operations in modern production and service facilities. Prerequisite: ME 403 or equivalent, HFE 471 (corequisite) or equivalent or instructor permission.

699 SPECIAL PROBLEMS IN HUMAN FACTORS ENGINEERING (1 to 5 credit hours)
Topics vary.

711 ADVANCED HUMAN FACTORS BIOENGINEERING (3 credit hours)
Advanced applications from a variety of bioengineering subfields are identified and defined with respect to their importance in the practice of human factors engineering. Prerequisite: BME 628 (428) or permission of instructor.

724 HUMAN FACTORS ENGINEERING ADVANCED AEROSPACE SYSTEMS DESIGN (3 credit hours)
(Also listed as BMS 953) Qualifies students to make significant human factors contributions to the design of state-of-the-art aerodynamic and space systems. Emphasizes the design of control-display integration, cockpit configuration, maintainability, and reliability. Prerequisite: HFE 676.

725 HUMAN FACTORS ENGINEERING WORKLOAD ANALYSIS (3 credit hours)
(Also listed as BMS 954) Provides required tools needed to accomplish a workload analysis as a requisite to a systems design or a redesign of an existing system. Prerequisite: HFE 650.

726 HUMAN FACTORS ENGINEERING CREW STATION DESIGN (3 credit hours)
(Also listed as BMS 955) In-depth treatment of human factors engineering principles applicable to design of crew command centers for aerodynamic, space, and maritime systems. Prerequisite: HFE 676.

731 HUMAN FACTORS ENGINEERING ADVANCES IN VISUAL DISPLAY DESIGN (3 credit hours)
Application of human factors engineering principles to the design of visual display systems. Discusses current display technologies, human vision, design of display parameters, and image quality metrics.

733 ADVANCED TOPICS IN HUMAN-COMPUTER INTERACTION (3 credit hours)
Seminar exposing students to theoretical and research issues associated with human-computer interaction (HCI) and cognitive-oriented work from a human factors engineering standpoint. May be taken for letter grade or pass/unsatisfactory.
734 EXPERIMENTAL RESEARCH AND EVALUATION IN HUMAN FACTORS ENGINEERING (4 credit hours)
Reviews issues related to designing, conducting, and analyzing experiments. Topics include experimental design, experimental ethics, evaluating statistical results, and writing research papers. Students are required to conduct and analyze an experiment. Prerequisite: HFE 506, STT 560, STT 561 or STT 666, STT 667.

735 ADVANCED SYSTEMS MODELS (3 credit hours)
Studies quantitative means of modeling, analyzing, and predicting the performance of human-machine systems. Topics include control theory, estimation theory, fuzzy set theory, information theory, and knowledge-based systems. Prerequisite: HFE 671/471.

742 UNDERSTANDING AND AIDING HUMAN DECISION MAKING (4 credit hours)
Introduction to the methods, concepts, models and results of the science of decision-making and human-centered design. Prescriptive and descriptive theories of human decision making are discussed and contrasted. Approaches to aiding human decision making are considered in the context of these theoretical frameworks. Applications-oriented issues are emphasized.

743 APPLICATION OF HUMAN FACTORS ENGINEERING TO REHABILITATION (3 credit hours)
(Also listed as BMS 963.) Teaches the application of human factors design concepts for designing aids for the physically handicapped. In addition to manipulation and locomotion aids, barrier-free designs are emphasized.

745 ADVANCED INDUSTRIAL ERGONOMICS (3 credit hours)
Discusses and demonstrates the use of ergonomics methods and techniques for controlling physical and physiological stress in the workplace. Specialized biomechanical models introduced. Prevalent ergonomic problems discussed. Real cases from worksites welcomed for discussion. Prerequisite: HFE 507 (307).

749 ERGONOMIC BIODYNAMICS (3 credit hours)
Covers quantitative assessment of human motions. Mathematical descriptions include anthropometry, kinematics, kinetics, and dynamics. The methods of kinesiology, biomechanical modeling, and electromyography are emphasized.

751 HUMAN AND TECHNOLOGY ASPECTS OF COLLABORATION (4 credit hours)
Explores the global revolution in human interconnectedness. Exposes students to the theoretical and research issues in collaboration including how people collaborate in environments with a high degree of decentralized computation, communication and decision-making.

753 QUANTITATIVE METHODS FOR COGNITIVE MODELING (4 credit hours)
Application of concepts and methods in adaptive learning from data. Includes: dynamical systems view of cognitive behavior and performance; adaptive learning concepts, principles; non-linear optimization strategies; regression methods; classification; support vector machines; Fuzzy Systems. Prerequisite: ise 301, MTH 233, MTH 253 or permission of instructor.

760 HUMAN FACTORS ENGINEERING IN VIRTUAL REALITY (3 credit hours)
Introduction to engineered systems associated with virtual reality. Human factors engineering introduction to engineering details underlying the development of virtual environmental displays. Prerequisite: HFE 671.

780 SPEC TOPICS IN OCCUPATIONAL CUMULATIVE TRAUMA DISORDERS (3 credit hours)
Provides and discusses background knowledge and current issues on cumulative trauma disorders, including epidemiological statistics, pathology, risk factors, analysis methods, control measures, and surveillance tools. Students welcomed to bring real worksite cases for discussion. Prerequisite: HFE 506 (306), HFE 507 (307).

789 CONTINUING REGISTRATION (1 credit hour)
May be taken for letter grade or pass/unsatisfactory.
890 SPECIAL PROBLEMS IN HUMAN FACTORS ENGINEERING (1 to 5 credit hours) 
Topics vary.

898 PH.D. DISSERTATION RESEARCH (1 to 5 credit hours) 

899 THESIS (1 to 5 credit hours) 
Graded pass/unsatisfactory.

Health/HLT 
Note: See quarterly class schedule or departmental advisor for further enrollment restrictions, requirements, or special course information.

616 SPECIAL TOPICS IN HEALTH (1 to 4 credit hours) 
Topics vary. Specific titles announced in quarterly class schedule.

617 SPECIAL TOPICS IN SCHOOL NURSING (1 to 4 credit hours) 
This course will offer school nurses and other health professionals the opportunity to update their knowledge and skills related to school health. Prerequisite: baccalaureate degree or permission of instructor.

Health, Physical Education, and Recreation/HPR 
Note: See quarterly class schedule or departmental advisor for further enrollment restrictions, requirements, or special course information.

630 COACHING THEORY (1 to 3 credit hours) 
Theory, skills, strategies, and organization principles of coaching a particular sport. Sports include baseball, basketball, football, soccer, swimming, track and field, tennis, and volleyball. Prerequisite: HPR 101 in same sport.

635 OFFICIATING: (SPORT) (1 to 3 credit hours) 
Rules and techniques of officiating a particular sport, including baseball, basketball, football, soccer, and volleyball.

640 THE ROLE OF THE NURSE IN SCHOOLS (1 to 10 credit hours) 
The nurse as a member of the school health service team. Topics include educational foundations, administration of school health programs, school health services and environment, health counseling (including mental health), and legal and ethical issues. Instructor permission required.

643 SCHOOL NURSING PRACTICUM (1 to 10 credit hours) 
An opportunity for the student to take full responsibility for the application of principles of school health in a school setting under supervision of qualified university and school personnel. May be taken for a letter grade or pass/unsatisfactory. Instructor permission required. Prerequisite: HPR 640.

688 INDEPENDENT STUDY (1 to 6 credit hours) 
Independent reading, writing, and/or reporting in an area related to health, physical education, or recreation. Titles vary.

689 WORKSHOP IN HEALTH, PHYSICAL EDUCATION AND RECREATION (1 to 6 credit hours) 
Intensive study of content, curriculum, method, or materials designed to meet the needs of pre-service and in-service professionals in health, physical education, and recreation. Titles vary.

710 PHYSICAL EDUCATION FOR CHILDREN WITH SPECIAL NEEDS (4 credit hours) 
Assessing students with handicapping conditions, planning appropriate physical activities based on this assessment, and providing the activities described in the plan. Prerequisite: HPR 212 or equivalent.

712 MOTOR DEVELOPMENT FOR LOW INCIDENCE DISABILITIES (4 credit hours) 
Understand how disabilities impact psychomotor development, ADL, mobility, and independence of individuals with disabilities. Knowledge of activities that contribute to an active lifestyle. Prerequisite: HPR 710 or instructor permission.

713 ART, MUSIC, PHYSICAL EDUCATION (3 credit hours) 
Designed to enhance students understanding and philosophies of art, music, and physical education as part of the total school curriculum. May be taken for letter grade or pass/unsatisfactory.
720 MOTOR DEVELOPMENT AND ACQUISITION OF MOTOR SKILLS (4 credit hours)
The relationship of motor learning and motor control processes in the development of human motor skills. Prerequisite: HPR 450 or equivalent.

740 ADMINISTRATION OF INTERSCHOLASTIC ATHLETICS (4 credit hours)
Ways of directing interscholastic athletic programs. Emphasis on personnel administration, program development, facility management, fiscal management, and winning community and professional support. Prerequisite: HPR 340 or equivalent.

750 SCIENTIFIC FOUNDATIONS FOR CONDITIONING (4 credit hours)
Topics include exercise training techniques, heart rate, blood pressure, ventilation, strength, flexibility, and body composition. Includes laboratory methods. Prerequisite: HPR 351 or equivalent.

753 ASSESSMENT OF PHYSICAL ACTIVITY (4 credit hours)
Focuses on selection of measurement materials, techniques of test administration, and essential statistical methods for scientific evaluation. Prerequisite: HPR 455 or equivalent.

760 ADVANCED ATHLETIC TRAINING TECHNIQUES (4 credit hours)
Examination of trauma, contusions, hematoma, strains, sprains, fractures, open wounds, and dislocations. Prerequisite: HPR 460 or equivalent.

780 RESEARCH IN PHYSICAL EDUCATION (5 credit hours)
Study of the research processes in physical education and the development of research projects in students' areas of interest. Prerequisite: HPR 480 or equivalent.

535 SPORTS IN AMERICAN LIFE (4 credit hours)
A survey of the development of American sports from colonial times to 1980, with emphasis on the social, political, and ideological forces that transformed folk games into commercial ventures.

605 ANCIENT HISTORY (4 credit hours)
Selected problems in Roman history to the death of Constantine in A.D. 337.

610 THE MIDDLE AGES (4 credit hours)
From the decline of the Roman Empire to ca. 1450. Topics vary and can include European, Islamic, and Byzantine civilizations.

615 MEDIEVAL AND EARLY MODERN HISTORY (4 credit hours)
Selected problems in European history from the decline of the Roman Empire through the Renaissance and Reformation. Titles vary.

625 MODERN EUROPEAN HISTORY (4 credit hours)
Modern Europe from the Enlightenment to the present through a national (e.g., Germany), chronological (e.g., 19th century), or topical (e.g., socialism) approach. Titles vary.

635 BRITISH HISTORY (4 credit hours)
Examines particular periods of British history (e.g., modern Britain) or topics (e.g., British constitutional history). Titles vary.

645 MIDDLE EASTERN HISTORY (4 credit hours)
Coursed offered under this number examine the Balkans and the Middle East from the Middle Ages to the present. Topics may include Byzantine history, the Crusades, and the Middle East today. Several of these courses will be offered jointly with the Department of Political Science.

655 LATIN AMERICAN HISTORY (4 credit hours)
Selected Latin American nations (e.g., Mexico), particular topics (e.g., Authoritarianism), and colonial Latin American. Titles vary.

665 ASIAN HISTORY (4 credit hours)
Examines various periods of Chinese, Japanese, and other Asian histories or special topics.

670 EARLY AMERICAN HISTORY (4 credit hours)
Examines colonial, revolutionary, and early republican periods of American history.
675 19TH CENTURY UNITED STATES HISTORY (4 credit hours)
Examines distinct periods in the 19th century (e.g., Civil War and Reconstruction) and major topics such as slavery. Titles vary.

680 20TH CENTURY UNITED STATES HISTORY (4 credit hours)
Particular stages of the 20th-century American experience (e.g., the Progressive era) or selected topics (e.g., the civil rights movement, oral history).

685 SPECIAL TOPICS IN UNITED STATES HISTORY (4 credit hours)
Intensive analysis of topics drawn from the entire range of the American experience, such as religion, diplomacy, women, material culture, immigration, and urbanization. Titles vary.

687 INTRODUCTION TO PUBLIC AND APPLIED HISTORY (4 credit hours)
Introduces students to the origins, nature and varieties of public history and to careers in the field. Explores issues of ethics and politics in public history.

688 HISTORY AND NEW MEDIA (4 credit hours)
Examines the impact of new media on access to primary sources, public programs, history education, scholarship, and the ways in which historians engage with each other. Presents productions in a variety of media.

HST 689 HISTORY INSTITUTE FOR EDUCATORS (2 to 4 credit hours)
Intensive analysis of historical topics (e.g., nearby history, oral history) or distinctive periods and areas (e.g., French Revolution). Course will model approaches and introduce scholarship and resources of particular value to educators. Topics vary.

690 TOPICS IN AFRICAN AMERICAN HISTORY (4 credit hours)
Examines topics drawn from the African American experience. Topics covered may include black ideology and leadership, racial tension in urban society, and the civil rights movement. Topics vary. Prerequisite: HST 211-212 or HST 214-215.

691 INDEPENDENT READINGS (1 to 4 credit hours)
Faculty-directed readings in a field of student's choice.

695 COMPARATIVE HISTORY (4 credit hours)
Compares developments or movements in different parts of the world and/or different times in history. May compare revolutions, slave systems, religious movements, or other human experiences that transcend a particular time or place. Titles vary.

698 HISTORIOGRAPHY (4 credit hours)
Introduction to the work of representative historians and important theories of historical interpretation. Prerequisite: 18 quarter hours of history.

700 HISTORICAL METHODS (4 credit hours)
Intensive training in the research methods and materials of history.

701 SEMINAR IN UNITED STATES HISTORY TO 1865 (4 credit hours)
May be repeated with content changes to a maximum of 12 credit hours. Prerequisite: completion of 400-level courses in appropriate areas of consent of instructor.

702 SEMINAR IN UNITED STATES HISTORY SINCE 1865 (4 credit hours)
May be repeated with content change to a maximum of 12 credit hours.

703 SEMINAR IN ANCIENT, MEDIEVAL AND EARLY MODERN EUROPEAN HISTORY (4 credit hours)
May be repeated with content change to a maximum of 12 credit hours. Prerequisite: completion of 400-level courses in appropriate areas or consent of instructor.

704 SEMINAR IN MODERN EUROPEAN HISTORY (4 credit hours)
May be repeated with content change to a maximum of 12 credit hours. Prerequisite: completion of 400-level courses in appropriate areas or consent of instructor.

705 SEMINAR IN LATIN AMERICAN HISTORY (4 credit hours)
May be repeated with content change to a maximum of 12 credit hours.

706 SEMINAR IN ASIAN HISTORY (4 credit hours)
May be repeated with content change to a maximum of 12 credit hours.
707 SEMINAR IN AFRICAN HISTORY (4 credit hours)
May be repeated with content change to a maximum of 12 credit hours.
Prerequisite: completion of 400-level courses in appropriate areas or consent of instructor.

708 SEMINAR IN HISTORY (4 credit hours)
Topics vary. Prerequisite: completion of 400-level courses in appropriate areas or consent of instructor.

709 TOPICS IN AFRICAN AMERICAN HISTORY (4 credit hours)
Conducted as a reading seminar. Focuses on African Diaspora in the Americas. Topics include the black experience in the United States and Latin America from the colonial period to the present. Topics vary. Prerequisite: HST 211 and 212 or HST 214 and 215 recommended.

710 INTRODUCTION TO ARCHIVES AND MANUSCRIPTS (4 credit hours)
Fundamental problems, theoretical principles, techniques, and practical administration of archives and manuscripts; the importance of records in the modern information age and the relationship of archives administration and records management; history of archives. Prerequisite: 9 credit hours in history.

711 LOCAL HISTORY RESEARCH IN ARCHIVES AND MANUSCRIPTS (2 credit hours)
Defines and discusses the origin and development of local history. Students will learn to identify, locate and use primary and secondary sources on a variety of local history topics.

712 MUSEUM ADMINISTRATION AND COLLECTIONS (4 credit hours)
Introduction to museums and their management; the establishment, functions, rules and duties of non-profits. Introduction to collections theory and practice as well as collections policies, accessioning, deaccessioning, management, care, treatment, and conservation.

713 HISTORICAL INTERPRETATION AND EXHIBITS (4 credit hours)
Examines interpretation theory and practice. Students will design and construct a museum exhibit including budgeting, research, design, construction, artifact selection, media relations and opening reception.

713 ADVANCED PROBLEMS IN HISTORICAL ADMINISTRATION (4 credit hours)
Prepares students for positions in historical societies and similar organizations that preserve, maintain, or interpret historical properties.

714 ADVANCED PROBLEMS IN ARCHIVAL WORK (4 credit hours)
Students will put into practice the theories and concepts associated with appraisal and acquisition, arrangement and description, reference, and preservation of archival materials. Course work includes practical experience in processing and preserving an archival collection. Prerequisite: HST 710.

715 PUBLIC HISTORY INTERNSHIP (5 credit hours)
Practical training in various aspects of public history and historical administration. Students complete a 300-clock-hour internship and prepare a report on the experience. Permission of the Public History Program Director required. Prerequisites: HST 710, 711, 712, 713, and 714.

716 ARCHITECTURAL PRESERVATION (4 credit hours)
Overview of the history and practices of architectural preservation. Introduces students to the supervision of, or participation in, the preservation program of an historical organization.

717 PRACTICA: ARCHIVES AND MUSEUMS (1 to 2 credit hours)

718 ORAL HISTORY TECHNIQUES (4 credit hours)
The study of oral history techniques and methodology.

719 PRACTICE OF ORAL HISTORY (4 credit hours)
Development of skill in the practice of oral history by means of intensive work in carrying out an oral history project. Prerequisite: HST 718.

720 PROJECT (1 credit hour)
Students complete a historical project (editing a diary, processing a manuscript collection, curating an exhibit, preparing a research report). Permission of the Public History Program director required. Prerequisites: HST 715, 727, 730 and 740.
727 TOPICS IN PUBLIC HISTORY
(4 credit hours)
Intensive analysis of topics related to the theory and practice of public history such as American decorative art, architectural history, history of photography, and history of technology.
A. Introduction to American Decorative Arts.
   The identification of artifacts which may be found in a history museum collection such as furniture, glassware, ceramics and fabrics, by date, material, use, style, and manufacture.
B. American Architectural History
   (previously HST 716 alternate designation)
   Introduces students to the origins, nature, and varieties of public history and to careers in the field. Explores questions of ethics and politics in public history.

730 ARCHIVAL RECORDS TECHNOLOGIES (2 credit hours)
Introduces the uses of digital electronic records systems in an archival setting.

740 INFORMATION MANAGEMENT (2 credit hours)
Examines the processes and concepts associated with records and information management in a variety of institutional settings.

791 TOPICS IN HUMANITIES (2 to 4 credit hours)
Problems, approaches, experiments, and speculations in the Humanities.

799 DIRECTED STUDIES (1 to 4 credit hours)
Individual study in the humanities under the direction of a faculty supervisor. Scope of project must be outlined in advance. Titles vary.

International Business/IB
Note: See quarterly class schedule or departmental advisor for further enrollment restrictions, requirements, or special course information.

680 SPECIAL TOPICS IN INTERNATIONAL BUSINESS (1 to 6 credit hours)
Reading or research in a selected field of international business. Topics vary.

780 INTERNATIONAL BUSINESS INTERNSHIP (1 to 6 credit hours)
Practical application in international trade. Integrates academic learning with work experiences. Students apply classroom learning in an organizational setting. Titles vary.

781 SPECIAL STUDIES IN INTERNATIONAL BUSINESS (1 to 3 credit hours)
Intensive reading or research in a selected field of advanced international business. Titles vary.

Latin/LAT
Note: See quarterly class schedule or departmental advisor for further enrollment restrictions, requirements, or special course information.

600 SPECIAL PROJECT WORKSHOP (1 to 5 credit hours)
Intensive study of Latin, including Latin pedagogy, designed for teachers and others who desire to improve or enhance existing ability. Topics vary.

681 INDEPENDENT READING IN LATIN (4 credit hours)
Reading and discussion of selected works of Latin literature with emphasis on grammatical, rhetorical, literary, and cultural analysis and criticism. May be repeated for credit by number, but not by content. Prerequisite: three years college Latin or departmental permission. Topics vary.
Law/LAW

Note: See quarterly class schedule or departmental advisor for further enrollment restrictions, requirements, or special course information.

620 LEGAL ASPECTS OF MANAGING A DIVERSE WORKFORCE
(3 credit hours)
(Also listed as LAW 420). Employment discrimination is examined in the broader context of workforce diversity. Major federal laws, court cases, and changing demographics impose obligations and present opportunities for employers and employees.

680 SPECIAL TOPICS IN BUSINESS AND GOVERNMENT (3 credit hours)
Deals with current problems of interest and value in the area of business. Topics include government regulation of business, social responsibility of business, and legal problems in business.

695 ETHICS OF AN INDUSTRIAL SOCIETY
(3 credit hours)
(Also listed as REL 679 and MGT 695.) Investigates the ethical responsibilities of business in light of political, moral, and religious considerations. Emphasizes the analysis and evaluation of the changing framework of responsibilities facing both business organizations and their leaders.

781 SPECIAL STUDIES IN BUSINESS
(1 to 3 credit hours)
Topics vary.

Microbiology and Immunology/Courses

Note: See quarterly class schedule or departmental advisor for further enrollment restrictions, requirements, or special course information.

675 PATHOGENIC MECHANISMS
(5 credit hours)
(Also listed as BMS 775.) This advanced level course will expand the knowledge of basic microbiology by focusing on human-microbial pathogen interactions. The molecular basis of the pathogenic mechanisms will be emphasized. In addition, the student will gain a better appreciation and understanding of the complexities of interactions between microbes and their human hosts. Prerequisite: BIO 210 or equivalent molecular biology course and BIO 252 or equivalent introductory microbiology course.

699 SPECIAL PROBLEMS IN MICROBIOLOGY (1 to 4 credit hours)
Study of the physiological and biochemical processes unique to microorganisms.

726 IMMUNOLOGY AND BASIC VIROLOGY (5 credit hours)
(Also listed as BMS 802.) Fundamentals of immunobiology and basic virology. Emphasis on the regulatory and cellular level of host immune responses against microbial pathogens, as well as mechanisms of immunopathology, and the characteristics and molecular biology of virus pathogens. Prerequisite: BIO 202, BIO 402, CHM 216 or equivalent.

727 PATHOGENIC MICROBIOLOGY
(5 credit hours)
(Also listed as BMS 803.) Microorganisms pathogenic for humans and animals using the organ system approach. Emphasis on mechanisms of pathogenesis and host resistance. Includes a project segment devoted to the independent study of the mechanisms of pathogenesis in the host-parasite interactions of the infectious agents used. Prerequisite: BIO 202, 402, CHM 216, M&I 726 or department consent.

731 BASIC VIROLOGY (3 credit hours)
(Also listed as BMS 807.) Introduction to the field of virology with emphasis on animal viruses. Intrinsic properties of viruses and their interaction with cells, multiplication, disease production, genetics, and tumor induction. Projects assigned to each student. Prerequisite: BIO 402, BCH 421, M&I 726 or consent.

745 IMMUNOBIOLOGY (5 credit hours)
(Also listed as BMS 812.) Biology of the immune system in terms of current concepts of antibody formation and function. Acquired, delayed, and immediate hypersensitivity are studied with respect to immunological deficiencies, malignancy, tolerance, graft rejection, infection, and acquired resistance. Prerequisite: M&I 726 & 728, BCH 751 & 752.

770 INTERCELLULAR COMMUNICATION
(4 credit hours)
(Also listed as BMS 805, P&B 776, PHA 740.) Introduces the concepts of intercellular communication through an interdisciplinary presentation of immune neuroendocrine system functions. Emphasizes the similarities between the systems and the multidisciplinary approaches used to study each.
GENE THERAPY (4 credit hours)
(Also listed as BIO 777.) Study of the molecular basis of gene therapy and the use of viral gene delivery systems for the treatment of human disease. Gene therapy strategies are contrasted with various diseases, including cancer and AIDS.

MICROBIOLOGY SEMINAR (1 credit hour)
Graded pass/unsatisfactory.

SEMIMAR: JOURNAL CLUB (1 to 5 credit hours)
Selected topics in microbiology.

SEMIMAR TOPICS IN MOLECULAR ViroLOGY (3 credit hours)
(Also listed as BMS 808.) Structure, infectious process, replication, maturation, release, and genetics at the molecular level of the major groups of animal viruses. Prerequisite: M/I 431/731.

SEMIMAR TOPICS IN VIRAL ONCOLOGY (3 credit hours)
(Also listed as BMS 809.) Understanding the processes involved in cell transformation by oncogenic viruses. Prerequisite: M/I 431/731.

SEMIMAR TOPICS IN TRANSPLANTATION IMMUNOLOGY (3 credit hours)
Survey of the fundamentals of transplant immunology. Topics include mechanisms of intra- and interspecies rejection, histocompatibility genes and their products, graft-versus-host diseases, immunologically privileged sites, techniques for immunosuppression, immune tolerance, and the immunobiology of the maternal/fetal relationship. Prerequisite: M/I 745 or departmental permission.

SEMIMAR TOPICS IN TUMOR IMMUNOLOGY (3 credit hours)
The host-tumor relationship is studied intensively. Interrelationships between tumor growth and host immune responses are examined at the molecular and cellular levels. Prerequisite: M/I 745 or permission of department.

SEMIMAR TOPICS IN IMMUNE REGULATION (3 credit hours)
Maintenance of immune homeostasis with emphasis on the contributions of lymphocyte subpopulations. Sequelae of immune imbalance are studied. Prerequisite: M/I 745 or permission of department.
532 SURVEY OF FINANCE (2 credit hours)
Theories, concepts, and techniques of financial management. Designed for students with no previous course work in financial management and for those with a need to review the basic techniques. Prerequisite: MBA 511.

541 SURVEY OF LAW (2 credit hours)
Examines economic, political, and social forces which shape law and impact the management of business. Public law topics include government regulation of markets and employment relationships. Private law topics include contracts, torts, and property.

551 SURVEY OF MANAGEMENT (2 credit hours)
Designed for those with no previous course work in management. Addresses both traditional managerial processes (planning, organizing, leading, and controlling) as well as more contemporary approaches. Covers leadership, motivation, empowerment, and team dynamics.

561 SURVEY OF MARKETING (2 credit hours)
Provides an introduction to the structure and function of marketing processes. Discussion focuses on management of the marketing mix variables and how these factors relate to the marketing concept.

581 SURVEY OF MATHEMATICS FOR BUSINESS (2 credit hours)
Develops competence in quantitative methods for the analysis of business problems. Includes intermediate and advanced algebra, and differential and integral calculus.

582 SURVEY OF STATISTICS (2 credit hours)
Basic statistical analysis within a problem solving and decision making context. Topics include sampling, probability and distribution, confidence intervals and central location. Statistical software package used. Prerequisite: MBA 581 or equivalent.

711 STRATEGIC COST MANAGEMENT (3 credit hours)
A core MBA course to develop understanding of cost management in the new manufacturing environment. Students must not only understand accounting concepts, but must also demonstrate their application in many different situations. Case work required. Prerequisites: MBA 511, 531 and 532 or equivalent and MBA 783.

722 ECONOMICS FOR MANAGERS (3 credit hours)
A core MBA course to develop understanding of cost management in the new manufacturing environment. Students must not only understand accounting concepts, but must also demonstrate their application in many different situations. Case work required. Prerequisite: EC 523, 524 and MBA 581 or equivalent.

723 INTERNATIONAL BUSINESS AND THE GLOBAL ECONOMY (3 credit hours)
A core MBA course to develop understanding of cost management in the new manufacturing environment. Students must not only understand accounting concepts, but must also demonstrate their application in many different situations. Case work required. Prerequisite: all foundation plus 7 of 9 business competency and functional area classes completed.

731 FINANCIAL ANALYSIS AND DECISION MAKING (3 credit hours)
Application of finance concepts, theories, and techniques. Emphasis on case problems and decision making. Prerequisite: MBA 532.

741 LAW, REGULATION, POLITICS AND THE SOCIAL ENVIRONMENT OF BUSINESS (3 credit hours)
Interdisciplinary study of the legal, political, regulatory, and social environment of U.S. business firms. Legal and economic regulation topics include restraints on competition, environmental regulation, product safety, health, and quality regulation. Prerequisite: all foundation plus 7 of 9 business competency and functional area classes completed.

751 MANAGING PEOPLE IN ORGANIZATIONS (3 credit hours)
A hands-on, experience-based course devoted to leading people and teams in today's workplace. Emphasizes communication, conflict resolution, influencing strategies, and empowerment principles. Prerequisite: MBA 551 or equivalent.
753 DEVELOPING AND IMPLEMENTING
ORGANIZATIONAL COMPETITIVE
STRATEGIES (3 credit hours)
Competitive strategy is presented as practice
in business and other types of organizations
from an integrated (cross-functional)
perspective. Industries, competition, and
other environmental forces are analyzed
to determine an organization's competitive
strategy. Students are required to work
in teams. Prerequisite: all foundation plus
7 of 9 business competency and functional
area classes completed.

761 MARKETING STRATEGY
(3 credit hours)
Overview of managing the marketing mix
variables and discussion of marketing plans,
formation of strategies and problem solving.
Material will be covered by readings and
discussion of cases. Individual and team
exercises will be assigned. Prerequisite:
MBA 561 or equivalent.

762 BUS PROFESSIONALISM
(3 credit hours)
Systematic assessment and development
of individual, group, and organizational
communication and integrity-building skills as
a career foundation for professional business
performance. Projects in business ethics
and organizational communication develop
proficiency in business professionalism tools.

771 INFORMATION, TECHNOLOGY AND
ORGANIZATIONS (3 credit hours)
Critical examination of organizational data/
information needs, information management
strategies, and the technology used to
support information management. Using
a systems theory approach, this course
analyzes both intra- and inter-organizational
data flow. Prerequisite: all foundation plus
7 of 9 business competency and functional
area classes completed.

781 QUANTITATIVE METHODS FOR
DECISION MAKING (3 credit hours)
Develop quantitative models to aid in analysis
and decision making. Decision analysis, time
series analysis, queuing models, simulation,
linear and nonlinear programming.
Prerequisite: MBA 562, MBA 573.

782 MANAGING OPERATIONS (3 credit
hours)
Introduction to the management of
production and operating systems. Focus
on both the design and management of
operations. Topics include plant layout,
project management, forecasting, production
planning, inventory policy, job design,
and measurement. Prerequisite: MBA 573,
MBA 781.

783 QUALITY MGT AND CONT IMPR
(3 credit hours)
Concepts, objectives and applications
of quality management with emphasis
on continuous improvement in business
organizations. Includes application of
statistical process control techniques.

Mechanical and Materials
Engineering/ME
Note: See quarterly class schedule or
departmental advisor for further enrollment
restrictions, requirements, or special course
information.

513 STRENGTH OF MATERIALS
(5 credit hours)
Axial and shear stresses and strains; biaxial
loading; torsion of circular shafts; shear and
bending moment diagrams; deflection of
beams; and column theory. 4 hours lecture,
2 hours lab. Prerequisite: ME 212, PHY 240,
EGR 153.

515 THERMODYNAMICS I (4 credit hours)
Classical thermodynamics with applications
of the first and second laws to engineering
systems. Prerequisite: undergraduate physics
sequence.

516 THERMODYNAMICS II (4 credit hours)
Concepts of availability and irreversibility,
power and refrigeration cycles,
thermodynamic relations, and mixtures and
combustion. 3 hours lecture, 2 hours lab.
Prerequisite: ME 515.

517 FLUID DYNAMICS (4 credit hours)
Fluid properties, fluid statics, one-
dimensional compressible and
incompressible flow, flow of real fluids,
and flow measurements. 3 hours lecture,
2 hours lab. Prerequisite: ME 213, ME 515.

518 HEAT TRANSFER (4 credit hours)
Principles that govern heat transfer in solids,
fluids, vacuum, and at interfaces of solids
and fluids are examined. Laboratory
experiments to illustrate these phenomena.
3 hours lecture, 2 hours lab. Prerequisite:
ME 517.

570 MATERIALS ENGINEERING SCIENCE:
INTRODUCTION (4 credit hours)
Effect of atomic, molecular, and crystalline
structures on the properties of materials
with emphasis on electronic materials and
ceramics, characterization of materials,
and device fabrication. Prerequisite:
undergraduate physics and chemistry
sequences.
571 STRUCTURE AND PROPERTIES OF ENGINEERING MATERIALS
(3 credit hours)
Effect of microstructure, phase equilibrium, and processing on properties of structural materials including metallic alloys, polymers, and composites. Prerequisite: ME 513, ME 570.

575 THERMODYNAMICS OF MATERIALS
(4 credit hours)
Application of classical thermodynamics to engineering materials. Heats of formation and reaction; behavior of solutions; free energy concepts; thermodynamic fundamentals of phase equilibria. Prerequisite: ME 515, ME 571.

576 PHYSICAL METALLURGY
(3 credit hours)
Fundamentals of structure-property relations in metals and alloys related to transformations and kinetics. Application to recovery and recrystallization, solidification, precipitation strengthening, and dislocation transformations. Prerequisite: ME 575.

605 KINEMATICS AND DESIGN OF MECHANISMS (4 credit hours)
Graphic, analytical, numerical, and symbolic techniques are used in the kinematic and dynamic analysis of machines. Computer-aided design of mechanisms is introduced. Emphasis on the application of these techniques to planar mechanisms. Prerequisite: ME 213.

608 DESIGN OPTIMIZATION (3 credit hours)
Concepts of minima and maxima; linear, dynamic, integer, and nonlinear programming. Variational methods. Engineering applications are emphasized. Prerequisite: ME 213, MTH 233, EE 520.

609 AEROSPACE STRUCTURES
(4 credit hours)
Analysis and design of flight structures, Stress, deformation, and stability analysis of aerospace structures. Thin-walled members bending, torsion, and shear stresses calculation in multi-cell structures. Buckling of thin plates. Prerequisite: ME 513.

612 FINITE ELEMENT ANALYSIS
(4 credit hours)
Finite element formulations for line, surface, bending, torsion, and three-dimensional elements. Numerical methods and applications of FEM programs in structural design and solid mechanics. Prerequisite: MTH 233, ME 513.

614 MECHANICAL DESIGN I
(4 credit hours)
Fundamental concepts in design for static strength, fatigue, and impact loading; application to selected mechanical components and systems. Prerequisite: ME 513.

615 MECHANICAL DESIGN II
(4 credit hours)
Design of mechanical elements such as springs, bearings, shafts, gears, clutches, brakes, and flywheels; students conduct an individual design project. Prerequisite: ME 614.

617 MECHANICS OF VISCOUS FLUIDS
(3 credit hours)
Fundamental equations of viscous flow for laminar and turbulent flows. Boundary layer analysis. Analytical and numerical solutions of the equation of motion. Prerequisite: ME 517.

618 HEAT CONDUCTION IN SOLIDS
(3 credit hours)
Analytical and numerical techniques for heat conduction problems in one, two, and three dimensions for steady and transient cases. Phase-change problems. Prerequisite: ME 518.

623 ENERGY CONVERSION (4 credit hours)
Study of important new developments in the field of energy conversion. Thermoelectric, photoelectric, thermionic, electromechanical, and electrochemical systems are studied. Prerequisite: ME 515.

