

# Electrical Engineering Planning Worksheet

## Required Courses

\*subject to change

- 15 units of required mathematics, 12 units of physics, 3 units of chemistry
- 12 units of required lower division engineering courses and 42 units of required upper division courses,
- 9 units of elective courses, and 36 units of General Education courses (for Engineering Track)
- All SF State studies requirement need to be completed within the 36 units. If not, additional GE units may be required to satisfy this requirement
- Course prerequisites are strictly enforced. Students not meeting the prerequisites are subject to being administratively dropped.
- All required lower division courses must be passed before upper division courses can be taken.

## Required Lower Division Math and Science Courses

Course Number	Course Name	Units	Grade	SFSU or Transfer	Term Yr	Prerequisite
CHEM 180 (OR CHEM 115)	Chemistry for the Energy and the Environment (or General Chemistry)	3				Category I or II placement for QR/Math or Category III or IV need MATH 197© (see bulletin for full details)
MATH 226	Calculus I	4				MATH 198© or 199© or equivalent or etc, (see bulletin for full details)
MATH 227	Calculus II	4				MATH 226©
MATH 228	Calculus III	4				MATH 227©
MATH 245	Elementary Differential Equations & Linear Algebra	3				MATH 228©
PHYS 220/222	General Physics with Calculus I & Lab	4				High school physics or equivalent; MATH 226© & PHYS 222♥ & MATH 227♥
PHYS 230/232	General Physics with Calculus II & Lab	4				PHYS 220© & PHYS 232♥ & MATH 227©; (MATH 228♥ recommended)
PHYS 240/242	General Physics with Calculus III & Lab	4				PHYS 220© & PHYS 242♥ & MATH 227©; (MATH 228♥ recommended)

## Required Lower Division Electrical Engineering Courses

ENGR	Course Name	Units	Grade	SFSU or Transfer	Term Yr	Prerequisite
100	Introduction to Engineering	3			F,S	High school algebra and trigonometry
2XX	Mechanical Engineering Elective. Any of: Engr 201, 203, 204, or 303	3				See Bulletin for prerequisite requirement Engr 201 & 303 are offered in F & S terms Engr 203 is offered in F terms only
205	Electric Circuits	3			F,S	PHYS 230 & MATH 245♥
206	Circuits and Instrumentation	1			F,S	ENGR 205♥
213	Introduction to C Programming for Engineers	3			F,S	MATH 226©
271 or 294	MATLAB or MicroController Module	1			F,S	MATH 226© Engineering students in sophomore year or later

## Required Upper Division Electrical Engineering Courses

ENGR	Course Name	Units	Grade	SFSU or Transfer	Term Yr	Prerequisite
300	Engineering Experimentation	3			F,S	ENGR 200©- or ENGR 205©- & 206©-
301	Microelectronics Laboratory	1			F,S	ENGR 353♥
305	Linear Systems Analysis	3			F,S	ENGR 205©- & MATH 245
306	Electromechanical Systems	3			F,S	ENGR 205©-
315	Linear System Analysis Laboratory	1			F,S	ENGR 305♥
350	Intro. Engineering Electromagnetics	3			F,S	MATH 245©- & PHYS 240©-
353	Microelectronics	3			F,S	ENGR 205©- & ENGR 206©-
356	Digital Design	3			F,S	ENGR 205©-
357	Digital Design Laboratory	1			F,S	ENGR 356♥
442	Op. Amplifier System Design	3			F,S	ENGR 305©-
446	Control Systems Laboratory	1			F,S	ENGR 447♥

447	Control Systems	3			F,S		ENGR 305©-
449	Communication Systems	3			F,S		ENGR 305©-
451	Digital Signal Processing	4			F,S		ENGR 305©- & ENGR 213©- or 271©- or CSC 210©-
478	Design with Microprocessors	4			F,S		ENGR 356©- & ENGR 213©- or CSC 210©-
696	Engineering Design Project I	1			F,S		Senior standing with 18 upper-division units in engineering or ENGR 323 & ENGR 300 & ENGR 301 or ENGR 302♥ (see SFSU Bulletin for GVAR information)
697	Engineering Design Project II	2			F,S		GE Area A2 & ENGR 696

