دانشکده مهندسی برق و کامپیوتر
پردیس دانشکده های فنی- دانشگاه تهران

Course:	**Introduction to Computing Systems and Programming**		
Course type:	Required	EE, CE, IT	Credit: 4
Level:			
Co-requisite(s):	N/A		
Prerequisite(s):	N/A		
Prerequisite by topic:	N/A		
Textbook(s):	[1] Introduction to Computing Systems from bits &gates to C & beyond, Y.N. Patt, S. J. Patel. McGraw-Hill, Second Edition 2005. [2] The C Programming Language, Brian Kernighan and Dennis Ritchie. Published by Prentice-Hall. Second Ed. 1989.		
Coordinator:	Mahmoud Reza Hashemi		
Goals:	This course is a serious introduction to the programming of computing systems. The main objective of this course is to give students exposure to basic concepts in programming using a high-level language, which in the case of this course is the C programming language. The philosophy of this course is very different than the typical introduction to programming course, however. We will approach programming from the bottom upwards: we will describe the architecture of a computer before describing how to program it. We will briefly talk about transistors, logic gates, data paths, registers, and memories. We will then focus on C programming, where each new C concept will be related to the fundamental concepts described in the first part of the course. We will cover basic programming concepts, functions, arrays, pointers, I/O, simple data structures, and link lists.		
Outcome:	Upon successful completion of the course, the students should have a better understanding of computing systems, their building blocks, concepts in programming, familiarity with the fundamentals of the C programming language, and hands on experience with C's basic programming tools through various computer assignments, and a term project. Here are some of the topics that the students are expected to learn: • Students will acquire sound knowledge of base 2 numbers, and arithmetic • Students will acquire basic understanding of the main functional units (memory unit, central processing unit, and input/output) of the Von Neumann model of a digital system and their interrelationships. • Students will develop expertise in using a high-level programming language (C language)		
Topics:	The following topics are discussed in this course. 1- Bit, base 2 conversion and arithmetic 2- Signed numbers, Floating points, HEX, ASCII 3- Computer Architecture, POST/BIOS, Boot 4- Introduction to programming		

	5- Introduction to algorithm 6- Digital Logic Structures 7- The Von Newman Model 8- Introduction to Assembler, and Compiler concepts 9- Introduction to Programming in C 10- Variables, and Operators 11- Control Structures 12- Functions 13- Pointers, and Arrays 14- Debugging 15- I/O in C 16- Data Structures 17- Link Lists
Computer usage:	Each student writes four or more C programs as part of their computer assignments. Programs require students to apply the concepts covered in the lecture. There will be 13 computer laboratory sessions in which they gain hands on experience on course topics by following a lab manual.
Assignments:	Students are expected to submit 6 to 8 weekly assignments throughout the semester. There will be online quizzes every week, as well.
Projects:	In addition, students will work individually and experience all the steps from algorithm development, pseudo code, C programming, and debugging by performing a more significant term project. Students are graded for these projects on the basis of their design as well as the accuracy of their solutions.
Grading:	Assignments: 5% Quiz 5% Computer Laboratory 15% Course project 15% Midterm Exam1 15% Midterm Exam 2 15% Final Exam 30%
Further readings:	
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