630 AERONAUTICS (4 credit hours)
Aviation history. Standard atmosphere, basic aerodynamics, theory of lift, airplane performance, principles of stability and control, astronautics, and propulsion concepts. Prerequisite: ME 213, ME 515.

631 AEROSPACE PROPULSION
(4 credit hours)
Engine cycle analysis: combustion fundamentals; reciprocating engines and propellers; applications to turbojet, turbofan, turboprop, ramjet, SCRAM jet, and rocket engines. Prerequisite: ME 517.

632 FLIGHT DYNAMICS AND CONTROL SYSTEMS (4 credit hours)
Covers development of the equations for general aircraft motion; Perturbed State equations; basic aerodynamic characteristics; control surface effectiveness; stability and control derivatives; dynamic stability; control of the airplane; and automatic flight control. Prerequisite: EE 521.
634 COMPUTATIONAL FLUID DYNAMICS
(4 credit hours)
Introduces CFD methods: governing equations, PDEs, finite difference numerical methods, stability analysis, incompressible and compressible flows, subsonic to supersonic flows. Prerequisite: ME 517.

642 VEHICLE ENGINEERING
(3 credit hours)
Develops students' abilities to derive and solve vehicle equations, and introduce dynamic analysis in vehicle design. Various performance criteria, control concepts, and HEVs will be studied.

644 PRINCIPLES OF INTERNAL COMBUSTION ENGINES
(4 credit hours)
Thermodynamics of I.C. engines, combustion thermodynamics, friction, heat and mass losses, and computer control of the modern fuel-injected I.C. engine. Prerequisite: ME 516, ME 517.

656 INTRODUCTION TO ROBOTICS
(4 credit hours)
(Also listed as CEG 656 and EE 656.) Introduction to the mathematics, programming, and control of robots. Topics covered include coordinate systems and transformations, manipulator kinematics and inverse kinematics, trajectory planning, Jacobians, and control. Prerequisite: MTH 253, proficiency in pascal, c or fortran programming.

658 INSTRUMENTATION AND MEASUREMENT (4 credit hours)
Develops understanding in measurements, conveys the principles and practice for design of systems including uncertainty and signal reconstruction, and establishes the physical principles and techniques used to measure those quantities most important for applications.

660 MECHANICAL VIBRATIONS
(4 credit hours)
Modeling and analysis of single and multi-degree freedom systems under free and forced vibration and impact. Lagrangian and matrix formulations, energy methods, and introduction to random vibrations. Prerequisite: ME 213, EE 521.

664 MECHANICAL SYSTEM MODELING AND DESIGN (4 credit hours)
Modeling of complex mechanical systems as a set of simple, linear or nonlinear components for the purpose of design. Introduces modern computational tools. Prerequisite: ME 213.

670 FAILURE ANALYSIS (3 credit hours)
Engineering aspects of failure analysis, failure mechanisms, and related environmental factors. Analysis of actual service failure. Prerequisite: ME 513, ME 571.

672 STRUCTURE AND PROPERTIES OF ENGINEERING POLYMERS
(4 credit hours)
Introduces polymers as engineering materials and covers fundamental concepts in polymer science and engineering. Includes polymerization processes, morphology and crystallinity, thermal transitions, viscoelasticity, rubber elasticity, aging, and contemporary issues in polymers. Prerequisite: ME 570.

675 HIGH TEMPERATURE MATERIALS
(3 credit hours)
Design and use of high-temperature superalloys, strengthening mechanisms, creep and fatigue, corrosion and oxidation, protective coatings, and alternative materials. Prerequisite: ME 576; co-requisite ME 677, or permission of the instructor.

677 MECHANICAL BEHAVIOR OF MATERIALS (4 credit hours)
Crystal plasticity and single crystal behavior. Introduction to dislocation theory. Strengthening mechanisms and polycrystalline behavior. Introduction to viscoelasticity. Fracture, fatigue, and creep of materials. Prerequisite: ME 513, ME 571.

678 X-RAY SPECTRAL ANALYSIS
(3 credit hours)
Electron microprobe and X-ray fluorescence for analysis of alloys and other materials are explained and demonstrated with examples. 2 hours lecture, 1 hour lab. Prerequisite: ME 682.

679 MATERIALS CORROSION
(4 credit hours)
Survey of the principles of corrosion processes with application to metallic and nonmetallic materials. Principles of electrochemistry are included. Prerequisite: ME 515, 571, or corequisite CHM 553.

681 MATERIALS CHARACTERIZATION
(4 credit hours)
Survey of the principal techniques used to detect and evaluate flaws in material components such as castings, weldments, and composites. Includes liquid penetrant, ultrasonic, radiographic, eddy current, and magnetic test methods. Prerequisite: ME 571.
682 INTRODUCTION TO TRANSMISSION ELECTRON MICROSCOPY
(4 credit hours)
Introduction to the theory and practice of diffraction methods in the study of alloys, refractory materials, and polymers. 2 hours lecture, 4 hours lab. Prerequisite: ME 571.

683 INTRODUCTION TO CERAMICS
(3 credit hours)
Ceramic and refractory raw materials and products; atomic structure and bonding; structure of crystalline phases and glasses; structural imperfections; diffusion in oxides; phase equilibria; processing of ceramics. Prerequisite: ME 575.

684 PHYSICAL CERAMICS (4 credit hours)
Processing, microstructure, and properties of ceramics; defect equilibria in oxides; thermal, optical, electrical, and mechanical properties of ceramic materials. Ceramics for special applications. 3 hours lecture, 2 hours lab. Prerequisite: ME 683.

685 SOLIDIFICATION PROCESSING
(4 credit hours)
Fundamentals of melt solidification, application to metals casting technology, and an introduction to powder metallurgy. 3 hours lecture, 2 hours lab. Prerequisite: ME 575.

686 DEFORMATION PROCESSING
(4 credit hours)
Fundamentals of principal deformation processing systems including forging, extrusion, rolling, and sheet forming; material response and formability; and mechanics and analysis of selected processes. 3 hours lecture, 2 hours lab. Prerequisite: ME 513, ME 571.

687 MACHINING (4 credit hours)
Fundamentals of machining with emphasis on engineering models of machinability, chip formation, cutting forces and power, and lubrication. Introduction to numerical control machining. 3 hours lecture, 2 hours lab. Prerequisite: ME 571.

688 POWDER PROCESSING
(4 credit hours)

689 ENGINEERING PLASTICS:
MATERIALS, PROCESSES, AND DESIGN (4 credit hours)
(Also listed as CHM 669.) Properties and manufacturing processes of engineering plastics and the effect of these factors on plastics design. Illustrative laboratory projects are included. 2 hours lecture, 4 hours lab. Prerequisite: CHM 665.

699 SPECIAL PROBLEMS IN MECHANICAL AND MATERIALS ENGINEERING (1 to 5 credit hours)
Special problems in advanced engineering topics. Titles vary.

700 PRINCIPLES OF INSTRUCTION IN ENGINEERING (3 credit hours)
Survey of available instructional materials and discussion of educational theories and techniques leading to more effective instruction.

708 MULTIDISCIPLINARY STRUCTURAL OPTIMIZATION (4 credit hours)
Structural optimization of large scale systems with constraint approximations, sensitivity analysis, and design variable linking methods. Primal, dual, and optimality criteria methods for shape and size optimization. 3 hour lecture. Prerequisite: ME 608 or equivalent.

710 COMPUTATIONAL METHODS IN STRUCTURAL DYNAMICS
(4 credit hours)
Vibration of discrete and continuous systems. Computational methods for the eigenvalue problem. Large-dimensional systems. Approximate methods for continuous systems. Substructure synthesis. Response of vibrating systems. 3 hours lecture, 2 hours lab. Prerequisite: ME 560, fortran programming.

712 FINITE ELEMENT METHOD APPLICATIONS (4 credit hours)
Concepts of dynamic analysis using the finite element method (FEM). Application of various computational techniques to dynamic structures and thermal systems including vehicle dynamics. 3 hours lecture, 2 hours lab. Prerequisite: ME 612.

714 NONLINEAR FINITE ELEMENT ANALYSIS (4 credit hours)
715 ADVANCED DYNAMICS (4 credit hours)
Introduction to classical mechanics. Application of distributed and discretized approaches to dynamic systems with rigid and deformable members. Emphasis on the understanding of fundamental theory of mechanics and applications of different techniques to dynamics. Prerequisite: graduate standing.

716 NONLINEAR DYNAMICS AND VIBRATIONS (4 credit hours)
The behavior of nonlinear mechanical systems is analyzed with numerical, symbolic, graphic, and analytical methods. Equal emphasis is placed on understanding nonlinear effects and methods of analysis. Prerequisite: graduate standing required.

718 RANDOM VIBRATION (4 credit hours)
Introduction of the fundamental concepts of random signal analysis for random vibration analysis. Statistical approaches to the response of mechanical vibratory systems, and the extension of this understanding to experimental modal analysis. Prerequisite: ME 660, equivalent or instructor approval.

720 ADVANCED MECHANICS OF SOLIDS (4 credit hours)

721 MECHANICS OF COMPOSITE MATERIALS (4 credit hours)
Constituent properties and micromechanics of composite materials are studied. Macromechanics of fiber reinforced composites and laminates are discussed and a brief introduction to finite element analysis of composites is presented. Prerequisite: ME 513 or equivalent.

722 AEROELASTICITY (4 credit hours)
Static and dynamic aeroelastic response of an aeroelastic airfoil and a straight wing in the presence of steady and unsteady aerodynamic loads. Use of the K and PK to determine flutter speeds. 3 hours lecture, 2 hours lab. Prerequisite: ME 720, ME 612.

723 VISCOELASTICITY (4 credit hours)
Extends the concepts of elasticity to include the energy dissipating effects of viscoelasticity. Linear/nonlinear viscoelastic behavior are examined in one and three dimensions. Finite element modeling of frequency dependent viscoelastic behavior is introduced. Prerequisite: ME 712 and ME 720, or equivalents.

724 CONTINUUM MECHANICS (4 credit hours)
Applying the physical laws of conservation of mass, energy, momentum, and thermodynamics to a continuum to formulate the mathematical equations governing the macroscopic behavior of matter. Understanding the physical meaning of the laws and individual terms in the equations, analysis of stress and deformation at a point, and the development of constitutive equations will be emphasized.

726 STRUCTURAL RELIABILITY (4 credit hours)
Analyze the uncertainties associated with mechanical and structural design. Methods to model various uncertainties in a design using probabilistic analysis tools. Computation of safety index and structural reliability using efficient techniques for implicit functions. Prerequisite: ME 720, ME 612 or equivalent.

730 ADVANCED FLUID DYNAMICS (3 credit hours)
Theory and application of conservation equations for fluid mechanics. Develops boundary layer equations for laminar and turbulent flows. Topics include incompressible, viscous, supersonic, and hypersonic flows. Prerequisite: ME 517.

732 BOUNDARY LAYER THEORY (4 credit hours)
Advanced fluid dynamics including formulation of the Navier-Stoke equations, boundary layers and exact and approximate solution of the boundary layer equations, and the transition to and characteristics of turbulent flows. Prerequisite: ME 617.

734 ADVANCED COMPUTATIONAL FLUID DYNAMICS (3 credit hours)
Introduction to modern computational fluid dynamic (CFD) methods. Survey of current numerical procedures to solve fluid dynamic problems from incompressible to hypersonic flows. 3 hours lecture, 2 hours lab. Prerequisite: ME 634.

736 CONVECTIVE HEAT AND MASS TRANSFER (3 credit hours)
Heat and mass transfer analysis within conductors and over submerged objects for laminar and turbulent flows. Film condensation and boiling. Prerequisite: ME 518.
738 RADIATION HEAT TRANSFER (3 credit hours)
Fundamentals and application of radiation heat transfer, radiation between gray and nongray bodies, network techniques, radiation through absorbing media, and radiation between gases and surrounding surfaces. Finite difference solution for radiation problem. Prerequisite: ME 518.

740 TWO-PHASE HEAT TRANSFER (4 credit hours)
Examination of the thermophysics of vaporization and condensation processes in heat transfer equipment. The basic physical mechanisms associated with phase-change phenomena are described, and the best empirical models are presented. Prerequisite: ME 318/518.

742 NUMERICAL SIMULATION OF HEAT AND MASS TRANSFER (3 credit hours)
Computational techniques for the solution of engineering problems in multidimensional fluid flow, and heat and mass transfer including two-phase flows and chemical reactions. Prerequisite: ME 736.

743 NUMERICAL HEAT TRANSFER II (4 credit hours)
Use of finite difference method to solve a variety of problems in heat transfer and fluid flow. Techniques used in the numerical solution of these types of problems are developed. Prerequisite: ME 742.

744 ADVANCED CLASSICAL THERMODYNAMICS (4 credit hours)
Critical examination of thermodynamic principles, equation of state for liquids, gases, and mixtures. Interpretation of thermodynamic functions and applications to processes, reactions, and equilibrium states. Prerequisite: ME 315/515, ME 316/516.

746 STATISTICAL THERMODYNAMICS (4 credit hours)
Critical examination of thermodynamics from the microscopic point of view, models of molecular distributions like the Maxwell-Boltzmann velocity distribution, and calculation of partition functions and their use in the determination of macroscopic thermodynamic properties. Prerequisite: ME 316/516.

748 FUNDAMENTALS OF PLASMA SCIENCE (4 credit hours)
Properties, characteristics, and use of ionized gases. Fundamentals of gaseous electronics including kinetic theory, excitation, ionization, equilibrium, non-equilibrium, and local thermodynamic equilibrium. Plasma generation, glow discharge, rf-discharges, plasma torches, and free-burning arcs. Prerequisite: ME 746.

754 NONLINEAR CONTROL (4 credit hours)
Nonlinear behavior and controllers are emphasized. Gain scheduling, model following, time-delay and slide-mode techniques will be discussed. Rule-based fuzzy logic and neural network will be developed. Emphasis will be on theory, algorithms, and applications. Prerequisite: EE 613.

756 ROBOTICS I (4 credit hours)
(Also listed as CEG 756 and EE 756.)
Detailed study of the dynamics and control of robotic systems and robot programming languages and systems. Material covered includes rigid-body dynamics; linear, nonlinear, adaptive, and force control of manipulators; and robot programming languages. Prerequisite: ME 656.

757 ROBOTICS II (4 credit hours)
An introduction to sensing, vision, and robot intelligence and task planning. Material covered includes sensors, low-level and higher level vision techniques, task planning including obstacle avoidance and artificial intelligence and expert systems as applied to robotic systems. Prerequisite: ME 656.

760 THERMODYNAMICS OF SOLIDS (4 credit hours)
Thermodynamics of solutions, reactions, phase transformations, surfaces and interfaces, and point defects. Quasi-chemical model for solutions. Heterogeneous phase equilibria. Phase diagrams and thermodynamic quantities. 3 hours lecture, 1 hour seminar. Prerequisite: ME 575.

761 PHASE DIAGRAMS AND DIFFUSION (4 credit hours)
Study of equilibrium diagrams through ternary diagrams with an introduction to quaternaries. Advanced topics in diffusion in binary and ternary alloys, ceramics, and intermetallics, defect structures. Fourth-hour discussion of current topics in materials.
762 TRANSFORMATIONS IN SOLIDS I
(4 credit hours)
This is the first course in a two course sequence. Covers the theory of homogenous and heterogeneous nucleation and diffusion and interface controlled growth. Prerequisite: ME 576.

763 TRANSFORMATIONS IN SOLIDS II
(4 credit hours)
This is the second course in a two course sequence. Covers recovery, recrystallization, grain coarsening, eutectoid decomposition, and spinodal decomposition. Prerequisite: ME 762.

768 QUANTITATIVE MICROSCOPY
(4 credit hours)
Deals with quantifying microstructural features, such as volume fraction, grain size, shape, and orientation of phases. The course covers stereology, the science of relating 2-dimensional images to 3-dimensional structure, and image analysis. Prerequisite: MTH 233, ME 585 or equivalent.

772 PHYSICAL POLYMER SCIENCE
(4 credit hours)
Polymer physics including phase diagrams, phase separation, the amorphous and crystalline states, liquid crystals, thermal transitions, viscoelasticity and rheology, as well as deformation and fracture. Prerequisite: ME 472/672, ME 375/575.

782 PROCESSING OF ENGINEERING MATERIALS (3 credit hours)
In-depth study of processing-microstructure-property relationships for selected engineering materials.

783 CERAMICS FOR ADVANCED APPLICATIONS (4 credit hours)
Science and technology of ceramics and glasses and their use in various products; atomic structure; bonding; defect-microstructure-property relations; thermal and structural ceramics; electronic, optical, and dielectric ceramics; and special applications. Prerequisite: ME 483/683 or permission from the instructor.

786 APPLIED PLASTICITY AND METAL FORMING (4 credit hours)

880 SELECTED TOPICS IN SYSTEMS ENGINEERING (3 credit hours)
Selected topics in current research and recent developments in systems theory and engineering.

890 SPECIAL PROBLEMS IN MECHANICAL AND MATERIALS ENGINEERING (1 to 5 credit hours)
Special problems in advanced engineering topics. Titles vary.

898 Ph.D. DISSERTATION RESEARCH (1 to 5 credit hours)

899 THESIS (1 to 5 credit hours)
Graded pass/unsatisfactory.

Management/MGT
Note: See quarterly class schedule or departmental advisor for further enrollment restrictions, requirements, or special course information.

675 SMALL BUSINESS CONSULTING (3 credit hours)
Students will work in teams with small businesses to develop a business plan. They will look at marketing, finances, staffing, etc. needed to start a business or grow an existing business. Provides excellent hands-on application of previous course work.

680 SPECIAL TOPICS (1 to 6 credit hours)
Seminar in an area of current interest in management or human resource management. Topics vary. May be taken for letter grade or pass/unsatisfactory.

695 ETHICS OF AN INDUSTRIAL SOCIETY (3 credit hours)
(Also listed as LAW 695 and REL 679.) Investigates the ethical responsibilities of business in light of political, moral, and religious considerations. Emphasizes the analysis and evaluation of the changing framework of responsibilities facing both business organizations and their leaders.

703 SEMINAR IN HUMAN RESOURCE MANAGEMENT (3 credit hours)
Analysis of the principal functions, processes, and problems involved in the management of human resources. Evaluation of personnel systems, with emphasis on implications of personnel policy and practice. Prerequisite: MBA 551 or equivalent.
705 SEMINAR IN INDUSTRIAL RELATIONS (3 credit hours)
Presents organization development as an ongoing change process that must be planned and managed. A variety of interventions are explained and situations are analyzed to determine effectiveness. Prerequisite: MBA 751 or equivalent.

706 ORGANIZATIONAL DEVELOPMENT AND CHANGE (3 credit hours)
Organization development is presented as an ongoing change process that must be planned and managed. A variety of interventions are explained, and situations are analyzed to determine effectiveness. Prerequisite: MBA 751.

721 INTERNATIONAL MANAGEMENT (3 credit hours)
Description and analysis of comparative and dominant international management trends with focus on the following topics: sensitivity to the need for a global managerial perspective; consideration of international and multinational strategic environmental factors; differences in human resource attitudes, behaviors, and management practices; and current issues international managers face in entering and remaining competitive in world markets. Prerequisite: all MBA Stage II core courses with the exception of MBA 753.

753 SELECTED TOPICS IN MANAGEMENT (3 credit hours)
Topics in international management.

755 HEALTH CARE MANAGEMENT (3 credit hours)
(Also listed as CMH 731.) Overview of health care systems, public and private. Topics include managing health service organizations and health delivery systems, marketing health care, and major influences on health professions and organizations. Seminar format Prerequisite: MBA 551.

763 SYSTEMS MANAGEMENT (3 credit hours)
Focuses on the systems approach to the design, management, and operation of organizations. The systems approach is presented as a contemporary organizational philosophy and managerial style as well as an aid in the design and redesign of organizations. A research project is required. Prerequisite: MBA 551 or equivalent.

770 FUNDAMENTALS OF PROJECT MANAGEMENT (3 credit hours)
Concepts and philosophies are developed by which modern management deals with one-time projects/tasks that have a set of specified time, cost, and performance objectives. Prerequisite: MBA 551 or equivalent.

772 PROJECT CONTRACT MANAGEMENT (3 credit hours)
Overview of the role of contracting and contract administration in contemporary society. Analysis and synthesis of the relationship of contracting to the project management system. Prerequisite: MBA 551, MGT 770.

773 PROJECT PLANNING EVALUATION AND CONTROL TECHNIQUES (3 credit hours)
Examines project management techniques that are currently available to aid in planning, estimating, scheduling, and controlling a project from inception to completion. Current project management software is used and demonstrated. Prerequisite: MBA 551 and MGT 770.

780 MANAGEMENT INTERNSHIP (3 to 6 credit hours)
One-quarter internship in a selected private or governmental organization under the direction of a faculty advisor and employment supervisor. Details to be arranged by the department or college office. Enrollment in the M.B.A. Program, completion of at least seven out of 10 core courses, and departmental approval required. Titles vary. Prerequisite: completion of at least 7 core courses.

781 SPECIAL STUDIES IN MANAGEMENT (1 to 3 credit hours)
Intensive reading or research in a selected field of advanced management. Titles vary.
Management Information Systems/ 
MIS

Note: See quarterly class schedule or 
departmental advisor for further enrollment 
restrictions, requirements, or special course 
information.

521 SURVEY OF INFORMATION SYSTEMS 
TECHNOLOGY (3 credit hours)
Orientation to types of information systems, 
database concepts, systems development 
processes, and telecommunications.
Fundamentals of modern programming 
concepts, environments, tools, and lab 
experience. Prerequisite: MBA 572 and 
MBA 573 or equivalent.

705 ELECTRONIC COMMERCE 
(3 credit hours)
Introduction to electronic commerce 
including fundamentals, applications, 
benefits and limitations, security and risks, 
infrastructure and other issues. Primary 
theme is proper application of electronic 
commerce and its technologies to gain 
competitive advantage for business. 
Prerequisite: MIS 521 or equivalent.

710 DATABASE MANAGEMENT 
(3 credit hours)
Database concepts, data modeling using 
ER and O0 approaches, relational model, 
relational database design, structured query 
language, database system implementation, 
distributed database concepts, and role of 
commercial databases in application 
environments. Prerequisite: MIS 521.

720 TELECOMMUNICATIONS 
MANAGEMENT (3 credit hours)
Includes data communications hardware, 
software, terminology, and network topology. 
Discusses the impact of communications 
on business operations, globalization and 
management practices, and investigates 
the issues related to managing networks. 
Prerequisite: MIS 521.

750 INFORMATION SYSTEMS 
PLANNING (3 credit hours)
Focuses on the strategic impact of 
information systems, assessment of 
organizational technology needs, strategic 
and operational planning, and systems 
integration. Prerequisite: MIS 521.

760 SYSTEMS ANALYSIS 
METHODOLOGIES (3 credit hours)
Surveys basic concepts and techniques of 
managing information systems development, 
requirements determination, structured 
analysis, data analysis, object-oriented 
analysis, and documentation. Prerequisite: 
MIS 521 or equivalent.

761 SYSTEMS DESIGN METHODOLOGIES 
(3 credit hours)
Continuation of MIS 760. Emphasis is on 
design concepts and techniques including 
structured design, user-interface design, 
object-oriented design, coding, testing, and 
prototyping. Prerequisite: MIS 760.

770 INFORMATION SYSTEMS 
IMPLEMENTATION (3 credit hours)
Focus is on the impact of information 
systems, user involvement, diagnosing and 
resolving resistance to systems, and applying 
implementation strategies. Emphasis on 
effective IS implementation. Students 
complete a team project, cases, and 
readings. Prerequisite: graduate status and 
MIS 521.

781 SPECIAL STUDIES IN MANAGEMENT 
INFORMATION SYSTEMS 
(1 to 4 credit hours)
Intensive research in a selected field of 
management information systems. Topics 
vary. Prerequisite: permission of instructor

785 ELECTRONIC COMMERCE 
IMPLEMENTATION (3 credit hours)
Focus on the implementation of e-commerce 
systems by considering user involvement, 
principal causes of e-commerce success 
and failure, managing technological 
implementation, relationship between 
implementation process and systems 
outcome, and leveraging corporate 
infrastructure. Prerequisite: MIS 705 
and either MIS 761 or MKT 748.

Marketing/MKT

Note: See quarterly class schedule or 
departmental advisor for further enrollment 
restrictions, requirements, or special course 
information.

635 STARTING NEW VENTURES 
(3 credit hours)
Concepts and techniques of how to start your 
own business. Development of a business 
plan to encompass opportunity assessment, 
market analysis, financing, staffing, 
production, tax accounting, and legal, 
insurance, and marketing aspects.
653 SPECIAL TOPICS IN MARKETING (3 credit hours)
Quantitative techniques of market segmentation, marketing policy in an age of discontinuity, product planning and development, and price management. Topics vary. Prerequisite: MBA 561.

675 ENTREPRENEURSHIP (3 credit hours)
Problems and perspectives in starting new ventures. Concepts and techniques of searching for market opportunities, screening and evaluating potentials, negotiating, and financing to initiate or purchase a company. Includes development of an individual comprehensive written business plan. Prerequisite: MBA 532, MBA 561.

704 PERSONAL SELLING AND SALES MANAGEMENT (3 credit hours)
Overview of the personal selling function and the attendant sales management task as they relate to the total marketing field. Extension of concept and theory into practical application. Prerequisite: MBA 561 or equivalent.

705 ADVERTISING AND SALES PROMOTION (3 credit hours)
A thorough examination of Advertising and Sales Promotion with emphasis on practical application of concepts and theory. Includes project development and role playing. Prerequisite: MBA 561 or equivalent.

707 MARKETING RESEARCH AND ANALYSIS (3 credit hours)
Understanding the marketing research function in both a basic and an applied sense with emphasis on the concepts, methods, and techniques currently employed in its use as a tool of management. Prerequisite: MBA 761, MBA 781.

708 MARKETING RESEARCH AND ANALYSIS II (3 credit hours)
Continuation of MKT 707 with emphasis on the use of marketing analysis in the decision-making process. The use of the scientific approach in relation to product, channel, price and promotional, and other marketing decisions is studied. Prerequisite: MKT 707 or equivalent.

710 CONSUMER AND INDUSTRIAL BUYER BEHAVIOR (3 credit hours)
Development of knowledge of the behavioral content of marketing in consumer, industrial, and international fields. Examination of applicable theory, research findings, and concepts that are provided by psychology, sociology, anthropology, and marketing. Understanding buyer behavior based on the sources of influence: individual, group, culture, and environment. Prerequisite: MBA 561.

713 LOGISTICS SYSTEMS (3 credit hours)
Examination of the concept of a logistics system, its components, and their relationship. Emphasis on identification of logistics system components and the impact of logistics systems on the economy and the organization. Consideration of institutions and managerial functions in marketing channels, inventory systems, and transportation modes. Prerequisite: basic economics and MKT 561 or equivalent.

714 MANAGEMENT OF LOGISTICS SYSTEMS (3 credit hours)
Critical examination of managerial alternatives in the construction of corporate logistics systems. The role of objectives, markets, and resources in the determination of facilities, movement channels, inventory systems, and transportation modes is examined. Prerequisite: MKT 713 or equivalent.

716 INTERNATIONAL MARKETING (3 credit hours)
Introduces the concepts and language of international marketing and examines institutional, behavioral, and managerial aspects of a cross section of national marketing systems and multinational organization operations. Prerequisite: MBA 561 or equivalent.

717 RETAILING AND PROFESSIONAL SERVICES MARKETING (3 credit hours)
Through case analysis and an applied project, students will examine contemporary marketing issues faced by retailers and service providers. The impact of technology on retailing and services marketing will be addressed. Prerequisite: MBA 561 or equivalent.
720 SERVICE AND NONPROFIT ORGANIZATION MARKETING
(3 credit hours)
Demonstrates how marketing logic, concepts, and procedures are applied to problems faced by managers in service organizations and hospitals, school systems, universities, charitable organizations, museums, government agencies (police, fire, etc.), and other nonprofit operations. Prerequisite: MBA 561 or equivalent.

727 DIRECT MARKETING (3 credit hours)
Concepts and principles of the direct marketing process as well as the basic successful direct marketing strategies and tactics. Prerequisite: MBA 561 or equivalent.

730 CONSUMERISM AND SOCIAL ISSUES IN MARKETING (3 credit hours)
Critical study of marketing concepts and practices as related to contemporary social issues in the American economy: consumerism, ecology, product safety, truth in advertising, poverty, national interest, social responsibility, and government's role in consumer protection. Emphasis on the institutional and managerial philosophy points of view, not a legal perspective. Prerequisite: MBA 561 or equivalent.

737 INTERNATIONAL RETAILING (3 credit hours)

747 INTERNET MARKETING I (3 credit hours)
Familiarizes students with the basic technological requirements for marketing on the Internet and links marketing principles and strategies to the development of powerful marketing Web pages.

748 INTERNET MARKETING II (3 credit hours)
Prepares students to use marketing principles, concepts, and strategies for developing and implementing a Web marketing plan and Web pages. A Web page will be developed and evaluated. Prerequisite: MKT 747.

780 MARKETING INTERNSHIP
(3 to 6 credit hours)
One-quarter internship in a selected private or governmental organization under the direction of a faculty advisor and employment supervisor. Completion of at least seven out of 10 core courses and departmental approval required. Titles vary.

781 INDEPENDENT STUDIES IN MARKETING MANAGEMENT
(1 to 6 credit hours)
Readings or research in a selected field of marketing. Prerequisite: MBA 561, 761 and advanced graduate standing.

Management Science/MS
Note: See quarterly class schedule or departmental advisor for further enrollment restrictions, requirements, or special course information.

650 SYSTEMS SIMULATION FOR BUSINESS AND ECONOMICS
(3 credit hours)
Introduction to simulation techniques as applied to business and economic systems. Topics include basic concepts, applications, design, and operation of computer models. Prerequisite: CS 142, MBA 581, MBA 582 or permission of instructor.

753 INVENTORY MANAGEMENT
(3 credit hours)
Extension of techniques surveyed in MBA 782 for forecasting and control of inventory systems. Topics include exponential smoothing, trend and seasonal forecasting techniques, safety stock and order quantity models, and aggregate inventory management methods. Prerequisite: MBA 782.

755 ADVANCED QUALITY MANAGEMENT
(3 credit hours)
Advanced study of quality management philosophy and techniques, including coverage of ISO 9000 quality standards. Prerequisite: MBA 781, MBA 783.

757 PRODUCTION PLANNING AND CONTROL
(3 credit hours)
Study of policies and techniques for the planning and control of inventories and production levels. Major topics include production planning, material requirements planning, capacity planning, and just-in-time production systems. Prerequisite: MBA 782.
759 PURCHASING AND MATERIALS MANAGEMENT (3 credit hours)
Survey of materials management functions in modern organizations including purchasing, shipping and receiving, transportation, traffic, warehousing, inventory control, and materials handling. Emphasis is on procurement and logistics support of organizational operations. Prerequisite: MBA 782.

770 SELECTED TOPICS IN MANAGEMENT SCIENCE (3 credit hours)
Seminar on one of the areas of management science (i.e., operations research, statistical analysis, and logistics). Topics vary. Prerequisite: varies (see class schedule).

771 WORLD CLASS STRATEGIES (3 credit hours)
Through lecture/discussion and case analyses of world-class companies, the development of a company's operations strategy and the key role it plays in directing corporate strategy are examined. Prerequisite: MBA 782.

781 SPECIAL STUDIES IN MANAGEMENT SCIENCE (1 to 3 credit hours)
Intensive reading or research in a selected field of management science. Individualized instruction with varying topics.

Mathematics/MTH
Note: See quarterly class schedule or departmental advisor for further enrollment restrictions, requirements, or special course information.

503 DIFFERENTIAL EQUATION II (3 credit hours)
Examples of systems of differential equations, complex and repeated eigenvalues, solutions of systems, matrix exponential, qualitative behavior of first-order equations, planar systems and stability, almost linear systems, and energy methods. Prerequisite: MTH 233, MTH 253.

517 NUMERICAL METHODS FOR DIGITAL COMPUTERS (4 credit hours)
An introduction to numerical methods used in the sciences. Includes methods of interpolation, data smoothing, functional approximation, integration, solutions of systems of equations, and solutions of ordinary differential equations. Prerequisite: MTH 233, MTH 316, and either MTH 253 or MTH 355.

532 COMPLEX VARIABLES (3 credit hours)
Topics discussed include power series expansion, the formula of Cauchy, residues, conformal mappings, and elementary functions in the complex domain. Prerequisite: MTH 232.

533 PARTIAL DIFFERENTIAL EQUATIONS AND BOUNDARY VALUE (3 credit hours)
Partial differential equations, boundary value problems, eigenfunctions, Fourier series, and applications. Prerequisite: MTH 232 and MTH 233.

540 HISTORY OF MATHEMATICS (3 credit hours)

543 ALGEBRA AND FUNCTIONS FOR MIDDLE SCHOOL TEACHERS (4 credit hours)
Polynomial, exponential, logarithmic, rational, and trigonometric functions are studied from a perspective appropriate for a teacher. Computing, programming, graphing, and data collection technology is used. Prerequisite: MTH 128.

544 PROBLEM SOLVING FOR MIDDLE SCHOOL TEACHERS (4 credit hours)
Frame work and useful heuristics for solving problems. Visual thinking and reasoning, metacognition, problem-solving logs and summaries, problem solving individually and in groups. Prerequisite: MTH 244, and MTH 343 or MTH 543.

545 GEOMETRY FOR MIDDLE SCHOOL TEACHERS (4 credit hours)
Axioms, finite geometries, nonmetric and metric lengths, angles, area, volume, polygonal figures, and elementary curves. Prerequisite: MTH 244.
546 MATHEMATICAL MODELING FOR MIDDLE SCHOOL TEACHERS (4 credit hours)
A framework and useful heuristics for solving problems. Visual thinking and reasoning, metacognition, problem-solving logs and summaries, problem solving individually and in groups, and application of mathematical modeling to real world problems. Prerequisite: MTH 244, MTH 343.

548 CONCEPTS IN CALCULUS FOR MIDDLE SCHOOL TEACHERS (4 credit hours)
An exploration and study designed to provide a conceptual understanding of differentiation and integration with examples of their diverse applications and their connections to algebra and geometry. Prerequisite: MTH 244, MTH 343 or MTH 543.

581 ELEMENTARY NUMBER THEORY (3 credit hours)
Divisibility properties of integers, prime numbers, congruences, the Chinese remainder theorem, quadratic reciprocity law, Mobius inversion formula, Euler function, other number-theoretic functions.

599 SELECTED TOPICS (1 to 5 credit hours)
Selected topics in mathematics. May be taken for letter grade or pass/unsatisfactory.

606 MATHEMATICAL MODELING (3 credit hours)
Structure and properties of mathematical models. Size effects, dimensional analysis, graphical methods, comparative statics, stability, optimization techniques, probabilistic models, and Monte Carlo simulation. Prerequisite: MTH 233 and MTH 253 or MTH 355, or permission of instructor.

607 OPTIMIZATION TECHNIQUES (3 credit hours)
Concepts of minima and maxima, linear programming, simplex method, sensitivity, and duality, transportation and assignment problems, and dynamic programming. Prerequisite: MTH 233, and either MTH 253 or 255.

610 THEORETICAL FOUNDATIONS OF COMPUTING (4 credit hours)
Turing machines; m-recursive functions; equivalence of computing paradigms; Church-Turing thesis; undecidability; intractability. 3 hours lecture, 2 hours lab. Prerequisite: CS 666.

