

Required Courses

- 15 units of required mathematics, 12 units of physics, and 3 units of chemistry,
- 16 units of required lower division engineering courses and 35 units of required upper division courses
- 3 units of modular electives, 9 units of engineering elective courses and 33 units of General Education courses
- Course prerequisites are strictly enforced. Students not meeting the prerequisites are subject to being administratively dropped.

Required Math and Science Lower Division Courses

Course Number	Course Name	Units	Grade	SFSU or Transfer	Term Yr	Prerequisite
CHEM 180	Chemistry for the Energy and the Environment	3				550 or above on Entry Level Math (ELM) exam or approved exemption, or MATH 70© and satisfactory score on chemistry placement exam.
MATH 226	Calculus I	4				Successful completion of ELM requirement; MATH 199© or equivalent.
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© and MATH 227©; PHYS 232♥
PHYS 240/242	General Physics with Calculus III & Lab	4				PHYS 220© and MATH 227©; PHYS 242♥

Required Lower Division Courses for Mechanical Engineering

ENGR	Course Name	Units	Grade	SFSU or Transfer	Term Yr	Prerequisite
100	Introduction to Engineering	1			F,S	High school algebra and trigonometry
101	Engineering Graphics	1			F,S	ENGR 100♥
102	Statics	3			F,S	MATH 227; PHYS 220
103	Introduction to Computers (Lab)	1			F,S	MATH 226
200	Materials of Engineering	3			F,S	CHEM 115 or CHEM 180
201	Dynamics	3			F,S	ENGR 102
205	Electric Circuits	3			F,S	PHYS 230; MATH 245♥
206	Circuits and Instrumentation	1			F,S	ENGR 205♥

Required Upper Division Courses for Mechanical Engineering

ENGR	Course Name	Units	Grade	SFSU or Transfer	Term Yr	Prerequisite
300	Engineering Experimentation	3			F,S	ENGR 200 or 206, 205; English 214 ©
302	Experimental Analysis	1			F,S	ENGR 300, 304♥, 309
303+	Engineering Thermodynamics	3			F,S	PHYS 240
304+	Mechanics of Fluids	3			F,S	ENGR 201, PHYS 240
305	Systems Analysis	3			F,S	ENGR 205; MATH 245
309	Mechanics of Solids	3			F,S	ENGR 102, 200♥
364	Material & Manufacturing processes	3			S	ENGR 201, 309
4xx*	Controls	3				Refer to the Table for Elective Courses
4xx*	Controls Laboratory	1				Refer to the Table for Elective Courses
463	Thermal Power Systems	3			S	ENGR 302, 467
464	Mechanical Design	3			F	ENGR 364
467	Heat Transfer	3			F	ENGR 303,304
696	Engineering Design Project I	1			F,S	Senior standing with 21 upper-division units in engineering; ENGR 302
697	Engineering Design Project II	2			F,S	ENGR 696

© = Grade C or better for science courses; © = Engineering Course must have been passed with a grade of C- or better

+ = It is recommended that ENGR 303 and ENGR 304 not be taken concurrently.

* = Either ENGR 410/411 (recommended for Thermal-Fluids focus area) or ENGR 447/446 (recommended for Machine Design/Robotics and Control focus area)

♥ = Course must either be completed or taken concurrently.

Elective Courses

- 9 units of the upper division engineering elective units are required.
- 3 units of modular electives are required. These are ENGR 290 courses that are offered in one unit modules.

Modular Electives (Refer to School of Engineering website for offerings each semester)

ENGR	Course Name	Units	Grade	SFSU or transfer	Term	Year	Prerequisite
290		1			F,S		
290		1			F,S		
290		1			F,S		

Elective Upper Division Courses for Mechanical Engineering

ENGR	Course Name	Units			Grade	SFSU or Transfer	Year	Prerequisite
		Total	ES	ED				
306	Electromechanical Systems	3	2	1		F,S	ENGR 205	
410	Process Instrumentation and Control	3	2	1		S	ENGR 300, 305	
411	Instrument. and Process Control Lab.	1	0	1		S	ENGR 410♥	
415	Mechatronics	3	2	1		S	ENGR 305	
416	Mechatronics Laboratory	1	0	1		S	ENGR 415 (corequisite)	
441	Fundamentals of Composite Materials	3	1	2		S	ENGR 309, MATH 245	
446	Control Systems Laboratory	1	0	1		F,S	ENGR 447♥	
447	Automatic Control Systems	3	2	1		F,S	ENGR 305©	
461	Mech. And Structural Vibration	3	2	1		F	ENGR 201, 309; MATH 245	
465	Principles of HVAC	3	2	1		S	ENGR 303, 304	
466	Gas Dynamics and B.L. Flow	3	2	1		F	ENGR 303, 304	
468	Applied Fluid Mech. and Hydraulics	3	2	1		S	ENGR 304	
469	Renewable Energy Systems	3	2	1		F	ENGR 303	
470	Biomechanics	3	2	1		F	ENGR 300, 309	
610	Engineering Cost Analysis	3	-	-		F,S	ENGR 103 or 213♥ and MATH 227♥	
820	Energy Resources & Sustainability ♦	3	2	1			ENGR 303	
830	Finite Element Methods ♦	3	2	1			MATH 245, 309	
863	Advanced Thermal Fluids ♦	3	2	1			ENGR 303, 304	
865	Energy-Efficient Buildings ♦	3	2	1			ENGR 467	
867	Energy Auditing, Measurement, and Verification ♦	3	2	1			ENGR 205, 467	
868	Advanced Control Systems ♦	3	2	1			ENGR 447	
869	Robotics and Haptics ♦	3	2	1			ENGR 447	
871	Advanced Electrical Power Systems ♦	3	1	2			MATH 245	

Units Completed			
Minimum Required	9	n/a	n/a

♦ = GPA of 3 or better and consent of instructor are required to take graduate courses (in addition to prerequisites listed)

♥ = Course must be completed or taken concurrently

▪ = Course can only be used as UD elective if not also being used for controls requirement (cannot be double-counted)

Program Planning

Fall 201__	Spring 201__	Fall 201__	Spring 201__
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
Fall 201__	Spring 201__	Fall 201__	Spring 201__
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Have you completed GE worksheet? Yes No Are you currently on academic probation? Yes No

