Winter 2005

CEG 320/520-01: Computer Organization and Assembly Language Programming

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WRIGHT STATE UNIVERSITY
Wright State University
College of Engineering and Computer Science
Department of Computer Science and Engineering

Computer Organization and Assembly Language Programming

CEG 320/520

Winter Quarter, 2006

Professor: Travis E. Doom, Ph.D.
Professor's Office: 331 Russ Engineering Center
Office Hours: 5:30-6:00 TR. Other office hours by appointment (via email).
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Room & Time:
Section 01: 6:05 - 7:20 TR 154 Russ

Course Description:
Terminology and understanding of functional organizations and sequential operatio of a digital computer. Program structure, and machine and assembly language topics including addressing, stacks, argument pasing, arithmetic operations, traps, and input/output. Macros, modularization, linkers, and debuggers are used. Three hours lecture, two hours lab. Prerequisite: CS 242, CEG 260.

Textbook:
Required: Patt, Yale and Patel, Sanjay (2004). "Introduction to Computing Systems, 2e", McGraw Hill, ISBN 0-070246750-9.

Grading: A student's demonstration of their ability to discuss issues, solve problems, and demonstrate mastery of computer organization and assembly language programming concepts will be the underlying metric for the determination of a student's overall grade in this course. Students will be provided the opportunity to demonstrate their mastery through examinations and laboratory projects. Grades will be assigned on a standard A/90%, B/80%, C/70%, D/60%, F/60%- scale. Clustering of grades may cause the thresholds to be lowered; they will not be raised. The instructor reserves the right to fail any student who does not a student attain both a passing grade (70%+) in the laboratory and at least a grade of 50% on the final. The overall course grade will be the weighted sum of the following grades:

40% Course Assignments (Projects, homework etc)	~4 @ ~50 pts. each [~200 pts. total]
20% One Mid-term Examination	100 pts. total
40% Final Examination	200 pts.

Laboratory Projects: Points will be deducted for projects submitted late. No points will be awarded for projects that are more than one week late. Corrupt files or other computer problems will not be considered a sufficient excuse to extend this deadline. It is your responsibility to back-up your work!

Course Assignments: The instructor will provide a number of opportunities for students to develop their mastery of the subject throughout the course through ungraded course assignments. **Examinations:** Examinations will occur at the normally scheduled class time and location unless announced otherwise in class. The final examination is cumulative and will take place during the university scheduled time period in the normally scheduled class location unless announced otherwise in class. Undergraduate students may use a page of notes on the examinations.

It is neither possible, nor desirable, to discuss every nuance of the material covered in this course during our limited class time. Students should be aware that although we will discuss the most important materials in class, the textbook contains important facts that may not be discussed in class. Students should not only be able to discuss course concepts in detail, but they should also be able to demonstrate their mastery by applying these concepts on examinations to related problems with which they have no previous experience.

Academic Integrity : Student-teacher relationships are built on trust. For example, students must trust that teachers have made appropriate decisions about the structure and content of the courses that they teach, and teachers must trust that the assignments which students turn in are their own. Acts which undermine this trust undermine the educational process. It is the policy of Wright State University to uphold and support standards of personal honesty and integrity for all students consistent with the goals of a community of scholars and students seeking knowledge and truth. Furthermore, it is the policy of the university to enforce these standards. The following recommendations are made for students:

1. Be honest at all times.
2. Act fairly towards others. For example, do not seek an unfair advantage over others by cheating with or by looking at other individual's work during examinations or laboratory assignments.
3. Take group as well as individual responsibility for honorable behavior. Collectively, as well as individually, make every effort to prevent and avoid academic misconduct, and reports acts of misconduct that you witness.
4. Know the policy -- ignorance is no defense. Read the policy contained in the student handbook. If you have any questions regarding academic misconduct, contact your instructor.

Students are encouraged to get together in small study groups to discuss the course topics and ungraded homework problems. However, **students must work on all graded course assignments and examinations on an *individual* basis**.

Conduct for Laboratory Assignments: Students may discuss "general concepts" of laboratories assignments with each other, but may not, under any circumstances, work with (or show) anyone on their actual implementation. If you work with other student on "general concepts" be certain to acknowledge the collaboration and its extent in the assignment. Unacknowledged collaboration will be considered dishonest. *You are responsible for ensuring that other students do not have access to your work* - do not give another student access to your account, do not leave printouts in the recycling bin, pick up your printouts promptly, do not leave your workstation unattended, etc. If you suspect that your work has been compromised notify your instructor immediately.

Conduct for Examinations: The academic code demands that no student should have an unfair advantage over any other student during examinations. Thus, it is strictly forbidden for any student to refer to

information from previous offerings of this course unless this information is provided by the instructor to all students fairly. Thus, the use of test banks of previous quizzes or asking questions about examinations or laboratory assignments to prior students is strictly forbidden.

Absences: Class attendance will not be a direct factor in your grade but will strongly effect the quality of your education. Students who miss class are responsible for the material or announcements presented. Any extenuating circumstances which impact on your participation in the course should be discussed with me as soon as those circumstances are known. Make-ups for examinations may be arranged if a student's absence is caused by documented illness or personal emergency. It is the student's responsibility to provide a written explanation (including supporting evidence) to the instructor in a timely manner. Students registering after the term begins are responsible for all missed assignments and cannot expect that due dates will be altered.

Additional Information: Copies of the transparencies used in lecture and additional course-related information will be made available via course web page.

Additional Needs: Students with disabilities or any additional needs are encouraged to set up an appointment at their convenience to discuss any classroom accommodations that may be necessary.

CEG 320/520: http://www.wright.edu/~travis.doom/courses/CEG320

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Section I: Data and Instruction Representation		
DATE	**TOPIC / ACTIVITY**	**HOMEWORK ASSIGNMENT**
T 1/3	An engineer's introduction to the digital computer	Read: Patt, Ch. 1
R 1/5	Representing data	Read: Patt, Ch 2.
T 1/10 - R 1/12	A simple ISA: The LC-3	Read: Patt, Ch 5.
T 1/17	Machine Language Programming	Read: Patt, Ch 6.
R 1/19	Assembly Language Programming	Read: Patt, Ch 7.
T 1/24	low-level I/O	Read: Patt, Ch 8.
R 1/26	Subroutines and TRAPs	Read: Patt, Ch 9.
T 1/31	Ressitation and Review	Study for Midterm
R 2/2	Midterm Examination	Study/Recover

Section III: A programmer's perspective		
DATE	**TOPIC / ACTIVITY**	**HOMEWORK ASSIGNMENT**
T 2/7 R 2/9	The runtime stack	Read: Patt, Ch 10.
T 2/14	Linking and compiling high-level languages	Read: Patt, Ch 11, 12, 13, 15.
R 2/16 T 2/21	Allocation records and the run-time stack	Read: Patt, Ch 14 and 17.
R 2/23	Implementation of Pointers and Arrays	Read: Patt, Ch 16.
T 2/28 R 3/2	High-level I/O and dynamic memory allocation	Read: Patt, Ch 18 and 19.
T 3/7	Digital logic and the von Neumann Model	Read: Patt, Ch. 3 and 4.
R 3/9	Memory Hierachy and Cache-friendly code x86	Read: Patt, Appendix.
R 3/16	Final examination	8:00-10:00; Regularly scheduled class room