616 MATRIX COMPUTATIONS (4 credit hours)
Survey of numerical methods in linear algebra emphasizing practice with high-level computer tools. Topics include Gaussian elimination, LU decomposition, numerical eigenvalue problems, QR factorization, least squares, singular value decompositions, and iterative methods. Prerequisite: MTH 253 or 355; CS 142 or 241.

619 CRYPTOGRAPHY AND DATA SECURITY (3 credit hours)
Introduces the mathematical principles of data security. Various developments in cryptography discussed, including public-key encryption, digital signatures, data encryption standard (DES), and key safeguarding schemes. Prerequisite: MTH 253 or 255.

623 ADVANCED LOGIC (3 to 4 credit hours)
(Offered jointly with the Department of Philosophy.) This course treats logic as an object rather than a subject. Although it contains extensions to higher order logic, its main concern will be with the use of logic and with the limitations of logical systems. Prerequisite: PHL 123 and 323, or one of these together with one math course beyond calculus, or consent of instructor.

631 REAL VARIABLES I (3 credit hours)
Functions, sequences, limits, continuity, differentiability, integration, and mean-value theorems. Prerequisite: MTH 232 or equivalent.

632 REAL VARIABLES II (3 credit hours)
Infinite series, uniform convergence, Taylor series, improper integrals, special functions, and Fourier series. Prerequisite: MTH 631.

633 REAL VARIABLES III (3 credit hours)
Theory of functions of several variables and vector-valued functions. Prerequisite: MTH 632.

634 INTRODUCTION TO COMPLEX ANALYSIS (5 credit hours)
Complex arithmetic, differentiation (analytic functions, the Cauchy-Riemann equations), elementary functions and their mapping properties, integration (Cauchy's theorem, Cauchy integral Formula), Taylor and Laurent series, poles, residues, the residue theorem. Prerequisite: MTH 232 is required. (MTH 431 is recommended).
650 DESCRIPTIVE ALGEBRAIC STRUCTURES (3 credit hours)
Introduces several abstract algebraic structures and their models that are used in computer science. Examples include semigroups, finite-state machines, and groups and code. Prerequisite: MTH 253 or 255 or equivalent.

651 INTRODUCTION TO MODERN ALGEBRA I (3 credit hours)
Introduction to abstract algebraic structures including groups, rings, integral domains, and fields. Prerequisite: MTH 231.

652 INTRODUCTION TO MODERN ALGEBRA II (3 credit hours)
Introduction to abstract algebraic structures including groups, rings, integral domains, and fields. Prerequisite: MTH 651.

655 ADVANCED LINEAR ALGEBRA (3 credit hours)
Vector spaces and subspaces, basis and dimension, linear transformations and matrices, eigenvalues and eigenvectors, inner product spaces. Prerequisite: MTH 255 or permission of instructor.

656 CODING THEORY (3 credit hours)
Introduction to the essentials of error-correcting codes, the study of methods for efficient and accurate transfer of information. Topics covered include basic concepts, perfect and related codes, cyclic codes, and BCH codes. Prerequisite: MTH 253 or MTH 355 (or equivalent).

657 COMBINATORICS (3 credit hours)
Topics from permutations, combinatorics, generating functions, recurrence relations, and Polya's theory of counting. Prerequisite: MTH 231 and at least junior standing.

658 APPLIED GRAPH THEORY (3 credit hours)
Introduction to methods, results, and algorithms from graph theory. Emphasis on graphs as mathematical models applicable to organizational and industrial situations. Prerequisite: MTH 231, and either CS 142 or 241.

659 COMBINATORIAL TOOLS FOR COMPUTER SCIENCE (3 credit hours)
Introduction to some of the mathematical tools needed for an understanding of computer programming. Topics covered are summations, elementary number theory, combinatorial identities, generating functions, and asymptotics.

671 GEOMETRY (3 credit hours)
Topics in the foundation of Euclidean geometry, introduction to non-Euclidean and other geometries. Prerequisite: MTH 231.

672 PROJECTIVE GEOMETRY (3 credit hours)

675 DIFFERENTIAL GEOMETRY (4 credit hours)
Calculus on Euclidean space, Frame fields, calculus on a surface, shape operators, and geometry of surfaces in Euclidean 3 space. Prerequisite: MTH 232.

680 METHODS OF APPLIED MATHEMATICS: GEOMETRIC METHODS (3 credit hours)
Basic mathematical tools for the description of physical systems in three-dimensional space: vector and tensor analysis, matrices, and curvilinear coordinate systems. Prerequisite: MTH 232, and either MTH 253 or 255.

681 METHODS OF APPLIED MATHEMATICS: DIFFERENTIAL EQUATIONS (3 credit hours)
Solution methods for ordinary differential equations commonly arising in physics and engineering. Systems of equations, linear spaces, eigenvalue problems, Sturm-Liouville theory, and orthogonal functions. Additional topics may include Bessel and Legendre functions, stability theory, Liapunov's methods, autonomous systems and the Poincare phase plane, and existence and uniqueness theorems. Prerequisite: MTH 233; MTH 355 or 480.

682 METHODS OF APPLIED MATHEMATICS: INTEGRAL METHODS (3 credit hours)
Use of integral transforms in the solution of differential and integral equations. Fourier series, Fourier and Laplace transforms and inverses, integral equations, and Greens functions. Prerequisite: MTH 332 or 434; MTH 355 or 480.

688 INDEPENDENT READING (1 to 5 credit hours)
Titles vary.

699 SELECTED TOPICS (1 to 5 credit hours)
Selected topics in mathematics.
700 PRINCIPLES OF INSTRUCTION IN MATHEMATICS (3 credit hours)
Survey of available instructional materials and discussion of educational theory and techniques leading to more effective instruction.

716 NUMERICAL ANALYSIS I: APPLIED LINEAR ALGEBRA (4 credit hours)
Topics chosen with emphasis on computational linear algebra. Systems of linear equations and Gaussian elimination; computation of eigenvalues and eigenvectors; matrix exponential; norm and condition number; and iterative methods. Prerequisite: MTH 355 and CS 142 (or knowledge of a high level language) or permission of instructor.

717 NUMERICAL ANALYSIS II: FINITE DIFFERENCE METHODS FOR PARTIAL DIFFERENTIAL EQUATIONS (4 credit hours)
Finite difference methods for partial differential equations; analysis of stability and convergence. Prerequisite: MTH 333, 431, 716 or permission of instructor.

718 NUMERICAL ANALYSIS III: FINITE ELEMENT METHODS FOR PARTIAL DIFFERENTIAL EQUATIONS (4 credit hours)
Finite element methods for elliptic boundary value problems, analysis of errors, approximation by finite element spaces, effects of curved boundaries, numerical integration, and finite element methods for parabolic problems. Prerequisite: MTH 333, 431, 716 or permission of instructor.

725 COMPUTATIONAL LOGIC (4 credit hours)
Introduces predicate logic as an inference system, emphasizing refutation procedures, problem reduction, and resolution. A basis for studying logic programming and artificial intelligence. Prerequisite: CS 400 or equivalent and departmental permission.

730 PRINCIPLES OF ANALYSIS (4 credit hours)

731 REAL ANALYSIS I (4 credit hours)
Lebesgue measure and integration on the real line. Convergence theorems, differentiation of integrals, functions of bounded variation, and absolute continuity. Prerequisite: MTH 730.

732 REAL ANALYSIS II (4 credit hours)
LP spaces and their bounded linear functionals. Banach spaces, Hahn-Banach theorem, and closed-graph theorem. Hilbert space, Riesz representation theorem, orthonormal bases, and general measure spaces. Prerequisite: MTH 731 or equivalent.

733 REAL ANALYSIS III (4 credit hours)
Outer measure, measure, integration, general convergence theorems, Radon-Nikodym theorem, product measure, and Fubini's theorem. Prerequisite: MTH 732 or equivalent.

751 ALGEBRA I (4 credit hours)
Group theory-isomorphism theorems, Jordan-Holder theorem, permutation groups, Sylow theorems, finitely generated Abelian groups, and free groups. Prerequisite: MTH 355, MTH 452 or equivalent.

752 ALGEBRA II (4 credit hours)
Ring theory-polynomial rings, unique factorization, radicals, and Wedderburn-Artin structure theory. Prerequisite: MTH 751.

753 ALGEBRA III (4 credit hours)
Field theory-simple extensions, Galois theory, solvability by radicals, cyclotomy, finite fields, and Wedderburn's theorem. Prerequisite: MTH 752.

777 APPLIED ANALYSIS I (4 credit hours)
Function spaces, differential and integral equations, fixed point theorems, Hilbert spaces, compact operators, eigenvalues, eigenfunction expansions, and Sturm-Liouville problems. Prerequisite: MTH 730.

778 APPLIED ANALYSIS II (4 credit hours)
Inverse operators, fixed-point theorems, compactness, variational methods, and functional analysis of numerical methods. Prerequisite: MTH 777.

792 SPECIAL PROBLEMS (1 to 5 credit hours)
Titles vary.

799 SELECTED TOPICS (1 to 5 credit hours)
Selected topics in mathematics.

899 GRADUATE RESEARCH (1 to 18 credit hours)
Titles vary.
Music: Applied Music/MUA

Note: See quarterly class schedule or departmental advisor for further enrollment restrictions, requirements, or special course information.

710 APPLIED MUSIC (1 credit hour)
Open only to music majors or minors. All students must have auditioned for and have received departmental approval before registering for applied music.

720 APPLIED MUSIC (2 credit hours)
Open only to music majors or minors. All students must have auditioned for and have received departmental approval before registering for applied music.

740 APPLIED MUSIC (4 credit hours)
Open only to music majors or minors. All students must have auditioned for and have received departmental approval before registering for applied music.

Music/MUS

Note: See quarterly class schedule or departmental advisor for further enrollment restrictions, requirements, or special course information.

635 INTRODUCTION TO MUSIC EDUCATION FOR THE SPECIAL LEARNER (4 credit hours)
Materials, techniques, curriculum for teaching music to the special learner in public/private school music programs.

650 OPERA PRODUCTION AND COACHING (3 credit hours)
Production of opera; public performance and individual coaching. For advanced singers. At the discretion of the instructor course requirements may include participation in Dayton Opera productions. Prerequisite: graduate standing in music education.

651 PIANO LITERATURE (3 credit hours)
Historical survey of music for piano from origins in clavichord and harpsichord in the Renaissance through the 20th century.

652 PIANO LITERATURE (3 credit hours)
Historical survey of music for piano from origins in clavichord and harpsichord in the Renaissance through the 20th century.

653 PIANO LITERATURE (3 credit hours)
A study of selected intermediate-level piano music written by major composers and chosen to illustrate chronological sequence and characteristics of important nationalities.

665 COMPUTER APPLICATIONS IN MUSIC (3 credit hours)
Study of computer technology and music software applications. Emphasis is placed upon using MIDI for electronic score notation, sequencing, and basic coursework design.

680 WORKSHOPS IN MUSIC (1 to 4 credit hours)
Selected topics or problems in music, or special areas of music teaching. Titles vary.

681 ADVANCED STUDIES IN SPECIAL SUBJECTS (1 to 6 credit hours)
May be taken for letter grade or pass/unsatisfactory.

701 INTRODUCTION TO GRADUATE STUDY IN MUSIC EDUCATION (4 credit hours)
Methods of investigation in music; use of music bibliography; problems of collecting and evaluating information; and reporting of findings. Prerequisite: graduate standing in music.

702 INTRODUCTION TO RESEARCH IN MUSIC EDUCATION (4 credit hours)
Class studies and individual projects. Reading, research, discussion, and reports; interpretation of contemporary research. Prerequisite: graduate standing in music.

704 FOUNDATIONS AND PRINCIPLES OF MUSIC EDUCATION (4 credit hours)
Historical, philosophical, and psychological foundations of music education. Principles applied to theoretical and practical problems of music education. Prerequisite: graduate standing in music.

706 SUPERVISION AND ADMINISTRATION OF SCHOOL MUSIC (3 credit hours)
Function of the supervisor of music in the public school. Curricula, testing programs, in-service training, teaching aids, school-community relationships, and budget. Prerequisite: graduate standing in music.

707 CONTEMPORARY TRENDS IN MUSIC EDUCATION (3 credit hours)

711 ADVANCED CHORAL CONDUCTING (3 credit hours)
Technique and practice of choral conducting and score preparation. Choral music literature suitable for high school and college groups. Prerequisite: graduate standing in music.
712 ADVANCED INSTRUMENTAL CONDUCTING (3 credit hours)
Technique and practice of instrumental conducting and score preparation.
Instrumental literature suitable for high school and college groups. Prerequisite: graduate standing in music.

713 CHORAL LITERATURE AND TECHNIQUES (3 credit hours)
Critical study of large group and ensemble literature from 1500 to present. Rehearsal techniques and performance practices. Selection of literature and programming. Prerequisite: graduate standing in music.

714 INSTRUMENTAL LITERATURE AND TECHNIQUES (3 credit hours)
Critical study of large group and ensemble literature. Rehearsal techniques and performance practices. Selection of literature and programming. Prerequisite: graduate standing in music.

716 TRENDS IN ELEMENTARY MUSIC (3 credit hours)
Contemporary practices in elementary school music. Creative approaches and techniques; use of new materials. Prerequisite: graduate standing in music.

717 GENERAL MUSIC IN MIDDLE SCHOOL AND JUNIOR HIGH SCHOOL (3 credit hours)
Philosophies, objectives, techniques, and materials. The listening program, the changing voice, and creative activities in music for the adolescent and pre-adolescent years. Prerequisite: graduate standing in music.

718 TEACHING MUSIC AND THE HUMANITIES (3 credit hours)
Exploration of relationships between music and other arts. Consideration of works of art in terms of social, political, religious, economic, and philosophical implications; teaching the arts as a humanistic discipline. Prerequisite: graduate standing in music.

721 20TH CENTURY MUSIC IN THE GENERAL MUSIC PROGRAM (3 credit hours)
Critical study of music of the 20th century, with techniques of teaching this music for Grades K–12. Prerequisite: graduate standing in music.

722 MARCHING BAND TECHNIQUES (3 credit hours)
Advanced study of various marching band styles and techniques. Adopting drum corps techniques. Selection of materials. Writing shows. Field planning and production.

731 THEORY OF MUSIC (3 credit hours)
Written and analytical skills relating to music of period of common practice through the 20th century with emphasis on four-part homophonic writing. Prerequisite: graduate standing in music.

732 EAR TRAINING (1 credit hour)
Sight singing and aural recognition of melodic, harmonic, and rhythmic components in music from the common practice to the present. Prerequisite: graduate standing in music.

733 ANALYTICAL TECHNIQUES I (3 credit hours)
Analytical study of representative compositions of the Middle Ages, Renaissance, and Baroque period. Prerequisite: graduate standing in music.

734 ANALYTICAL TECHNIQUES II (3 credit hours)
Analytical study of representative compositions of the Classical and Romantic periods.

735 ANALYTICAL TECHNIQUES III (3 credit hours)
Analytical study of representative compositions of the 20th century. Prerequisite: graduate standing in music, or department permission.

736 CONTRAPUNTAL TECHNIQUES (3 credit hours)
Analytical study of representative compositions of the 20th century. Study of contrapuntal techniques with practical application in writing and analysis. Prerequisite: graduate standing in music.

741 BAND AND ORCHESTRAL ARRANGING (3 credit hours)
Band and orchestral instrumentation; scoring of transcriptions and original compositions. Prerequisite: graduate standing in music.

742 CHORAL ARRANGING (3 credit hours)
Arranging for choral ensembles common to schools, grades 6–12. Prerequisite: MUS 735 or the equivalent thereof.
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746 MEDIEVAL AND RENAISSANCE MUSIC (3 credit hours)
Includes critical analysis of representative works from major composers. Prerequisite: graduate standing in music.

747 BAROQUE MUSIC (3 credit hours)
Includes critical analysis of representative works from major composers. Prerequisite: graduate standing in music.

748 CLASSIC AND ROMANTIC MUSIC (3 credit hours)
Includes critical analysis of representative works from major composers. Prerequisite: graduate standing in music.

749 20TH CENTURY MUSIC (3 credit hours)
Includes critical analysis of representative works from major composers. Prerequisite: graduate standing in music.

780 PEDAGOGY (1 to 4 credit hours)
Advanced course in techniques, practices, and materials for group and individual instruction. Musical styles and interpretation. Performance in instruments or voice. Titles vary. Prerequisite: graduate standing in music.

614 SELECTED TOPICS (3 credit hours)
Special topics. For nursing majors only.

617 SELECTED TOPICS (2 to 4 credit hours)
Special topics.

640 SCHOOL NURSING (2 to 5 credit hours)
Roles and responsibilities of school nurses in Ohio. Overview of national trends in school nursing. Emphasis on preparing an individual to assume the role of school nurse.

641 CHILDREN WITH SPECIAL NEEDS (1 credit hour)
Roles and responsibilities of the nurse in caring for children with special needs in the school setting.

642 HEALTH ASSESSMENT OF CHILDREN AND ADOLESCENTS IN SCHOOL (2 credit hours)
Health assessment course with emphasis on health history and physical assessment of children and adolescents in the school setting.

643 SCHOOL NURSING PRACTICUM (1 to 10 credit hours)
Application of roles and responsibilities of school nurses in Ohio. Graded pass/unsatisfactory.

644 HEALTH PROMOTION IN SCHOOL NURSING (2 credit hours)
Exploration of the art, principles, and strategies of promoting health in the school setting. Examination of existing community-based materials available for school nurse use.

707 RESEARCH DESIGN AND METHODS (3 credit hours)
Critical analysis of components, methodology, and state-of-the-art research. Application of the research process in developing a research proposal. Prerequisite: NUR 708.

708 THEORETICAL FOUNDATIONS FOR NURSING (3 credit hours)
Analysis of nursing and other selected concepts, models, and theories as related to nursing practice, administration, and education. Emphasis on development and application to nursing science. Prerequisite: NUR 750, pre or co-requisite.

710 ADVANCED HEALTH ASSESSMENT (3 credit hours)
Use of assessment skills with clients for maximum and altered health states using both theoretical and experiential knowledge as appropriate in the role of the advanced clinical practitioner.

714 SELECTED TOPICS (3 credit hours)
Advanced study of various topics. Titles vary.

715 INDEPENDENT STUDY (1 to 3 credit hours)
Faculty-directed, individualized study in topics selected by the students.
716 FAMILY CENTERED CHILD/ADOLESCENT HEALTH NURSING (4 credit hours)
Selected family theories and family research methods are analyzed for use in nursing care of children and adolescents. Clinical practicum will incorporate nursing care for diverse child/adolescent in family populations. Prerequisite: NUR 707, 708.

717 ISSUES IN CHILD/ADOLESCENT HEALTH NURSING (2 credit hours)
Examination of social, political, legal, economic, and ethical concerns and analysis of initiatives to promote the health and well-being of children, adolescents, and their families. Prerequisite: NUR 716.

718 NURSING CARE OF CHILDREN/ ADOLESCENTS IN FAMILIES I (4 credit hours)
Application of theory and nursing interventions for children and adolescents in families. Clinical practicum to assist in analyzing variables in the delivery of comprehensive health care in various settings. Prerequisite: NUR 717.

719 NURSING CARE OF CHILDREN/ ADOLESCENTS IN FAMILIES II—PRACTICUM (8 credit hours)
Application of theoretical frameworks and nursing interventions to provide care for children/adolescents in families. Clinical practicum incorporates research and multidisciplinary collaboration in analyzing situations and delivering health care to children/adolescents in families. May be taken for letter grade or pass/unsatisfactory. Prerequisite: NUR 718.

720 FOUNDATIONS OF ADVANCED CLINICAL PRACTICE (3 credit hours)
Analysis of theories and concepts related to advanced nursing practice and alternative models of care. Students concentrate on chosen client population for development of advanced nursing practice role. Prerequisite: NUR 711, six hours clinical support courses.

723 PRACTICUM IN ADULT HEALTH AND ILLNESS (6 credit hours)
Observation, participation, and practice in area of clinical specialization. Seminars synthesize previous learning with application to the role of the advanced practice nurse. Clinical practicum required. Graduate standing in the College of Nursing and Health required. Prerequisite: NUR 724, 725, 751, 752, 754, 755.

724 ADULT HEALTH AND ILLNESS I (6 credit hours)
Use of primary care and advanced practice concepts in the care of adult clients experiencing changes in their bio-psycho-social-spiritual being. Prerequisite: NUR 708, 761, 762, NUR 707, 751, 760 pre/corequisite.

725 ADULT HEALTH AND ILLNESS II (6 credit hours)
Examination and application of models for advanced practice roles. Use of primary care and advanced practice concepts in the care of adult clients. Prerequisite: NUR 724.

730 ORGANIZATIONAL THEORY AND BEHAVIOR IN NURSING ADMINISTRATION (3 credit hours)
Evaluation of the concepts, models, theories and principles of nursing administration. Provides an in-depth macro focus on organizational theories and behaviors applicable to the nurse administrator in a variety of settings. Prerequisite: NUR 708, pre or co-requisite.

731 STRATEGIC PLANNING FOR NURSING AND HEALTH CARE SYSTEMS (6 credit hours)
A micro approach to nursing administration. Evaluation of management processes with an experiential component. Practical application of leadership/management concepts, models, and theories. Prerequisite: NUR 730.

732 HUMAN RESOURCE MANAGEMENT IN NURSING ADMINISTRATION (3 credit hours)
Analysis of human resource management in health care organizations. Specific application is made to the nurse administrator role. Graduate standing in the College of Nursing and Health required. Prerequisite: NUR 708.

733 PRACTICUM IN NURSING ADMINISTRATION (5 to 8 credit hours)
Observation, participation, and practice in the administration of nursing services in health care settings. Seminars synthesize previous learning and application to nursing administration. Clinical practicum required. Prerequisite: NUR 731, 732, 734, 751, 752, 753, 755.
734 FINANCIAL RESOURCE MANAGEMENT IN NURSING ADMINISTRATION (3 to 6 credit hours)
Fiscal management concepts for nurse administrators. Content focuses on financial reporting function, resource allocation, managerial issues related to finance, financial planning, and control in nursing administration. Prerequisite: NUR 730, 755.

735 DECISION MAKING IN THE ADMINISTRATION OF NURSING AND HEALTH CARE SYSTEMS (3 credit hours)
Analysis of quantitative and qualitative decision making models in health care systems. Cost-benefit, cost-utility, and cost-effectiveness analysis models are compared. CQI models evaluated for patient and staff outcomes. Introduction to database management.

736 INFORMATION AND TECHNOLOGY IN NURSING AND HEALTH CARE SYSTEMS (3 credit hours)
Systematic assessment of the clinical and administrative information needs of health care systems. Examines the technology and strategies needed to support nursing and health care in dynamic environmental systems.

740 NURSING CURRICULUM AND PROGRAM DEVELOPMENT (3 credit hours)
Analysis of learning theories and models of nursing curriculum design. Development and evaluation of nursing curriculum and educational programs. Prerequisite: NUR 708.

741 NURSING EDUCATION STRATEGIES (3 credit hours)
Examination and application of the art, principles, and strategies of teaching in nursing programs. Role of teacher in classroom is explored. Prerequisite: NUR 706 or permission of instructor.

742 EVALUATION STRATEGIES IN NURSING EDUCATION (3 credit hours)
Examination and application of the art, principles, theories, models, and strategies of evaluation in nursing. Prerequisite: NUR 740 and 741.

743 PRACTICUM IN NURSING EDUCATION (7 credit hours)
Observation, participation, and practice in teaching nursing concepts. Seminars synthesize previous learning with application to the role of the nurse educator. Clinical practicum required. Prerequisite: NUR 707, 742, 751, 753, 754, 755, 761 and 724 or 763 and 770.

750 HEALTH POLICY, POLITICS, AND ISSUES (3 credit hours)
Critical analysis of public policies and issues affecting nursing and health care delivery. Encompasses economic, political, social, technological, ethical, and legal influences on consumers and health care providers from a global perspective. Restricted to students with graduate nursing degree status.

751 HEALTH AND WELL-BEING (3 credit hours)
Identification of theoretical foundations of health promotion, disease prevention, and well-being for individuals and aggregates. Application and investigation of epidemiological concepts, cultural diversity, multidisciplinary collaboration, and national goals and trends affecting health care. Restricted to students with graduate nursing degree status.

752 CONCEPTS OF EDUCATION IN NURSING (2 credit hours)
Analysis of conceptual models of education and instructional technologies for advanced practice. Restricted to students with graduate nursing degree status.

753 CONCEPTS OF ADVANCED PRACTICE (2 credit hours)
Analysis of concepts and models for advanced practice. Restricted to students with graduate nursing degree status.

754 CONCEPTS OF NURSING LEADERSHIP AND MANAGEMENT (2 credit hours)
Analysis of models and concepts of leadership and management for advanced nursing practice. Restricted to students with graduate nursing degree status.

756 CONCEPTS OF NURSING LEADERSHIP (2 to 3 credit hours)
An introduction to theories and concepts as a basis for leadership in complex, interdisciplinary health care systems with an emphasis on implications for nursing practice, administration, and education. Restricted to students with graduate nursing degree status or permission of instructor.
760 PRIMARY CARE CONCEPTS  
(2 credit hours)  
Analysis of concepts and scope of practice for the nurse as a primary health care provider.

761 ADVANCED PHYSIOLOGY FOR NURSES  
(3 credit hours)  
Examines selected major physiological concepts associated with nursing diagnoses. Physiological concepts are integrated with diagnosis and treatment of human responses to health problems. Includes cardiovascular, pulmonary, renal, neurological, endocrine, reproductive, and gastrointestinal physiology.

762 ADVANCED HEALTH ASSESSMENT  
(3 credit hours)  
Application of cognitive processes and psychomotor skills needed for comprehensive health assessment. Emphasis on health history, physical, developmental, and nutritional assessment; and identification of common client problems across the life span.

763 PRINCIPLES OF EPIDEMIOLOGY  
(2 credit hours)  
Study of epidemiological concepts, principles, and methods with application to health and disease surveillance, investigation of disease outbreaks, and health planning. Critical analysis of published epidemiological research with regard to implications for clinical practice.

764 APPLIED PHARMACOLOGY FOR THE ADVANCED PRACTICE NURSE  
(3 credit hours)  
Focuses on prescriptive knowledge of pharmacologic agents used in treatment of common primary health care problems and stable chronic disease states. Emphasis on indications, mechanisms of action, drug interactions, side effects, and client education. Graded pass/unsatisfactory.

765 PATHOPHYSIOLOGY OF CHILDREN/ADOLESCENTS FOR NURSES  
(3 credit hours)  
Advances study of physiologic systems and common pathologies for children/adolescents. Emphasis on knowledge for provision of nursing care for acute and chronic conditions as well as disease prevention and health promotion.

766 ADVANCED HEALTH ASSESSMENT OF CHILDREN AND ADOLESCENTS  
(3 credit hours)  
Application of processes and skills for comprehensive health assessment of children/adolescents. Emphasis on health history, physical assessment of children and adolescents incorporating various instruments to assess growth and development issues.

770 COMMUNITY/PUBLIC HEALTH NURSING I  
(5 credit hours)  
Analysis of the role of the community health nurse specialist in community assessment and diagnosis, interdisciplinary practice, and health promotion and disease prevention primary care in a culturally and ethnically diverse evolving environment. Prerequisite: NUR 708, NUR 707 & 751 pre or co-requisite.

771 COMMUNITY/PUBLIC HEALTH NURSING II  
(5 credit hours)  
Analysis of role of community health nurse specialist in program planning in partnership with community. Continuous quality improvement including both evaluation and consultation to increase social justice and improve the environment of the aggregate. Prerequisite: NUR 761, 762, 763, 770.

772 PRACTICUM: COMMUNITY NURSE SPECIALIST  
(6 credit hours)  
Observation, participation and practice as community health nurse specialist: seminars synthesize previous learning with application to the role. Public health policies, legislation and economics of health care, including obtaining and management of grants. Prerequisite: NUR 771, 752, 754, 755.

781 THESIS/SCHOLARLY PROJECT SEMINAR  
(2 to 3 credit hours)  
Development of a proposal for a thesis or scholarly project. Seminars include application of statistics, analysis, interpretation, and presentation of data. 4 hours of seminar required weekly. Prerequisite: NUR 707.

782 ADVANCED NURSING OF CHILDREN AND ADOLESCENTS I  
(6 credit hours)  
Application of advanced practice nursing skills integrating theory, research findings, and differential diagnosis in the provision of primary, acute, and chronic care. Clinical learning incorporates use of case management in the primary care setting. May be taken for a letter grade or pass/unsatisfactory. Prerequisite: NUR 716, 765, 766, and 790; BIO 701.
783 ADVANCED NURSING OF CHILDREN AND ADOLESCENTS II (6 credit hours)
Introduces theoretical frameworks and research findings for advanced nursing practice required to provide care management and primary care for children/adolescents in families. Emphasis on nursing management of chronic/complex illnesses. Clinical practicum required. May be taken for a letter grade or pass/unsatisfactory. Prerequisite: NUR 782.

784 ADVANCED NURSING OF CHILDREN AND ADOLESCENTS III (6 credit hours)
Clinical application of relevant theories and research findings for health promotion and disease prevention, as well as health maintenance and restoration for children/adolescents using a family centered approach. May be taken for a letter grade or pass/unsatisfactory. Prerequisite: NUR 783.

789 CONTINUING REGISTRATION (1 credit hour)
A student must be registered at the graduate level in the quarter in which the degree is granted, or in any quarter in which the department is offering some service, such as giving an examination, reading a thesis, or giving advice on the thesis after completion of all other requirements of course work and research.

790 NURSE PRACTITIONER ROLES AND ISSUES (2 credit hours)
Analysis of the concepts and roles of the family nurse practitioner. Study of family theory as it relates to practice. Supervised lab for specialty skills. Prerequisite/corequisites: NUR 761, NUR 762, NUR 764.

791 PRIMARY HEALTH CARE OF WOMEN (1 to 7 credit hours)

792 PRIMARY HEALTH CARE OF YOUNG ADULTS, ADULTS AND OLDER ADULTS (1 to 8 credit hours)
Provides knowledge and skills to deliver primary health care to adults across their lifespan in multiple settings. Emphasizes application of problem identification and management, health promotion, and client and family counseling. Supervised lab and clinical experiences. Titles vary. May be taken for letter grade or pass/unsatisfactory. Prerequisite: NUR 707, 708, 761, 762, 764, 790.

793 PRIMARY HEALTH CARE OF CHILDREN AND ADOLESCENTS (1 to 7 credit hours)
Provides knowledge and skills to deliver primary health care to children and adolescents in multiple settings, and patient and family counseling. Supervised lab and clinical experiences. Titles vary. May be taken for letter grade or pass/unsatisfactory. Prerequisite: NUR 707, 708, 761, 762, 764, 790.

794 FAMILY NURSE PRACTITIONER PRECEPTORSHIP (1 to 7 credit hours)
Intensive clinical focus provides students the opportunity to apply relevant theories, concepts, and research findings to clinical care. Stress development of clinical competence required in delivering primary health care. Graded pass/unsatisfactory. Prerequisite: NUR 791, 792, 793.

795 MANAGING COMMON ACUTE AND EMERGENT HEALTH PROBLEMS I (8 credit hours)
Focus on complex symptom management in acute and emergent physiological alterations in systems. Health promotion, maintenance, and restoration emphasized. Advanced practice role development incorporated into the course through patient care management seminars, and practice. Prerequisite: NUR 790, 750, 751, 761, 762, 764.

796 MANAGING COMMON ACUTE AND EMERGENT HEALTH PROBLEMS II (8 credit hours)
Focus on complex symptom management in acute and emergent physiological alterations in systems. Health promotion, maintenance, and restoration emphasized. Advanced practice role development incorporated into the course through patient care management seminars, and practice. Prerequisite: NUR 795.
797 ACUTE CARE NURSE PRACTITIONER PRACTICUM (7 credit hours)
Focus on synthesis of theory and implementation of ACNP role. Experiences emphasize clinical decision-making in an interprofessional environment with focus on ACNP as principal provider of care for patients with acute, emergent health problems. Graded pass/unsatisfactory. Prerequisite: NUR 796.

799 THESIS SCHOLARLY PROJECT ADVISEMENT (1 to 3 credit hours)
Thesis or scholarly project.

Physiology and Biophysics/P&B

Note: See quarterly class schedule or departmental advisor for further enrollment restrictions, requirements, or special course information.

501 HUMAN PHYSIOLOGY I (4 credit hours)
Includes homeostasis; cell, nerve, and muscle function; nervous system regulation; and cardiovascular and circulatory systems.

502 HUMAN PHYSIOLOGY II (4 credit hours)
Includes gastrointestinal and metabolic systems; respiratory and renal systems; acid-base balance; endocrinology; and temperature regulation.

601 CELL PHYSIOLOGY AND BIOPHYSICS (4 credit hours)
Fundamentals of cellular homeostasis and the role of specialized cells in organismal homeostasis. Prerequisite: PHY 111, 112, 113, 210, 211 or PHY 240, 241, 242 and physical chemistry or CHM 456 or equivalent.

602 PHYSIOLOGY AND BIOPHYSICS OF CELLS AND SYSTEMS II (4 credit hours)
Epithelial solute and water transport; the control of intracellular pH and role in cellular growth; gastrointestinal mucosal transport; hormonal adaptation; and muscle energetics and exercise. Prerequisite: P&B 601.

610 HUMAN PHYSIOLOGY (5 credit hours)
An overview of human/mammalian organ physiology. Fundamental mechanisms and the experimental basis for current understanding is emphasized. Prerequisite: Introductory biology, chemistry, physics, or permission of instructor.

642 INTRODUCTORY NEUROPHYSIOLOGY (4 credit hours)
Physiological mechanisms that subserve the functions of the nervous system. Topics include the biophysics of neuronal information, intercellular communications, motor control, sensory systems, and developmental neurobiology. Prerequisite: introductory biology and introductory chemistry or equivalents.

650 GLIAL CELL PHYSIOLOGY (3 credit hours)
Concepts of glial cell physiology based on the analysis of current primary literature. Topics include interactions between glia and other cell types and the role of glia in pathophysiology. Prerequisite: P&B 642.

666 INTRODUCTION TO PHYSIOLOGY AND BIOPHYSICS (3 credit hours)
Each student participates in a one-week tutorial study with each P&B faculty member. Tutorials are given sequentially over the fall quarter for entering P&B Master of Science students. Learning opportunities include readings, discussions, and written assignments. May be taken for a letter grade or pass/unsatisfactory.

669 QUANTITATIVE ASPECTS OF MEMBRANE TRANSPORT (3 credit hours)
Employs a quantitative approach to the properties of solutes, water, bio-electrical phenomena, the properties of transport systems that move solutes across biological membranes, and the interactions of these solutes with membranes. Completion of calculus, cell biology, and cellular physiology and biophysics required. May be taken for letter grade or pass/unsatisfactory. Prerequisite: calculus, cell biology and cellular physiology and biophysics.

699 SPECIAL PROBLEMS IN PHYSIOLOGY (1 to 4 credit hours)
Enables students to explore potential careers in physiology. Varies from working on an ongoing physiological research project to historical survey related to a completed research project. May be taken for a letter grade or pass/unsatisfactory.

701 SELECTED TOPICS IN PHYSIOLOGY (1 to 5 credit hours)
A selected area is discussed in greater detail than in the basic courses (P&B 702, 703). Some topics may include laboratory. Prerequisite: P&B 702, 703, or consent of instructor.
702 BASIC HUMAN PHYSIOLOGY I
(6 credit hours)
Homeostasis, cell function, muscle action, nervous system integration, and circulation. 4 hours lecture, 2 hours lab, conference. Prerequisite: one year each of biology, chemistry, physics and cell physiology, or consent of department.

