MECHANICAL ENGINEERING (BS) (SOLANO CAMPUS)

Offered at: Solano Campus

The Mechanical Engineering program at the Solano Campus offers a unique educational approach by combining hands-on experiences and math and science-intensive coursework. The mission of the program is to produce entry-level professionals capable of applying their knowledge of science and engineering in the design, analysis, operation, and production of engineering components, systems, and products. Students can choose one of two options under Mechanical Engineering program. The U.S. Coast Guard Third Assistant Engineer License Concentration is for those seeking engineering careers in the maritime industry, both at sea and on land. The General Curriculum is for those interested in applying their maritime experience toward traditional engineering careers.

The Mechanical Engineering program provides a sound foundation for the practice of engineering through instruction in basic sciences and mathematics, computer applications, design, laboratory experiences, communication, humanities, and social sciences. All students, regardless of concentration, start with the same first year experience, which includes fundamental math, science, communications, and critical thinking courses. In addition, students are trained to be engineering cadets aboard the Training Ship *Golden Bear* before embarking on a summer sea term lasting over 60 days. In subsequent terms, the curriculum includes fundamental mechanical engineering courses such as statics, dynamics, thermodynamics, fluid mechanics, mechanics of materials, and heat transfer. In addition, students will have time in both lecture and the laboratory for circuits, instrumentation and measurements, electromechanical machinery, controls, materials/mechanical, manufacturing processes, and experimental design. Throughout the curriculum, core ideas about design, programming, and controls are introduced and reinforced. Through the selection of electives, students can choose to specialize in several different areas. The entire experience is incorporated into a two-semester senior capstone experience.

The mission of the Mechanical Engineering program at the Solano Campus is to produce graduates capable of applying their knowledge of science and engineering in the design, analysis, evaluation, and production of engineering devices and systems. The academic foundation provided to each graduate allows for further education and professional development going forward.

Mechanical Engineering Program Educational Objectives

Mechanical Engineering graduates of Cal Poly Maritime Academy working in the engineering profession will:

1. Be well educated professionals who utilize their intellectual learning, applied technology experience, leadership skills and global awareness in successful careers, and continue to improve their skills through lifelong learning and advanced studies;
2. Effectively practice as professional engineers, managers, and leaders in the maritime and energy industries and a wide variety other fields, and as licensed engineers in the merchant marine;
3. Successfully combine fundamental engineering knowledge, core leadership skills and the practical experience gained at the Academy to turn ideas into reality for the benefit of society;
4. Be influential members of multidisciplinary teams, creatively and effectively contributing to the design, development, and objective evaluation of engineering components, systems, and products;
5. Personally assume and actively encourage peers to uphold the professional, ethical, social and environmental responsibilities as well as the safety practices of their profession;
6. Demonstrate professional and effective communication skills to varying audiences, including colleagues, customers, and the general public.

Concentrations

United States Coast Guard License

Offered at: Solano Campus

The U.S. Coast Guard Third Assistant Engineer License Concentration is for those seeking engineering careers in the maritime industry, both at sea and on land.

Program Learning Objectives

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
3. An ability to communicate effectively with a range of audiences.
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Degree Requirements and Curriculum

In addition to the program requirements listed on this page, students must also satisfy requirements outlined in more detail in the Minimum Requirements for Graduation (https://catalog.calpoly.edu/academic-standards-policies/general-requirements-bachelors-degree/) section of this catalog, including:

- 40 units of upper-division courses
- 2.0 GPA
- Graduation Writing Requirement (GWR)
- U.S. Cultural Pluralism (USCP)

Note: No Major, Support or Concentration courses may be selected as credit/no credit. In addition, no more than 12 units of cooperative or internship courses can count towards your degree requirements.