♥ = Course may be taken concurrently

©- = Engineering Course must have been passed with a grade of C- or better

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## Elective Courses

- A minimum of 9 upper division engineering elective units is required.
- Upper division courses must have been taken within five years of graduation.
- Students with GPA of 3.0 or better may take graduate courses from this list with approval from advisor or Program Head: ENGR 844, 845, 848, 849, 850, 852, 853, 856, 858.
- ENGR 844, 845, 850 & 852 will be offered regularly as they are required MS courses. (844, 852 in Fall; 845, 850 in Spring)

## Elective Upper Division Electrical Engineering Courses

EN GR	Course Name	Units	Grade	SFSU or Transfer	Term Yr	Prerequisite
378	Digital Systems Design	3			F,S	ENGR 356©-
410	Process Instrumentation and Control	3			F,S	ENGR 300 & ENGR 305 or ENGR 307
411	Instrumentation & Process Control Lab	1			S	ENGR 410♥
415	Mechatronics	4			F,S	ENGR 305©- or ENGR 307©-
445	Analog Integrated Circuit Design	4			F	ENGR 301©-, 353©-
448	Electrical Power Systems	3			S	ENGR 306©-
453	Digital Integrated Circuit Design	4				ENGR 301©- & 353©- & 356©-
454	ASIC Design	4				ENGR 356©-
455	Power Electronics	3			F	ENGR 301©- & 305©- & 306©- & 353©-
456	Computer Systems	3			F,S	ENGR 356©- & ENGR 213©- or CSC 210©-
458	Renewable Electric Power Systems & Smart Grids	3				ENGR 306©
476	Computer Communication Networks	3			F,S	ENGR 356©- & ENGR 213©- or CSC 210©-
492	Hardware for Machine Learning	3			S	ENGR 213©- & ENGR 353©- & ENGR 356©-
610	Engineering Cost Analysis	3			F,S	ENGR 103 or 213 or 271 & Math 227♥
844	Embedded Systems	3			F	Graduate Standing or consent of instructor
845	Natural-Machine Interfaces: Design and Applications	3			S	Graduate Standing or consent of instructor
848	Digital VLSI Design	3				Graduate Standing or consent of instructor
849	Advance Analog IC Design	3				Graduate Standing or consent of instructor
850	Digital Design Verification	3			S	Graduate Standing or consent of instructor
851	Advance Microprocessor Architecture	3				Graduate Standing & ENGR 456 or instructor consent
852	Advance Digital Design	3			F	Graduate Standing or consent of instructor
853	Advance Topics in Computer Communication and Network	3				Graduate Standing or consent of instructor
854	Wireless Data Communication Standards	3				Graduate Standing or consent of instructor
855	Advance Wireless Communication Technologies	3				Graduate Standing or consent of instructor
856	Nanoscale Circuits and Systems	3				Graduate Standing or consent of instructor
858	Hardware Security and Trust	3				Graduate Standing & ENGR 356 or instructor consent
859	On-Device Machine Learning	3				See SFSU Bulletin
868	Advance Control Systems	3				Graduate Standing or consent of instructor
869	Robotics	3				Graduate Standing or consent of instructor
870	Robot Control	3				Graduate Standing or consent of instructor
871	Advance Electrical Power Systems	3				Graduate Standing & MATH 245 or instructor consent
890	RF Devices and Transceiver Principles of Design	3				Graduate Standing & ENGR 350 or instructor consent

Units Completed		©- = Engineering course must have been passed with a grade of C- or better © = CSC Course must have been passed with a grade of C or better ♥ = Course may be taken concurrently ♦ = GPA of 3 or better and consent of instructor are required to take ` courses (in addition to prerequisites listed)
<b>Minimum Required</b>	<b>9</b>	

It is intended to be used as a guideline for advising purposes. See SFSU Academic Bulletin for most recent major curriculum, course information & prerequisites.