703 BASIC HUMAN PHYSIOLOGY II
(4 credit hours)
Negative feedback regulation; metabolism; gastrointestinal, pulmonary, renal, and endocrine functions; and integrative functions. 4 hours lecture, 2 hours lab, conference. Prerequisite: P&B 702 and cell physiology, or consent of department.

704 FLUORESCENCE (1 credit hour)
Covers the theoretical basis for fluorescence and instrument design in this methods-oriented course. Applications of interest to the physiological and biochemical sciences will be discussed. Graded pass/unsatisfactory.

720 NEUROPHYSIOLOGY (3 credit hours)
Topics address the representation, processing, and transmission of neuronal information, and the role of neuronal circuits in motor control and sensory systems.

722 ION CHANNELS (4 credit hours)
This course explores the role of ion channels in a variety of cell types with an emphasis on both electrophysiological and biochemical methods for evaluation of channel function. Prerequisite: P&B 601 or permission of instructor.

733 CARDIOVASCULAR PHYSIOLOGY
(3 credit hours)
Survey of the physiology of the human cardiovascular system; components and control, cell, organ, and system level. Both newborn and adult are included, as well as adjustments to exercise and non-exercise stress. Prerequisite: one (1) year each of biology, chemistry, and physics.

741 PULMONARY PHYSIOLOGY
(3 credit hours)
Survey of the respiratory vascular and biochemical mechanisms involved in transport of oxygen and carbon dioxide from atmosphere to cells. Nonrespiratory functions of the lung are also discussed. Prerequisite: P&B 702 and 703 or consent of the instructor.

751 MOLECULAR BASIS OF SECRETION
(3 credit hours)
Explores current hypothesis for the formation, sorting, and release of secretory vesicles at a molecular level integrating ideas from cell biology, neuroscience, and membrane biophysics. Methodology is emphasized. Prerequisite: P&B 601 or BMS 852.

761 GASTROINTESTINAL PHYSIOLOGY
AND BIOPHYSICS (3 credit hours)
Principles of gastrointestinal physiology and biophysics emphasizing cellular mechanisms of secretion, absorption, and motility. Prerequisite: P&B 601 or permission of instructor.

771 GENERAL ENDOCRINOLOGY
(3 credit hours)
Survey of endocrinological mechanisms and their role in integration of body function.

776 INTERCELLULAR COMMUNICATION
(4 credit hours)
Introduces the concepts of intercellular communication through an interdisciplinary presentation of immune and neuroendocrine system functions. Emphasizes the similarities between the systems and the multidisciplinary approaches used to study each.

777 MEDICAL NEUROSCIENCE
(7 credit hours)
Interdisciplinary/interdepartmental course for graduate and medical students that integrates basic and clinical neurosciences. Structural and functional topics are combined with clinical information to address major neurological and psychiatric disorders.

783 EXERCISE PHYSIOLOGY
(5 credit hours)
Integration of physiological mechanisms involved in exercise. Cellular, neuromuscular, cardiovascular, and respiratory changes are discussed with relationship to exercise performance. 4 hours lecture, 2 hours lab, student recitation. Prerequisite: P&B 702, 703 or equivalent or consent of instructor.

789 CONTINUING REGISTRATION
(1 credit hour)
A student must be registered at the graduate level in the quarter in which the degree is granted or in which some service is being rendered by the department, such as thesis writing.

800 SEMINAR (1 to 2 credit hours)
Students organize and present material to colleagues and faculty.
805 GEN BIOPHYSICS SEMINAR  
(2 credit hours)  
Faculty and students present scientific information/findings.

808 NEUROSCIENCE SEMINAR  
(1 credit hour)  
Students present a current scientific article to colleagues and faculty. Graded pass/unsatisfactory.

870 PHYSIOLOGY AND PHARMACOLOGY OF VASCULAR CELLS (3 credit hours)  
Physiological steady state and pharmacological properties of vascular cells, circulating erythrocytes, endothelial cells, and smooth muscle cells in particular as a basis of pathophysiological aberrations and clinical disorders. Prerequisite: cell biology, cell biophysics, or equivalent.

876 PRINCIPLES OF PHARMACOLOGY I  
(2 to 3 credit hours)  
Abbreviated course describing passage of drugs across membranes and their mechanisms of action, distribution, biotransformation, and elimination. Discusses dose-response relationships, receptor-binding kinetics, and topics of interest and importance to enrolled students. May be taken for letter grade or pass/unsatisfactory.

880 GENERAL PHARMACOLOGY II  
(4 credit hours)  
Extends the principles and theories learned in PHA 879 and applies them to the action of drugs on the respiratory, endocrine, GI, and GU systems. Emphasis on antibiotics, antineoplasia, immuno-suppressants, and toxicology.

898 NEUROPHARMACOLOGY  
(3 credit hours)  
In-depth treatment of the anatomy, biochemistry, physiology, and functions of neurotransmitter systems and the effects of drugs on the nervous system.

899 PHARMACOLOGY RESEARCH  
(1 to 14 credit hours)  
Supervised thesis research.

Environmental Toxicology/PHA

Note: See quarterly class schedule or departmental advisor for further enrollment restrictions, requirements, or special course information.

701 SELECTED TOPICS IN PHARMACOLOGY (2 to 5 credit hours)  
Topics vary.

740 INTERCELLULAR COMMUNICATION  
(4 credit hours)  
Introduces the concepts of intercellular communication through an interdisciplinary presentation of immune and neuroendocrine system functions. Emphasizes the similarities between the systems and the multidisciplinary approaches used to study each.

752 GENERAL TOXICOLOGY II  
(4 credit hours)  
Continuation of PHA 751. Introduction to general toxicology. Particular toxic agents are studied, including teratogens, mutagens, oncogens, heavy metals, and other environmental contaminants and toxins. Clinical, forensic, industrial, and agricultural toxicology are addressed along with regulations that apply to the field.

758 ETHICS AND MEDICINE  
(4 credit hours)  
Ethical issues confronting society in the area of medicine and health care, considered from the perspective of philosophical and theological ethics. Examples include ethics of abortion, euthanasia, experimental medicine, and behavior control.

Philosophy/PHL

Note: See quarterly class schedule or departmental advisor for further enrollment restrictions, requirements, or special course information.

532 STUDIES IN POLITICAL PHILOSOPHY  
(4 credit hours)  
Courses of variable content dealing with topics in ancient and modern political philosophy. May be repeated.

541 AESTHETICS (4 credit hours)  
Study of theories concerning the nature of the work of art, aesthetic experience, the arts, and beauty.

578 ETHICS AND MEDICINE  
(4 credit hours)  
Ethical issues confronting society in the area of medicine and health care, considered from the perspective of philosophical and theological ethics. Examples include ethics of abortion, euthanasia, experimental medicine, and behavior control.
582 PHILOSOPHY OF RELIGION: PROCESS (4 credit hours)
(Listed jointly with REL 582.) Realism and the revolt against idealism. Cross-disciplinary analysis of major contemporary process philosophers, and the implications of their thoughts for religion. Focus on Alfred North Whitehead.

583 PHILOSOPHY OF RELIGION: SECULAR (4 credit hours)
(Listed jointly with REL 583.) Cross-disciplinary analysis of modes of human awareness through which religious meaning is expressed. Examination of presuppositions of contemporary secular religious movements in existentialism. The problem of the ultimate from the secular perspective.

599 STUDIES IN SELECTED SUBJECTS (1 to 4 credit hours)
Problems, approaches, and topics in the field of philosophy.

601 MAJOR PHILOSOPHERS (4 credit hours)
Introduction to the major writings of the outstanding philosophers. Involves presentation and critical examination of the philosophers' views. Titles vary.

623 ADVANCED LOGIC (3 to 4 credit hours)
(Listed jointly with MTH 623.) Treats logic as an object rather than as a subject. Although it contains extensions to higher order, its main concern is with use of logic and with limitations of logical systems. Prerequisite: PHL 123 and 323, or one of these together with one math course beyond calculus, or consent of instructor.

624 MATHEMATICAL PHILOSOPHY (4 credit hours)
Investigation of philosophical theories concerning the nature of mathematics, the ground of mathematical knowledge, the necessity of mathematical truth, the empirical relevance of mathematics, and the relationships between mathematical philosophy and general philosophy.

631 CLASSICAL AND MEDIEVAL AND POLITICAL PHILOSOPHY (4 credit hours)
Critical examination of political ideas from 500 B.C. to A.D. 1500 with emphasis on Plato, Aristotle, Cicero, St. Augustine, St. Thomas Aquinas, Luther, Calvin, and Machiavelli.

632 MODERN POLITICAL PHILOSOPHY (4 credit hours)
Critical examination of political ideas from 1600 to 1900 with emphasis on Hobbes, Locke, Rousseau, Montesquieu, Hume, Burke, Hegel, Bentham, Marx, and Mill.

642 PHILOSOPHY AND LITERATURE (4 credit hours)
Examination of philosophical ideas found in literature, philosophical interpretations of literature, and evaluations of theories and aesthetics of literature.

643 ASIAN RELIGIOUS PHILOSOPHY (4 credit hours)
Perennial themes in Asian cultures, such as individual, society, and cosmos; appearance and reality; time and history; and karma, freedom, and responsibility. Treatment of these themes in the philosophical traditions of Asian cultures.

667 PHILOSOPHY OF MIND (4 credit hours)
Classical and contemporary approaches to such issues as the nature of mind, relationships of mind to body, knowledge of other minds, intentionality, perception, and agency.

681 INDEPENDENT READING (3 to 4 credit hours)
Faculty-directed readings in philosophical literature.

682 INDEPENDENT READING (3 to 4 credit hours)
Faculty-directed readings in philosophical literature.

683 INDEPENDENT READING (3 to 4 credit hours)
Faculty-directed readings in philosophical literature.

694 EXISTENTIALISM (4 credit hours)
Representative writers of the existentialist movement.

695 METAPHYSICS (4 credit hours)
Investigation of classical and contemporary attempts to develop a theory of the nature of being and reality.

696 EPISTEMOLOGY (4 credit hours)
Origin, certainty, and extent of human knowledge.

751 RESEARCH IN PHILOSOPHY (1 to 5 credit hours)
Independent study.
752 Research in Philosophy
(1 to 5 credit hours)
Independent study.

753 Research in Philosophy
(1 to 5 credit hours)
Independent study.

Physics/PHY

Note: See quarterly class schedule or departmental advisor for further enrollment restrictions, requirements, or special course information.

599 Special Problem in Physics
(1 to 4 credit hours)
Special topics, problems, or research designed for specific needs and talents of the student.

600 Introduction to Semiconductor Materials
(3 credit hours)
Study of crystal structure; selected topics in quantum theory; electron band structure; charge carriers in semiconductors; generation, recombination, and motion of charge carriers; electrical and optical properties; and structure and characteristics of p-n junctions. Prerequisite: PHY 240, 242, 244 and CHM 121.

601 Semiconductor Device Physics
(3 credit hours)
Covers the structure and characteristics of bipolar transistors, field effect transistors, and other selected devices. Design and computer modeling of devices. Prerequisite: PHY 600.

602 Semiconductor Device Processing (3 credit hours)
Survey of the individual processes used in fabricating semiconductor devices. Integration of these processes to produce MOS and bipolar structures. Computer design aids. Prerequisite: PHY 600 and 601 or ME 570 or permission of instructor.

615 Physics Instrumentation I
(3 credit hours)
Physics laboratory experiments with an emphasis on electrical measurements and electronic instruments. Lectures on circuit theory, experiment design, and electronic instruments. 1.5 hours lecture, 3 hours lab. Prerequisite: PHY 260 or permission of instructor.

616 Physics Instrumentation II
(3 credit hours)
Experiments emphasizing electronic instruments applied to areas such as mechanics, atomic physics, and nuclear physics. Lectures on applications of integrated circuits to experimentation, data analysis, and data presentation. 1.5 hours lecture, 3 hours lab. Prerequisite: PHY 615 or permission of instructor.

620 Thermodynamics (3 credit hours)
Covers the first and second laws of thermodynamics: general thermodynamic formulas with applications to matter. Prerequisite: PHY 210 and 211 or PHY 242.

621 Statistical Thermodynamics
(3 credit hours)
Covers the kinetic theory of gases. Maxwell-Boltzmann statistics, and an introduction to quantum statistics. Prerequisite: PHY 620.

622 Applied Optics (4 credit hours)
Study of optical instruments by means of both geometric and physical optics. Theory and applications of interferometry and light detection devices. Brief introduction to lasers and holography. 4 hours lab for five weeks, 3 hours lecture. Prerequisite: MTH 255 and PHY 244 or equivalent.

632 Lasers (3 credit hours)
Introduction to the physics of lasers including emission and absorption processes in lasing, the factors controlling laser gain, the properties of optical resonators, and a survey of salient features for principal types of lasers. Prerequisite: PHY 260, MTH 233 or permission of instructor.

642 Physical Optics (4 credit hours)
Interaction of light and matter and the interpretation of these phenomena using the electromagnetic wave theory of radiation. Topics include emission, coherence, and holography, interference, diffraction, absorption, scattering, and polarization. Prerequisite: PHY 352, MTH 333.

645 Integrating Physical Science and Mathematics I (4 credit hours)
Integration of physics and mathematics, fulfilling science and math standards, physics education issues, inquiry teaching practices, and assessment will be addressed in the context of science and math process skills, measurement, and properties of matter. Prerequisite: PHY 245 or PHY 240.
646 INTEGRATING PHYSICAL SCIENCE AND MATH II (4 credit hours)
Integration of physics and mathematics, science and math standards, physics education issues, inquiry teaching, assessment and technology will be addressed in the context of kinematics, forces and energy transfers. Prerequisite: PHY 645 or permission of instructor.

647 INTEGRATING PHYSICAL SCIENCE AND MATH III (4 credit hours)
Integration of physics and mathematics, science and math standards, physics education issues, inquiry teaching, assessment, technology will be addressed in the context of electricity, magnetism, waves, optics. Prerequisite: PHY 646 or permission of instructor.

650 ELECTRICITY AND MAGNETISM (3 credit hours)
Fundamental laws of electricity and magnetism presented from the viewpoint of field theory. Maxwell’s equations, transient and steady state currents, electric and magnetic properties of matter, and electromagnetic radiation. Prerequisite: PHY 242 and MTH 256.

651 ELECTRICITY AND MAGNETISM (3 credit hours)
Fundamental laws of electricity and magnetism presented from the viewpoint of field theory. Maxwell’s equations, transient and steady state currents, electric and magnetic properties of matter, and electromagnetic radiation. Prerequisite: PHY 242, PHY 650.

652 ELECTRICITY AND MAGNETISM (3 to 4 credit hours)
Fundamental laws of electricity and magnetism presented from the viewpoint of field theory. Maxwell’s equations, transient and steady state currents, electric and magnetic properties of matter, and electromagnetic radiation. Prerequisite: PHY 242.

660 INTRODUCTION TO QUANTUM MECHANICS (4 credit hours)
Mathematical structure of quantum mechanics. Applications to selected one- and three-dimensional problems with emphasis on atomic structure. Prerequisite: PHY 260, 372, MTH 333.

661 INTRODUCTION TO SOLID STATE PHYSICS (4 credit hours)
Selected properties of solids and their quantitative explanation in terms of simple physical models. Applications of quantum mechanics to solids. 3 hours lecture, 2 hours lab. Prerequisite: PHY 260, MTH 233.

662 INTRODUCTION TO NUCLEAR PHYSICS AND RELATIVITY (4 credit hours)
Special theory of relativity. Nuclear radiation, nuclear properties, nuclear transformations, and elementary particles and interactions. Prerequisite: PHY 460 or 660.

671 ANALYTICAL MECHANICS I (3 credit hours)
Intermediate problems in statics, kinematics, and dynamics; the study of equilibrium of forces, rectilinear motion, curvilinear motion, central forces, constrained motion, energy and moments of inertia; and the Lagrange method. Prerequisite: PHY 244.

672 ANALYTICAL MECHANICS II (3 credit hours)
Intermediate problems in statics, kinematics, and dynamics; the study of equilibrium of forces, rectilinear motion, curvilinear motion, central forces, constrained motion, energy and moments of inertia; and the Lagrange method. Prerequisite: PHY 671, PHY 244.

673 MATHEMATICAL PHYSICS (3 credit hours)
Survey of the field of mathematical physics including vector analysis, analytical mechanics, electromagnetism, and thermodynamics.

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Survey of the field of mathematical physics including vector analysis, analytical mechanics, electromagnetism, and thermodynamics.

675 MATHEMATICAL PHYSICS (3 credit hours)
Survey of the field of mathematical physics including vector analysis, analytical mechanics, electromagnetism, and thermodynamics.

680 INTRODUCTION TO THEORETICAL PHYSICS (4 credit hours)
Classical theoretical physics with emphasis on mechanics, electromagnetic field theory, and mathematical techniques. Prerequisite: PHY 372, PHY 452, MTH 333 and consent of department.
681 INTRODUCTION TO THEORETICAL PHYSICS (3 credit hours)
Classical theoretical physics with emphasis on mechanics, electromagnetic field theory, and mathematical techniques. Prerequisite: PHY 680.

682 INTRODUCTION TO THEORETICAL PHYSICS (3 credit hours)
Classical theoretical physics with emphasis on mechanics, electromagnetic field theory, and mathematical techniques. Prerequisite: PHY 681.

700 PRINCIPLES OF INSTRUCTION IN PHYSICS (3 credit hours)
Introduction to nonrelativistic quantum mechanics. Schroedinger's equation. Matrix mechanics. Applications to simple atomic and nuclear systems. Prerequisite: Restricted to physics majors or by consent of the department.

704 PHILOSOPHY OF PHYSICS (2 credit hours)
The various areas of physics are studied with regard to their historical and philosophical basis in modern physical theory. Consent of the department required.

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The various areas of physics are studied with regard to their historical and philosophical basis in modern physical theory. Consent of the department required.

706 PHILOSOPHY OF PHYSICS (2 credit hours)
The various areas of physics are studied with regard to their historical and philosophical basis in modern physical theory. Consent of the department required.

710 QUANTUM MECHANICS (3 credit hours)
Introduction to nonrelativistic quantum mechanics. Schroedinger's equation. Matrix mechanics. Applications to simple atomic and nuclear systems.

711 QUANTUM MECHANICS (3 credit hours)
Introduction to nonrelativistic quantum mechanics. Schroedinger's equation. Matrix mechanics. Applications to simple atomic and nuclear systems. Prerequisite: PHY 710.

712 QUANTUM MECHANICS (3 credit hours)
Introduction to nonrelativistic quantum mechanics. Schroedinger's equation. Matrix mechanics. Applications to simple atomic and nuclear systems. Prerequisite: PHY 711.

720 STATISTICAL PHYSICS (4 credit hours)

728 GENERAL RELATIVITY (2 to 3 credit hours)
Principles of the general theory of relativity with applications to gravitation and cosmology. Review of special relativity and tensor analysis. The equivalence principle, curvature, and Einstein's field equations. Prerequisite: PHY 260, 372, 452, MTH 333; corequisite: PHY 681 or permission of instructor.

729 GENERAL RELATIVITY (2 to 3 credit hours)
Continuation of PHY 728. Applications of general relativity. Gravitational radiation and gravitational collapse. Prerequisite: PHY 728; corequisite: PHY 681.

730 SOLID STATE PHYSICS (3 credit hours)
Introduction to the physics of solids. Lattice dynamics; thermal, electrical, and mechanical properties. Free electron and band theories of solids.

731 SOLID STATE PHYSICS (3 credit hours)
Introduction to the physics of solids. Lattice dynamics; thermal, electrical, and mechanical properties. Free electron and band theories of solids.

732 SOLID STATE PHYSICS (3 credit hours)
Introduction to the physics of solids. Lattice dynamics; thermal, electrical, and mechanical properties. Free electron and band theories of solids.

740 NUCLEAR PHYSICS (3 credit hours)
Introductory methods in nuclear physics. Elementary concepts and simple considerations about nuclear forces, alpha and beta decay, and nuclear structure. Phenomenological treatment of nuclear reactions and decay processes.
741 NUCLEAR PHYSICS (3 credit hours)
Introductory methods in nuclear physics. Elementary concepts and simple considerations about nuclear forces, alpha and beta decay, and nuclear structure. Phenomenological treatment of nuclear reactions and decay processes.

742 NUCLEAR PHYSICS (3 credit hours)
Introductory methods in nuclear physics. Elementary concepts and simple considerations about nuclear forces, alpha and beta decay, and nuclear structure. Phenomenological treatment of nuclear reactions and decay processes.

751 ATOMIC SPECTRA AND STRUCTURE (4 credit hours)
Modern theory of the atom and quantum mechanical treatment of the origin of atomic and X-ray spectra.

762 MOLECULAR SPECTRA AND STRUCTURE (4 credit hours)
Theory of molecular spectra and structure with examination of experimental data as related to molecular spectra.

770 SELECTED TOPICS (3 credit hours)
Topics vary.

780 PLASMA PHYSICS (3 credit hours)
Introduction to plasma physics. Motion of charged particles in electric and magnetic fields. Magneto-ionic theory, continuum equations, the Vlasov equation, the Boltzmann equation, and the BBGKY equations.

781 PLASMA PHYSICS (3 credit hours)
Introduction to plasma physics. Motion of charged particles in electric and magnetic fields. Magneto-ionic theory, continuum equations, the Vlasov equation, the Boltzmann equation, and the BBGKY equations.

782 PLASMA PHYSICS (3 credit hours)
Introduction to plasma physics. Motion of charged particles in electric and magnetic fields. Magneto-ionic theory, continuum equations, the Vlasov equation, the Boltzmann equation, and the BBGKY equations.

799 MINOR PROBLEMS (1 to 5 credit hours)
Students pursue topics on a tutorial basis. Cannot be used for thesis credit.

800 SEMINAR (1 credit hour)
Scheduled discussions of current problems in physics. Centered around student presentations.

899 RESEARCH (1 to 15 credit hours)
Gives students opportunities for study or laboratory work in a specialized field of interest. For thesis preparation. May be repeated.

Political Science/PLS
Note: See quarterly class schedule or departmental advisor for further enrollment restrictions, requirements, or special course information.

525 AFRICAN AMERICAN POLITICS (4 credit hours)
Explores what makes African American politics distinctive from American politics and the Prerequisites for effective political and economic leadership in the black community. The notion of black power is a major course theme.

539 UNITED STATES HEALTH POLICY (4 credit hours)
Critical review of important political, social, and economic causes and consequences of health policies in the United States.

540 LAW AND SOCIETY (4 credit hours)
Theories of law and the nature and functions of the judicial process.

542 CIVIL LIBERTIES I: THE FIRST AMENDMENT (4 credit hours)
Cases and related materials on the Bill of Rights and the 14th Amendment with emphasis on the First Amendment freedoms, concentrating on Supreme Court behavior and First Amendment procedures.

543 CIVIL LIBERTIES II (4 credit hours)
Covers cases and related materials on the Bill of Rights and the Fourteenth Amendment. Emphasis on the First Amendment freedoms concentrating on enforcement of civil rights and liberties under the Bill of Rights and the Fourteenth Amendment.

547 AMERICAN PUBLIC POLICY ANALYSIS (4 credit hours)
The nature and classification of public policy. Emphasis on fragmentation, incrementalism, and bargaining as means of policy development. Impact of citizens on public policy evaluation. Examination of illustrative selected issues in the study of Latin American politics with an emphasis on the nature of the state and the role of institutions, such as the military and unions in politics. Examples from major Latin American states and Mexico will be examined.
551 WESTERN EUROPEAN POLITICS
(4 credit hours)
Comparative study of the political systems of Great Britain, France, and West Germany.

552 POLITICS OF NATIONALISM
(4 credit hours)
Compares ethnic identity and politics in western societies, including the United States, Canada, Great Britain, and France. Topics include minorities and the welfare state, affirmative discrimination, and Black politics in the United States.

554 GOVERNMENTS OF EASTERN EUROPE (4 credit hours)
Introduction to the governments and politics of Eastern Europe, particularly since World War II. Includes current developments in Poland, Czechoslovakia, East Germany, Hungary, Romania, Bulgaria, and Yugoslavia.

556 POLITICS AND SOCIETY IN FRANCE (4 credit hours)
Examines the historic interaction of French culture and politics. Topics include the growth of the French nation and state, French society, the nature of modern politics and institutions, and France’s role in world affairs.

558 LATIN AMERICAN POLITICS (4 credit hours)
Selected issues in the study of Latin American politics with an emphasis on the nature of the state and the role of institutions such as the military and unions in politics. Examples from major South American states and Mexico where appropriate. Prerequisite: PLS 222.

560 POLITICS OF THE DEVELOPING NATIONS (4 credit hours)
Comparative analysis of various problems, particularly political, confronting developing nations in nation building and development.

564 CONTEMPORARY AFRICAN POLITICS (4 credit hours)
Political processes and governmental institutions of sub-Saharan Africa; special attention to dynamics of political development and socioeconomic change. Comparative analysis of selected African political systems.

566 POLITICS OF THE MIDDLE EAST (4 credit hours)
Introduction to governments and politics of the Middle East with emphasis on cultural and historical background and the Arab-Israeli conflict.

567 POLITICAL SYSTEM OF CHINA: THE PEOPLE’S REPUBLIC (4 credit hours)
Analysis of political structures and processes of Communist China; focus on dynamic factors of socioeconomic and political development.

568 POLITICS OF VIETNAM (4 credit hours)
Examines the history, demography, politics, culture, and economy of Vietnam.

571 CURRENT WORLD PROBLEMS (4 credit hours)
Various views and perspectives on selected contemporary problems and trends in international politics.

572 INTERNATIONAL ORGANIZATION (4 credit hours)
Analysis of developing structures and functions of the United Nations and other international organizations, and concepts relating to world government.

574 INTERNATIONAL HUMAN RIGHTS (4 credit hours)
Examines the role of human rights in international relations. Considers contending definitions of human rights and debates over policy by focusing on case studies including South Africa, China, Guatemala, and Bosnia.

575 HUMAN RIGHTS IN USA (4 credit hours)
Examines controversies over human rights in the U.S. Considers contending definitions of human rights and debates over policy by focusing on a range of issues including immigration, pornography, gay rights, race relations, and poverty.

576 PEACE STUDIES (4 credit hours)
Study of war, peace, and current efforts in dealing with international conflict. Examines the roots of war in American society and alternative strategies for elimination of war as an instrument of policy.

581 NATIONAL SECURITY POLITICS (4 credit hours)
Study of U.S. national defense and security policy process and the major strategic issues facing the U.S. government. Prerequisite: PLS 200 and major core.

582 U.S.-JAPAN FOREIGN RELATIONS (4 credit hours)
Examines the course of the relationship between the U.S. and Japan. Includes political, security, and economic issues.
599 STUDIES IN SELECTED SUBJECTS
(1 to 4 credit hours)
Problems, approaches, and topics in the field of political science. Topics vary.

602 CLASSICAL AND MEDIEVAL
POLITICAL THOUGHT (4 credit hours)
Critical examination of political ideas from 500 B.C. to A.D. 1500 with emphasis on Plato, Aristotle, Cicero, St. Augustine, St. Thomas Aquinas, Luther, Calvin, and Machiavelli.

603 POLITICAL THOUGHT: HOBBES TO MILL (4 credit hours)
(Listed jointly with PHL 632) Critical examination of political ideas from 1600 to 1900 with emphasis on Hobbes, Locke, Rousseau, Montesquieu, Hume, Burke, Hegel, Bentham, Marx, and Mill.

604 20TH CENTURY POLITICAL
THOUGHT (4 credit hours)
Critical examination of the ideas of 20th-century political theorists. Emphasis on the nature, methodology, evaluation, existing condition, and future of political thought.

605 FEMINIST THOUGHT (4 credit hours)
An exploration of feminist interpretations and critiques of Western political theory and an examination of the development of contemporary feminist political thought.

606 GLOBALIZATION THEORIES AND
GENDER POLITICS (4 credit hours)
Examines contending theories of the international political economy, including mercantilist, liberal, (neo) Marxist, and feminist perspectives.

607 SEMINAR IN POLITICAL THEORY
(4 credit hours)
Readings, research, reports, and discussion on selected theorists, topics, and problems.

608 RADICAL BLACK THOUGHT
(4 credit hours)
Examines radical black thought and philosophy from a Pan-Africanist perspective, primarily focuses on the 20th century.

611 SEMINAR IN METHODOLOGY
(4 credit hours)
Techniques and methods relating to research in political science; application to individual projects and research designs.

612 TOPICS IN EMPIRICAL POLITICAL
ANALYSIS (4 credit hours)
Selected topics of methodological or analytical concern in contemporary political research. Prerequisite: PLS 610 or permission of instructor.

620 POLITICS AND THE NOVEL
(4 credit hours)
(Also listed as ENG 660) Study and critique of political themes in works of selected 20th century authors, including social roles, activism, political awareness, power, government, and conflict at the individual, institutional, and international level.

625 SEMINAR IN METROPOLITAN
STUDIES (4 credit hours)
Intensive interdisciplinary treatment of metropolitan studies. Reading and discussion of pertinent theory, methodology, and case studies. Practical research by students.

627 URBAN POLICY ANALYSIS
(4 credit hours)
(Also listed as URS 627) Selected urban problems and their relationship to the political environment; explores program design and evaluation, and the use of social indicators.

628 CONTEMPORARY AFRICAN
AMERICAN PROBLEMS
(4 credit hours)
Critical pedagogy allows for an in-depth exploration of many problematic issues that assail African Americans from outside and within the black community. Several possible explanations and solutions will be addressed.

629 URBAN COMMUNICATIONS THEORY
(4 credit hours)
(Also listed as COM 629) Processes and institutions by which individuals and groups communicate in an urban environment. Model of an urban communication system developed by interdisciplinary systems approach.

630 SEMINAR IN AMERICAN POLITICS
AND GOVERNMENT (4 credit hours)
Selected topics related to American political institutions and processes. Emphasis on readings, discussion, and research.

633 PUBLIC OPINION (4 credit hours)
Opinion formation in American politics; relationship of opinion to public policy, voting behavior in American elections; role of mass media and political interest groups in the policy process; and development of political attitudes and values.
634 POLITICAL LEADERSHIP
(4 credit hours)
Involves the study of political attitude development. The acquisition of basic political orientations and values, beginning with childhood and proceeding through adolescence and adulthood. Investigation of the role of various socializing agents.

635 SEMINAR IN POLITICAL CORRUPTION (4 credit hours)
Analysis of political corruption in America, including campaigns and elections, graft, the executive branch, congressional ethics, corruption in law enforcement, organized crime, and abuse of authority.

636 CRIMINAL LAW (4 credit hours)
Examines the nature of the criminal law and reviews the law pertaining to criminal liability; inchoate crimes; the elements of crimes against persons, property, and habitation; and the defenses to criminal actions.

637 CRIMINAL PROCEDURE
(4 credit hours)
Examines the constitutional protections that the individual has when confronting the criminal justice system and examines the case law pertaining to the Fourth Amendment (search and seizure), Fifth Amendment (self-incrimination), and Sixth Amendment (right to counsel).

638 ENVIRONMENTAL LAW AND POLICY
(4 credit hours)
Examines environmental law and policy and reviews the statutory framework pertaining to environmental impact statements, the regulation of air and water pollution, the disposal and cleanup of toxic wastes, and workplace safety.

639 BIOETHICS AND LAW (4 credit hours)
New biological technologies are emerging that increase our control over human behavior and functions. Course examines the legal implications of these new biological technologies, particularly mind and behavior control, genetic engineering, birth and death control, and organ transplantation.

640 CONSTITUTIONAL LAW
(4 credit hours)
Cases in which provisions of the Constitution have been judicially interpreted: federal systems; separation of powers; and limits on government.

641 NATURAL RESOURCES LAW
(4 credit hours)
This course examines federal management of natural resources on public lands, specifically, water, minerals, grazing, and wildlife. Constitutional authority, statutes, regulations, federalism, and judicial review of administrative decisions are analyzed.

642 THE AMERICAN CRIMINAL JUSTICE SYSTEM (4 credit hours)
Survey of the American criminal justice system, concentrating on political aspects. Topics include police, judges, attorneys, Supreme Court decisions, crime, and public opinion.

643 ADMINISTRATIVE LAW PROCEDURE
(4 credit hours)
Study of the law controlling the process by which policy is made and administered by public agencies. Topics include policy formulation and budgeting, legislative delegation, administrative agencies, rule-making, and adjudication.

646 PUBLIC BUDGETING (4 credit hours)
Examination of the major phases of the governmental budget cycle: types of budget; budgetary reform; economic and public policy impact of government budgeting; decision-making; and legislative-executive relations in budget formation and implementation.

648 GENDER VIOLENCE AND AMERICAN POLITICS (4 credit hours)
Examines gender violence in the U.S. Considers the range of violence, its sources, and solutions. Topics include domestic violence, rape, eating disorders, reproductive rights, and pornography.

649 INTERNATIONAL POLITICS OF GENDER VIOLENCE (4 credit hours)
Cross-cultural examination of gender violence. Considers the range of violence, its sources, and solutions. Topics include domestic abuse, rape, female genital surgeries, prostitution, and reproductive rights.

650 POLITICAL ANTHROPOLOGY
(4 credit hours)
(Also listed as ATH 650.) Study of the part of the culture of primitive societies that is recognized as political organization. An attempt is made to show how in less-complex (primitive) societies, new local communities come into being through fission. Prerequisite: 12 credit hours of Anthropology.
653 SOVIET SUCCESSOR STATES
(4 credit hours)
Examines the political life in the former Soviet Union, with emphasis on the legacy of communism and the role of economics and politics in the transition to democracy.

660 SEMINAR ON COMPARATIVE POLITICAL SYSTEMS (4 credit hours)
Readings, research, reports, and discussion of selected topics and problems. Topics vary.

661 SOCIAL MOVEMENTS AND PROTESTS (4 credit hours)
Examines group behavior motivated by the desire to change political, economic, and social systems. Special attention will be given to movements outside of the United States, including cross-national and global movements.

662 SEMINAR IN INTERNATIONAL RELATIONS (4 credit hours)
Readings, research, reports, and discussion on selected topics and problems.

663 INTERNATIONAL LAW (4 credit hours)
Study of rules governing the conduct of international politics with emphasis on their relevance to current world problems.

664 INTERNATIONAL TERRORISM SEMINAR (4 credit hours)
Surveys the phenomenon of terrorism: who employs it, how and why it occurs in international politics, and how targets respond to terrorism. Prerequisite: PLS 222.

665 AMERICAN FOREIGN POLICY (4 credit hours)
A cross-cultural examination of women's human rights and gender violence. Considers the range of violence, its sources and solutions. Topics include domestic abuse and rape, female circumcision, purdah, anorexia, and reproductive rights.

666 POLITICS OF WOMEN TERRORISTS (4 credit hours)
Survey of the political behavior of women in crime and terrorism, including the roles played by women in criminal activities and terrorist groups. Prerequisite: PLS 222 or permission of instructor.

667 WOMEN, GENDER AND WORLD POLITICS (4 credit hours)
An examination of the position of women and the power of gender in world politics through the feminist international relations theory and case studies of women in international politics.

682 LEGISLATIVE INTERNSHIP (4 credit hours)
Experiential internship in the office of a state legislator, including office work, constituent assistance and research.

686 MODEL UN SEMINAR (4 credit hours)
Model UN is an experiential learning opportunity built around the seminar, with intensive training in research, public speaking, bargaining, and conflict resolution. It culminates at the national collegiate conference in New York, simulating the United Nations.

