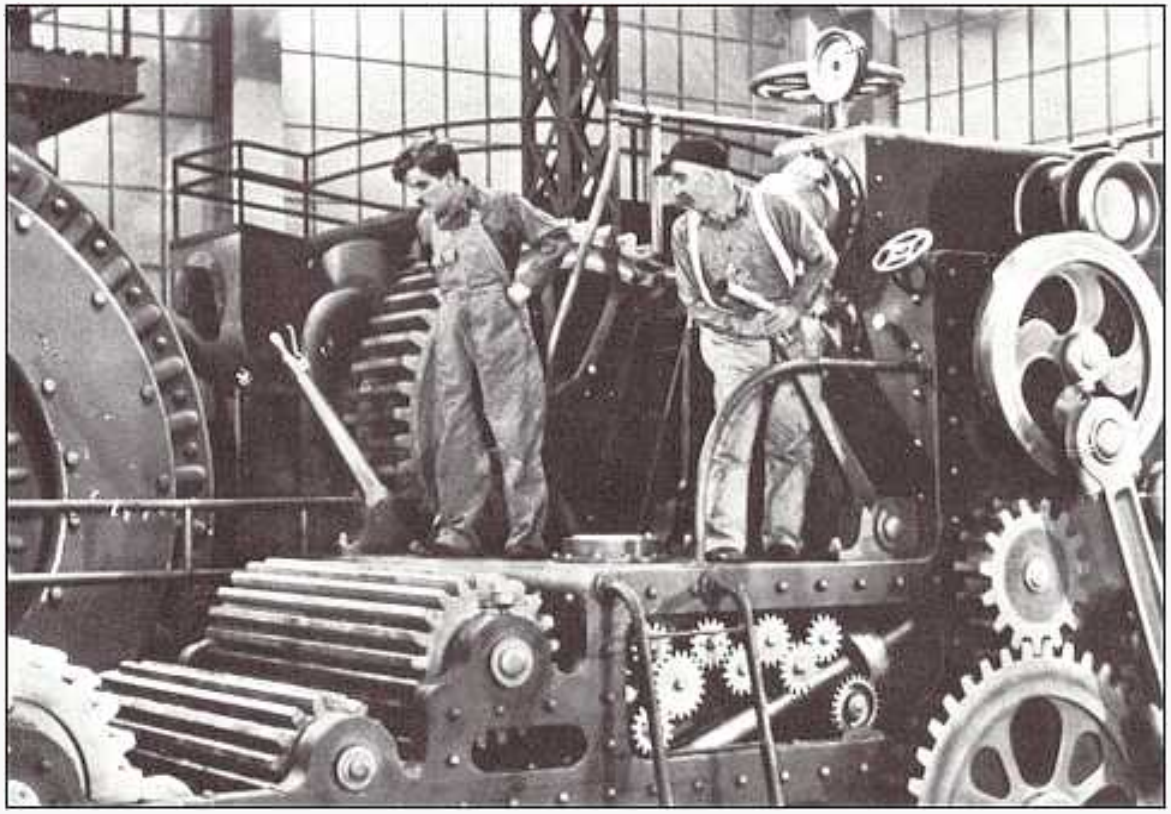
Computer Science 2505
Computer Organization I



Modern Times

Chaplin

Instructor and Course Information

William D McQuain

Email: wmcquain@cs.vt.edu

Office: 634 McBryde Hall

Office Hours: see course website

An introduction to the design and operation of digital computers.

Works up from the logic gate level to combinational and sequential circuits, information representation, computer arithmetic, arithmetic/logic units, control unit design, basic computer organization, relationships between high level programming languages and instruction set architectures.

Course Objectives

Having successfully completed this course, the student will be able to:

- design combinational and sequential circuits that realize different aspects of a digital computer, particularly the control unit;
- represent and manipulate information in arbitrary number systems, including binary;
- design and analyze finite state automata;
- explain the different layers of abstraction in a computing system, i.e., logic design, computer architecture, machine language, assembly language, high level language;
- write simple programs in machine language, assembly language and C;
- describe the characteristics of an instruction set and how it maps to underlying hardware;
- explain the basics of instruction on a computer, i.e., the instruction cycle;
- define the relationship between hardware and software.

