BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING - QUANTITATIVE REASONING CATEGORY I/II AND ENG 114

129 Total Units Required
Minimum Number of Units in Major: 95

Course	Title	Units
First Semester		
ENG 114	Writing the First Year: Finding Your Voice (A2) [1]	3
ENGR 100	Introduction to Engineering (Major Core)	1
MATH 226	Calculus I (Major Core, B4) [2]	4
GE Area A: Oral Communication (A1) [3,4]		3
GE Area B: Life Science (B2)		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)	
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
GE Area E		3
	Units	14-16
Third Semester		
ENGR 213	Introduction to C Programming for Engineers (Major Core) [4]	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 C		3
GE Area D		3
	Units	17
Fourth Semester		
ENGR 205	Electric Circuits (Major Core) [4]	3
ENGR 206	Circuits and Instrumentation Laboratory (Major Core)	1
ENGR 290	Modular Elective (Major Core)	1
MATH 245	Elementary Differential Equations and Linear Algebra (Major Core)	3
PHYS 240 & PHYS 242	General Physics with Calculus III and General Physics with Calculus III Laboratory (Major Core)	4
GE Area C		3
GE Area D		3
	Units	18
Fifth Semester		
ENGR 300	Engineering Experimentation (Major Core) [5]	3
ENGR 305 & ENGR 315	Linear Systems Analysis and Systems Analysis Lab (Major Core)	4
ENGR 353	Microelectronics (Major Core)	3
ENGR 356 & ENGR 357	Digital Design and Digital Design Laboratory (Major Core)	4
GE Area C		3
	Units	17
Sixth Semester		
ENGR 301	Microelectronics Laboratory (Major Core) [5]	1
ENGR 306	Electromechanical Systems (Major Core)	3
ENGR 442	Operational Amplifier Systems Design (Major Core)	3
ENGR 451	Digital Signal Processing (Major Core)	4

ENGR 478	Design with Microprocessors (Major Core)	4
	Units	15
Seventh Semester		
ENGR 446 & ENGR 447	Control Systems Laboratory and Control Systems (Major Core)	4
ENGR 449	Communication Systems (Major Core)	3
ENGR 696	Engineering Design Project I (Major Core) [6]	1
Mechanical Engineering Elective - Select One:		3
ENGR 201	Dynamics	
ENGR 203	Materials of Electrical and Electronic Engineering	
ENGR 204	Engineering Mechanics	
ENGR 303	Engineering Thermodynamics	
Major Upper-Division Electives - Take One [7]		3-4
GE Area UD-D: Upper-Division Social Sciences (Consider SF State Studies Course)		3
	Units	17-18
Eighth Semester		
ENGR 350	Introduction to Engineering Electromagnetics (Major Core)	3
ENGR 697GW	Engineering Design Project II - GWAR (Major Core)	2
Major Upper-Division Electives - Take Two [7]		6-8
GE Area UD-C: Upper-Division Arts and/or Humanities (Consider SF State Studies Course)		3
	Units	14-16
	Total Units	129-134

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. Information regarding the courses that correspond with your MATH Pathway/Category can be found on the Developmental Studies Office Website.

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

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

5 Upper-Division General Education, Physical and Life Sciences (UD–B) 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 Upper-Division Electives**
ENGR 378 Digital Systems Design (3 units)
ENGR 410 Process Instrumentation and Control (3 units) (Hidden Prerequisite for ENGR 411)
ENGR 411 Instrumentation and Process Control Laboratory (1 units)
ENGR 415 Mechatronics (3 units) (Hidden Prerequisite for ENGR 416)
ENGR 416 Mechatronics Lab (1 units)
ENGR 445 Analog Integrated Circuit Design (4 units)
ENGR 448 Electrical Power Systems (3 units)
ENGR 453 Digital Integrated Circuit Design (4 units)
ENGR 454 Application Specific Integrated Circuit Design (4 units)
ENGR 455 Power Electronics (4 units)
ENGR 456 Computer Systems (3 units)
ENGR 458 Renewable Electrical Power Systems and Smart Grid (3 units)
ENGR 476 Computer Communications Networks (3 units)
ENGR 610 Engineering Cost Analysis (3 units)
ENGR 699 Independent Study (1-3 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)