Spring 2008

CEG 403/603-01: CEG Personal Area Networks

Yong Pei
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CEG 403/603 Personal Area Networks

4 Credits

Syllabus

Time/Place: Lecture: 6:05 – 7:20 PM, M. & W., 036 Rike Hall

Instructor: Dr. Yong Pei, 489 Joshi Research Center
Tel. 937-775-5111, Email: yong.pei@wright.edu
Office Hours: 1:00-3:00pm, Tu.

Prerequisites: CEG402/602 (or equivalent)

Required Textbooks:

- Yu-Kwong Kwok and Vincent Lau, "Wireless Internet and Mobile Computing", Wiley Interscience, ISBN 978-0471-67968-4.

Supplemental Readings:

- Recent journal and conference papers on personal area networks and applications.
- Lecture slides will be posted through WebCT.

References:

1. T.S. Rappaport, "Wireless Communications: Principle and Practice", 2nd Edition, Prentice Hall, 2002.
2. James F. Kurose and Keith W. Ross, *Computer Networking: A top down approach featuring the Internet*, 3rd edition, Addison-Wesley, 2005.
3. Andrew Tanenbaum, *Computer Networks*, Prentice Hall, 1997.

Course Webpage: Through WebCT

Course Objective:

Increasingly, people, computers and microelectronic devices are being linked together to bring to life the communications mantra: anybody, anything, anytime, anywhere. Wireless Personal and Local Area Networks are an essential part of the complex puzzle that will solve the problem of ultimate connectivity. Understanding wireless Personal Area Networks (WPANs) is, in itself, a problem due to the fact that there are many technologies and products available, the market has not yet been consolidated, and progress and technological innovation is non-stop. However, it is essential to present students a systematic view of the existing WPAN technologies and their advancements. In this course we will provide an introduction to the concepts, architecture, design, and performance evaluation of personal area networks design principle, protocols and applications. At the conclusion of this course the student will have an understanding of these principles and be capable of implementing network protocols and applications for personal pervasive systems.

Learning Goals:
The aim of this course is to give an introduction to wireless Personal Area Networks (WPANs) and cover leading edge topics in WPANs, including (but not limited to) the networking architectures and protocol design and development, resource management, middleware and agent technologies, safety, security and compatibility and performance analysis.

Grading:

Homework = 20%
Midterm Exam = 30%;
Final Exam = 30%;
Project/Term Paper = 20%.

Lectures:

The following **tentative** schedule defines in greater details what material is covered in the course and when it is covered.

Week	Reading	Contents
1	Chapter 11 and 12 Lecture Slides	Welcome and introduction WPAN technologies, issues and challenges
2	Lecture Slides	WPAN models and architectures
3, 4	Chapter 16, Lecture Slides	Wireless TCPs
5	Lecture Slides Chapter 9	WPAN MAC **Midterm Exam**
6,7	Chapter 9	IEEE 802.11x WLAN
7, 8	Chapter 10	Bluetooth technology
9	Chapter 12	PAN middlewares and agent architecture
10	Chapter 15	WPAN application protocols and application design
11		**Final Exam**

CEG/MTH 416/616 Matrix Computations

Section 1 - Spring 2008 M, W, F 12:15 – 1:05 p.m. Rike Hall 163
Last Updated: March 27, 2008

Description: This course is a survey of numerical methods in linear algebra for application to problems in engineering and the sciences. Emphasis is on using modern software tools on high performance computing systems. This course covers the mathematics of linear equations, eigenvalue problems, singular value decomposition, and least squares. Material covered will be relevant to applications areas such as structural analysis, heat transfer, neural networks, mechanical vibrations, and image processing in biomedical engineering. A familiarity with MATLAB is useful, and the ability to program in languages such as C/C++ or Fortran is very important. A basic knowledge of matrix algebra is required. Four credit hours.

Prerequisites: MTH 253 or 355 (matrix or linear algebra); and CS 142 or 241 (intermediate programming).

Instructor: Dr. Ronald F. Taylor, RC 340, 775-5122, ronald.taylor(at)wright.edu, 6:30 – 7:30 p.m. on Monday and Wednesday also 2:00 – 3:00 p.m. on Tuesday and Thursday (other times by appointment).

Required Textbook:

Matrix Methods in Data Mining and Pattern Recognition, Lars Eldén, Society for Industrial and Applied Mathematics (SIAM), 2007, ISBN 978-0-898716-26-9. ("MM" in Syllabus)

Textbooks for Readings/Problems:

Numerical Linear Algebra, Biswa Datta, Brooks/Cole Publishing Company, 1995, ISBN 0-534-17466-3, WSU Dunbar Library Course Reserve ("NLA" in Syllabus).

Matrix Operations, Richard Bronson, Schaum's Outline, McGraw-Hill, 1998, ISBN 0-07-007978-1, online as e-book, WSU Dunbar Library ("MO" in Syllabus).

Course Home Page and WebCT: http://www.cs.wright.edu/people/faculty/rtaylor/ceg416 available by the start of second week of class. We will also be using WebCT for posting of grades and submittal of some assignments or portions of assignments. Students should familiarize themselves with accessing WebCT: http://wisdom.wright.edu/. Students are also responsible for accessing the Course Home Page or WebCT for printing copies of resource materials. Some handouts will be given in class.

