

ICS 312 : Machine-Level and Systems Programming (3 cr.)			
Description	Machine organization, machine instructions, addressing modes, assembler language, subroutine linkage, linking to higher-level languages, interface to operating systems, introduction to assemblers, loaders, and compilers.		
Prerequisites	211 , 212 (or concurrent), or consent		
Learning Objectives	<ul style="list-style-type: none"> ● to understand machine instructions for a commonly-used microprocessor ● to develop programming skill in an assembler language ● to understand the relationship between machine and assembler language and high-level languages ● to overview computer architecture ● to learn about systems programs (assemblers, linkers, compilers, debuggers) including some experience writing systems programs 		
Topic List	#	Topic	Lecture Hours
	1	Review of hex and binary notation and representation of data (integers, characters, floating point variables) in a computer	2.0
	2	Introduction to the architecture of the Pentium Processor	1.0
	3	Addressing modes in the Pentium	2.0
	4	Introduction to machine instructions (MOV, ADD, SUB, CALL, PUSH, POP, CALL, RET)	4.0
	5	Introduction to assembler language	2.0
	6	Linkage to C programs	2.0
	7	Using a debugger with machine instructions	1.0
	8	The mechanics of assembling, linking, and running programs	2.0
	9	Sequence control instructions, including conditional	2.0
	10	Integer multiply and divide	1.0
	11	Logic instructions	2.0
	12	Miscellaneous instructions	2.0
	13	Floating point instructions	2.0
	14	Parsing	3.0
	15	Compiling	3.0
	16	Operation of a two-pass assembler	1.0
	17	The format of a typical object file	1.0
	18	The functions of a link editor	2.0
19	Architectures of some other important processors (RISC)	5.0	