Course TAs

Suhasini Balaji	balaji AT vt DOT edu
Yong Ju Cho	ycho76 AT vt DOT edu
Min Li	limin AT vt DOT edu

Pre- and Co-requisites

CS 1114 **Intro to Software Design**

or

CS 1124 **Media Computation**

The prerequisite must have been completed with a grade of C or higher (C- is not acceptable).

Math 2534 **Discrete Mathematics**

Must be taken before or concurrently with CS 2505.

I will not grant any exceptions to the stated prerequisites, including the minimum grade requirements.

Text and Recommended References

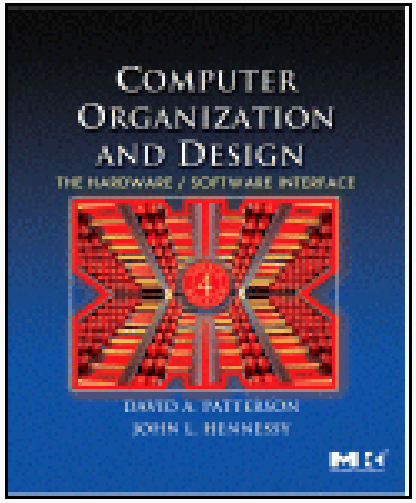
Required:

Computer Organization and Design, 4th Edition

David A Patterson & John L Hennessey

Elsevier ©2009

ISBN 978-0-12-374493-7



Recommended:

CS 2505 Course Notes, Spring 2010 Edition

W D McQuain, ©2006-10

(available ONLY at the course website)

courses.cs.vt.edu/~cs2505

Additional resources on the CD accompanying the P&H text.

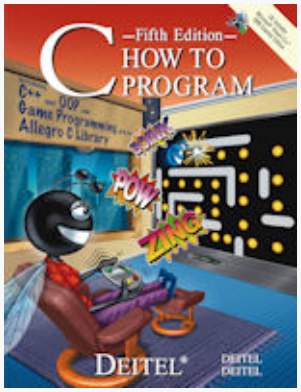
Documentation and additional resources linked from the course website.

C Language References

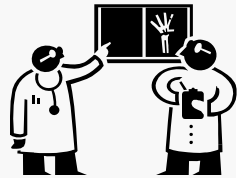
Recommended:

C Programming a Modern Approach, 2nd Edition
K. N. King
WW Norton ©2008
978-0-393-97950-3

C How to Program, 5th Edition
Deitel & Deitel
Prentice-Hall ©2006
978-0-13-240416-7



Evaluation

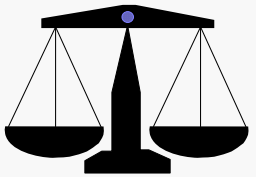


Final grades will be based on the average achieved over the following :

Item	Weight	Tentative Dates
Homework and Projects	50%	See course website
Tests	12% each	Tentatively: Feb 19 and April 14
Final Exam*	26%	19:00 – 21:00 Monday May 10

Grade Scale

The usual 10-point scale will apply (subject to any curve). A final average of 90% will guarantee an A-, 80% will guarantee a B-, and so forth.



Curve

A grade curve may or may not be employed in this course.The application of a curve is dependent upon class performance on tests, projects and homework. The decision to utilize a curve rests entirely with the course instructors.

* Exam score will replace the midterm score, if it is higher.

Development System

Test Environments

- When relevant, a test environment, such as MARS or Logisim will be specified for homework assignments.
- The C-language assignments will be compiled with gcc 4.3.2.
- Solutions will only be tested under the specified environment.
- It is the YOUR responsibility to ensure that YOUR solutions execute correctly in the appropriate environment; solutions that do not will receive substantial deductions.

Late Work

Due dates

Each programming project and homework assignment will have a due date and time and will include instructions for submission.

Homework

Usually, no late submissions will be allowed for homework assignments.

Programming Assignments

Except in the very rare case that an extension is granted, late submissions will incur a penalty per diem late penalty that will be included in the project specification. This is typically 10%.

Extensions

Any request for an extension must be made, preferably by email, at least 24 hours prior to the due date.

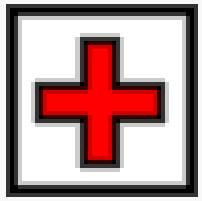
Late submissions will not be given any credit if submitted after graded assignments or solutions have been released.