687 HISTORY AND POLITICS OF INTELLIGENCE GATHERING

690 INDEPENDENT READINGS (1 to 4 credit hours)
Supervised individual readings on selected topics.

691 INDEPENDENT RESEARCH (1 to 4 credit hours)
Supervised individual research on selected topics.

692 INDEPENDENT FIELD EXPERIENCE (1 to 4 credit hours)
Supervised individual projects. May involve intern programs in local government or other special programs.

693 CONTEMPORARY PROBLEMS (1 to 4 credit hours)
Advanced study in selected topics in political science. Topics frequently include new developments in the methodology or subject matter of the various sub-fields of the discipline. May be repeated for credit.

694 SPECIAL TOPICS (1 to 4 credit hours)
Study of particular political problems of contemporary significance.

Professional Psychology/PSI
Note: See quarterly class schedule or departmental advisor for further enrollment restrictions, requirements, or special course information.

801 HISTORY AND SYSTEMS OF PSYCHOLOGY (3 credit hours)
Historical and philosophical precursors of philosophers' and recent thinkers' views of epistemology, existentialism, consciousness, and behavior.
802 MEMORY, COGNITION AND INDIVIDUAL DIFFERENCES IN INFORMATION PROCESSING
(3 credit hours)
Structure of human cognitive systems. Relationship of individual differences, including cognitive styles and intelligence test performance, and cognitive structure and processing. Applications to clinical and training problems.

803 FUNDAMENTALS OF LEARNING
(1 to 3 credit hours)
An overview of theories of learning, including classical and operant conditioning and verbal learning. Course includes application of learning theories in the development and treatment of psychological disorders. Titles vary.

804 ADVANCED STATISTICS AND EXPERIMENTAL DESIGN I
(3 credit hours)
Strengths, limitations, and applications of research designs. Statistical theory and principles of descriptive and major parametric and nonparametric inferential procedures. Develops ability to critically review research, demonstration, and evaluation results. Lecture, lab, field work. Titles vary.

805 ADVANCED STATISTICS AND EXPERIMENTAL DESIGN II
(3 credit hours)
This is a continuation of PSI 804-Advanced Statistics and Experimental Design I. Titles vary.

806 INTERVIEWING I (3 credit hours)

807 INTERVIEWING II (1 to 6 credit hours)

810 PSYCHOLOGICAL ASSESSMENT I
(1 to 3 credit hours)
The basics of psychological assessment. Reliability and validity of measurements, current issues in measurement, clinical interviewing and mental status examination are covered. As time allows, an introduction to the theories of intelligence is presented. Titles vary. May be taken for letter grade or pass/unsatisfactory.

811 PSYCHOLOGICAL ASSESSMENT II: COGNITIVE (3 credit hours)
Basic intelligence and aptitude assessment devices and interface with intervention plans. Biological, individual, and social system influences, and minority and social class issues in assessment. Lecture, lab, field work. Titles vary. Lab may be taken for letter grade or pass/unsatisfactory and variable credit hours.

812 PSYCHOLOGICAL ASSESSMENT III
(3 credit hours)
Study of circumscribed personality theories and nonpathological aspects of personality measurement and predicting behavior; individual differences as related to personality. Knowledge of tests for measurement of personality; their use and limitations.

813 PROJECTIVE ASSESSMENT I
(1 to 5 credit hours)
Overview of the administration, scoring, and interpretation of several projective techniques, including projective drawings, Incomplete Sentence Blanks, the Thematic Apperception Test (TAT), the Children's Apperception Test (CAT), and other story telling techniques. Titles vary. May be taken for a letter grade or pass/unsatisfactory.

814 EDUCATIONAL ASSESSMENT
(1 to 3 credit hours)
Covers the issues and methods surrounding the assessment of various types of academic/learning problems, including academic underpreparation, impact of psychological impairment, impact of physical impairment, specific learning disabilities, and adult ADHD. Titles vary. May be taken for a letter grade or pass/unsatisfactory.

819 MULTICULTURAL LAB: I
(1 to 6 credit hours)
Focuses on the recognition of cultural diversity issues as an integral component of a psychologist's clinical and professional responsibilities and the incorporation of these issues into one's evolving professional identity. May be taken for a letter grade or pass/unsatisfactory.
820 MULTICULTURAL LAB: II  
(1 to 6 credit hours)  
Continuation of PSI 819.

821 ETHNOCULTURAL ISSUES  
(3 credit hours)  
Effects of prejudice, social policies, housing desegregation, and language styles on work and other relationships. Problem areas, strengths of minorities. Managing prejudice within the professional/client relationship. Lecture, lab, field work.

822 GENDER ISSUES (1 to 6 credit hours)  
Explores the impact of gender on human behavior with specific focus on the role of gender in psychological assessment and practice. Titles vary.

830 PHYSIOLOGICAL PSYCHOLOGY I  
(3 credit hours)  
Personality and behavior in a clinical setting. Psychodynamic, phenomenological, dispositional, and behavioral theories of personality. Role of cognition, person-situation interaction, extroversion, self-esteem, and achievement motivation in therapy.

831 ADULT PSYCHOPATHOLOGY  
(3 credit hours)  
Covers definition and models of psychopathology including biochemical, genetic, dynamic, and behavioral dimensions; diagnostic systems, differential diagnosis, and treatment selection. Variables affecting individual and group functioning also are covered.

832 CHILD PSYCHOPATHOLOGY  
(3 to 5 credit hours)  

835 HUMAN DEVELOPMENT  
(3 credit hours)  
Conceptualizations of infancy, early childhood, and adolescence including physical, cognitive, intellectual, social, and interpersonal development. Lecture, lab, field work. Titles vary.

840 SOCIAL PSYCHOLOGY (3 credit hours)  
Theories and experimental findings regarding determinants of social behavior including social motivation, attribution theory, perception of people, attitude theories, group processes, interpersonal attraction, and environmental determinants of behavior. Lecture, lab, field work.

841 GROUP PSYCHOTHERAPY  
(3 credit hours)  
Background, development, and theory of small groups. Effective leadership techniques and procedures for planning, conducting, and evaluating group interaction and progress. Lecture, lab, field work.

842 CRISIS INTERVENTION LABORATORY (3 credit hours)  
Theory and definition of crisis. Individual and community support systems and crisis programs in hospitals, suicide and crisis centers, office, family, and other settings. Lecture, lab, field work. Concurrent enrollment in lecture and lab is required.

850 PHYSIOLOGICAL PSYCHOLOGY  
(3 credit hours)  
Physiology of body systems including endocrine, nervous, musculoskeletal, respiratory, cardiovascular, reproductive, and renal systems. Autonomic and endocrine regulation of body systems in homeostasis and during stress.

851 ELECTIVE (1 to 6 credit hours)  
Intensive treatment of subject materials or techniques providing students with increased experience or specialization in specific interventions, assessments, concepts, or approaches. Titles vary. Topics vary. May be taken for a letter grade or pass/unsatisfactory.

852 ELECTIVE (1 to 6 credit hours)  
Intensive treatment of subject materials or techniques providing students with increased experience or specialization in specific interventions, assessments, concepts, or approaches. Titles vary. Topics vary. May be taken for a letter grade or pass/unsatisfactory.

872 SERVICE DELIVERY SYSTEM  
(3 credit hours)  
Problem identification, analysis, intervention management, planning, and evaluation related to systems of service, organization, and support. Quality assurance, operations theory, and evaluation applied to service delivery. Lecture, lab, field work.

873 CONSULTATION (3 credit hours)  
Consultation as used for analysis and change in human service settings, business, and industry. Learning principles used to change public, community, group, and individual behavior. Lecture, lab, field work.
874 ORGANIZATIONAL PSYCHOLOGY
(3 credit hours)
Analysis and assessment of systems, management styles, work environments, stress and stress management, and executive assessment. Personnel relations, productivity, and human factors (human/machine interface) are considered. Lecture, lab, field work.

875 FORENSIC PSYCHOLOGY: CRIMINAL
(3 to 5 credit hours)
Introduction to legal and criminal justice system. Study of criminal and civil law in relation to professional practice. Study of evidentiary procedures. Discussion of adversary procedures.

880 ELECTIVE (1 to 6 credit hours)
Intense treatment of subject materials or techniques providing students with increased experience or specialization in specific interventions, assessments, concepts, or approaches. Titles vary. Topics vary.

881 ELECTIVE (1 to 6 credit hours)
Intense treatment of subject materials or techniques providing students with increased experience or specialization in specific interventions, assessments, concepts, or approaches. Titles vary. Topics vary.

882 ELECTIVE (1 to 6 credit hours)
Intense treatment of subject materials or techniques providing students with increased experience or specialization in specific interventions, assessments, concepts, or approaches. Titles vary. Topics vary.

908 PRACTICE TUTORIAL
(1 to 6 credit hours)
Exposure to a variety of clinical case materials using a vertical team format. Titles vary.

910 ELECTIVE (1 to 6 credit hours)
Intensive treatment of subject materials or techniques providing students with increased experience or specialization in specific interventions, assessments, concepts, or approaches. Topics vary.

911 NEUROPSYCHOLOGY I
(3 to 6 credit hours)
Neurophysiology emphasizing major CNS structures and tracts, location and function of cranial nerve nuclei and cranial nerve pathways. Organization of CNS vasculature and localization of function. Lecture, lab, field work.

912 NEUROPSYCHOLOGY II
(1 to 3 credit hours)
Introduction to the field of clinical neuropsychological assessment. Students will be provided with information relevant to the selection, administration, scoring, and interpretation of neuropsychological tests in different clinical situations.

913 PROJECT ASSESSMENT II
(3 credit hours)
Continuation of PSI 813-Projective Assessment I. Objective and projective techniques; how and when to administer, score, interpret, and convey results meaningfully. Emphasis on integrating these results into the clinical situation. Lecture, lab, field work.

914 ELECTIVE (1 to 3 credit hours)
Intensive treatment of subject materials or techniques providing students with increased experience or specialization in specific interventions, assessments, concepts, or approaches. Titles vary. Topics vary.

915 CHILD ASSESSMENT
(1 to 6 credit hours)
Overview of child assessment theory, techniques, and strategies to prepare students for further practical work in the assessment of child functioning. Titles vary.

916 FORENSIC ASSESSMENT
(1 to 6 credit hours)
Focuses on the interface between psychological assessment and the legal arena. Titles vary.

917 ELECTIVE (1 to 6 credit hours)
Intensive treatment of subject materials or techniques providing students with increased experience or specialization in specific interventions, assessments, concepts, or approaches. Titles vary. Topics vary.

918 INTEGRATIVE ASSESSMENT
(1 to 6 credit hours)
Provides a format for integrating various psychological tests into a coherent battery. In addition to addressing the evaluation of various psychological disorders, an approach is provided for constructing batteries for unique populations. Titles vary.
920 MULTICULTURAL COUPLES
(1 to 4 credit hours)
Explores multicultural issues in couples therapy and combines clinical theory and skills development with an appreciation of ethnicity, race, family of origin, values, and sexual orientation as cultural perspectives. Titles vary.

921 GAY/LESBIAN ISSUES
(1 to 3 credit hours)
Issues central to psychological intervention with gay/lesbian clients including dealing with homophobia/heterophobia, development of a positive gay/lesbian identity, coming-out issues, and issues for gay/lesbian couples and families. Titles vary.

922 ELECTIVE (1 to 6 credit hours)
Intensive treatment of subject materials or techniques providing students with increased experience or specialization in specific interventions, assessments, concepts, or approaches. Titles vary. Topics vary.

923 ELECTIVE (1 to 6 credit hours)
Intensive treatment of subject materials or techniques providing students with increased experience or specialization in specific interventions, assessments, concepts, or approaches. Titles vary. Topics vary.

924 ELECTIVE (1 to 6 credit hours)
Intensive treatment of subject materials or techniques providing students with increased experience or specialization in specific interventions, assessments, concepts, or approaches. Titles vary. Topics vary.

930 PSYCHODYNAMIC PSYCHOTHERAPY
I (1 to 6 credit hours)
Freud and development of psychoanalysis, neo-Freudian, and ego psychology schools. Structural aspects, techniques, and evaluation of psychoanalysis including stages of development, the unconscious, and psychodynamics. Titles vary.

931 PSYCHODYNAMIC PSYCHOTHERAPY
II (1 to 6 credit hours)
Second quarter of a three-quarter sequence designed to teach theory, research, and applications of psychodynamic, object relations, and self psychology. Titles vary.

932 PSYCHODYNAMIC PSYCHOTHERAPY
III (1 to 6 credit hours)
Focuses on the efficacy of brief dynamic treatments, examines the research on empirically validated and nonvalidated dynamic treatment protocols for DSM-IV Axis I and II disorders. Titles vary.

933 BEHAVIORAL PSYCHOTHERAPY I
(3 credit hours)
History and assumptions of behavior therapy. Assessment for behavioral intervention techniques of behavior therapy emphasizing cognitive approaches. Intervention in problem areas with high probability outcomes. Lecture, lab, field work. Titles vary.

934 BEHAVIORAL PSYCHOTHERAPY II:
COGNITIVE (1 to 6 credit hours)
Continuation of PS I 933. Titles vary.

935 BEHAVIORAL PSYCHOTHERAPY III:
ADVANCED COGNITIVE THERAPY
(1 to 3 credit hours)

936 HUMANISTIC PSYCHOTHERAPY I
(3 credit hours)

937 HUMANISTIC PSYCHOTHERAPY II
(1 to 6 credit hours)
Continuation of PSI 936. Course is the second quarter of a three-quarter sequence. Titles vary.

938 HUMANISTIC PSYCHOTHERAPY III
(1 to 3 credit hours)
Seminar exploring in-depth Humanistic theory, research, and practice skills that can be utilized by a general practitioner of clinical psychology. Titles vary.

940 CHEMICAL DEPENDENCY
(3 credit hours)
Incidence and prevalence of use and misuse of substances, with emphasis on addiction syndromes and stages of alcoholism/addiction. Theories of addiction/misuse and underlying personality dynamics and styles. Lecture, lab, field work.
941 ADVANCED GROUP THERAPY
(1 to 6 credit hours)
Addresses practical and clinical aspects of conducting group therapy. Titles vary.

942 BRIEF PSYCHOTHERAPY
(1 to 6 credit hours)
Study and discussion of problem-focused, time-limited interventions. Study of concepts and techniques; use of programmatic and group methods. Titles vary.

943 SELECTIVE (1 to 5 credit hours)
Intensive treatment of subject materials or techniques providing students with increased experience or specialization in specific interventions, assessments, concepts, or approaches. Topics vary.

944 CHILD THERAPY (3 credit hours)
Behavior disorders of children and adolescents. Behavior therapy, group therapy, family therapy, milieu therapy, and pharmacotherapy as intervention techniques. Problems associated with the treatment of children. Lecture, lab, field work.

945 MEDICAL FAMILY THERAPY
(1 to 5 credit hours)
Multidisciplinary seminar introducing students to principles of family-focused health care and collaborative team practices.

946 COUPLES/FAMILY THERAPY
METHODS (1 to 3 credit hours)
Different from a beginning survey course, students will apply a more limited focus to the study of family psychology and family therapy. Students will select a theoretical framework or approach to treatment which they intend to research and/or apply to case examples and scholarly exposition. Titles vary.

947 AIDS: CLINICAL ISSUES
FOR CLIENTS AND FAMILIES
(1 to 3 credit hours)
Explores the physiological, psychological, social, economic, and political aspects of HIV infection and AIDS with an emphasis on the unique role of psychologist as one of the many health care professionals with whom PLWAs and their families interact. Titles vary.

948 DOMESTIC VIOLENCE
(1 to 3 credit hours)
Seminar addresses research and clinical issues regarding domestic violence. Explores impact on and intervention with victims, perpetrators, children and adolescents, and society. Titles vary.

949 INTRODUCTION TO SEX THERAPY
(1 to 5 credit hours)
Assists students in expanding their knowledge base of human sexuality, developing awareness of personal sexual values, and increasing competence in intervening with clients' sexual concerns.

950 PSYCHOPHARMACOLOGY
(3 credit hours)
Interaction of genetic and environmental influences on behavior; inheritance of dominant, recessive, sex-linked characteristics; genetic influence in psychopathology, intellectual function, and personality development; and genetic counseling.

951 SERVING THE CHRONIC MENTALLY
ILL (1 to 6 credit hours)
Designed to impact the student's knowledge, skills, and attitudes about working with individuals and families affected by chronic mental illness. Titles vary.

952 FAMILY THERAPY (3 credit hours)
Organization and structure of the family and common problem areas. Review of theories of family therapy and treatment strategies of marital and sexual dysfunctions. Lecture, lab, field work.

953 HEALTH PSYCHOLOGY (3 credit hours)
Techniques of therapy applied to populations whose problems arise from faulty lifestyles and not from serious psychopathology. Topics include stress management, weight control, and health maintenance. Lecture, lab, field work.

954 INTRODUCTION TO CLINICAL
HYPNOSIS (1 to 6 credit hours)
Beginning-level course addresses the nature and theory of hypnosis as well as the integration of this therapeutic technique into clinical practice. Titles vary.

955 GERIATRIC CLINICAL PSYCHOLOGY
(3 credit hours)
Psychological and social derivation of stereotypes and prejudice and their maintenance. Techniques for assessing and modifying stereotypes and prejudice including self-awareness, group, educational, and environmental approaches. Lecture, lab, field work. Titles vary.

956 ELECTIVE (1 to 6 credit hours)
Intensive treatment of subject materials or techniques providing students with increased experience or specialization in specific interventions, assessments, concepts, or approaches. Titles vary.
957 PSYCHOLOGY OF WOMEN
(1 to 3 credit hours)
Seminar addresses issues including, but not limited to, female development; the interaction of gender, race, ethnicity, and SES; body image; impact of female gender role on mental health. Feminist therapy is also covered. Titles vary. Topics vary.

958 ELECTIVE (1 to 6 credit hours)
Intensive treatment of subject materials or techniques providing students with increased experience or specialization in specific interventions, assessments, concepts, or approaches. Titles vary. Topics vary.

959 INTEGRATIVE PSYCHOTHERAPY
(3 credit hours)
Practicum in developing, monitoring, and reviewing individualized service-by-objective plans and programmatic service plans. Peer review, criteria development, and other quality assurance methods are applied. Lecture, lab, field work.

965 SUPERVISION AND CASE MANAGEMENT TECHNIQUES
(1 to 6 credit hours)
Focuses on issues related to personal and professional practice management; i.e., time and resource management, quality assurance, fundamentals of service delivery systems, and case management activities. Development of general knowledge and skill acquisition in practice management.

966 PROFESSIONAL ETHICS/ISSUES
(1 to 5 credit hours)
Provide a working knowledge of APA ethical principles and code of conduct, and Ohio law and rules governing psychologists. Increase sensitivity to potential ethical dilemmas and develop skills in identifying and resolving ethical dilemmas in professional psychology.

967 ETHICS IN AN INTERPROFESSIONAL CONTEXT (1 to 3 credit hours)
Study and discussion between faculty and students from medicine, professional psychology, and theology concerning ethical issues and implication for client/patient care across professional disciplines. Titles vary. May be taken for a letter grade or pass/unsatisfactory.

968 INTRODUCTION TO MULTIPROFESSIONAL TEAM PRACTICE IN COMMUNITY BASED CARE (1 to 3 credit hours)
Brings together faculty and students from allied health, medicine, nursing, professional psychology and social work to study access to and utilization of primary care and prevention services in urban communities. Titles vary. May be taken for a letter grade or pass/unsatisfactory.

970 ELECTIVE (1 to 3 credit hours)
Intensive treatment of subject materials or techniques providing students with increased experience or specialization in specific interventions, assessments, concepts, or approaches. Titles vary. Topics vary.

972 PROGRAM EVALUATION (3 credit hours)
Emphasis on knowledge of measurement theory, test construction, survey methods, and questionnaire techniques. Study of reliability and validity of measurement devices. Familiarity with APA standards for tests and test usage.

973 TEACHING OF PSYCHOLOGY (1 to 5 credit hours)
Seminar provides participants with a forum for exploring issues associated with teaching psychology in higher education settings. Titles vary.

974 GRANT WRITING (1 to 3 credit hours)
Methods for locating funding sources as well as researching and writing grant applications. Seminar includes formats employed by state and federal funding agencies. Titles vary. May be taken for a letter grade or pass/unsatisfactory.

975 FORENSIC PSYCHOLOGY: CIVIL (1 to 6 credit hours)
Continuation of PSI 875. Focuses on civil court proceedings, such as civil commitment, family law, and professional practice issues. Forensic Psychology I is not a prerequisite, but those who have not had the course must meet with the instructor prior to enrolling. Titles vary. May be taken for a letter grade or pass/unsatisfactory.
976 ELECTIVE (1 to 6 credit hours)
Intensive treatment of subject materials or techniques providing students with increased experience or specialization in specific interventions, assessments, concepts, or approaches. Topics vary. May be taken for a letter grade or pass/unsatisfactory.

980 ELECTIVE (1 to 3 credit hours)
Issues relevant to students' development as professional psychologists including professional involvement, legal and legislative issues, professional ethics and standards, and relation with other professional groups.

981 ELECTIVE (1 to 6 credit hours)
Provides for an in-depth exposure of students to a variety of clinical case materials under the direct supervision of experienced clinical faculty, using a vertical team format comprised of students at various levels of training and experience. Titles vary.

982 SELECTIVE (1 to 5 credit hours)
Intensive treatment of subject materials or techniques providing students with increased experience or specialization in specific interventions, assessments, concepts, or approaches. Topics vary.

995 DIRECTED STUDY
(1 to 5 credit hours)
Individualized course of readings completed under faculty supervision.

996 ELECTIVE (1 to 5 credit hours)
Research or evaluation performed under faculty supervision. Titles vary.

997 SUPERVISED EXPERIENCE
(1 to 6 credit hours)
Faculty supervised clerkship, field placement, or other isolated circumscribed professional experience.

998 PROFESSIONAL DISSERTATION
(1 to 5 credit hours)
Project of excellence or other professional project carried out with faculty approval and supervision.

Psychology/PSY

Note: See quarterly class schedule or departmental advisor for further enrollment restrictions, requirements, or special course information.

503 PSYCHOLOGY OF HEALTH
BEHAVIOR (4 credit hours)
The contributions of psychology of health care. Focus is theoretical and practical, emphasizing the integration of physiological and psychological knowledge. Prerequisite: PSY 111, 112.

504 INDUSTRIAL AND ORGANIZATIONAL PSYCHOLOGY (4 credit hours)
Scientific psychological principles, procedures, and methods applied to human behavior in organizations. Prerequisite: PSY 111 and 112.

506 ENGINEERING PSYCHOLOGY
(4 credit hours)
(Also listed as HFE 506.) Introduction to the study of human factors in the design and operation of machine systems. Prerequisite: PSY 111, 112.

507 TESTS AND MEASUREMENTS
(4 credit hours)
Introduction to the construction and use of attitude scales, aptitude and ability tests in organizational settings with emphasis on the use of standard tests. Prerequisite: PSY 111, 112 and MTH 127

508 ENVIRONMENTAL PSYCHOLOGY
(4 credit hours)
Effects on behavior of environmental factors such as crowding, noise, pollution, temperature, lighting, and architecture. Also covers applications of psychological knowledge and techniques in dealing with current environmental problems. Prerequisite: PSY 111 and 112

509 BEHAVIOR MODIFICATION: METHOD AND THEORY (4 credit hours)
Principles of conditioning as related to problems in human adjustment. General principles of the psychology of learning are illustrated with cases of interest to a wide variety of helping professionals (e.g., psychologists, educators, social workers, nurses, and speech therapists). Prerequisite: PSY 111 and 112.
510 PSYCHOLOGY OF WOMEN AND MEN
(4 credit hours)
The current state of research evidence about sex differences in all aspects of human behavior as well as patterns of public attitudes about the natures and proper roles of men and women are examined. Prerequisite: PSY 111 and 112.

511 ABNORMAL PSYCHOLOGY
(4 credit hours)
An overview of the facts and theories pertaining to abnormal behavior. Topics include classification and diagnosis, causes, and treatment of abnormal behavior. For nonmajors only. Prerequisite: PSY 111 and 112.

521 COGNITION AND LEARNING
(4 credit hours)
Cognitive processes with emphasis on learning and memory systems. Topics include short-term memory, retrieval mechanisms, conceptual structures and skills tests (IQ), mnemonic techniques, and amnesia. Prerequisite: PSY 111, 112.

531 THEORY AND RESEARCH IN PERSONALITY (4 credit hours)
Review of contemporary theories of personality and associated research methodology.

541 DEVELOPMENTAL PSYCHOLOGY
(4 credit hours)
Theory, research, and issues in the study of development of children and the young of other species.

551 EXPERIMENTAL SOCIAL PSYCHOLOGY (4 credit hours)
Current theories and experimental findings regarding the determinants of social behavior.

561 CONDITIONING AND LEARNING
(4 credit hours)
Introduction to experimental findings and contemporary theories of conditioning, learning, and motivation.

571 PERCEPTION (4 credit hours)
Physiology and psychology of the phenomena of sensation and perception.

591 BEHAVIORAL NEUROSCIENCE
(4 credit hours)
Physiological mechanisms of behavior; emphasis on motivational systems and learning.

592 BEHAVIORAL NEUROSCIENCE II
(4 credit hours)
Physiological mechanisms of behavior with emphasis on motor and sensory systems. Prerequisite: PSY 591.

600 ADVANCED RESEARCH DESIGN AND QUANTITATIVE ANALYSIS
(4 credit hours)
Use of factorial designs and multivariate tests in psychological research. Prerequisite: PSY 300.

601 ADVANCED EXPERIMENTAL DESIGN: PACKAGED COMPUTER PROGRAMS
(4 credit hours)
The use of canned computer programs such as SPSS, SAS, and BIOMED in the design, analysis, and interpretation of behaviorally oriented research. Prerequisite: PSY 300 and 400.

611 ADVANCED TOPICS IN ABNORMAL PSYCHOLOGY (4 credit hours)
Theories and research relating to causes, symptoms, and influence of abnormal behavior. Prerequisite: PSY 311 or permission of instructor.

619 ADVANCED TOPICS IN PHYSIOLOGICAL PSYCHOLOGY
(4 credit hours)
(Also listed as BMS 910.) Detailed examination of selected areas in cognition and learning. Prerequisite: PSY 391.

621 ADVANCED TOPICS IN COGNITION AND LEARNING (4 credit hours)
Detailed examination of selected areas in cognition and learning. Prerequisite: PSY 321.

625 HUMAN-COMPUTER INTERFACE
(4 credit hours)
Relationship of human cognitive, perceptual, and language processes to the effective operation of computer systems. Review of research and theory. Prerequisite: PSY 321, CS 142.

629 INTERPERSONAL RELATIONS SKILLS (4 credit hours)
Surveys the scientific literature on conformity, obedience, interpersonal choice, and verbal and nonverbal communication; relates this information to enhancement of everyday communication and interaction; and introduces techniques for developing basic interpersonal skills. Prerequisite: PSY 331 or PSY 351.
631 ADVANCED THEORY AND RESEARCH IN PERSONALITY (4 credit hours)
Review of selected topics in personality. Focuses on selected personality constructs and their measurement (i.e., need for achievement and self-concept) as well as situational determinants of behavior. Prerequisite: PSY 300, 331.

632 PRACTICUM IN APPLIED PSYCHOLOGY (4 credit hours)
Provides an opportunity to work in an applied psychological setting under supervision. The setting will be consistent with the individual student's interests (mental health agency, industrial or organizational setting, etc.). Prerequisite: advanced standing in psychology and instructor permission.

633 DEVELOPMENTAL PSYCHOPATHOLOGY (4 credit hours)
Survey of theoretical approaches to the description and explanation of childhood psychopathology. Overview of current research in childhood psychopathology, and description of methodological problems involved in clinical research with children. Prerequisite: PSY 300 and 341, 541 or consent of instructor.

636 BEHAVIOR MODIFICATION: METHOD AND THEORY (4 credit hours)
The principles of conditioning as they relate to problems in human adjustment. The general principles of the psychology of learning are illustrated with cases of interest to a wide variety of helping professionals (e.g., psychologists, educators, social workers, nurses, and speech therapists). Prerequisite: PSY 435, 635 or 311 or 361 or consent of instructor.

637 BEHAVIOR MODIFICATION (4 credit hours)
Applications of psychological principles to a wide variety of behaviors. Prerequisite: PSY 331, 332 or 435 or 635 or permission of instructor.

639 THEORY AND RESEARCH IN CLINICAL PSYCHOLOGY (4 credit hours)
Overview of contemporary clinical approaches, research techniques, and empirical data. Prerequisite: PSY 331, 531, 435, 635, or advanced standing.

641 ADVANCED DEVELOPMENTAL PSYCHOLOGY (4 credit hours)
Development of learning and cognition in children is covered in depth. Prerequisite: PSY 300, 341.

643 PSYCHOMETRICS (4 credit hours)
The basic principles, problems, and techniques of psychological testing with emphasis on test construction, interpretation, and usage. Prerequisite: permission of instructor.

644 ADVANCED INDUSTRIAL PSYCHOLOGY (4 credit hours)
Theories and research findings in selected topics in industrial psychology.

647 PSYCHOLOGY OF AGING (4 credit hours)
Overview of the theoretical, methodological, and conceptual issues in the study of human aging. Focus is on current research and applied relevance. Prerequisite: PSY 111, 112, 341.

650 BIOFEEDBACK: RESEARCH AND APPLICATION (4 credit hours)
Introduction to biofeedback in the context of general behavior theory of learning. Literature is surveyed. Topics include problems of methodology and experimental design, and application to problems in clinical psychology. Prerequisite: PSY 361 or 561.

651 ADVANCED TOPICS IN EXPERIMENTAL SOCIAL PSYCHOLOGY (4 credit hours)
Detailed examination of selected areas of current research in social psychology. Prerequisite: PSY 300, 351.

655 PSYCHOLINGUISTICS (4 credit hours)
Experimental findings in the areas of animal communication and human language with emphasis on their implications for current theories of language. Includes production and reception of speech, acoustic signal, speech mechanism, personality and speech behavior, development and deficiencies, and communication.

657 PSYCHOLOGY OF ADMINISTRATIVE PRINCIPLES FOR SOCIAL AGENCIES (4 credit hours)
The basic social psychological principles involved in administrative mental health and mental retardation programs. Focus is on factors governing application of those principles to communication, organization development, and supervision within the mental health/mental retardation field. Prerequisite: consent of instructor.

661 ADVANCED TOPICS IN LEARNING AND MOTIVATION (4 credit hours)
Continued study of conditioning, learning, and motivation. Prerequisite: PSY 300, 361.
665 INFORMATION PROCESSING (4 credit hours)
(Also listed as BMS 905.) Experimental findings in animal and human memory with emphasis on their implications for current theories of memory.

671 ADVANCED TOPICS IN PERCEPTION (4 credit hours)
Emphasis on modern controversial issues and theories. Prerequisite: PSY 371 and 300.

675 SIGNAL DETECTION THEORY (4 credit hours)
Presents signal detection theory in the context of Thurstonian scaling and statistical decision theory. Studies the application of signal detection theory in various areas of psychology including psychophysics, memory, physiology, and psycholinguistics. Prerequisite: PSY 300.

678 ANIMAL BEHAVIOR (4 credit hours)
(Also listed as BIO 678.) Physiology, phylogeny, and ontogeny of behavior. Prerequisite: BIO 111, 112, 114; or BIO 101, 102, 103; or PSY 111, 112, 300. One course in statistics suggested. BIO 302 suggested.

681 HISTORY OF PSYCHOLOGY (4 credit hours)
Major trends in the development of psychology from its beginning to the present.

682 THEORIES AND SYSTEMS IN PSYCHOLOGY (4 credit hours)
Comprehensive treatment of the historical antecedents for selected theories and systems in psychology.

688 SEMINAR IN SPECIAL TOPICS (1 to 4 credit hours)
Topics vary.

690 INDEPENDENT READINGS IN SELECTED TOPICS IN PSYCHOLOGY (1 to 4 credit hours)
Topics vary. Graded pass/unsatisfactory.

698 INDEPENDENT RESEARCH (1 to 4 credit hours)
Original problems for investigation.

700 PRINCIPLES OF INSTRUCTION IN PSYCHOLOGY (4 credit hours)
Survey of available instructional material and discussion of educational theory and techniques leading to more effective instruction. For psychology majors only. Department permission required. Graded pass/unsatisfactory.

701 RESEARCH DESIGN AND QUANTITATIVE METHODS I (4 credit hours)
The foundation of experimental design and quantitative techniques will be developed. Students are expected to understand assumptions underlying each technique or procedure. They must also understand their applications to experimental and field research and to experimental and quasi-experimental designs. Both complex analyses of variance, multiple regression and non-parametric techniques will be covered. Computation and computer skills must be mastered. First year research projects and their design and analysis will be reviewed.

702 RESEARCH DESIGN AND QUANTITATIVE METHODS II (4 credit hours)
Continuation of PSY 701. Prerequisite: PSY 701.

703 RESEARCH DESIGN AND QUANTITATIVE METHODS III (4 credit hours)
Continuation of PSY 702. Prerequisite: PSY 702.

707 MULTIVARIATE METHODS IN PSYCHOLOGY (4 credit hours)
The techniques of multivariate analysis will be reviewed and developed. Techniques will include MANOVA, discriminant analysis, canonical correlation, factor analysis, and path analyses. Application to problems in psychology will be required. Use of statistical packages for analysis. Prerequisite: PSY 703 or permission of department.

717 MOLECULAR BIOLOGY OF LEARNING AND MEMORY (3 credit hours)
Modern molecular biological investigations of the process of learning and memory. Implications for the development of a molecular theory of memory processes are considered.

721 ENGINEERING PSYCHOLOGY (4 credit hours)
Application of psychology to equipment design and human-machine relationships.

724 HUMAN FACTORS IN SYSTEM DEVELOPMENT (4 credit hours)
System design and development are described, and human factors activities at each phase are explained. Macroergonomic as well as microergonomic considerations are reviewed.
725 EXPERIMENTAL METHODS IN SOCIAL PSYCHOLOGY
(4 credit hours)
The experimental method as it is applied to social psychological problems. Provides experiences in both laboratory and field techniques. Prerequisite: PSY 325 or consent of instructor.

726 ATTITUDE STRUCTURE AND CHANGE (4 credit hours)
Attitude as a social psychological concept, including problems of measurement, empirical findings, and theoretical models. Prerequisite: PSY 325 or consent of instructor.

727 SMALL GROUPS (4 credit hours)
Current theory and research in selected areas of small groups, including communications, group norms and conformity, group structure, and leadership. Prerequisite: PSY 325 or consent of instructor.

729 INTERPERSONAL RELATIONS
(4 credit hours)
Current theory and research in selected areas of small groups, including communications, group norms and conformity, group structure, and leadership. Prerequisite: PSY 325 or consent of instructor.

731 THEORIES OF PERSONALITY
(4 credit hours)
Contemporary theories of the development, organization, and dynamics of personality.

732 PERSONALITY STRUCTURE AND ASSESSMENT (4 credit hours)
The major approaches for describing personality structure will be discussed and the results of factor analytic studies will be summarized. Implications of personality structure for behavior will be explored and the interactionist model will be described and evaluated. Relevant data on individual differences and tests will be summarized and evaluated. Consistency of differences across situations as well as application of results will be discussed.

733 COMMUNITY PSYCHOLOGY
(4 credit hours)
Seminar on policy formulation and programming for community-oriented approaches to mental health problems. Covers history, policy, and program development difficulties, social problems versus illness models of psychopathology and treatment, and preventive interventions. Prerequisite: ABS 701 or consent of instructor.