Programming: Writing and using numerical programs is an important part of this course. Programming assignments (in order of language preference): MATLAB (strongly preferred), C/C++, Fortran , or Java. MATLAB is available on a number of Wright State systems as is Fortran, C/C++, Java and Mathematica. Many times numerical work can be done on a scientific or programmable calculator. MATLAB is very useful, and you may want to consider purchasing the Student Edition if you have a PC that can support it. The Symbolic Math Toolbox which comes with the Student Edition will be discussed in lecture and maybe useful for some assignments. It is expected that students will spend a minimum of 2 hours per week working in a computer lab or equivalent environment enhancing their programming skills and completing programming assignments for this course. If you need to use a language other than MATLAB, please meet with the Instructor and discuss.

Computers and Computing Accounts: You must be able to access the Web and have a WSU Student Login to Wings, e-mail, and WebCT. Check your WSU e-mail on a regular basis for any course announcements from the instructor. Get familiar with the use of the PCs in Russ Center 152C to access MATLAB if you do not have it on your own PC. Needed computing topics be covered in class and handouts or web citations given as appropriate. Check the University computing information at http://www.wright.edu/cats/help/guides/students/index.html as well as that for the College of Engineering and Computer Science at: http://www.cs.wright.edu/help/services.shtml

Grading Policy: Mid-term exam and quizzes – 35% . One comprehensive final – 40%. Homework/Project assignments – 25%. Quizzes may be in class or take-home: points included with mid-term score. Students registered at the graduate level (i.e. CEG 616 or MTH 616) will be required to complete extra problems, programs and/or special projects as part of the Homework/Project component of this course. Expect about six major Homework/Project assignments. Some problems assigned will be considered "practice" and may not be graded. In general, one week will be given to prepare these assignments. Smaller

homework problems/investigations may be due the next class period. Follow the "Homework Standards" posted on the course website. Course Grade Based on Course Average: **A:** 100-90, **B**: less than 90-80, **C:** less than 80-70, **D:** less than 70-60, **F:** less than 60-0.

Class Policies: No late or early exams unless verifiable emergency. No make-up quizzes: quizzes may be unannounced. Attendance at lecture is not a component of your grade. However, students are expected to attend all lectures and to participate in class discussion. Attendance may be taken in the course to better get to know students. In cases of infrequent attendance, lower homework and exam grades will inevitably result since a significant portion of lecture material is not covered in the text. All Homework/Project assignments are due at the start of class and/or in WebCT on the date and time specified. Grades on late assignments will be reduced by 10%. Submittals more than one day late will not be graded - "zero" grade assigned. Exceptions to the above policies may be made unusual circumstances when documentation is provided in writing -- otherwise expect strict enforcement of the policies. All work submitted must be your own unless group assignments are explicitly made by the instructor; sharing of program code or copying problem solutions/codes from any source will result in at least a homework grade of "zero" for all involved and possibly a grade of "F" for the course. University procedures for plagiarism will be strictly followed. Sharing ideas and general mathematical and computer skills with others outside of class is encouraged. Students are expected to read, understand and follow the University Academic Integrity Policy at: http://www.wright.edu/students/judicial/integrity.html

Supplemental Class Information and Homework Standards: A document: "Supplemental Information" is given on the course website which clarifies and details how the above class and grading policies are to be implemented. Also carefully study and follow the "Homework Standards" document on the course website. Students are responsible for understanding these documents referring to them during the quarter as needed. Please ask for clarification if you have questions on either of these two important documents.

Schedule: MM = Matrix Methods in Data Mining and Pattern Recognition, NLA = Numerical Linear Algebra and MO = Matrix Operations. Topics may vary. **Exams dates and times** are firm.

Week	Topic/Tests etc.	Readings/Reference
1	Introduction to Matrix Computations; Applications; MATLAB and Other Software	MM Chapter 1; NLA Chap 0, 4(parts), App A, B, Key Terms; MO Chap 1
2	Fundamentals: Operations, Norms, SVD Introduction to Floating Point Numbers & Errors	MM Chap 2; NLA Chap 1, 2 (parts); MO Chap 6, 12
3	Stability & Condition; Solving Linear Equations by Direct Methods; Applications	MM Chap 3; NLA Chap 3 (parts), 5 (parts), 6 (start); MO Chap 2, 4
4	Solving Linear Equations by Iteration	NLA Chap 6 (continue)
5	Linear Equations: Software and Applications **(Mid-Term Exam – Friday May 2nd)**	NLA Chap 6 (finish) & Notes
6	Introduction to Eigenvalue Problems	NLA Chap 8 (start); MO Chap 8, 19
7	Eigenvalue Problems: Algorithms, Software and Applications The Unsymmetrical and Generalized Eigenvalue Problem	MM Chap 15, NLA Chap 8 (finish); MO Chap 20; NLA Chap 9 (parts) & Notes
8	Singular Value Decomposition and Applications	MM Chap 6,10 (parts),15; NLA Chap 10
9	Orthogonalization and Least Squares	MM Chap 5; NLA Chap 7 (parts) MO Chap 21
10	Selected Special Topics & Applications (as time permits): Image Processing, Data Mining & Parallel Computations	MM Chapter 11, 12 (parts) and Notes
Finals	**Comprehensive Final – Wednesday June 11th 1-3 p.m.**	