Statute of Limitations

Any questions about the grading of an assignment must be raised with your instructor within two weeks after the graded assignment has been made available to you.

Sources of Help for This Course

General Issues



- CS 2505 classmates
- CS 2505 Forum online at forum.cs.vt.edu
- CS 2505 TA
- CS 2505 Instructor

Programming Language Help

- P&H text and other resources from the course website
- C language references
- CS 2505 Forum

Lecture Instruction

Lectures will consist of presentations, applications, problems and solutions interspersed with classroom discussion.

Damage Control

Backups

Students are responsible for making backup copies of all their work in this (and all) courses.

Loss of work due to hard drive failure is **NOT** an acceptable excuse. Backup copies of files on the same hard drive are not backup copies. Backup copies of files on second hard drives are also risky. Backup copies should be maintained on two separate distinct storage mediums, (e.g., hard drives and Zip disks).

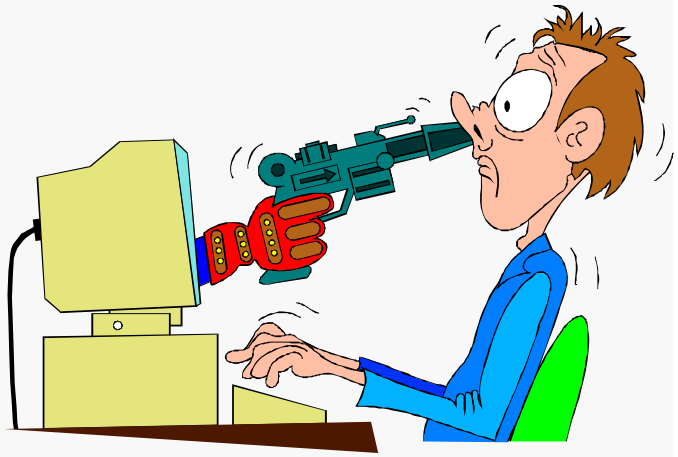
Backup copies should be maintained until after the end of the term and students have received their course grade. (The Army lives by triplicate for a reason.)

Remember: Computer systems are mechanical devices.

Systems fail. Drives die. Bad sectors appear.

Network connections break.

Plan for it. It is inevitable!



Honor Code

An exhaustive list of Honor Code violations would be impossible to present here, but among other things, each of the following is a flagrant violation of the Virginia Tech Honor Code, and violations will be dealt with severely (Honor Court):

- Working with another student to derive a common program or solution to a problem. Unless explicitly stated otherwise, there are no group projects in this course.
- Discussing the details required to solve an assignment. You may not share solutions, or collaborate in the creation of a solution.
- Copying source code (programs) in whole or in part from someone else.
- Copying files from another student's disk or lab account even though they might be unprotected.
- Editing (computer generated) output to achieve apparently correct results.

It is acceptable to discuss an assignment with classmates in a general way, i.e., to discuss the nature of the assignment. In other words, you may discuss with your classmates what your solution is required to accomplish but not how to achieve that goal using C, MIPS assembly, or other relevant tools. In no way should the individual statements of a program or the steps leading to the solution of the problem be discussed with or shown to anyone except those people cited in the following statement.

Honor Code

Feel free to discuss the homework assignments and your program source code with the teaching assistants assigned to CS 2505, the instructor, or the free tutors provided by UPE. The discussion of your program source code must be limited to these people. Note that this specifically excludes discussions of your program source code with other students (even if they are not enrolled in CS 2505), or with tutors except for those named above. Privately hired tutors are not an exception to this requirement, nor are athletic or other tutors provided by the University.

Copies of all submitted work are retained indefinitely by the Department. Submitted programs are subjected to automated analysis for detection of cheating.

If you have any question as to how the Honor Code applies to this class, remember that:

- Any work done in this class must be done on an individual basis.
- Credit will be given only for work done entirely on an individual basis.
- Do not make any assumptions as to who can provide help on a programming assignment.
- All submitted work is archived. All submitted programs will be subjected to automated cheat analysis.

Evidence indicating the violation of the policies stated above will be submitted to the Honor Court.

It is much easier to explain a poor grade to parents or a potential employer than to explain an Honor Court conviction.