735 SYSTEMS ANALYSIS AND ORGANIZATIONAL CHANGE
(4 credit hours)
Overview of the systems approach to organizational diagnosis, planning, and intervention in human service organizations. Behavioral interventions are emphasized. Prerequisite: ABS 701, 702, 703, 721, 722 or consent of instructor.

740 SEMINAR IN INDUSTRIAL/ORGANIZATIONAL PSYCHOLOGY
(4 credit hours)
Provides an overview of the major topics in industrial/organizational psychology. Traditional as well as developing topics are surveyed.

741 PERSONNEL SELECTION
(4 credit hours)
In-depth review of the psychological basis of personnel selection including recruitment techniques, criterion development, performance evaluation, validity generalization, and instruments. Theoretical, practical, and legal issues are covered. Prerequisite: PSY 740/ABS 770.

742 BEHAVIOR IN ORGANIZATIONS
(4 credit hours)
Review of behavior in organizations within a framework of psychological theory and research. Topics include socialization, careers, organizational design, and leadership. Prerequisite: PSY 740/ABS 770.

743 PSYCHOLOGY OF LEADERSHIP
(4 credit hours)
Designed to explore the theories, research, and practice of leadership in work organizations from a psychological perspective. Prerequisite: ABS 770 or PSY 740.

745 RESEARCH METHODS IN INDUSTRIAL/ORGANIZATIONAL PSYCHOLOGY (4 credit hours)
The course focuses on the unique methodological challenges faced by I/O researchers. The empirical problems that the complex nature of organizations and their uncontrollable environments pose for researchers are discussed. Theory, causation, and experimental validity are reviewed. Various research designs (e.g., true experiments, quasi-experiments, correlation and regression analysis, ethnographic study) are presented and scrutinized. Methods of data collection (e.g., unobtrusive measurement, survey, qualitative) are reviewed. Meta-analysis as a research method is discussed.
751 PROSEMINAR IN HUMAN FACTORS
PSYCHOLOGY I (4 credit hours)
In-depth review of major areas of human factors research. The areas reviewed in this course complement those areas reviewed in PSY 752. Prerequisite: PSY 721 or consent of instructor.

752 PROSEMINAR IN HUMAN FACTORS
PSYCHOLOGY II (4 credit hours)
In-depth review of major areas of human factors research. The areas reviewed in this course complement those areas reviewed in PSY 751. Prerequisite: PSY 721 or consent of instructor.

753 GROUP PROCESSES AND SOCIAL BEHAVIOR (4 credit hours)
Theories and data on social behavior will be reviewed. Topics will include attitude and attitude change, social perception, prejudice, and group decision-making. Possible applications will be discussed.

761 HUMAN LEARNING AND MEMORY
(4 credit hours)
Phenomena, principles, and problems of learning and retention. Prerequisite: consent of instructor.

762 ADVANCED LEARNING
(4 credit hours)
Experimental findings in animal and human learning with emphasis on their implications for current theories in learning. Prerequisite: PSY 361, 362 or consent of instructor.

763 ADVANCED MOTIVATION
(4 credit hours)
Experimental findings in animal and human motivation with emphasis on their implications for current theories of motivation. Prerequisite: PSY 361, 362 or consent of instructor.

771 PERCEPTION (4 credit hours)
Selected problems in perception with emphasis on theoretical interpretations. Prerequisite: PSY 372 or consent of instructor.

773 SENSORY PROCESSES
(4 credit hours)
The basic physiology of the senses and the peripheral nervous system. Emphasis on receptor mechanisms and neural coding processes. Prerequisite: PSY 371 or 375 or consent of instructor.

775 NEUROPSYCHOLOGY (4 credit hours)
Intensive laboratory involvement with the instrumentation and surgical techniques used in physiological psychology including: GSR, EMG, EKG, and EEG recordings; animal behavioral changes produced by electrical stimulation of the brain and/or lesions of brain structures. Prerequisite: PSY 375-376 or consent of instructor.

776 VISUAL SCIENCE (3 to 4 credit hours)
Study of visual systems including psychophysical measurement, temporal and spatial properties, display criteria, colorimetry, and visual system modeling.

778 CORTICAL VISUAL PROCESSES
(4 credit hours)
In-depth consideration of visual processes that originate in the cerebral cortex. Topics include binocular vision, motion perception, eye movements, and the application of these to human factors research. Prerequisite: PSY 776 and PSY 777.

782 INSTRUMENTATION IN PSYCHOLOGY
(4 credit hours)
Review of instrumentation used in psychological research and applications-relevant microprocessor and analog devices will be described. Topics will include displays, timing, transducers, A/D/A, amplifiers, and logical control. Students will construct and modify devices.

785 INTERMEDIATE STATISTICS
(4 credit hours)
Statistical methods and interpretations encountered in experimental studies and presentations of behavioral data.

790 INDEPENDENT RESEARCH
(1 to 15 credit hours)
Research conducted under faculty supervision.

797 INTERNSHIP (1 to 15 credit hours)
Internship in private or governmental organizations under the direction of a faculty advisor. Does not count for graduate credit toward the M.S. or Ph.D. degree in psychology. Graded pass/unsatisfactory.

799 THESIS RESEARCH
(1 to 15 credit hours)
Research conducted for the M.S. thesis. Research must be approved by supervisory committee, submitted in writing and defended by public oral examination.
823 DISPLAY DESIGN (4 credit hours)
Principles and data underlying the design of visual displays will be reviewed. Topics will include legibility and physical display characteristics, organization of display screen information, and stimulus-response compatibility and coding systems. Students will explore methods for evaluating displays.

825 AVIATION PSYCHOLOGY
(4 credit hours)
Review of human factors applications in aviation. Cockpit displays and controls and the principles of their design will be summarized. Causes of human error and accidents will be examined. Use of flight training and simulation methods. Students will write a critical review paper on relevant topic and give oral presentation on it. Prerequisite: PSY 721 or permission of department.

842 WORK MOTIVATION (4 credit hours)
Work motivation theories are examined in terms of their empirical support and practical usefulness. Goals and the setting of objectives by employees are discussed. The design of work is discussed.

845 ORGANIZATIONAL THEORY
(4 credit hours)
The structuring of organizations is discussed in terms of centralization, formalization, and complexity. Issues of division of labor, span of control and departmentalization and delegation are examined. Mechanistic versus organic models of organizational design are compared and contrasted. The role technology plays in design is addressed. The environment's impact on organizational design is examined including uncertainty, information processing and adaptation. Matrix designs are evaluated in terms of their efficiency and flexibility.

864 COGNITIVE MODELING
(4 credit hours)
Review of computer models for cognitive processing, including propositional and connectionist approaches. Development and evaluation of mathematical models.

873 VESTIBULAR FUNCTION
(4 credit hours)
Role of vestibular organs in space orientation. Stimulus parameters, anatomy, neurophysiology, psychophysics, perception, performance, and motor responses are examined with special reference to aerospace vehicles.

875 PSYCHOACOUSTICS (4 credit hours)
Advanced examination of auditory psychophysics and perceptual processes involving consideration of peripheral and central auditory physiology whenever possible.

881 HISTORY AND SYSTEMS IN PSYCHOLOGY (4 credit hours)
A review of the history of psychology that explores the major trends in the development of the field. The relation of modern psychology to its antecedents will be explored.

886 TOPICS IN HUMAN FACTORS
(1 to 4 credit hours)
Seminars with in-depth coverage of special topics in human factors. Topics vary. Permission of Instructor. May be taken for a letter grade or pass/unsatisfactory.

888 TOPICS IN INDUSTRIAL/ORGANIZATIONAL
(1 to 4 credit hours)
Seminars with in-depth coverage of special topics in industrial or organizational psychology. Topics vary. Permission of Instructor. May be taken for a letter grade or pass/unsatisfactory.

891 BEHAVIORAL NEUROSCIENCE
(4 credit hours)
(Also listed as BMS 914.) Coverage of the neurobiological basis of behavior. Focuses on motor function, ingestion, mating, learning, memory, rhythmical influences, and emotion.

894 ENGINEERING PSYCHOPHYSIOLOGY
(4 credit hours)
The application of psychophysiological measures to problems in engineering psychology will be addressed. Electroencephalographic, ocu lomotor, cardiovascular and respiratory measures will be reviewed. Relationship to workload, attention, circadian rhythms, stress, and display design will be explored.
968 MANUAL CONTROL AND PSYCHOMOTOR SKILLS
(4 credit hours)
Description of human control processes and their models. Analyses of human skills and skill typology. Prerequisite: PSY 665 or equivalent.

991 PSYCHOBIOLOGY OF STRESS
(4 credit hours)
The effects of psychological stress on neuroendocrine and other physiological systems are explored. The implications of these relationships for disease processes and human performance are discussed.

999 DISSERTATION RESEARCH
(1 to 15 credit hours)
Original research of a quality that is publishable in refereed journals. Research must be acceptable to the supervisory committee, submitted in writing and defended by public oral examination.

Pharmacology and Toxicology/PTX
Note: See quarterly class schedule or departmental advisor for further enrollment restrictions, requirements, or special course information.

700 RESEARCH TECHNIQUES (3 credit hours)
Practical laboratory experiences in commonly used biological techniques including DNA purification and manipulation, protein expression and analysis, and the classical pharmacological techniques of mediating receptor binding. Designed to give hands-on experience along with a short weekly lecture providing background on the theory behind the topic.

710 PRINCIPLES OF BIOKINETICS
(4 credit hours)
This course will introduce the basic principles that govern the bio-availability/activity of drugs and toxants in an organism with the focus on humans.

750 PRINCIPLES OF BIODYNAMICS
(4 credit hours)
This course will introduce the basic principles that govern the dynamics of drugs and toxants in an organism with the focus on humans.

751 MOLECULAR TOXICOLOGY
(4 credit hours)
Modern toxicology focuses on understanding the mechanism of action of chemicals at the molecular level. This course will explore a spectrum of molecular mechanisms of toxicity providing a broad perspective of the cutting edge of research in toxicology.

879 MOLECULAR PHARMACOLOGY
(4 credit hours)
This course will provide students with an in-depth treatment of the theoretical principles and practical approaches to experimental investigation of drug action at the membrane receptor level using a text and articles from the primary literature.

990 PHARMACOLOGY AND TOXICOLOGY SEMINAR/JOURNAL CLUB

Religion/REL
Note: See quarterly class schedule or departmental advisor for further enrollment restrictions, requirements, or special course information.

510 EARLY AND MEDIEVAL WESTERN RELIGIOUS THOUGHT (4 credit hours)
Survey of important themes in the religious thought of the major Western traditions. Selected readings from primary sources and secondary interpretations.

511 REFORMATION AND MODERN WESTERN RELIGIOUS THOUGHT
(4 credit hours)
Survey of important themes in the religious thought of the major Western traditions. Selected readings from primary sources and secondary interpretations.

515 CHRISTIANITY (4 credit hours)
An examination of the structures of religious experience which have shaped the development of Christianity in history. Institutional and ritual forms will be investigated as systems of meaning against the backdrop of the general history of religions.

516 JUDAISM: FAITH AND PEOPLE
(4 credit hours)
Judaism as a religious culture of a particular people is examined critically, historically and phenomenologically.
518 CONTEMPORARY JEWISH THOUGHT (4 credit hours)
Examination of the major themes and issues in the works of contemporary Jewish thinkers, e.g., Borowitz, Herberg, Fackenheim, Kaplan, Rothschild, Heschel, Rubenstein and Wiessel.

521 RELIGIONS IN THE BIBLICAL PERIOD (4 credit hours)
Examination of selected religious movements and/or problems in the Biblical period and their interconnectedness and mutual influences.

522 TOPICS IN BIBLICAL LITERATURE (4 credit hours)
Examination of selected aspects of Biblical literature from both literary and historical perspectives to explore the possible structures, functions, and meanings of this literature for its original community.

530 TOPICS IN AMERICAN RELIGION (4 credit hours)
Examination of selected topics in American religion to investigate basic religious structures and to explore the relationship of religious phenomena to their cultural context.

540 TOPICS IN ASIAN RELIGION (4 credit hours)
Studies in the religious dimension of Asian cultures, with emphasis on historical, social, and aesthetic perspectives.

544 RELIGION IN JAPANESE LIFE (3 credit hours)
Examination of the role of religion in Japanese culture and society with attention to both historical development and current issues. Prerequisite: graduate standing.

557 UNDERSTANDING DEATH (4 credit hours)
Basic issues in death and dying using resources from human sciences and humanities in a religious perspective.

561 RELIGION AND SOCIETY (4 credit hours)
(Also listed as SOC 561.) Treatment of religion as a social institution. Examines the influence of religious ideas and organizations on other social institutions, and the influence of society on religion.

562 ANTHROPOLOGY OF RELIGION (4 credit hours)
(Also listed as ATH 546.) Anthropological approach to the meaning and function of religion in social life and the nature of the thought or belief systems that gave rise to different forms of religious life. Emphasis on primitive and peasant societies.

563 RELIGION AND PSYCHOLOGY (4 credit hours)
An introduction to selected themes, issues, and problems in the interaction of religion and psychology. Differing points of view are considered.

570 STUDIES IN ETHICS (4 credit hours)
A special topics course for intensified study of the ethical dimensions of a particular religious tradition or for concentrated study in theoretical or practical ethical problems. Topics to be announced with each offering.

578 ETHICS AND MEDICINE (4 credit hours)
(Also listed as PHL 578.) An examination of the ethical issues confronting society in the area of medicine and health care, considered from the perspective of philosophical and theological ethics. Examples include ethics of abortion, euthanasia, experimental medicine, and behavior control.

582 PHILOSOPHY OF RELIGION: PROCESS (4 credit hours)
Realism and the revolt against idealism. Cross-disciplinary analysis of major contemporary process philosophers and the implications of their thoughts for religion. Focus on Alfred North Whitehead.

583 PHILOSOPHY OF RELIGION: SECULAR (4 credit hours)
Cross-disciplinary analysis of modes of human awareness through which religious meaning is expressed (sensation, morality, beauty, reason, and human relations). Examination of presuppositions of contemporary secular religion in existentialism.

635 BLACK AMERICAN RELIGIOUS THOUGHT (4 credit hours)
Analysis of black American religious thought through critical study of the writings of selected figures who have helped shape black religion from 1780 to the present.

641 ISLAM (4 credit hours)
Study of the origin and development of Islam, including contemporary issues and problems.
643 ASIAN RELIGIOUS PHILOSOPHY
(4 credit hours)
(Also listed as PHL 643.) Perennial themes in Asian cultures, such as individual, society, and cosmos; appearance and reality; time and history; and karma, freedom, and responsibility. Treatment of these themes in the philosophical traditions of Asian cultures.

656 RELIGIOUS THEMES IN LITERATURE:
(4 credit hours)
Courses offered under this number provide intensive study of literary works in terms of significant and recurring religious themes and images as they can be traced in various cultures, and literary traditions.

670 WORKSHOP (1 to 6 credit hours)
Intensive study of selected problems (e.g., the teaching of religion in secondary school, medical ethics) to meet particular needs of participating students. Titles vary.

679 ETHICS IN AN INDUSTRIAL SOCIETY:
THE RESPONSIBILITY OF BUSINESS IN SOCIETY (3 credit hours)
(Also listed as LAW 695 and MGT 695.) Ethical responsibilities of business in light of political, moral, social, and religious considerations. Emphasis on analysis and evaluation of the changing framework of responsibilities facing both business organizations and their leaders.

687 EVOLUTION, RELIGION, AND ETHICS
(4 credit hours)
Introduction to the biological, philosophical, theological, and ethical aspects of evolution.

693 SEMINAR IN RELIGION
(4 credit hours)
Topics vary.

694 EXISTENTIALISM (3 to 4 credit hours)
(Also listed as PHL 694.) Representative writers of the existentialist movement.

701 READING AND RESEARCH IN RELIGION (2 to 4 credit hours)
Intensive research in specialized areas. Students must submit written proposals, with faculty approval, for acceptance into course. Prerequisite: a minimum of 30 hours of advanced work in religion or approved related courses; related courses must be approved by the chair of the department.

702 MEDICAL ASSESSMENT
(1 to 5 credit hours)
Necessary terminology and knowledge of disabilities and disorders for understanding and interpreting medical reports. Symptomology, treatment, functional limitations, and other management aspects of specific disabilities encountered in the course of employment are covered. Titles vary.

704 READING AND RESEARCH IN RELIGION (2 to 4 credit hours)
Intensive research in specialized areas. Students must submit written proposals, with faculty approval, for acceptance into course. Prerequisite: a minimum of 30 hours of advanced work in religion or approved related courses; related courses must be approved by the chair of the department.

703 READING AND RESEARCH IN RELIGION (2 to 4 credit hours)
Intensive research in specialized areas. Students must submit written proposals, with faculty approval, for acceptance into course. Prerequisite: a minimum of 30 hours of advanced work in religion or approved related courses; related courses must be approved by the chair of the department.

Rehabilitation/RHB
Note: See quarterly class schedule or departmental advisor for further enrollment restrictions, requirements, or special course information.

670 WORKSHOP IN REHAB
(1 to 4 credit hours)
Workshop courses to meet the needs of in-service rehabilitation professionals as well as providing courses on a one-time basis to meet special interest needs.

700 FOUNDATIONS OF VOCATIONAL REHABILITATION (4 credit hours)
Introduces rehabilitation. Topics include history, philosophy, legislative bases, organizational structures, rehabilitation process and procedures, public and private sectors of rehabilitation, rehabilitation agencies, and professional issues and ethics.

701 COUNSELING THEORY AND PRACTICE (1 to 5 credit hours)
Surveys the major theories of counseling and provides opportunities to develop the basic skills associated with the counseling process. Also addresses the key philosophical and ethical issues associated with the counseling profession.

702 MEDICAL ASSESSMENT
(1 to 5 credit hours)
Necessary terminology and knowledge of disabilities and disorders for understanding and interpreting medical reports. Symptomology, treatment, functional limitations, and other management aspects of specific disabilities encountered in the course of employment are covered. Titles vary.
703 APPLIED RESEARCH IN REHABILITATION (1 to 5 credit hours)
Introduction to current rehabilitation research and rehabilitation program evaluation models.

704 PSYCHOLOGICAL ADJUSTMENT: SEVERE DISABILITY (1 to 5 credit hours)
Psychological issues associated with specific disabling conditions. An in-depth review of the general adjustment process to disability and definitions of normality and abnormality. Prerequisite: RHB 701.

705 BEHAVIORAL ASSESSMENT (1 to 5 credit hours)
Surveys psychological tests and measurements with emphasis on attitude, interest, vocational, and personality tests. Understanding of basic principles and their application to counseling in various settings are stressed. Prerequisite: RHB 701 (EDL 751 is recommended).

706 SPECIAL TECHNIQUES IN COUNSELING THE SEVERELY DISABLED (1 to 5 credit hours)
Techniques of counseling individuals who are different by reason of disability. Includes counseling for adjustment to disability, problem solving, and motivation. Prerequisite: RHB 701, 702, 703.

707 MEDICAL ASSESSMENT (1 to 5 credit hours)
Necessary terminology and knowledge of disabilities and disorders for understanding and interpreting medical reports. Symptomology, treatment, functional limitations, and other management aspects of specific disabilities encountered in the course of employment are covered. Titles vary.

711 VOCATIONAL EVALUATION AND JOB PLACEMENT TECHNIQUES (1 to 5 credit hours)
The history, philosophy, theoretical basis, goals, function, and scope of vocational evaluation. Theories and principles concerning work and career development are also explored. Prerequisite: RHB 702, 705, EDL 751 recommended.

712 INDUSTRIAL REHABILITATION (1 credit hour)
Familiarizes rehabilitation professionals and students with industrial rehabilitation (IR), and how IR programs assist in the successful placement of people with disabilities. May be taken for a letter grade or pass/unsatisfactory. Prerequisite: graduate standing or permission of instructor.

714 WORK INCENTIVE (1 credit hour)
Familiarizes rehabilitation professionals and students with the available legislatively and regulatory work incentives, and how they assist in the placement of people with disabilities. Includes the following programs: Social Security Act (SS), state and federal Workers Compensation, Targeted Job Tax Credit (TJTC), and various personal insurance (LTDD, STD, Catastrophin). May be taken for a letter grade or pass/unsatisfactory. Prerequisite: graduate standing or program consultant approval.

716 EMPLOYMENT SPECIALIST TRAINING (3 credit hours)
Familiarizes rehabilitation professionals and students with the concept of Supported Employment including definition, worker identification, learning styles, worksite and task analysis, development and implementation of skill training and support services, and demonstrates how Supported Employment is used in placement of people with disabilities. May be taken for a letter grade or pass/unsatisfactory. Prerequisite: graduate standing or approval of program consultant.

718 DEVELOPING RELATIONSHIPS WITH BUSINESS AND INDUSTRY (5 credit hours)
Exposes rehabilitation professionals and students to the philosophy and practices of business and industry, incorporates specific skill competencies in job development and job placement in working with business and industry, and demonstrates how these skills assist in enhancing employment opportunities and job placement of people with disabilities. May be taken for a letter grade or pass/unsatisfactory. Prerequisite: RHB 711, graduate standing or permission of instructor.

720 CASE MANAGEMENT IN VOCATIONAL REHABILITATION (4 credit hours)
Develops specific case management skills in diagnosis, information processing planning, service arrangement, program monitoring, and job placement. Emphasis on case management techniques, ethics, consultation strategies, and specialized counseling skills development. Prerequisite: RHB 700, 702, 711 or permission of instructor.
721 PROGNOSTIC ASPECTS OF VOCATIONAL EVALUATION
(5 credit hours)
Study of processes, principles, and techniques used to determine and predict work behavior and vocational potential. Consideration is given to adapting assessment tools and systems to clients needs. Prerequisite: occupational information for the physically disabled; introduction to vocational evaluation; RHB 701, 702, 703, 711.

730 EPIDEMIOLOGY OF CHEMICAL DEPENDENCY (1 to 4 credit hours)
Addresses the sociocultural influences associated with chemical dependency. Examines models of drug and alcohol use and the personal evolution of chemical dependency, and the ethical and legal ramifications germane to work in the drug-abuse field. Prerequisite: RHB 701 and 705, CNL 663 and 863 or permission of instructor.

731 TREATMENT APPROACHES IN CHEMICAL DEPENDENCY (1 to 4 credit hours)
The theory and practice of a variety of treatment modalities, including in-patient and out-patient approaches, family interventions, and group techniques. Emphasizes systems approaches and holistic intervention strategies. Also covers self-help groups such as Alcoholics Anonymous and Al-Anon. Prerequisite: RHB 730 or permission of instructor.

770 INDEPENDENT READING AND MINOR PROBLEMS IN REHABILITATION (1 to 3 credit hours)
Independent study in areas of interest to students but not readily available in any existing course. May be taken for a letter grade or pass/unsatisfactory.

774 SELECTED PROBLEMS (3 credit hours)
Examines techniques of rehabilitation applied to selected disability groups such as mental retardation, drug abuse, emotional disturbances, alcoholism, and cultural and social deprivation. Prerequisite: RHB 771.

775 GRADUATE SEMINAR (1 to 4 credit hours)
Includes the study of community-related rehabilitation program efforts in terms of individualized systems analysis. Graded pass/unsatisfactory.

801 INTERNSHIP IN BEHAVIORAL ASSESSMENT LABORATORY (2 to 10 credit hours)
Students spend approximately 20 to 30 hours per week in a selected rehabilitation setting performing assigned entry-level work consistent with the integration of skills, attitudes, and knowledge of rehabilitation counseling. Titles vary. Graded pass/unsatisfactory. Prerequisite: RHB 700, 701, 702, 711, 720, CNL 863.

802 INTERNSHIP IN MEDICAL ASSESSMENT LABORATORY (1 to 10 credit hours)
Culminating integrative experience for graduate rehabilitation counseling students. Students spend from 20 to 30 hours per week in a rehabilitation setting providing professional-level rehabilitation counseling and services to severely disabled clients. Titles vary. Graded pass/unsatisfactory.

811 USE AND INTERPRETATION OF VOCATIONAL EVALUATION DATA (5 credit hours)
Interpretation of evaluation data to client, rehabilitation personnel, and facility staff. Attention is given to vocational counseling, staff conferences, report writing, and follow-up. Prerequisite: RHB 701, 702, 703, 711, 721, 704.

865 REHABILITATION COUNSELING PRACTICUM (4 credit hours)
Provides counseling experience in which students, under supervision, actually counsel individuals with rehabilitation concerns including vocational, educational, medical, psychosocial, and personal issues. Prerequisite: RHB 701, 702, 704, CNL 863 with a grade of "B" or better in all these courses.

873 INTERNSHIP VOCATION EVAL (15 credit hours)
Supervised practical experience in a Vocational Evaluation unit. The student will concurrently spend two hours/week in Organization and Management of VE units seminar.
Rehabilitation Medicine and Restorative Care/AM

Note: See quarterly class schedule or departmental advisor for further enrollment restrictions, requirements, or special course information.

699 SPECIAL PROBLEMS IN REHABILITATIVE SCIENCES (1 to 4 credit hours)
Course enables students to explore selected research topics related to the rehabilitation of various patient populations. Students and faculty advisors will interact to establish specific course requirements. May be taken for letter grade of pass/unsatisfactory.

800 SEMINAR IN REHABILITATIVE SCIENCES (1 to 2 credit hours)
Various topics related to research in rehabilitative sciences are presented. Students hear faculty and guest speakers, as well as participate in seminar presentations. Graded pass/unsatisfactory.

Russian/RUS

Note: See quarterly class schedule or departmental advisor for further enrollment restrictions, requirements, or special course information.

599 STUDIES IN SEL SUBJECTS (4 credit hours)
Problems, approaches, and topics in the field of Russian. Topics vary.

Science and Mathematics/SM

Note: See quarterly class schedule or departmental advisor for further enrollment restrictions, requirements, or special course information.

645 PROJECTS IN SCIENCE I (3 credit hours)
An exercise in the application of data collection and analysis to an assigned small group project, reflecting analysis of the four basic sciences.

646 PROJECTS IN SCIENCE II (3 credit hours)
Using a variety of resources, including the course Web site, students will individually design and implement and extended scientific investigation into one of the four basic science areas. Prerequisite: SM 645 or instructor permission.

Sociology/SOC

Note: See quarterly class schedule or departmental advisor for further enrollment restrictions, requirements, or special course information.

510 SOCIOLOGY OF GENDER (4 credit hours)
Cross-cultural sociological knowledge and theories concerning origin/nature of sex roles; stratification of sexes in various societies; sex roles in institutions of family, education, religion, politics, economics, and health; and other topics such as socialization and media.

514 WORKSHOP IN CURRENT PROBLEMS (1 to 6 credit hours)
Intensive study of a particular problem area, utilizing professionally qualified personnel from the academic and community environments. Specific subtitles to be added with individual workshops.

520 SOCIOLOGY OF DEVIANT BEHAVIOR (4 credit hours)
Extensive exploration of the various sociological approaches to the study of deviance and social disorganization with emphasis on contemporary sociological theory and research.

532 JUVENILE DELINQUENCY (4 credit hours)
Problems of definition and treatment of delinquency; preparation for further study and work with delinquents.

540 SOCIAL ORGANIZATION (4 credit hours)
Theories and analysis of social organization in its historical and present context. Emphasis on the interrelationship between individuals, the family, and other institutions. Prerequisite: graduate standing or permission of instructor required.

541 SOCIAL INEQUALITY (4 credit hours)
Structures, theories, and consequences of social inequality with emphasis on the United States. Prerequisite: graduate standing or permission of instructor required.

550 SOCIOLOGY OF WORK (4 credit hours)
Investigation, analysis, and discussion of contemporary theories focusing on the relationship of the individual to work. Prerequisite: graduate standing or permission of instructor required.
560 SOCIOLOGY OF FAMILY
(4 credit hours)
Sociological analysis of family development over its life cycle, and the relationship of the family to society and the individual. Topics include courtship, marriage, parenthood, adulthood, and aging.

561 RELIGION AND SOCIETY (4 credit hours)
(Also listed as REL 561.) Treatment of religion as a social institution, examining the influence of religious ideas and organizations on other social institutions, and the influence of society on religion. Prerequisite: graduate standing or permission of instructor required.

563 SOCIOLOGY OF EDUCATION
(4 credit hours)
The school as a social institution. Internal and external influences; structure of the school social system; and sociological issues affecting the school, such as social class factors and equality of educational opportunity.

599 STUDIES IN SELECTED SUBJECTS
(1 to 4 credit hours)
Problems, approaches, and topics in the field of sociology. Topics vary. Prerequisite: graduate standing or permission of instructor required.

601 SELECTED TOPICS IN THEORY METHODS (4 credit hours)
Topics vary. Prerequisite: graduate standing or permission of instructor required.

620 SOCIOLOGY OF SEXUAL BEHAVIOR
(4 credit hours)
This course examines alternative sexual lifestyles and behaviors. Employing the concepts of cultural relativity and ethnocentrism, we learn how sexual relationships are perceived and responded to in contemporary American society. Prerequisite: SOC 200.

622 THE SOCIOLOGY OF THE COURTS, LAW, AND JUSTICE (4 credit hours)
Students will critically examine the process, structure, and effects of the U.S. court system. Special attention will be given to issues of race, class, and other social factors that affect justice in society. Prerequisite: SOC 330 or equivalent.

632 PENOLOGY (4 credit hours)
Historical development and critical assessment of penal institutions. Field visits to selected institutions. Prerequisite: SOC 330 or SOC 332 or consent of instructor.

633 INTERNSHIP IN CORRECTIONS (4 credit hours)
Supervised field experience in corrections (e.g., probation, parole, and jail). Course requires readings, a log, progress reports, and a paper synthesizing readings and field experience. Prerequisite: eight credit hours from SOC 330, 332 or 432.

639 SELECTED TOPICS IN PROBLEMS/DEVIANC E (4 credit hours)
Topics vary. Prerequisite: graduate standing or permission of instructor required.

641 INDUSTRIAL SOCIOLOGY
(4 credit hours)
Cross-cultural analysis of industrialization; organization of relationships within industrial social groups.

642 RACE AND MINORITY RELATIONS
(4 credit hours)
Intergroup, racial, and ethnic group relations, including the processes and consequences of conflict, prejudice, and discrimination. Prerequisite: graduate standing or permission of instructor required.

644 URBAN SOCIOLOGY (4 credit hours)
Role of cities in past and present societies, the social and cultural implications of urban living, and problems associated with city life.

646 NEIGHBORHOODS AND COMMUNITIES (4 credit hours)
Examines the part the community and the neighborhood play in the social life of modern societies. What makes a "good" neighborhood? What makes a "good" community? These and other questions are addressed. Prerequisite: graduate standing or permission of instructor required.

657 POLICING IN SOCIETY
(4 credit hours)
Developed to expand the depth of the criminology track for Sociology majors independent of, but which may be used as, course work for the new ABS CJ track. Prerequisite: SOC 330 or equivalent.

659 EXPLAINING CRIME: FROM BECCARIA TO THORNBERRY
(4 credit hours)
Objective is to provide students with a sound understanding of theories of crime and how they operate within society as part of our understanding of the criminal justice system. Prerequisite: SOC 306, 330 or equivalent.
661 MEDICAL SOCIOLOGY
(4 credit hours)
The social dimension of health and illness. Consideration of the patterns of disease, along with the organization, provision, and delivery of health care services.

662 SOCIAL GERONTOLOGY
(4 credit hours)
(Also listed as SW 662.) Study of social aspects of aging, the needs of the aging population, and society’s response to those needs.

663 SOCIAL GERONTOLOGY II
(4 credit hours)
(Also listed as SW 663.) Continuation of social gerontology. Explores in-depth concepts and issues related to aging. Prerequisite: SOC 662 or consent of the instructor.

679 SELECTED TOPICS IN SOCIAL INSTITUTIONS (4 credit hours)
Topics vary. Prerequisite: graduate standing or permission of instructor required.

681 SOCIOLOGY OF SMALL GROUPS
(4 credit hours)
Study of face-to-face interaction with emphasis on both intergroup and intragroup structure and processes. Prerequisite: graduate standing or permission of instructor required.

689 SELECTED TOPICS IN SOCIAL INTERACTION (4 credit hours)
Topics vary. Prerequisite: graduate standing or permission of instructor required.

690 DIRECTED STUDIES IN SOCIOLOGY
(2 to 4 credit hours)
May be taken for letter grade or pass/unsatisfactory. Prerequisite: graduate standing and permission of department required.

701 SELECTED TOPICS IN SOCIOLOGY
(2 to 4 credit hours)
Variable content. Specific topic announced when course is offered.

720 SEMINAR IN SOCIAL DEVIANCE
(4 credit hours)
Study of contemporary theories of deviant behavior from both an institutional and social-psychological perspective, with emphasis on the relationship between social change and social disorganization.

760 SEMINAR ON FAMILY PROBLEMS
(4 credit hours)
(Also listed as ABS 781.) Builds on the foundations of society and its institutions to examine contemporary problems facing American families.

770 SEMINAR CRIMINAL JUSTICE
(4 credit hours)
(Also listed as ABS 771.) Investigation of the criminal justice system in the United States and its relation to deviant adult and juvenile behavior.

Spanish/SPN
Note: See quarterly class schedule or departmental advisor for further enrollment restrictions, requirements, or special course information.

531 SURVEY OF SPANISH LITERATURE
(4 credit hours)
Historical survey of Spanish literature from the beginning to romanticism.

532 SURVEY OF SPANISH LITERATURE
(4 credit hours)
Historical survey of Spanish Literature from romanticism to the present.

533 SURVEY OF SPANISH-AMERICAN LITERATURE (4 credit hours)
Reading of prose, poetry, and plays by Spanish-American writers. From pre-Columbian times to romanticism.

534 SURVEY OF SPANISH-AMERICAN LITERATURE (4 credit hours)
Reading of prose, poetry, and plays by Spanish-American writers from romanticism to the present.

590 FOREIGN LANGUAGE INSTITUTE
(8 credit hours)
For teachers of Spanish. Intensive experience designed, through total immersion, to improve language skills (conversation and composition) and increase awareness of Spanish civilization and contemporary culture.

602 SPANISH NOVEL OF THE 19TH CENTURY (4 credit hours)
Nineteenth-century prose works by Galdos and others. Prerequisite: consent of instructor.
603 ADVANCED STUDIES: LANGUAGE AND CIVILIZATION (4 credit hours)
Topics vary. Conducted in Spanish.
Prerequisite: graduate standing.

611 GOLDEN AGE DRAMA (4 credit hours)
Intensive readings of plays by playwrights of the 16th and 17th centuries.

612 MODERN DRAMA (4 credit hours)
Intensive readings of plays by playwrights of the nineteenth and twentieth centuries.

621 INTENSIVE STUDY OF DON QUIXOTE, PART I (4 credit hours)
Cervantes. Intensive study of the works of Cervantes, including Don Quixote, novelas, ejemplares, entremeses, and longer dramatic works. Lectures, discussions, and oral reports on Cervantes and his time.

631 SEMINAR IN SPANISH LITERATURE (4 credit hours)
Intensive study of selected topics in peninsular literature. Background lectures, oral reports, and discussions. Titles vary.

632 SEMINAR IN SPANISH-AMERICAN LITERATURE (4 credit hours)
Readings and reports in the novel, poetry, and drama of selected Spanish-American authors. Representative works of Borges, Garcia Marquez, Rulfo, Paz, Vargas Llosa, Sanchez, and others. Prerequisite: language competence and graduate standing.

