CSU Bakersfield

School of Natural Sciences and Mathematics

Requirements for the Bachelor of Science Degree with a Major in Computer Engineering

Program Description

Computer engingeering is a field which, in some sense, resides between the long-established fields of computer science and electrical engineering. It is concerned with topics such as analog and digital circuit design, embedded controllers, computer hardware, system software, computer system design, data communication, signal processing, computer networks, robotics, computer vision, graphics and image processing, and other topics in computing where hardware plays an important role. Computer engineers often work with other engineers, physical scientists, and software engineers.

Converting from the Hardware Track in Computer Science to a Computer Engineering Major

Current Computer Science Hardware Track students may wish to transfer to the major in Computer Engineering. There are four key differences which are listed below. Please refer to the table on the next page for full details.

(i.) Three courses (15 units) which are taken as *electives* in the Hardware Track will be counted under *required* courses in the Computer Engineering major: CENG/CMPS 322 (Digital Design w/VHDL), CENG/CMPS 422 (Digital Signal Processing), and CENG/CMPS 457 (Robotics). These courses are marked with a double asterisk (**) in the table.

(ii.) Four courses (20 units) which are not part of the Hardware Track are *required* for the Computer Engineering major: CENG 304 (Linear Systems), CENG 307 (Analog Circuits), CENG 446/447 (Image Processing or Computer Vision), PHYS 223 (Modern Physics). These courses are marked in **bold** in the table.

(iii.) The Computer Science electives (10 units) for the Computer Engineering major include most upper division Computer Science courses. Many students may have already taken some of these courses and can, hence, count them toward the Computer Engineering major.

(iv.) One course, CMPS 222 (Object-Oriented Programming), required for the Hardware Track, *does not* count towards the Computer Engineering major.

	Computer Engineering	2009/11 Computer Science Hardware Track
Intro.	(21 units)	(26 units)
	CMPS 150 Intro. to Unix (1)	CMPS 150 Intro. to Unix
	CMPS 221 Prog. Fundamentals	CMPS 221 Prog. Fundamentals
		CMPS 222 Obj. Oriented Programming
	CMPS 223 Data Struct. and Algorithms	CMPS 223 Data Struct. and Algorithms
	CMPS 224 Assembly Language Prog.	CMPS 224 Assembly Language Prog.
	CMPS 295 Discrete Structures	CMPS 295 Discrete Structures
Upper Div.	(40 units)	(30 units)
	CENG 304 Linear Systems	
	CENG 307 Analog Circuits	
	CENG 320 Digital Circuits	CMPS 320 Digital Circuits
	CMPS 321 Computer Architecture	CMPS 321 Computer Architecture
	CENG 322 Digital Design w/VHDL **	
	CMPS 360 Operating Systems	CMPS 360 Operating Systems
	CENG 420 Embedded Systems	CMPS 420 Embedded Systems
		CMPS 421 Advanced Comp. Architecture
	CENG 490 Senior Project	CMPS 490 Senior Project
CE Elect.		
	choose one (5 units)	(0 units)
	CENG 422 Digital Signal Processing **	
	CENG 423 Digital Communications	
	choose one (5 units)	
	CENG 457 Robotics **	
	CENG 432 Instr., Control and Data Acq.	
	choose one (5 units)	
	CENG 446 Image Processing	
	CENG 447 Computer Vision	
CS Elect.		
	choose two (10 units)	choose three (15 units)
		CMPS 322 Digital Design w/VHDL **
	CMPS 335 Software Engineering	CMPS 335 Software Engineering
		CMPS 350 Prog. Languages
	CMPS 435 Advanced Software Eng.	
	CMPS 342 Database Systems	
		CMPS 422 Digital Signal Processing **
	CMPS 442 Advanced Database Systems	
	CMPS 356 Artificial Intelligence	
	CMPS 456 Advanced AI	
		CMPS 457 Robotics **
	CMPS 371 Computer Graphics	CMPS 371 Computer Graphics
	CMPS 471 Advanced Computer Graphics	CMPS 471 Advanced Computer Graphics
	CMPS 376 Computer Networks	CMPS 376 Computer Networks
	CMPS 476 Advanced Computer Networks	CMPS 476 Advanced Computer Networks
		(other courses with advisor consent)
Cognate	(48 units)	(42 units)
	MATH 201 Calculus I	MATH 201 Calculus I
	MATH 202 Calculus II	MATH 202 Calculus II
	MATH 203 Calculus III	MATH 203 Calculus III
	MATH 204 Calculus IV	MATH 204 or 205 or 206
	MATH 330 Linear Algebra	MATH 330 Linear Algebra
	PHYS 221 Newtonian Physics (6)	PHYS 221 Newtonian Physics (6)
	PHYS 222 Maxwellian Physics (6)	PHYS 222 Maxwellian Physics (6)
	PHYS 223 Modern Physics (6)	
	PHYS 207 Electric Circuits	PHYS 207 Electric Circuits
	(134 units total)	(113 units total)