

16.070 Introductions to Computers and Programming Spring 2002 Course Syllabus

Introduction to Computers and Programming will provide students with a strong foundation of the basics of software engineering relevant to Aerospace and aeronautical applications. Students will obtain hands-on experience programming a single board computer to enhance their understanding of embedded systems. Progressive homework coding assignments that build upon one another will solidify the software lifecycle process and enable the students to gradually progress from simple workstation programs to an interactive, embedded system. A web page will be maintained as the electronic repository of lectures, homework assignments, and class notes. The URL is <http://web.mit.edu/16.070/www/>.

Course Objectives: The Course Objectives are set in the context of conceiving, designing, implementing, and operating aerospace/aeronautical information systems. Students will be able to

- 1) Design modular programs using a top-down design approach (CD);
- 2) Create structured, well-documented computer programs (I)
- 3) Test and analyze programs to ensure proper program operation (IO)

Measurable outcomes for this course will be the following:

- 1) Demonstration of problem solving employing a methodical software development process [measured by problem sets and exams]
- 2) Conception and design of applications programs (e.g., simulators and real-time embedded systems) [measured by problem sets and exams]
- 3) Building, testing and operation of real-time embedded application programs through hands-on experience with a single-board computer [measured by problem sets and demonstration]
- 4) Demonstration of effective test methods to evaluate and document program execution [measured by problem sets and demonstration]

Teaching Staff:

Instructor:	Dr. Lorraine Fesq	Room: 37-435	fesq@mit.edu	(617) 253-8080
Co-instructors:	Prof. Ed Crawley	Room: 33-207	crawley@mit.edu	(617) 253-7510
	Heidi Perry	Draper Laboratory	hperry@draper.com	
	Terry Smith	Draper Laboratory	tsmith@draper.com	
Teaching Assistants:	Louis Breger	Room: 17-010	lbreger@mit.edu	x3-2428
	Kay Sullivan	Room: 17-010	kay@mit.edu	x3-2428
	Gerardo Guevara	Room: 33-106	alpha_g1@mit.edu	x2-3312
	Nayden Kambouchev	Room: 33-106	nayden@MIT.EDU	x2-3312
	Joshua Randall	Room: 33-106	jrandall@MIT.EDU	x2-3312

Wk	Description	Reading	Homework
1	Class starts on Wednesday, 2/6/02.		
2/6	W. Introduction - The course as part of the Aero/Astro core, Organization of the course, Expectations, Class Objectives. What is programming? What is C, and why C? <i>Key section(s) in text:</i> 1.1	C1, C2	PS #1 out - 6% of homework grade
2/7	R. Programming mechanics: How to use the PC computers, brief intro to compiler, tools, Source code, executable, libraries, simple I/O, and web page basics		
2/8	F. Crash course in C - Anatomy of a C program, The basics of designing a program, Software development method, what is an algorithm, pseudo-code. 1.3, 2.1		
2			
2/11	M. Variables and Operators - Global/local variables, constants. Operators, expressions, and statements. Data types and ranges. 2.2-2.4, 3.2	C3	PS #1 due 2/13 PS #2 out - 8%
2/12	T. Lab (33-202): familiarity with Win2K computers in lab. VC basics. Debugging simple programs. Using variables.		
2/13	W. Program Control - Branch and Jump. <i>if</i> and <i>if else</i> , relational expressions, <i>break</i> , <i>continue</i> , and <i>goto</i> 3.3		
2/14	R. Explain expected format for homework, i.e., follow software process, include comments and good style. Tips for pset 2.		
2/15	F. Program Control - Looping. Why loops? How to terminate loops, conditionals, nested loops. 3.4-3.5		
3			
2/18	M. Holiday		PS 2 due 2/20 PS 3 out - 10%
2/19	T. (Monday lecture) Methods for developing algorithms. Alternate ways to represent first approach to solution –flowcharts, state transition diagrams 3.1	C4	
2/20	W. Modular Programming - Functions, function arguments, returning values Basic I/O - character I/O, keyboard I/O, file I/O 2.4, 2.8, 3.6-3.8, 4.1-4.2	C5	
2/21	R. I/O use, algorithm development		
2/22	F. Arrays - defining, initializing, assigning values 5.1-5.3		
4			
2/25	M. Composite Data Types: structures - Defining, initializing, assigning structure values. 7.1-7.2, 7.4 (Draper)	C6, C7	