Course Title: Computer Organization

Course number: CSCI-2500-01

Credit hours: 4

Semester/year: Spring 2010

Meeting days: Monday, Wednesday 6:00-7:50 PM

Room location: Amos Eaton 214

Webpage: [https://rpilms.rpi.edu/webct/logon/102913954001](https://rpilms.rpi.edu/webct/logon/102913954001)

Prerequisites: CSCI 1200 (CS II)

INSTRUCTOR: Alok Mehta, Adjunct Faculty

Office location: N/A (Amos Eaton 208)

Office telephone number: N/A

Office hours: Before and after class, and by appointment

e-mail address: mehtaa@cs.rpi.edu

Teaching Assistant name(s): Shrikant Thakare

TA office location: Amos Eaton 217

TA office hours: Tuesdays 12:00-2:00 PM

TA e-mail: shri.thakare@gmail.com

Course description

Student Learning Outcomes

1. Students will analyze the performance of computers and programs using multiple metrics.
2. Students will solve moderately complex software problems using the C programming language.
3. Students will learn and apply assembly language programming skills to solve problems.
4. Students will describe the details of integer and floating point formats.
5. Students will design logic circuits and apply the concepts of Boolean Algebra and K-Maps to simplify given Boolean equations.
6. Students will describe the processing steps that different classes of instructions require as they move through datapath and control hardware structures.
7. Students will compare memory caching and hierarchy options and describe their impact on the design of computer systems.
8. Students will apply the concepts of parallel programming to the construction and implementation of a correct and efficiently executing multithreaded program.

Course text


Grading criteria

- 50%: Homework; Six assignments; lowest homework grade will be dropped
- 50%: Quizzes; Six quizzes; lowest quiz grade will be dropped

Homework and quizzes will be graded by the TA assigned to this course; grades will be posted on the course web site.

Grade Modifiers Policy: Grade modifiers will be used in this class. Nominally, for example, you expect to earn a B- if your score is greater than 79.5 and less than 83.0, B if your score is greater than 83 and less than 86, B+ if your score is greater than 86 and less than 89.5. The same modifier points occur for the A, C and D ranges except that there is no A+ nor is a D- allowed under the RPI Grade Modifier Policy.

Assignment Grading Criteria: Programming assignments are graded as follows: 15% for proper comments (e.g., each function should indicate what it does) and 85% for a correct working implementation. We typically divide the correctness points over key functions working. For example, reading - worth 10 points, writing - worth 10 points, doing the calculation correctly - worth 65 points. Note that programs that either don't compile or generate a "core dump" typically get no more than 20 points of the 85. Thus, your max score
for a "properly commented" program that fails in some fundamental way is only 35 points even if you spent 100 hours of time on it. Non-programming assignments/homeworaks are graded on a per-problems basis.

Course Topics

- Week 1: Chapter 1: Computer Abstractions and Technology
- Week 2: Unix and C
- Week 3: Chapter 2: Assembly Language Programming
- Week 4: …
- Week 5: Chapter 3: Arithmetic for Computers
- Week 6: Appendix C: Digital Logic
- Week 7: Chapter 4: Building a Processor
- Week 8: …
- Week 9: Chapter 7: Introduction to Pipelining and Multiprocessors
- Week 10: Chapter 5: Memory Hierarchy
- Week 11: …
- Week 12: Chapter 6: Storage and I/O
- Week 13: …
- Week 14: Chapter 7: Pipelining and Multiprocessors

Note: schedule is tentative and subject to change, depending on the progress of the class

Course Schedule

- Feb 08: Assignment 1 due
- Monday, Feb 15: No Class. Tuesday, Feb 16 (RPI is on a Monday Schedule): Quiz 1
- Feb 22: Assignment 2 due
- Mar 01: Quiz 2
- Mar 08, Mar 10: Spring Break; No Classes.
- Mar 15: Assignment 3 due
- Mar 22: Quiz 3
- Mar 29: Assignment 4 due
- Apr 05: Quiz 4
- Apr 12: GM Week; Nothing due
- Apr 19: Assignment 5 due
- Apr 26: Quiz 5
- May 3: Assignment 6 due
- May 10: Quiz 6
Course policies

Attendance Policy: Attendance for quizzes is required. Attendance at other lectures in general is not required, but be aware that you are responsible for all material covered in class and for all announcements made in lecture, even if these are not included in the materials posted on the course web site.

Homework Submission: Programming assignments, and any files associated with your assignments must be submitted via RPILMS on the course web site by the due date. If all or part of your homework involves a paper submission, this should be submitted in class on the due date.

Late Assignments/Missed Quizzes Policy: Late assignments will not be graded. You will get a zero for any late assignment or missed quiz, unless you have a documented excused absence from the Student Experience Office (4th floor of Academy Hall, x8022, se@rpi.edu). When submitting homework via RPILMS, it is your responsibility to ensure that the submission process is complete (i.e., that you actually submitted your assignment, and didn't just upload your files into RPILMS).

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 they teach, and teachers must trust that the assignments that students turn in are their own. Acts, which violate this trust, undermine the educational process. The Rensselaer Handbook of Student Rights and Responsibilities define various forms of Academic Dishonesty and you should make yourself familiar with these. In this class, all assignments that are turned in for a grade must represent the student’s own work. In cases where help was received, or teamwork was allowed, a notation on the assignment should indicate your collaboration. Submission of any assignment that is in violation of this policy will result in a penalty of a zero on the assignment and a five point deduction from your final average. For a second offense, the student or students involved will fail this course and a report will be sent to the Dean of Students office which could result in additional disciplinary action. If you have any question concerning this policy before submitting an assignment, please ask for clarification.

I strongly encourage you to form study groups and work together in learning this material. You may work through example exercises and programs together, as long as they are not given to you as a homework or programming assignment. Homework and programming assignments are to be done individually unless otherwise noted by the assignment/project specification. What this means is that you should do whatever is necessary to ensure your work remains your work.