641 CONTEMPORARY SPANISH LITERATURE (4 credit hours)
Readings in the novel, poetry, and drama of major Spanish writers in the post-Civil war period. Prerequisite: consent of instructor.

642 CONTEMPORARY LATIN-AMERICAN LITERATURE (4 credit hours)
Readings in the novel, poetry, and drama of various Latin-American writers from the late 1930s to the present day.

650 INDEPENDENT GRADUATE RESEARCH (1 to 4 credit hours)
Independent graduate research.

659 THE GENERATION OF 1898 (4 credit hours)
Novel, poetry, and theatre of Unamuno, Baroja, and others.

681 INDEPENDENT READING FOR GRADUATE STUDENTS (4 credit hours)
Independent reading for graduate students.

682 INDEPENDENT READING FOR GRADUATE STUDENTS (4 credit hours)
Independent reading for graduate students.

Statistics/STT
Note: See quarterly class schedule or departmental advisor for further enrollment restrictions, requirements, or special course information.

542 PROBABILITY AND STATISTICS FOR MIDDLE SCHOOL TEACHERS (4 credit hours)

560 APPLIED STATISTICS I (4 credit hours)
Introduces probability, random variables and their expectations, some commonly used discrete and continuous distributions, concept of random sampling and sampling distributions. Uses computer software packages for simulating, summarizing, and displaying data. Prerequisite: MTH 229 and MTH 230, or equivalent.

561 APPLIED STATISTICS II (4 credit hours)
Introduces statistics, standard statistical methods for estimation of parameters and hypothesis testing, regression analysis and analysis of variance techniques, and exposure to data analysis using packaged computer programs. Prerequisite: STT 560.

567 INTRODUCTION TO SAS (2 credit hours)
Introduces the use of Statistical Analysis System (SAS), a statistical computing package widely used in industry, government, and academia. Prerequisite: STT 265 or equivalent.

586 INDEPENDENT READING IN STATISTICS AND PROBABILITY (1 to 5 credit hours)
Independent reading in statistics and probability.
591 ADVANCED STATISTICAL METHODS FOR NURSING RESEARCH (1 credit hour)
Coverage of concepts, principles, interpretation and practical rules of thumb for advanced statistical methods used in nursing research. Prerequisite: one statistics course or equivalent.

596 TOPICS IN STATISTICS AND PROBABILITY (1 to 5 credit hours)
May be taken for letter grade or pass/unsatisfactory. Titles vary.

601 NONPARAMETRIC METHODS (4 credit hours)
Distribution-free estimation and hypothesis testing procedures. Includes methods for use in one- and two-sample location and dispersion problems, nonparametric alternatives to ANOVA and regression, goodness-of-fit tests, measures of association, and tests for randomness. Prerequisite: STT 666 or equivalent.

611 APPLIED TIME SERIES (4 credit hours)
Stochastic models for discrete time series in the time-domain, moving average processes, autoregressive processes, model identification, parameter estimation, and forecasting. Statistical computing software packages are used. Prerequisite: STT 361/561 or permission of instructor.

624 STATISTICAL QUALITY CONTROL AND IMPROVEMENT (4 credit hours)
Statistical process control for attributes and variables data: probability distributions, sampling plans, control charts, statistical control, process capability, process improvement, tolerance intervals, evolutionary operation, and applications. Prerequisite: STT 361 or 363 or permission of instructor.

626 RELIABILITY AND LIFE DATA (4 credit hours)
Presentation of important models and methods, and analysis of lifetime and survival data. Prerequisite: STT 361 or equivalent.

628 QUEUEING THEORY (4 credit hours)
The stochastic concept of a queuing process is developed. The theory and applications of single and many server queues are presented. Particular emphasis is placed on application in engineering and computer science. Prerequisite: STT 360 or STT 363 or equivalent.

630 ENVIRONMENTAL STATISTICS (4 credit hours)
Statistical methods suitable for the collection, analysis, and interpretation of the temporal and spatial data arising in the environmental studies are discussed. Computer packages for the data analysis are introduced. Prerequisite: STT 265 or equivalent or permission from the instructor.

646 STATISTICAL METHODS FOR ENGINEERS I (4 credit hours)
Classical statistical techniques for analysis and interpretation of research data, with extensive use of statistical software. Includes review of basic statistics. Simple, multiple, and polynomial regression, and single factor analysis of variance are covered. Prerequisite: STT 361 or 561 or permission of instructor.

647 STATISTICAL METHODS FOR ENGINEERS II (4 credit hours)
Continuation of STT 646. Analysis of variance, techniques for interpretation of research data, with extensive use of statistical software. Includes factorial experiments, fixed and random effects, crossed and nested factors, and repeated measures. Prerequisite: STT 646 or 466 or 666.

661 THEORY OF STATISTICS I (4 credit hours)
Probability models, density and distribution functions, expectation, marginal and conditional distributions, stochastic independence, moment generating function, central limit theorem, decision theory, and estimation of parameters. Prerequisite: MTH 232 or permission of instructor.

662 THEORY OF STATISTICS II (4 credit hours)
Hypothesis testing, linear model, and nonparametric methods. Prerequisite: STT 661 or permission of the instructor.

664 BIOSTATISTICS (4 credit hours)
(Also listed as BMS 664) Classical statistical techniques for analysis and interpretation of research data with emphasis on biomedical applications. Includes descriptive statistics, distributions, experimental design, ANOVA, regression, correlation, contingency table analysis, and nonparametric procedures.
666 STATISTICAL METHODS I
(4 credit hours)
Classical statistical techniques for analysis and interpretation of research data, with emphasis on the use of packaged computer routines. Includes descriptive statistics, normal distributions, one- and two-sample t-tests, sample contingency table analysis, simple linear regression, and correlation. Introduction to analysis of variance. Prerequisite: MTH 253, or 355, and STT 266 or STT 361 or equivalent.

667 STATISTICAL METHODS II
(4 credit hours)
Continuation of STT 666. Includes further topics in analysis of variance, multiple and curvilinear regression, multiple and partial correlation, analysis of covariance, and some exploratory data analysis. Prerequisite: STT 666.

669 INTRODUCTION TO EXPERIMENTAL DESIGN (4 credit hours)
Techniques of blocking, randomization, replication, factorial design. Topics from complete and incomplete block designs, confounding, fractional factorial designs, split-plots, response surface methods, parameter design, hierarchical designs. Statistical software used extensively. Prerequisite: STT 667 or permission of instructor.

686 INDEPENDENT READING IN STATISTICS AND PROBABILITY
(1 to 5 credit hours)
Independent reading in statistics and probability.

696 TOPICS IN STATISTICS AND PROBABILITY (1 to 5 credit hours)
Topics in statistics and probability.

702 APPLIED STOCHASTIC PROCESSES I
(4 credit hours)
Stationary processes, Markov chains, Poisson processes, pure birth process, queueing processes, inventory problems, and traffic flow problems. Prerequisite: STT 661 or permission of instructor.

721 SAMPLING DESIGN (4 credit hours)
Applications of sampling theory and basic methods of sampling selection. Simple random sampling, systematic sampling, sampling with probability proportionate to unit size, use of auxiliary estimators, and Warners procedure. Prerequisite: STT 661 or permission of the instructor.

740 CONTINGENCY TABLE ANALYSIS
(4 credit hours)
Standard techniques for analyzing two-dimensional contingency tables. Log-linear model analysis developed for analyzing higher-dimensional tables, including model selection procedures, logit models, and incomplete tables. SAS and BMDP procedures are used. Prerequisite: STT 662 and STT 666, or permission of instructor.

744 APPLIED MULTIVARIATE ANALYSIS
(4 credit hours)
Matrix theory, multivariate distributions, correlation and regression, MANOVA, tests on covariance matrices, test of independence, canonical correlation, classification and discrimination, and structure of multivariate observations. Completion of at least two courses in probability and statistics or equivalent required. Prerequisite: MTH 253 or MTH 355 and at least two courses in probability and statistics or the equivalent.

761 THEORY OF LINEAR MODELS
(4 credit hours)
Concepts of matrix algebra and the multivariate normal distribution are developed in order to study the general linear model of full rank. Some applications of regression are covered. Prerequisite: STT 662 and MTH 253 and a statistical methods course or permission of the instructor.

762 TOPICS IN LINEAR MODELS
(4 credit hours)
Computing techniques and applications of the general linear model. Correlation and regression are emphasized. Prerequisite: STT 761.

764 TOPICS IN EXPERIMENTAL DESIGN
(4 credit hours)
Continuation of STT 669. Topics from incomplete block designs, blocked and fractional asymmetric factorial designs, mixture experiments, split-plot designs, response surface methods, parameter design, hierarchical designs, variance components, mixed models. Prerequisite: STT 669 or permission of instructor.

767 APPLIED REGRESSION ANALYSIS
(4 credit hours)
Multiple linear regression with introduction to more complicated models, including nonlinear models and up-to-date computing techniques. Completion of a mathematical statistics course or permission of instructor. Prerequisite: a course in mathematical statistics or permission of the instructor.
786 INDEPENDENT READING IN STATISTICS AND PROBABILITY
(1 to 5 credit hours)
Independent reading in statistics and probability.

791 STATISTICAL CONSULTING
(3 to 4 credit hours)
Consultation with graduate students and faculty on statistical problems arising from research projects. Prerequisite: STT 662, STT 667 and permission of instructor.

796 TOPICS IN STATISTICS AND PROBABILITY (1 to 5 credit hours)
Topics in statistics and probability.

899 GRADUATE RESEARCH
(1 to 18 credit hours)
Supervised thesis research.

Social Work/SW

Note: See quarterly class schedule or departmental advisor for further enrollment restrictions, requirements, or special course information.

520 WORKSHOP IN CURRENT PROBLEMS (1 to 6 credit hours)
Intensive study of a particular problem area, utilizing professionally qualified personnel from academia and the practice community. Specific subtitles to be added with individual workshops. May be repeated to a maximum of 12 credit hours.

580 BASIC PRACTICE THEORY
(4 credit hours)
Generalist social work practice theory. Problem assessment, data collection, data analysis, interventional methods, and evaluation procedures are studied and simulated.

599 STUDIES IN SELECTED SUBJECTS
(1 to 4 credit hours)
Variable content dealing with problems, approaches, and topics in the field of social work. Titles vary. May be taken for a letter grade or pass/unsatisfactory.

662 SOCIAL GERONTOLOGY
(4 credit hours)
(Also listed as SOC 662.) Social aspects of aging. The needs of the population and society's response to those needs.

663 SOCIAL GERONTOLOGY II
(4 credit hours)
(Also listed as SOC 663.) Explores in-depth concepts and issues related to aging. Prerequisite: SW 662 or equivalent experience.

664 RACIAL AND ETHNIC AWARENESS IN THE HUMAN SERVICES
(4 credit hours)
Impact of racism and ethnicity on the delivery of human services. Examination of interpersonal relationships and institutional policies and procedures with an opportunity to develop strategies for change at both levels. Prerequisite: SW 270, 271 and 380, or equivalent.

677 SEMINAR ON SPECIAL PROBLEMS IN SOCIAL WELFARE POLICY AND SERVICES (1 to 4 credit hours)
The operation of the social welfare system in America; issues, trends, and problems. Topics vary.

680 GERONTOLOGY PRACTICUM
(3 to 4 credit hours)
Supervised learning under direction of faculty and agency staff. Ten weeks/20 hours per week, or 20 weeks/10 hours per week.

681 GENERALIST PRACTICE WITH INDIVIDUALS (4 credit hours)
In-depth study of generalist social work practice theory for the enhancement of social functioning of individuals.

682 GENERALIST PRACTICE WITH GROUPS (4 credit hours)
In-depth study of generalist social work practice theory for the enhancement of social functioning as small groups. 3 hours lecture, 1 hour field experience.

683 GENERALIST PRACTICE WITH FAMILIES (4 credit hours)
In-depth study of generalist social work practice theory for the enhancement of family social functioning.

684 GENERALIST PRACTICE WITH ORGANIZATIONS AND COMMUNITIES (4 credit hours)
In-depth study of generalist social work practice theory for the enhancement of social welfare organizations and communities. Prerequisite: SW 380 or permission of instructor.
690 RESEARCH METHODS IN SOCIAL WORK I (4 credit hours)
First course in a two quarter sequence study of evaluation research methodology. Criteria for intelligent consumption of research reports. Evaluation of selected research reports for relevance to social work practice.

691 RESEARCH METHODS IN SOCIAL WORK II (4 credit hours)
Second course in a two quarter sequence study of evaluation research methodology. Criteria for intelligent consumption of research reports. Evaluation of selected research reports for relevance to social work practice.

Theatre/TH
Note: See quarterly class schedule or departmental advisor for further enrollment restrictions, requirements, or special course information.

531 STUDIES IN FILM HISTORY (3 credit hours)
Intensive study of a selected area of film history. Titles vary. Prerequisite: TH 131 or permission of instructor.

533 STUDIES IN FILM GENRE (3 credit hours)
Intensive study of a film genre (e.g., the western, the musical, and the gangster film). Titles vary. Prerequisite: TH 131 or permission of instructor.

635 STUDIES IN FILM CRITICISM (3 credit hours)
Intensive examination of a selected area of film criticism. Titles vary.

695 WORKSHOP IN THEATRE: SUMMER THEATRE (3 to 9 credit hours)
Intensive study of selected special topics or problems or intensive experience in theatrical presentations designed to meet the particular needs of participating students. Specific titles to be announced for each workshop. May be repeated for credit subject to departmental, divisional, and university limits.

Urban Studies/URSWORK
Note: See quarterly class schedule or departmental advisor for further enrollment restrictions, requirements, or special course information.

599 STUDIES IN SELECTED SUBJECTS (4 credit hours)
Deals with problems, approaches, and topics in the field of urban studies. Topics vary.

612 CITIES AND TECHNOLOGY (4 credit hours)
Deals with the evolving relationship between technology and urban growth, physical form, government, and politics. Explores how technological fixes for complex urban problems have shaped urban development and politics.

614 URBAN FISCAL ADMINISTRATION (4 credit hours)
Examines local fiscal institutions and introduces analytical tools for designing and evaluating fiscal policies. Reviews financial reporting and accounting, the municipal bond market, pension systems, state and local taxes, user charges, and intergovernmental relations. Prerequisite: URS 710 or equivalent.

615 COMMUNITY DEVELOPMENT I (4 credit hours)
Focuses on the importance, the profession, and the practice of community development. Introduces theories of community and development and studies current neighborhood programs and policies.

616 COMMUNITY DEVELOPMENT II (4 credit hours)
Examines three fundamental organizing strategies—self-help, technical assistance, and conflict—which are used to improve a community's quality of life. The course combines classroom learning and field observation. Prerequisite: Community Development I strongly recommended but not mandatory.

617 PUBLIC SECTOR LABOR RELATIONS (4 credit hours)
Examines collective bargaining, the negotiation process, impasse resolution, and contract and grievance administration in local government.
618 URBAN PUBLIC WORKS
ADMINISTRATION (4 credit hours)
Examines the community's infrastructure with an emphasis on capital improvements programming. Reviews the community's development of the street system, water and sewer systems, solid waste management, and code enforcement. Prerequisite: URS 710 and 614(714) or permission of instructor.

620 PUBLIC SAFETY ADMINISTRATION
(4 credit hours)
Policing, corrections, fire, emergency medical services, and emergency management systems will be surveyed to provide an understanding of the services offered, technologies used, problems faced, and alternatives available in each of the areas.

623 ISSUES IN URBAN ADMINISTRATION
(4 credit hours)
Courses taught under this title explore issues and topics related to the administration of urban nonprofit organizations, community development agencies, and local governments. Titles vary.

624 ISSUES IN URBAN PLANNING
(4 credit hours)
Various issues related to planning urban environments. Topics include housing, funding nonprofit organizations, strategic planning, vision planning, and economic development action plans. Titles vary.

625 ISSUES IN URBAN DEVELOPMENT
(4 credit hours)
Explores issues that impact urban development such as housing, pollution, or privatization. Emphasizes an approach for understanding the issues and formulating effective responses.

627 URBAN POLICY ANALYSIS
(4 credit hours)
(Also listed as PLS 427/627.) Study of the policy development process and its relationship to past and current urban issues. The course focuses on a current urban issue through discussion, reading, and research.

650 ETHICS IN PUBLIC SERVICE
(4 credit hours)
Systematic development of ethics in public service, including individual roles and obligations, values, standards, and codes of conduct.

670 URBAN LEADERSHIP (4 credit hours)
Study of urban government leadership and community decision making. Major theories and concepts of leadership behavior within organizations and macro studies of urban community power systems.

675 MANAGEMENT OF URBAN
NONPROFIT AGENCIES
(4 credit hours)
Examines the organizational and managerial foundations of nonprofit organizations. Areas such as the nature and mission of nonprofit organizations, strategies for achieving the mission, roles, involved, evaluating performance, resource development/ fundraising, and managing volunteers are explored.

690 SPECIAL TOPICS (1 to 4 credit hours)
Advanced study in selected topics in urban studies. Topics may include new developments in methodology or the various subfields of the discipline.

710 ENVIRONMENT OF PUBLIC
ADMINISTRATION (4 credit hours)
Examines the legal and political variables that affect the management and operation of local governments with special emphasis on Ohio.

711 URBAN ORGANIZATIONAL THEORY
AND MANAGEMENT BEHAVIOR (4 credit hours)
Analysis of the fundamental behavior concepts and processes involved in public sector organizations. Evaluation of approaches to major behavioral issues such as motivation, leadership, and management development. Prerequisite: URS 710 or permission of instructor.

712 RESEARCH METHODS IN PUBLIC
ADMINISTRATION (4 credit hours)
Focuses on different aspects of policy evaluation by obtaining facts and analyzing information on impact of public programs. Deals with controversy over the use of objective performance indicators and citizen surveys as program performance measures. Prerequisite: URS 710 and 711, or permission from the instructor.

713 PUBLIC PLANNING (4 credit hours)
Reviews concepts, theories, and practices of community development and planning. Evaluation of current developments in the field with special emphasis on implementation strategies.
715 PUBLIC AND NONPROFIT BUDGETING (4 credit hours)
Focuses on the budget process at the city level. Structural influences on the budget process are discussed. Different budget techniques are analyzed and critiqued.

716 PUBLIC HUMAN RESOURCES ADMINISTRATION (4 credit hours)
Examines personnel functions such as job evaluation, recruitment and selection, performance appraisal, compensation, training, labor relations, and affirmative action. Prerequisite: URS 710 or permission of instructor.

720 QUANTITATIVE ANALYSIS FOR PUBLIC MANAGERS (4 credit hours)
Survey of the methodologies and concepts for analyzing the efficiency and effectiveness of decision-making, information management, and processes of the public organization.

722 DIRECTED STUDY IN URBAN ADMINISTRATION (4 credit hours)
If previous knowledge and/or experience in a selected core course is demonstrated, then URS 722 may be substituted for that selected core course. Prerequisite: M.A. (urban administration) core courses.

723 URBAN INTERNSHIP (4 to 8 credit hours)
One quarter supervised internship of at least 200 hours in a selected urban government or agency, arranged in consultation with student's advisor or intern director. Graded pass/unsatisfactory. Prerequisite: permission of internship director.

724 URBAN RESEARCH PROJECT (4 credit hours)
Research project for the masters degree in urban administration. Prerequisite: permission of department chair.

799 URBAN THESIS (4 to 8 credit hours)
Under the supervision of a thesis committee and chair, students select an urban administration problem, prepare a proposal detailing the research question, complete the research, write their thesis with full documentation and defend their work before the committee.

Vocational Education/VOE
Note: See quarterly class schedule or departmental advisor for further enrollment restrictions, requirements, or special course information.

601 BUSINESS AND MARKETING EDUCATION PRACTICUM (1 to 4 credit hours)
Selected and supervised work experience in an office. Graded pass/unsatisfactory. Prerequisite: Bachelor's degree in business education or completion of 9 credit hours of graduate business education required.

611 WORKFORCE CLASSROOM LABORATORY MANAGEMENT (3 credit hours)
Course consists of a system of strategies for selection and arrangement of learning activities in the classroom and laboratory setting, procedures for safety, handling and storage of materials and supplies, student personnel systems, records and reports, maintenance of equipment, rotation of assignments, and student evaluation.

613 ORGANIZATION AND OPERATION OF A COOPERATIVE ED PROGRAM FOR AT-RISK STUDENTS (3 credit hours)
Designed to present the fundamentals of establishing and operating a cooperative program following state and federal guidelines for at-risk, work/study students.

614 TEACHING IN A COOPERATIVE EDUCATION PROGRAM I (3 credit hours)
A study of the methods used in the operation of programs that are vocationally cooperative, including the coordination of classroom related instruction with on-the-job experience. Includes the development and use of a variety of individualized methods of instruction as well as group procedures. Prerequisite: VOE 613.

615 TEACHING IN A COOPERATIVE EDUCATION PROGRAM II (3 credit hours)
A study of the methods used in the operation of programs that are vocationally cooperative, including the coordination of classroom related instruction with on-the-job experience. Includes the development and use of a variety of individualized methods for at-risk students who are academically, economically, or socially disadvantaged. Prerequisite: VOE 613, VOE 614.
616 TEACHING IN A COOPERATIVE EDUCATION PROGRAM III (3 credit hours)
The State Department of Education requires each vocational cooperative teacher to complete in-service training as partial completion of the requirements for a four-year provisional teaching certificate. This course offers instruction, clinical experiences, and field experiences, each designed to develop a quality cooperative education program for those teachers who qualify for a cooperative certificate. Prerequisite: VOE 613, 614, 615.

618 HISTORICAL AND PHILOSOPHICAL FOUNDATIONS OF VOCATIONAL EDUCATION (4 credit hours)
Course provides historical and philosophical antecedents to present day workforce education including vocational and technical education. It examines social influences which have affected legislation which supports vocational and technical education.

621 STUDENT BEHAVIOR MANAGEMENT IN WORKFORCE EDUCATION (3 credit hours)
Course is designed to provide the vocational instructor with the opportunity to explore various management techniques which will allow him or her to more effectively organize, manage, and control the students in the laboratory and classroom.

631 STUDENT PERFORMANCE ASSESSMENT IN WORKFORCE EDUCATION (3 credit hours)
Student performance assessment in workforce education.

642 SCIENCE CONTENT IN THE OWA/OWE CLASSROOM (3 credit hours)
Provides instruction in science content for the teacher in the Occupational Work Adjustment/Occupational Work Experience classroom. Prerequisite: must be employed as an OWE/OWA coordinator.

643 ENGLISH/LANGUAGE ARTS CONTENT IN THE OWA/OWE CLASSROOM (3 credit hours)
Provides background information, specific content, and methods leading to the endorsement for teaching English/language arts in an Occupational Work Adjustment/Occupational Work Experience classroom.

644 MATHEMATICS CONTENT IN THE OWA/OWE CLASSROOM (3 credit hours)
Provides instruction in mathematics content for the teacher in the Occupational Work Adjustment/Occupational Work Experience classroom.

645 SOCIAL STUDIES CONTENT IN THE OWA/OWE CLASSROOM (3 credit hours)
Provides instruction in social studies content for the teacher in the Occupational Work Adjustment/Occupational Work Experience classroom.

646 ENGLISH/LANGUAGE ARTS METHODS IN THE OWA/OWE CLASSROOM (3 credit hours)
Provides instruction in English/language arts methods for the teacher in the Occupational Work Adjustment/Occupational Work Experience classroom.

647 MATHEMATICS METHODS IN THE OWA/OWE CLASSROOM (3 credit hours)
Provides instruction in mathematics methods for the teacher in the Occupational Work Adjustment/Occupational Work Experience classroom.

648 SOCIAL STUDIES METHODS IN THE OWA/OWE CLASSROOM (3 credit hours)
Provides instruction in social studies methods for the teacher in the Occupational Work Adjustment/Occupational Work Experience classroom.

649 SCIENCE METHODS IN THE OWA/OWE CLASSROOM (3 credit hours)
Provides instruction in science methods for the teacher in the Occupational Work Adjustment/Occupational Work Experience Classroom. Prerequisite: must be employed as an OWE/OWA coordinator.

650 TEACHING IN WORKFORCE EDUCATION PROGRAM (3 credit hours)
Provides students with an overview of teaching workforce education. Workforce education philosophy, workforce education instructional organization, lesson planning, integrated academies, and workforce classroom/laboratory planning will be presented or implementation in classroom instruction.
651 STRATEGIES AND TECHNIQUES IN WORKFORCE ED TEACHING
(3 credit hours)
Provides students with a foundation for teaching workforce education competencies. Workforce education philosophy, workforce education instructional organization, lesson planning, integrated academics, and workforce classroom/laboratory planning are the focus. Students incorporate functioning in a multicultural/pluralistic society into their classrooms. Prerequisite: VOE 671.

652 ASSESSMENT OF WORKFORCE TEACHER PERFORMANCE
(3 credit hours)
A program of teacher assessment using three assessment methods, direct observation of classroom practice, review of written documentation prepared by the teacher, and semi-structured interviews before and after the observation. Required for certification of new, unlicensed workforce teachers completing the licensure program.

654 METHODS AND STRATEGIES FOR AT-RISK STUDENTS (3 credit hours)
Since many of the secondary vocational students are considered at risk, teachers must know and employ the most effective methods and strategies to enhance student achievement. It is imperative that workforce education teachers be able to identify, define, and practice intervention techniques. Alternative methods to teach basic academic skills will be explored.

669 COORDINATION TECHNIQUES IN WORKFORCE EDUCATION
(3 credit hours)
Effective coordination strategies and procedures in the administration and management of cooperative programs in high schools and in adult and postsecondary education.

670 WORKSHOP IN VOCATIONAL EDUCATION (1 to 4 credit hours)
Intensive practical study in vocational education.

671 INSTRUCTIONAL DESIGN OF WORKFORCE EDUCATION
(8 credit hours)
The development of basic cognitive and performance skills required by new non-vocational certified teachers to earn a one-year vocational teaching certificate.

672 SUPERVISED TEACHING IN WORKFORCE EDUCATION I
(3 credit hours)
Development of basic knowledge, skills, attitudes, and values required for vocational certification of new, non-certified vocational teachers.

673 SUPERVISED TEACHING IN WORKFORCE EDUCATION II
(3 credit hours)
Development of basic knowledge, skills, attitudes, and values required for vocational certification of new, non-certified vocational teachers.

674 SUPERVISED TEACHING IN WORKFORCE EDUCATION III
(3 credit hours)
Development of basic knowledge, skills, attitudes, and values required for vocational certification of new, non-certified vocational teachers.

675 WORKFORCE EDUCATION INTEGRATION WORKSHOP
(4 credit hours)
The refinement of curriculum development, motivation, leadership, and human relations skills required by employed one-year certified vocational teachers.

706 SURVEY OF WORKFORCE EDUCATION (3 credit hours)
An overview of the instructional programs in workforce education and their administration at the national, state, and local levels. Current legislation, School-to-Work initiatives, Tech-Prep, and trends affecting workforce education programs are addressed and explored.

723 EDUCATION AND THE CHANGING WORKPLACE (4 credit hours)
Designed to assist counselors, teachers, and administrators in implementing an effective Career Guidance Program within their respective schools.

724 BUSINESS/INDUSTRY LINKAGES FOR IMPROVING SCHOOL-TO-WORK EXPERIENCES (4 credit hours)
Externship program designed to be an action-oriented collaboration with business and industry to establish networks to advance counselor and school-to-work, vocational, tech-prep, and academic teacher learning and professional development in the workplace.
725 ADMINISTRATION AND SUPERVISION IN WORKFORCE EDUCATION (3 credit hours)
In-depth study of the principles, theories, and practices in the supervision of vocational education programs.

726 ADULT WORKFORCE EDUCATION (4 credit hours)
Investigation of workforce education programs for adults, including curriculum, special methods, and the development of curriculum materials suitable to such programs.

727 PREPARING TO WORK WITH ADULT LEARNERS AND MARKETING ADULT EDUCATION PROGRAMS (4 credit hours)
Information about adult learners in terms of development, learning capabilities, and learning needs is presented. Students will take part in planning and implementing a marketing effort for adult programs.

728 DETERMINING INDIVIDUAL TRAINING NEEDS AND PLANNING INSTRUCTION FOR ADULTS (4 credit hours)
Various methods of determining individual training needs and planning instruction for adults are presented.

729 MANAGING THE INSTRUCTION PROCESS AND EVALUATING THE PERFORMANCE OF ADULTS (4 credit hours)
Instructional techniques effective with adults are presented to help the student manage the adult instructional process. Evaluating the adult learners progress in meeting specified objectives is covered.

824 CURRICULUM DEVELOPMENT FOR WORKFORCE EDUCATION (3 credit hours)
Comprehensive study of curriculum designs including occupational task analysis, innovations, sequential structuring, preparation and development of teaching units, evaluation, and change in the workforce education programs.

825 FACILITIES AND MANAGEMENT OF WORKFORCE EDUCATION (3 credit hours)
Planning, evaluation, and management of workforce education laboratories and related areas.

826 PROGRAM DEVELOPMENT TECHNIQUES FOR WORKFORCE EDUCATION (3 credit hours)
Overview of coordination techniques used in a workforce program, including development of appropriate integration and simulations, behavior modification studies, guidance, selection, and placing of students in job situations, and processes used in program.

827 EVALUATION OF VOCATIONAL EDUCATION (3 credit hours)
Developing procedures and involvement in the use of instruments for conducting evaluations for programs including teachers, students, facilities and equipment, and curriculum.

828 TEACHING STRATEGIES AND EQUIPMENT ADAPTATIONS FOR THE DISADVANTAGED AND HANDICAPPED STUDENT IN VOCATIONAL EDUCATION (3 credit hours)
Develops teaching strategies and equipment adaptations for disadvantaged and handicapped students in workforce education.
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Ahmad, Khursheed Associate Professor of Real Estate and Insurance B.A., 1953, Karachi; M.A., 1955, Punjab University (India); Ph.D., 1970, University of Pennsylvania

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Allen, Arnold Professor Emeritus of Psychiatry B.S., 1940, University of Cincinnati; M.D., 1943, Cincinnati Medical College; Certified in Psychoanalysis, 1962, Chicago Institute for Psychoanalysis

Allen, Jeffery B. Associate Professor of Professional Psychology B.S., 1965, Ball State University; M.A., 1989, Bradley University; Ph.D., 1994, University of Mississippi

Alter, Gerald M. Associate Professor of Biochemistry/Molecular Biology, Director, Biomedical Sciences Ph.D. Program B.A., 1968, Albion; Ph.D., 1975, Washington State University

Alvarez, Francisco J. Assistant Professor of Anatomy B.S., 1984, Complutense University, Madrid, Spain; Ph.D., 1987 Complutense University and Cajal Institute, Madrid, Spain

Amer, Maher S. Assistant Professor of Materials Science and Engineering B.Sc., 1987, M.Sc., 1990, Alexandria University (Egypt); Ph.D., 1995, Drexel University

Amon, James P. Associate Professor of Biological Sciences B.S., 1965, University of Cincinnati; M.A., 1968, Ph.D., 1974, College of William and Mary

Apesos, James Clinical Professor of Surgery Program Director, Plastic and Reconstructive Surgery, Kettering Medical Center M.D., 1974, Georgetown University School of Medicine

Arasu, K. T. Professor of Mathematics B.S., 1976, M.Sc., 1977, Punjab University (India); Ph.D., 1983, The Ohio State University

Arbaj, Martin Associate Professor of History A.B., 1961, Georgetown University; M.A., 1967, Ph.D., 1969, Rutgers University

Arlan, Larry G. Professor of Biological Sciences; Director, Microbiology and Immunology Program B.S., 1966, M.S., 1968, Colorado State University; Ph.D., 1972, The Ohio State University

Bacon, Peter W. Professor of Finance Chair, Department of Finance and Financial Services B.A., 1962, Albion College; M.B.A., 1964, D.B.A., 1967, Indiana University

Baik, Scott E. Associate Professor of Biological Sciences B.S., 1976, University of Toledo; Ph.D., 1988, University of Connecticut Health Center


Baker, Marjorie Associate Professor of Social Work B.A., 1972, Wright State University; M.S.W., 1984, Ph.D., 1995, The Ohio State University


Ballantine, Jeanne H. Professor of Sociology B.S., 1963, The Ohio State University; M.A., 1966, Columbia University; Ph.D., 1971, Indiana University

Bambakidis, Gust Professor of Physics and Department Chair B.S., 1968, University of Akron; M.S., 1963, Ph.D., 1966, Case Western Reserve University

Bargerhoff, Mary E. Assistant Professor of Education B.A., 1977, University of Evansville; M.Ed., 1988, University of Houston; Ph.D., 1998, Miami University

Barr, David L. Professor of Religion B.A., 1965, Fort Wayne Bible College; M.A., 1969, Ph.D., 1974, Florida State University

Basista, Beth Associate Professor of Physics and Teacher Education, Director, Interdisciplinary Science and Mathematics Program B.S., 1993, University of Akron; M.S., 1990, Ph.D., 1994, University of Cincinnati

Battino, Rubin Professor Emeritus of Chemistry B.S., 1953, City College of New York; M.A., 1954, Ph.D., 1957, Duke University

Becker, Carl Professor Emeritus of History B.A., 1949, Otterbein College; M.A., 1950, University of Wisconsin; Ph.D., 1971, University of Cincinnati

Belcher, Janice Associate Professor of Nursing B.S.N., 1973, M.S., 1976, The Ohio State University; Ph.D., 1991, Medical College of Virginia/Virginia Commonwealth University

Bellisario, Anna Associate Professor of Anthropology Director, University Honors Programs B.A., 1962, Wittenberg University; M.A., 1976, Ph.D., 1984, The Ohio State University

Bennett, Kevin B. Associate Professor of Psychology A.B., 1979, Ohio University; M.A., 1982, Ph.D., 1984, The Catholic University of America
Berberich, Steven J. Associate Professor of Biochemistry/Molecular Biology B.S., 1985, Clemson University; Ph.D., 1990, Wright State University

Bernhardt, Gregory R. Professor of Education and Counseling Education; Dean, College of Education and Human Services B.A., 1971, Colorado State University; M.S., 1973, Kansas State Teachers College; Ed.D., 1979, University of Northern Colorado

Bernstein, Jack M. Professor in Medicine and Associate Professor in Pathology, M.D., 1975, Medicine, Georgetown University; School of Medicine, Postdoctoral, University of Rochester, 1978–80

Bethke, Richard J. Associate Professor of Electrical Engineering; Chair, Mechanical and Materials Engineering B.S.M.E., 1965, Ph.D., 1971, University of Wisconsin

Bigley, Nancy J. Professor of Anatomy B.S., 1953, Pennsylvania State University; M.Sc., 1955, Ph.D., 1957, The Ohio State University


Bland, Leland D. Associate Professor of Music B.S., 1962, M.A., 1963, Northeast Missouri State University; Ph.D., 1973, University of Iowa

Bogdan, Bela J. Professor of Social Work and Community Health B.S., 1962, Ecole Sociale de Louvain (Belgium); M.S.W., 1966, University of Wisconsin–Madison

Bogumil, David D. Assistant Professor of Sociology B.S., 1985, M.S., 1988, State University of New York at Buffalo; Ph.D., 1993, Purdue University

Bombeck, Daniel D. Associate Professor of Chemistry B.S., 1973, M.S., 1979, Wright State University; Ph.D., 1986, Michigan State University

Booth, David M. Associate Professor of Music B.M., 1979, Boise State University; M.M., 1987, University of Oregon; D.M.A., 1994, University of Oklahoma

Bourbakis, Nikolas G. Director of the Information Technology Research Institute and OBR Distinguished Professor of Information Technology; Director, Computer Science and Engineering Ph.D. Program B.S., 1974, National University of Athens (Greece); Ph.D., 1983, University of Patras (Greece)

Bracher, Peter S. Professor Emeritus of English B.A., 1954, Wittenberg University; M.A., 1956, University of Washington; Ph.D., 1966, University of Pennsylvania

Brackney, Kennard S. Associate Professor of Accountancy and Department Chair B.S., 1981, M.S., 1985, Old Dominion University; Ph.D., 1990, University of North Carolina, Chapel Hill; C.P.A. (Inactive)

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Brown, Hunting W. Lecturer, Department of Biological Sciences and Institute for Environmental Quality B.A., 1968, Colgate University; M.A., 1975, University of South Florida; J.D., 1983, University of Akron School of Law

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Reo, Nicholas V.  Associate Professor of Biochemistry and Molecular Biology, and of Physics  B.A., 1973, Rutgers University; M.S., 1981, Ph.D., 1983, University of Massachusetts

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Rusch, Tracy L.  Assistant Professor of Mathematics Education and of Mathematics and Statistics  B.S., 1982, Boston University; M.A., 1992, California State University—Sacramento; Ph.D., 1997, University of Texas

Rutter, Edgar A.  Professor of Mathematics and Statistics  B.A., 1959, Marietta College; Ph.D., 1965, Iowa State University
Ryan, Charles W. Professor of Education and Director of Graduate Programs B.S., 1959, Slippery Rock State University; M.A., 1961, Colgate University; Ph.D., 1966, University of Toledo

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University Faculty Officers

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President-Elect
Jack Dustin 2003–2004

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David Barr 1999–2000
James E. Sayer 1997–98
Rudy Fichtenbaum 1996–97
Donna Schlagheck 1995–96
James E. Sayer 1994–95
Marguerite G. MacDonald 1993–94
Edgar A. Rutter 1992–93
Gregory R. Bernhardt 1991–92
Rudy Fichtenbaum 1990–91
James E. Sayer 1989–90
Alphonso L. Smith 1988–89
Jeanne Ballantine 1987–88

Richard Williams 1986–87
Robert Dixon 1985–86
Elizabeth Harden 1984–85
James Jacob 1983–84
Charles Hartmann 1982–83
Donald Pabst 1981–82
Lilburn Hoehn 1980–81
James E. Sayer 1979–80
Joseph Castellano 1978–79
Jacob Dorn 1977–78
Glenn Graham 1976–77
Barbara Dreher 1975–76
John Treacy 1974–75
Ira Fritz 1972–74
Lawrence Hussman 1971–72
Emil Kmetec 1968–71

Presiding Officers of Faculty Meetings
Norman Anon 1967–68
Edward Cox 1966–67

Chair of Academic Council
Nicholas Piediscalzi 1966–67
University Aim Statement

Adopted by the WSU Board of Trustees
December 3, 1996.

