

# Mechanical Engineering Planning Worksheet

## Admitted to Engineering Pre Fall 2022

### Required Courses

\*subject to change

- 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 36 units of General Education courses
- 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.

### Required Math and Science Lower Division 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 MATH 226©- 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				MATH 226© & PHYS 222♥ & (MATH 227♥ recommended)
PHYS 230/232	General Physics with Calculus II & Lab	4				PHYS 220© & MATH 227© & PHYS 232♥ (MATH 228♥ recommended)
PHYS 240/242	General Physics with Calculus III & Lab	4				PHYS 220© & MATH 227©; PHYS 242♥ (MATH 228♥ recommended)

### Required Lower Division Courses for Mechanical Engineering

ENGR	Course Name	Units	Grade	SFSU or Transfer	Term Yr	Prerequisite
100	Introduction to Engineering	3			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	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 Lab	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 ENGR 206©- & ENGR 205©-
302	Experimental Analysis	1			F,S	ENGR 300 & ENGR 304♥ & ENGR 309
303+	Engineering Thermodynamics	3			F,S	PHYS 240
304+	Mechanics of Fluids	3			F,S	ENGR 201 & PHYS 240
305	Linear Systems Analysis	3			F,S	ENGR 201©- & ENGR 205©- (students who entered SFSU prior to Fall 2022 can choose to take either Engr 305 or 307)
309	Mechanics of Solids	3			F,S	ENGR 102 & ENGR 200♥
364	Material & Manufacturing Processes	3			F,S	ENGR 201©- & ENGR 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			F,S	ENGR 467©- & ENGR 302©-

464	Mechanical Design	3			F,S		ENGR 364©-
467	Heat Transfer	3			F,S		ENGR 303©- & ENGR 304©-
696	Engineering Design Project I	1			F,S		Senior standing with 18 upper-division ENGR units or ENGR 323 & ENGR 300 & ENGR 301♥ or ENGR 302♥ (see SFSU Bulletin for GVAR information)
697	Eng. Design Project II	2			F,S		GE Area A2; ENGR 696

© = Grade C or better

©- = Course passed with Grade C- or better

♥ = Course must either be completed or taken concurrently

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

## Elective Courses

- 9 units of the upper division engineering elective units are required.
- 3 units of modular electives are required. Select a total of 3 units below 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
271	Intro to MATLAB	1					MATH 226©
272	Engineering Project Management	1					Engineering students in sophomore year or later.
291	Intro to Creo Parametric (ProE)	1					
292	Intro to SolidWorks	1					
294	MicroController	1					
295	Design Methodology	1					

## Elective Upper Division Courses for Mechanical Engineering

ENGR	Course Name	Units Total	Grade	SFSU or Transfer	Year	Prerequisite
306	Electromechanical Systems	3			F,S	ENGR 205©-
410 ■	Process Instrumentation and Control	3			F,S	ENGR 300 & ENGR 305 or ENGR 307
411 ■	Instrument. and Process Control Lab.	1			S	ENGR 410♥
415	Mechatronics	4			F, S	ENGR 305©- or ENGR 307©-
462	Failure Mechanics and Prevention	3			F	ENGR 309©-
432	Finite Element Methods	3				ENGR 309
441	Fundamentals of Composite Materials	3			F,S	ENGR 309 & Math 245
446 ■	Control Systems Laboratory	1			F,S	ENGR 447♥
447 ■	Automatic Control Systems	3			F,S	ENGR 305©- or ENGR 307©-
465	Principles of HVAC	3				ENGR 303©-
466	Gas Dynamics and B.L. Flow	3				ENGR 303, ENGR 304
468	Applied Fluid Mech. and Hydraulics	3				ENGR 304
469	Renewable Energy Systems	3			F	ENGR 303
470	Biomechanics	3				ENGR 200©-
610	Engineering Cost Analysis	3			F,S	ENGR 103 OR ENGR 213 OR ENGR 271 & Math 227♥ (no ENGR 213 in this worksheet)
820	Energy Resources & Sustainability ♦	3				Graduate standing and consent of instructor
860	Applied Engineering Analysis ♦	3			S	Graduate standing and consent of instructor (See SFSU Bulletin)
863	Applied Thermal Fluids ♦	3				Graduate standing and consent of instructor
864	Transportation Phenomena ♦	3				Graduate standing and consent of instructor & ENGR 860©-
865	Energy-Efficient Buildings ♦	3				Graduate standing and consent of instructor
867	Energy Auditing, Measurement, and Verification ♦	3				Graduate standing and consent of instructor ENGR 205 & ENGR 467
868	Advanced Control Systems ♦	3			S	Graduate standing and consent of instructor
869	Robotics and Haptics ♦	3				Graduate standing and consent of instructor
870	Robot Control ♦	3				Graduate standing and consent of instructor

Units Completed	
<b>Minimum Required</b>	<b>9</b>

♦ = 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)

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