BACHELOR OF SCIENCE IN COMPUTER ENGINEERING - QUANTITATIVE REASONING CATEGORY I/II AND STRETCH ENGLISH

128 Total Units Required
Minimum Number of Units in Major: 94

Course	Title	Units
First Semester		
ENG 104	Writing the First Year: Finding Your Voice Stretch I [1]	3
ENGR 100	Introduction to Engineering (Major Core)	1
ENGR 121	Gateway to Computer Engineering (Major Core)	1
ENGR 212	Introduction to Unix and Linux for Engineers (Major Core)	2
MATH 226	Calculus I (Major Core, B4) [2]	4
GE Area A: Oral Communication (A1) [3,4]		3
GE Area D		3
	Units	17
Second Semester		
Select One (Major Core):		3-5
CHEM 115	General Chemistry I: Essential Concepts of Chemistry	
CHEM 180	Chemistry for the Energy and the Environment (B1, B3, ES)	
ENG 105	Writing the First Year: Finding Your Voice Stretch II (A2) [1]	3
ENGR 213	Introduction to C Programming for Engineers (Major Core) [4]	3
MATH 227	Calculus II (Major Core)	4
PHYS 220 & PHYS 222	General Physics with Calculus I and General Physics with Calculus I Laboratory (Major Core, B1, B3)	4
	Units	17-19
Third Semester		
CSC 210	Introduction to Computer Programming (Major Core)	3
MATH 228	Calculus III (Major Core)	4
PHYS 230 & PHYS 232	General Physics with Calculus II and General Physics with Calculus II Laboratory (Major Core)	4
GE Area B: Life Science (B2)		3
GE Area E		3
	Units	17
Fourth Semester		
CSC 220	Data Structures (Major Core)	3
CSC 230	Discrete Mathematical Structures for Computer Science (Major Core)	3
ENGR 205	Electric Circuits (Major Core) [4]	3
ENGR 206	Circuits and Instrumentation Laboratory (Major Core)	1
MATH 245	Elementary Differential Equations and Linear Algebra (Major Core)	3
GE Area D		3
	Units	16
Fifth Semester		
CSC 340	Programming Methodology (Major Core)	3
ENGR 300	Engineering Experimentation (Major Core) [5]	3
ENGR 305	Linear Systems Analysis (Major Core)	3
ENGR 353	Microelectronics (Major Core)	3
ENGR 356	Digital Design (Major Core)	3

GE Area C		3
	Units	18
Sixth Semester		
CSC 412	Advanced Software Lab (Hidden Prerequisite for CSC 413)	1
ENGR 301	Microelectronics Laboratory (Major Core) [5]	1
ENGR 357	Digital Design Laboratory (Major Core)	1
ENGR 451	Digital Signal Processing (Major Core)	4
ENGR 476	Computer Communications Networks (Major Core)	3
ENGR 478	Design with Microprocessors (Major Core)	4
GE Area C		3
	Units	17
Seventh Semester		
CSC 413	Software Development (Major Core)	3
ENGR 378	Digital Systems Design (Major Core)	3
ENGR 456	Computer Systems (Major Core)	3
ENGR 696	Engineering Design Project I (Major Core) [6]	1
GE Area C		3
GE Area D		3
	Units	16
Eighth Semester		
ENGR 697GW	Engineering Design Project II - GWAR (Major Core)	2
Major Upper-Division Electives - Take Two [7]		6
GE Area UD-C: Upper-Division Arts and/or Humanities (Consider SF State Studies Course)		3
GE Area UD-D: Upper-Division Social Sciences (Consider SF State Studies Course)		3
	Units	14
	Total Units	132-134

1 ENG 114 can only be taken if you complete Directed Self-Placement (DSP) and select ENG 114; if you choose ENG 104/ENG 105 through DSP you will satisfy A2 upon successful completion of ENG 105 in the second semester; multilingual students may be advised into alternative English courses.

2 Depending on courses completed through Early Start, students in Pathway/Category III or IV may be required to enroll in a support course to complement their Quantitative Reasoning/B4 requirement. There are multiple course options for this pathway. Before enrolling in a B4 course, students should verify their MATH Pathway/Category in their Student Center (http://cms.sfsu.edu/content/student-center). Information regarding the courses that correspond with your MATH Pathway/Category can be found on the Developmental Studies Office Website (http://developmentalstudies.sfsu.edu).

3 To avoid taking additional units, it is recommended that you meet **SF State Studies** requirements (AERM, GP, ES, SJ) within your GE and major.

4 GE Area A: Critical Thinking (A3) is satisfied upon completion of ENGR 205 and ENGR 201 or ENGR 213.

5 GE Area UD-B: Upper-Division Physical and/or Life Sciences is satisfied upon completion of ENGR 300 and either ENGR 301 or ENGR 302.

6 Students must complete 21 units of upper-division Engineering units before registering for ENGR 696.

7 **Major Electives (6 units)**
CSC 415 Operating System Principles (3 units) (CSC 256 and MATH 324 are hidden prerequisites for this course)
CSC 510 Analysis of Algorithms I (3 units) (MATH 324 is a hidden prerequisite for this course)
CSC 645 Computer Networks (3 units) (CSC 415 is a hidden prerequisite for this course)
CSC 648 Software Engineering (3 units)
CSC 667 Internet Application Design and Development (3 units)
CSC 668 Advanced Object Oriented Software Design and Development (3 units)
ENGR 306 Electromechanical Systems (3 units)
ENGR 350 Introduction to Engineering Electromagnetics (3 units) (PHYS 240 is a hidden prerequisite for this course)
ENGR 442 Operational Amplifier Systems Design (3 units)
ENGR 446 Control Systems Laboratory (1 units) (ENGR 447 is a hidden prerequisite for this course)
ENGR 447 Control Systems (3 units)
ENGR 449 Communication Systems (3 units)
ENGR 453 Digital Integrated Circuit Design (4 units)
ENGR 454 Application Specific Integrated Circuit Design (4 units)
ENGR 610 Engineering Cost Analysis (3 units)
ENGR 844 Embedded Systems (3 units)
ENGR 848 Digital VLSI Design (3 units)
ENGR 849 Advanced Analog IC Design (3 units)
ENGR 851 Advanced Microprocessor Architectures (3 units)
ENGR 852 Advanced Digital Design (3 units)
ENGR 853 Advanced Topics in Computer Communication and Networks (3 units)
ENGR 854 Wireless Data Communication Standards (3 units)
ENGR 856 Nanoscale Circuits and Systems (3 units)
ENGR 868 Advanced Control Systems (3 units)
ENGR 869 Robotics (3 units)