Wright State University will be a catalyst for educational excellence in the Miami Valley.

Mission Statement

Adopted by the WSU Board of Trustees
December 3, 1996.

Wright State University will be a catalyst for educational excellence in the Miami Valley, meeting the need for an educated citizenry dedicated to lifelong learning and service. To those ends, as a metropolitan university, Wright State will provide: access to scholarship and learning; economic and technological development; leadership in health, education and human services; cultural enhancement; and international understanding while fostering collegial involvement and responsibility for continuous improvement of education and research.

University Ethics Statement

Adopted by the WSU Board of Trustees

Wright State University’s goal of excellence and its dedication to innovation in teaching, research, and service rests upon an individual and a collective commitment to ethics. The purpose of this statement is to provide general guidelines for strengthening the integrity of the university. It sets forth basic principles for enabling the university to accomplish its mission and serves the public interest in an ethical way.

This statement also identifies a basic process for integrating these principles into the institution’s culture. The university expects the administration, the faculty, the staff, and the students to exemplify these principles in their words and actions.

To guide the conduct of the university community, Wright State University endorses the following principles:

Honesty

Members of the university community will be guided in all their activities by a high regard for truth.

Respect

Members of the university community will show concern for the individuality of others and their ideas.

Justice

Members of the university community will treat others fairly.

Accountability

Members of the university community will be responsible stewards of the public trust.

To integrate these principles into the institution’s culture and to encourage ethical conduct, Wright State University is committed to the ongoing process which will involve the creation of a standing advisory and resource committee to support ongoing formal ethics education, and to assist the university in developing ethics policies and procedures.
Criteria for Ohio Residency

Ohio Board of Regents Rule 3333-1-10
Ohio student residency for state subsidy and tuition surcharge purposes

(A) Intent and Authority
(1) It is the intent of the Ohio Board of Regents in promulgating this rule to exclude from treatment as residents, as that term is applied here, those persons who are present in the state of Ohio primarily for the purpose of receiving the benefit of a state-supported education.
(2) This rule is adopted pursuant to Chapter 119 of the Revised Code, and under the authority conferred upon the Ohio Board of Regents by section 3333.31 of the Revised Code.

(B) Definitions
For purpose of this rule:
(1) A "resident of Ohio for all other legal purposes" shall mean any person who maintains a twelve-month place or places of residence in Ohio, who is qualified as a resident to vote in Ohio and receive state welfare benefits, and who may be subjected to tax liability under section 5747.02 of the Revised Code, provided such person has not, within the time prescribed by this rule, declared himself or herself to be or allowed himself or herself to remain a resident of any other state or nation for any of these or other purposes.
(2) "Financial support," as used in this rule, shall not include grants, scholarships, and awards from persons or entities that are not related to the recipient.
(3) An "institution of higher education," as used in this rule, shall mean any university, community college, technical institute or college, general and technical college, medical college, or private medical or dental college that receives a direct subsidy from the state of Ohio.
(4) For the purpose of determining residency for tuition surcharge purposes at Ohio's state-assisted colleges and universities, "domicile" is a person's permanent place of abode; there must exist a demonstrated intent to live permanently in Ohio, and a legal ability under federal and state law to reside permanently in the state. For the purpose of this policy, only one domicile may be maintained at a given time.
(5) For the purpose of determining residency for tuition surcharge purposes at Ohio's state-assisted colleges and universities, an individual's immigration status will not preclude an individual from obtaining resident status if that individual has the current legal status to remain permanently in the United States.

(C) Residency for Subsidy and Tuition Surcharge Purposes
The following persons shall be classified as residents of the state of Ohio for subsidy and tuition surcharge purposes:
(1) A dependent student, at least one of whose parents or legal guardian has been a resident of the state of Ohio for all other legal purposes for twelve consecutive months or more immediately preceding the enrollment of such student in an institution of higher education.
(2) A person who has been a resident of Ohio for the purpose of this rule for at least twelve consecutive months immediately preceding his or her enrollment in an institution of higher education and who is not receiving, and has not directly or indirectly received in the preceding twelve consecutive months, financial support for persons or entities who are not residents of Ohio for all other legal purposes.
(3) A dependent child of a parent or legal guardian, or the spouse of a person who, as of the first day of a term of enrollment, has accepted full-time, self-sustaining employment and established domicile in the state of Ohio for reasons other than gaining the benefit of favorable tuition rates. Documentation of full-time employment and domicile shall include both the following documents:
   (a) A sworn statement from the employer or the employer's representative on the letterhead of the employer or the employer's representative certifying that the parent or spouse of the student is employed full time in Ohio.
   (b) A copy of the lease under which the parent or spouse is the lessee and occupant of rented residential property in the state; a copy of the closing statement on residential real property located in Ohio of which the parent or spouse is the owner and occupant; or if the parent or spouse is not the lessee or owner of the residence in which he or she has
established domicile, a letter from the owner of the residence certifying that the parent or spouse resides at that residence.

(D) Additional criteria that may be considered in determining residency for the purpose may include but are not limited to the following:

1. Criteria evidencing residency:
   a. If a person is subject to tax liability under section 5747.02 of the Revised Code;
   b. If a person qualifies to vote in Ohio;
   c. If a person is eligible to receive state welfare benefits;
   d. If a person has an Ohio's driver's license and/or motor vehicle registration.

2. Criteria evidencing lack of residency:
   a. If a person is a resident of a state or intends to be a resident of another state or nation for the purpose of tax liability, voting, receipt of welfare benefits, or student loan benefits (if the student qualified for that loan program by being a resident of that state or nation);
   b. If a person is a resident of another state or nation for any purpose other than tax liability, voting, or receipt of welfare benefits (see paragraph (D)(2)(a) of this rule).

(E) Exceptions to the general rule of residency for subsidy and tuition surcharge purposes:

1. A person who is living and is gainfully employed on a full-time or part-time and self-sustaining basis in Ohio who is pursuing a part-time program of instruction at an institution of higher education shall be considered a resident of Ohio for these purposes.

2. A person who enters and currently remains upon active duty status in the United States military service while a resident of Ohio for all other legal purposes and his or her dependents shall be considered residents of Ohio for these purposes as long as Ohio remains the state of such person's domicile.

3. A person on active duty status in the United States military service who is stationed and resides in Ohio and his or her dependents shall be considered residents of Ohio for these purposes.

4. A person who is transferred by his or her employer beyond the territorial limits of the fifty states of the United States and the District of Columbia while a resident of Ohio for all other legal purposes and his or her dependents shall be considered residents of Ohio for these purposes as long as Ohio remains the state of such person's domicile as long as such person has fulfilled his or her tax liability to the state of Ohio for at least the tax year preceding enrollment.

(F) Procedures

1. A dependent person classified as a resident of Ohio for these purposes under the provisions of paragraph (C)(1) of this rule and who is enrolled in an institution of higher education when his or her parents or legal guardian removes their residency from the state of Ohio shall continue to be considered a resident during continuous full-time enrollment and until his or her completion of any one academic degree program.

2. In considering residency, removal of the student or the student's parents or legal guardian from Ohio shall not, during a period of twelve months following such removal, constitute relinquishment of Ohio residency status otherwise established under paragraph (C)(1) or (C)(2) of this rule.

3. For students who qualify for residency status under paragraph (C)(3) of this rule, residency status is lost immediately if the employed person upon whom resident student status was based accepts employment and establishes domicile outside Ohio less than twelve months after accepting employment and establishing domicile in Ohio.

4. Any person once classified as a nonresident upon the completion of twelve consecutive months of residency, must apply to the institution he or she attends for reclassification as a resident of Ohio for these purposes if such person in fact wants to be reclassified as a resident. Should such person present clear and convincing proof that no part of his or her financial support is or in the preceding twelve consecutive months has been provided directly or indirectly by persons or entities who are not residents of Ohio for all other legal purposes, such person shall be reclassified as a resident.
Evidentiary determinations under this rule shall be made by the institution which may require, among other things, the submission of documentation regarding the sources of a student’s actual financial support.

(5) Any reclassification of a person who was once classified as a nonresident for these purposes shall have prospective application only from the date of such reclassification.

(6) Any institution of higher education charged with reporting student enrollment to the Ohio Board of Regents for state subsidy purposes and assessing the tuition surcharge shall provide individual students with a fair and adequate opportunity to present proof of his or her Ohio residency for purposes of this rule. Such an institution may require the submission of affidavits and other documentary evidence which it may deem necessary to a full and complete determination under this rule.

Guidelines for Interpretation and Application of Ohio Board of Regents’ Residency Rule 3333-1-10

1. Section (B)(1)
   a. A “twelve-month place or places of residency in Ohio,” within the meaning of this section, shall mean the maintenance of living quarters in the state. This may be fulfilled in whole or in part by the rental of a dormitory room. It should not be interpreted so as to require unbroken physical presence in the state, so long as the “place” of residence is maintained. Residence is not lost, therefore, by vacationing out of the state. However, should an individual leave for the entire summer to be employed out of state, the legitimacy of a claim that twelve-month residency in Ohio has been maintained should be seriously questioned.
   b. A person who is “qualified as a resident to vote in Ohio and receive state welfare benefits” need only be physically present here for thirty days and have declared himself or herself to be a resident. This should not be interpreted as to require anyone to actually register to vote or apply for welfare benefits.
   c. Persons “who may be subjected to tax liability under section 5747.02 of the Revised Code” are defined in Revised Code 5747.01 (0) as follows:

   "(i) ‘Resident’ means:
   (1) an individual who is domiciled in this state;

(2) an individual who lives in and maintains a permanent place of abode in this state, and who does not maintain a permanent place of abode elsewhere, unless such individual, in the aggregate, lives more than 335 days of the taxable year outside this state.” The essential reason for this requirement is to insure that persons who do enjoy residency benefits also have such income as they have subjected to Ohio taxation.

d. A person who has not “declared himself or herself to be or allowed himself or herself to remain” a resident of another state for those and other purposes shall mean one who does not retain an out-of-state driver’s license, automobile registration, or voting residence, or who does not receive such things as loans or scholarships from another state when residency in that state is a prerequisite therefore. This total disavowal of residency in another state must be for a full year’s time before Ohio residency can be granted under this rule.

2. Section (B)(2)
   The purpose of this section is to ensure that persons receiving direct and substantial parental or family support from out of state shall not be allowed Ohio residency. Occasional small gifts that are not a substantial part of a person’s maintenance should not disqualify that person from achieving residency. Similarly, the receipt of grants, loans, or scholarships from the federal government, corporations, foundations, or banks that are not simply conduits for family support, or from other states when this is not precluded by section (B)(1), should not disqualify a person.

3. Section (B)(5)
   a. Certain immigration visas carry with them the current legal status, by virtue of federal treaties and agreements, to enable the holder to remain in the United States and establish resident status. A student who holds one of these visas can therefore be considered for resident status for tuition surcharge purposes in the same manner as any other student assuming that the requirements specified in section (B)(1) of this rule are met.
   b. The determination of the twelve-month residency requirement for an alien admitted for permanent residence, if necessary, shall include any portion, up to twelve months, of the elapsed time between the date of application for adjustment of status to lawful
permanent resident and the date of application for residency for these purposes. All other relevant requirements under section (C) of this rule must also be adhered to in making the residency determination.

c. To change his or her immigration status from temporary to permanent, an alien must file INS Form I-845. The college or university residency official can obtain the date an application was accepted by INS through an information release form (G-641) signed by the alien. There is also a nominal service fee that must accompany the release form.

d. In instances where, prior to August 10, 1978, aliens, for reasons of quota, have not been permitted to officially file for permanent residency (INS Form I-845), but have had their visa preference petition approved by INS, and have been allowed to remain and to work in the United States, the residency official may use the INS verified petition approval date to document intent to become a permanent resident. In these cases, the visa preference petition must be filed by the individual seeking Ohio residency, if adult, and not by another party. In the case of minors, the head of the family’s application for such minors is acceptable. All other relevant requirements under section (C) of this rule must be adhered to in making the residency determination.

4. Section (C)(1)
The intent of the term “dependent student” is to tie the residency of persons who have never emancipated themselves from their parents to those parents. This connotes a continued, unbroken dependency. Children who emancipate themselves from parents who are Ohio residents and later return to dependency on those parents may be awarded immediate residency status by providing satisfactory documentation of renewed dependence and evidence of compliance with other pertinent provisions of the rule, including physical presence in the state.

“Enrollment” under this section shall commence with the first day of classes at the institution attended.

5. Section (C)(2)
The term “resident” in this section shall mean a person who meets the requirements of section (B)(1).

6. Section (C)(3)
The intent of this provision is to speed up the “residency clock” for family members (i.e., spouse, dependent children) whose domicile follows that of a full-time employed person who has moved into Ohio for employment purposes. Rather than being subject to out-of-state tuition rates for the first twelve months of the employed person’s presence in Ohio, the dependent children and spouse of the full-time employed person are eligible for resident tuition rates immediately—provided that the move to Ohio was not for the purpose of gaining favorable tuition rates, and that appropriate documentation is provided.

In accordance with the provisions of section (F)(5) of the rule, residency officers may request such documentation in addition to the materials specifically described in (C)(3) as they deem necessary to conclusively determine employment status and/or domicile.

Also, residency officers may request documentation of application and acceptance dates pertaining to employment and instructional programs as necessary to weigh questions of intent.

7. Section (E)(1)
a. “Gainfully employed,” as used in this section, shall mean engaged in an income-producing occupation. The spouse of the person gainfully employed may also be considered gainfully employed provided he or she is providing full-time services as a homemaker.

b. “Full-time” employment, as used in this section, shall be construed in light of the standards applicable to a given occupation.

c. A “part-time program of instruction” for these purposes is to be defined by an institution as that term is otherwise applied.

8. Section (E)(2)
a. The “United States military service,” as used in this section and in section (E)(3), shall mean persons holding status in the branches of military service, whether performing actual military duty or on assignment elsewhere.

b. “Dependents” under this section and under section (E)(3) shall be limited to members of the immediate family who are in fact dependent on the member of the military for a substantial part of their financial support.

c. Active service of commissioned officers of the Public Health Service shall be deemed to be active military service in the armed forces of the United States for determining residency for tuition purposes.
"Domicile," under this section, shall mean the place a person declares to be his or her home for voting and taxation purposes.

9. Section (E)(4)
"Domicile," under this section, is to be interpreted in the same manner as (E)(2).

10. Section (E)(5)

a. For purposes of this rule, a migrant is defined as someone who makes or has made his or her livelihood in hiring out to do seasonal work and has traveled interstate for this purpose.

b. The income earned in Ohio shall have been subjected to Ohio taxation.

c. In making a determination under this section, an institution may consider any probative evidence submitted by a person. Any evidence taken may be required to be sworn.

11. Sections (F)(1), (F)(2), and (F)(3)

a. A person’s parents or legal guardian shall be deemed to have removed their residency from Ohio when the person with whom a student resides and upon whom he or she is financially dependent leaves the state with no present intention of returning to resume residency.

b. An “academic degree program” shall not include the associate degree when the person receiving such a degree continues full-time pursuit of a baccalaureate degree.

c. For students who qualify for residency status under (C)(1) or (C)(2), a period of twelve months following removal of the independent student or dependent student’s parents or legal guardian is permitted during which residency is not lost.

d. Students who qualify for residency status under (C)(3) will lose residency status immediately if the employed person upon whom immediate resident student status was based accepts employment and establishes domicile outside Ohio less than twelve months after accepting employment and establishing domicile in Ohio. If the employed person retains Ohio employment and domicile for twelve months or more, the student would qualify for residency under (C)(1) and would retain residency status as described in a., b., and c. above.

12. Section (F)(4)

a. A change in residency status under this section is never automatic and must be initiated by an application for such change by the person seeking it.

b. “Clear and convincing proof” is that standard of evidence that is beyond mere preponderance, but falling short of the “beyond a reasonable doubt” test. It requires that there exist no substantial evidence, direct or circumstantial, conflicting with that proffered by a person applying for a change in residency status.

c. In making a determination under this section, an institution may consider any probative evidence submitted by a person. It may require, however, submission of only those things which the person himself or herself can secure. Any evidence taken may be required to be sworn.

13. Section (F)(5)

It is incumbent upon a person to apply for a change in residency, and his or her failure to do so as soon as he or she is entitled to a change shall preclude the granting of residency retroactive to that date. A change in residency shall be prospective only from the date such application is received.

14. Section (F)(6)

No person need be afforded the opportunity for personal appearance before the person or body making a determination under this rule; however, any such opportunity that is afforded any one person must be equally granted to others. A person or body making a determination under this section should allow the student an opportunity to submit all documentary evidence that such student wishes in support of a claim of residency, and shall consider all such evidence that is relevant and probative.
Notice to Students


The following notice is published as a public service for the student body. Federal regulations require annual notice to students on this subject.

Wright State University has for many years regulated access to student records. Federal regulations now apply in this area and are designed to protect the privacy of student records. The statute and regulations govern access to records, their release, and the rights of students to review and, if necessary, challenge information they believe to be inaccurate.

This notice, to be published annually, is a digest of these regulations. The full text is available for student examination in the Office of Student Affairs, the Office of the Registrar, the Affirmative Action Programs Office, and in most college offices. A more detailed digest of the act may also be found in the Student Handbook.

Under the act, "education records" means, with certain exceptions as listed below, those records, files, documents, or other materials related directly to a student and maintained by any unit of the university. The following categories of information are exempt and are not considered to be "education records": (a) records made by university personnel which are in the sole possession of the maker and are not revealed to any other person; (b) records maintained by campus security; and (c) medical and counseling records used solely for treatment. (Records pertaining to students, which are maintained by university offices, are official records, and as such, remain the property of Wright State University.)

Students may seek access to their records by submitting a written and dated request on forms provided by each office from which information is sought. The head of that unit will make the records available within forty-five days and give students the right to challenge any material contained therein on the basis of it being inaccurate, misleading, or inappropriate. The right to challenge grades does not apply under the act unless the grade was inaccurately recorded.

Exceptions to the right to review records by students are as follows: (a) financial records of parents; (b) confidential letters and statements of recommendation made prior to January 1, 1975, and any other recommendations for which the student has voluntarily waived the right to access.

Wright State University does not maintain education records in any one central office. Records are maintained generally in the respective colleges and schools, the Offices of the Registrar, Student Affairs, Career Services, Admissions, Financial Aid, University Division, Veterans Affairs, Bursar, Athletics, Residence Services, Student Health Services, and Disability Services. Questions concerning the location of individual student records should be directed to the Office of Student Affairs or the registrar.

With specified exceptions, the university may release information in students' records to others if: (a) there is written consent from the student specifying the records to be released, the reasons for such release and to whom, and with a copy of the records provided to the student if desired by the student; or (b) such information is furnished to comply with judicial orders upon condition that the university make a reasonable attempt to notify the student in advance of compliance by the university.

Information identified as public information may be released to anyone without the student's written consent. This includes the student's name, address, telephone listing, date and place of birth, major field of study, participation in officially recognized activities and sports, weights and heights of members of athletic teams, dates of attendance, degrees and awards received, and the most recent previous educational agency or institution attended by the student.

A student may request his/her name, address, and telephone number not be included in the public student directory by checking the appropriate box on the quarterly registration form. A student may request that public information, other than directory information, not be made public by signing, during the first week of classes each quarter, a request to withhold information, available in Student Affairs. The university will not notify a student's hometown newspaper of outstanding academic achievement (e.g., if the student is named to the dean's list) if the student requests either of the above options.

Education records or personally identifiable information other than public information may be released without the written consent of the student to the following only: (a) other university officials who have legitimate educational interests; (b) officials of other schools in which the student intends to enroll, provided the student is informed of the record transfer, receives a copy of the record, if desired, and has an opportunity to challenge the content of the record; (c) authorized representatives of certain federal agencies, and education agencies, or state educational authorities under certain conditions; (d) in connection with a student's application for, or receipt of, financial aid; (e) state and local officials or authorities to whom information is specifically required to be reported or disclosed pursuant to
the Ohio Revised Code adopted prior to November 19, 1974; (f) organizations conducting studies for, or on behalf of, educational agencies or institutions for the purpose of developing, validating, or administering predictive tests, administering student aid programs, and improving instruction; if such studies are conducted in such a manner as will not permit the personal identification of students and their parents by persons other than representatives of such organizations and such information will be destroyed when no longer needed for the purpose for which it is conducted; (g) accrediting function; (h) parents of a dependent student as defined in section 152 of the Internal Revenue Code of 1957; (i) in connection with an emergency, appropriate persons may be advised if the knowledge of such information is necessary to protect the health and safety of the student or other persons; (j) in compliance with judicial order or pursuant to lawfully issued subpoena, upon condition a reasonable attempt to notify the student is made in advance of the compliance therewith.

Diversity Statement

Wright State University celebrates diversity. Our daily life is made rich by the diversity of individuals, groups, and cultures. The interplay of the diverse stimulates creativity and achievement in all facets of our existence.

Respect, tolerance, and goodwill are the keystones to enjoying the diversity of our world. We are all linked to each other in a world created for all of us to share and enjoy. Each member of humanity has a potential contribution to make to the whole. It is our duty to encourage and promote that contribution.

Wright State University is committed to achieving an intellectual, cultural, and social environment on campus in which all are free to make their contribution. We will achieve an environment in which every student may think, learn, and grow without prejudice, intimidation, and discrimination. We will achieve an environment in which personal dignity and respect for the individual are recognized by all.

Wright State University promotes the acceptance and appreciation of every individual regardless of race, gender, age, ethnicity, ability or disability, sexual orientation, socioeconomic status, religious affiliation, or national origin. We encourage appropriate activities and events that foster learning about the diversity of our world.

Wright State University will be a model for our geographic region, exemplifying that a human community can exist that celebrates diversity, enjoys the richness that diversity brings to our lives, and grows stronger with every new member.
Wright State University Report on the Quality of Teacher Preparation

Academic Year 2000–2001


Provided in compliance with the requirements of the Title II Higher Education Act.

College of Education and Human Services

Teacher Preparation

The College of Education and Human Services (CEHS) offers more than 50 majors in pre-K–12 education leading to provisional licensure in Ohio. Master's degrees are offered in many areas of specialization, an Ed.S. program in school administration, a school counseling program, and a post-baccalaureate program for licensure candidates who wish to practice the art and science of teaching in the classroom for an entire school year.

Student Characteristics

The College of Education and Human Services has a total enrollment of 1,717 students; 53 percent are enrolled in graduate programs. The majority of students are female, "nontraditional" age, commuter students. The average undergraduate grade-point average (GPA) of a student admitted to a teacher education program was 3.173, with the average GPA for admitted graduate students at 3.83. The CEHS candidates achieved an overall pass rate of 93 percent on the Praxis II exam and in almost all areas exceeded the national pass rates. Thirteen percent of all Wright State University (WSU) students are minority students.

Admission Requirements

Admission to Teacher Education:

Undergraduate admission requirements include the completion of 45 quarter hours with a minimum 2.5 grade-point average, a writing sample, and an interview with a faculty advisor. Undergraduates must also demonstrate successful scores on the Praxis I basic skills test in reading, writing, and mathematics.

In addition to the formal application process described above, requirements for admission to a graduate program include a 2.7 grade point average and successful scores on either the Graduate Records Exam (GRE) or the Millers Analogy Test (MAT).

State Approval and Accreditation

The Teacher Preparation Program at Wright State University is approved by the Ohio Department of Education. As required by the Title II Higher Education Act (HEA) of 1998, Section 208 (a), WSU reports that the teacher education programs offered by the College of Education and Human Services are not currently designated as "low performing" by the state of Ohio.

The Teacher Preparation Program is accredited by the National Council for Accreditation of Teacher Education (NCATE), 2010 Massachusetts Ave., NW, Suite 500, Washington, D. C. 20036; telephone (202) 466-7496. This accreditation applies to the initial teacher preparation programs, the advanced educator preparation programs, and the school counseling program.

Program Information

The average undergraduate GPA of a student admitted to a teacher preparation program was 3.142. The average graduate GPA of a student admitted to a teacher preparation program was 3.782. In reporting year 2000–2001, 486 students completed a teacher preparation program and took one or more of required exams. The total number of students admitted into teacher preparation programs, all specializations, in reporting year 2000–2001 was 1,421. The total number of students in supervised student teaching was 440. The data below is information on the number of supervising faculty: 16 were full-time faculty in professional education, 6 were part-time faculty in education but full time at WSU, and 71 were part-time faculty in education and not otherwise employed at WSU. The total number of supervising faculty during 2000–2001 was 48. The student/faculty ratio in supervised student teaching was 9 to 1. The average hours per week required in student teaching was 30. The total number of weeks required in student teaching was 11. The total number of hours required in student teaching was 330.

Special Features and Notable Accomplishments

- Wright State education graduates excel at state and national levels. In recognition of their commitment to the teaching profession, Wright State graduates have received the Milken Family Foundation National Educator Award, Disney's American Teacher Award, the Presidential Award for Excellence in Science Teaching, the Ohio Governor's Leadership Award, and the Ohio Department of Education Family Partnership Award. Within the past seven years, three Wright State graduates have been named Ohio Teacher of the Year.
Wright State is one of three universities chosen by the Ohio Board of Regents to develop the Ohio Teaching-Learning Initiative to improve teacher education statewide. The modeling of best practice is shared with K–12 educators in the C.L.A.S.S. research project and the Model Schools Science and Mathematics Initiative. WSU coordinates the Regents Scholars Program, a state-funded, multi-university graduate program in mathematics and science education.

Funded by the Ohio Board of Regents, Montgomery County, and private donors, Wright State recently established the Urban Literacy Institute. The Diversity in Teaching and Teacher Education Initiatives and the Urban Teachers' Institute are two additional examples of the collaborative relationships that exist with community schools and agencies for continuous program improvement and service to citizens in the greater Miami Valley.
### HEA–Title II 2000–2001 Academic Year

**Institution Name:** Wright State University  
**Institution Code:** 1179  
**Number of Program Completers Submitted:** 486  
**State:** Ohio  
**Number of Program Completers Found, Matched, and Used in Passing Rate Calculations:** 452

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#### Academic Content Areas

<p>| Education in the Elementary School                        | 010             | 41                       | 40                        | 98%                    | 98%                 | 81.6%              |
| Elem Ed Curr Instruct Assessment                          | 011             | 206                      | 200                       | 97%                    | 94%                 | 87.2%              |
| Early Childhood Education                                 | 020             | 17                       | 16                        | 94%                    | 97%                 |                    |
| Biology and General Science                               | 030             | 3                        |                            | 100%                   | 76%                 | 66.2%              |
| English Lang Lit Comp Content Knowledge                   | 041             | 25                       | 21                        | 84%                    | 83%                 |                    |
| Middl School English Language Arts                        | 049             |                          |                            |                        |                     |                    |
| Mathematics                                                | 060             | 2                        |                            |                        |                     | 100%               |
| Mathematics: Content Knowledge                            | 061             | 12                       | 9                         | 75%                    | 89%                 | 71.1%              |
| Chem, Physics, and General Science                        | 070             | 1                        |                            |                        | 100%                | 66.6%              |
| Social Studies                                            | 080             | 2                        |                            |                        |                     |                    |
| Social Studies: Content Knowledge                         | 081             | 16                       | 14                        | 88%                    | 90%                 | 71.7%              |
| Physical Education                                        | 090             | 4                        |                            |                        | 92%                 | 74.6%              |
| Physical Ed: Content Knowledge                            | 091             | 14                       | 11                        | 79%                    | 83%                 | 57.4%              |
| Business Education                                        | 100             | 14                       | 14                        | 100%                   | 82%                 | 57.7%              |
| Music Content Knowledge                                   | 113             | 8                        | 14                        | 93%                    | 90%                 | 76.5%              |
| Art Education                                             | 130             |                          |                            |                        |                     |                    |
| Art Content Knowledge                                     | 133             | 3                        |                            |                        | 94%                 | 85.2%              |
| French                                                    | 170             |                          |                            |                        | 65%                 | 62.1%              |
| French Productive Language Skills                         | 171             | 1                        |                            |                        | 94%                 | 84%                |
| French Content Knowledge                                  | 173             | 1                        |                            |                        |                      |                    |
| German Content Knowledge                                  | 181             |                          |                            |                        |                      | 81.7%              |</p>
<table>
<thead>
<tr>
<th>German Productive Language Skills</th>
<th>182</th>
<th></th>
<th></th>
<th>83.6%</th>
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</thead>
<tbody>
<tr>
<td>Spanish</td>
<td>190</td>
<td></td>
<td></td>
<td>86%  76.6%</td>
</tr>
<tr>
<td>Spanish Content Knowledge</td>
<td>191</td>
<td></td>
<td></td>
<td>59%  55.1%</td>
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<tr>
<td>Spanish Productive Language Skills</td>
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<tr>
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<td>230</td>
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<td>92%  73%  57.3%</td>
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<td>231</td>
<td>13</td>
<td>13</td>
<td>100%</td>
</tr>
<tr>
<td>Biology Content Knowledge Part 2</td>
<td>232</td>
<td>13</td>
<td>12</td>
<td>92%</td>
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<tr>
<td>Chemistry</td>
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<td></td>
<td>71%  49.8%</td>
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<tr>
<td>Chemistry Content Knowledge</td>
<td>241</td>
<td>1</td>
<td></td>
<td>60%  61%</td>
</tr>
<tr>
<td>Physics Content Knowledge</td>
<td>261</td>
<td></td>
<td></td>
<td>90%  72.2%</td>
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<tr>
<td>General Science</td>
<td>430</td>
<td>1</td>
<td></td>
<td>90%  71.1%</td>
</tr>
<tr>
<td>General Sci Content Knowl Part 1</td>
<td>431</td>
<td>2</td>
<td></td>
<td>100%</td>
</tr>
<tr>
<td>General Sci Content Knowl Part 2</td>
<td>432</td>
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<td></td>
<td>80%  81.5%</td>
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<tr>
<td>Earth Science Content Knowledge</td>
<td>571</td>
<td>3</td>
<td></td>
<td>71%  89%  100%  87.8%  85.2%  99.1%</td>
</tr>
</tbody>
</table>

**Other Content Areas**

| Home Economics Education | 120 |  | 100%  87.8% |
| Library Media Specialist | 310 |  | 100%  85.2% |
| Health Education | 550 | 13 | 13 | 100%  100%  99.1% |
| Marketing Education | 560 | 1 |  | 100%  99% |

**Teaching Special Populations**

| Intro to the Teaching of Reading | 200 |  | 100%  96.7% |
| Ed of Students w/ Mental Retardation | 320 |  | 100%  92.9% |
| SE Knowledge-Based Core Principles | 351 | 26 | 26 | 100%  97%  78.9% |
| SE Appic of Core Principles Across | 352 | 25 | 25 | 100%  97%  71.1% |
| Tchg English as a Second Language | 360 |  |  | 97.4% |
| Tchg Students w/ Emotional Disturb | 370 |  |  |  |
| Tchg Students w/ Learning Disabil | 380 |  | 100%  100%  99% |

1 The number of program completers found, matched, and used in the passing rate calculation will not equal the sum of the column labeled "Number Taking Assessment" since a completer can take more than one assessment.

2 The national passing rate is calculated at Ohio's cut scores, which are among the highest in the nation. For instance, Ohio requires the highest cut score in Principles of Learning and Teaching 5–9 (middle childhood) and ranks second in Principles of Learning and Teaching in K–6 and 7–12 (early childhood and adolescent/young adult).
<table>
<thead>
<tr>
<th>Type of Assessment</th>
<th>Number Taking Assessment</th>
<th>Number Passing Assessment</th>
<th>Institutional Pass Rate</th>
<th>Statewide Pass Rate</th>
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<tr>
<td>Aggregate—Professional Knowledge</td>
<td>451</td>
<td>410</td>
<td>91%</td>
<td>93%</td>
</tr>
<tr>
<td>Aggregate—Academic Content Areas (Math, English, Biology, etc.)</td>
<td>391</td>
<td>367</td>
<td>94%</td>
<td>92%</td>
</tr>
<tr>
<td>Aggregate—Other Content Areas (Career/Technical Education, Health Educations, etc.)</td>
<td>14</td>
<td>14</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Aggregate—Teaching Special Populations (Special Education, ELS, etc.)</td>
<td>26</td>
<td>25</td>
<td>96%</td>
<td>97%</td>
</tr>
<tr>
<td>Aggregate—Performance Assessments</td>
<td>452</td>
<td>404</td>
<td>89%</td>
<td>89%</td>
</tr>
</tbody>
</table>

3 Institutions and/or states did not require the assessments within an aggregate where data cells are blank.
4 Number of completers who took one or more tests in a category and within their area of specialization.
5 Number who passed all tests they took in a category and within their area of specialization.
6 Summary Totals and Pass Rate: Number of completers who successfully completed one or more tests across all categories used by the state for licensure and the total pass rate.
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