Code	Title	Units
MAJOR COURSES		
ENG 1110	Introduction to Engineering and Technology	1
ENG 1112	Introduction to Technical Communication (1C) [1]	2
ENG 2210	Engineering Computer Programming	2
ENG 2250 & 2250L	Electrical Circuits and Electronics and Electrical Circuits and Electronics Laboratory	4
ENG 3310	Engineering Ethics (Upper-Division 4) [1]	3
EPO 1110	Plant Operations I	1
EPO 1125 & 1125L	Introduction to Marine Engineering and Introduction to Marine Engineering Laboratory	4
EPO 2213	Welding Laboratory	1
EPO 2215	Manufacturing Processes I	1
ME 2220	Computer Aided Engineering	2
ME 2230	Engineering Materials	3
ME 2232	Engineering Statics	3
ME 2241	Engineering Thermodynamics	3
ME 3330	Engineering Dynamics	3
ME 3332	Mechanics of Materials	3
ME 3340	Engineering Fluid Mechanics	3
ME 3344	Heat Transfer	3
ME 3360 & 3360L	Instrumentation and Measurement Systems and Instrumentation and Measurement Systems Laboratory	3
ME 3392	Mechanical Design	3
ME 4429	Manufacturing Processes Laboratory	1
ME 4436 & 4436L	Mechatronic System Design and Mechatronic System Design Laboratory	3
ME 4462 & 4462L	Experimental Methods in Mechanical Engineering and Experimental Methods in Mechanical Engineering Laboratory	2
ME 4490	Engineering Design Process (1C) [1]	3
ME 4492 & 4492L	Project Design I and Project Design I Lab	3
ME 4494 & 4494L	Project Design II and Project Design II Lab	3
SUPPORT COURSES		
General Curriculum in Mechanical Engineering or Concentration		
See General Curriculum in Mechanical Engineering and Concentration below		17-42
CHE 1110 & 1110L	General Chemistry and General Chemistry Laboratory (5A & 5C) [1]	4
CRU 1150	Sea Training I - Engine	8
DL 1105 & 1105L	Marine Survival and Marine Survival Laboratory	2

DL 1105X	United States Coast Guard Lifeboatman's Exam	0
EGL 1100	English Composition (1A) [1]	3
EGL 2220	Critical Thinking (1B) [1]	3
FF 1100	Basic Marine Firefighting	0
GOV 2200	American Government (4A) [1]	3
HIS 1100	Survey of American History to 1877: Precontact Through the Civil War (4B) [1]	3
or HIS 1101	Survey of American History from 1877: Civil War Through Civil Rights	
MTH 2210	Calculus I (2) [1]	4
MTH 2211	Calculus II	4
MTH 2212	Calculus III	4
MTH 2215	Differential Equations	3
NAU 1104	Shipboard Security and Responsibility	1
PE 1101	Swim Competency Exam [2]	0
PHY 2200 & 2200L	Engineering Physics I and Engineering Physics I Laboratory	4
PHY 2205 & 2205L	Engineering Physics II and Engineering Physics II Laboratory	4
GENERAL EDUCATION (GE)		
(See GE program requirements below)		18
FREE ELECTIVES		
Free Electives		0
Total Units		**148-173**

[1] Required in Major or Support; also satisfies General Education (GE) requirement.

[2] Swim assessments are required of all cadets during Orientation week. If PE 1101 is not passed with a grade CR, then enrollment in PE 1102 will be required.

General Curriculum

Code	Title	Units
REQUIRED COURSES		
CEP 2250	Mechanical Engineering Industry Cooperative I	3
CEP 3350	Mechanical Engineering Industry Cooperative II	3
ME 2205	Engineering Career Preparation	1
ME 4405	Fundamentals of Engineering Exam Seminar	1
Select from the following:		9
ME 4430	Mechanical Vibrations	
ME 4432	Machinery Design	
ME 4445	Advanced Fluid Mechanics and Thermodynamics	
ME 4446	Heating, Ventilating, and Air Conditioning	
ME 4447	Energy Systems Design	
ME 4459	Automatic Feedback Control	
Total Units		**17**

Concentrations

United States Coast Guard License

Code	Title	Units
REQUIRED COURSES		
CRU 2250	Sea Training II - Engine	8
CRU 3350	Sea Training III - Engine	8
ENG 4430	Naval Architecture	3
EPO 2210	Plant Operations II	1
EPO 2220 & 2220L	Diesel Engineering I and Diesel Engineering I Laboratory	2

EPO 2214	Boilers	3
EPO 2217	Shipboard Medical	1
EPO 2230	Steam Plant System Operations	1
EPO 2235	Steam Plant Watch Team Management	1
EPO 3310	Plant Operations III	1
EPO 3312	Turbines	3
EPO 3322 & 3322L	Diesel Engineering II/Simulator and Diesel Engineering II/Simulator Laboratory	2
EPO 3343	Refrigeration & A/C	1
FF 3300	Advanced Marine Firefighting	0
ME 3350 & 3350L	Electromechanical Machinery and Electromechanical Machinery Laboratory	4
ME 4459	Automatic Feedback Control	3
Total Units		**42**

General Education (GE) Requirements

- 43 units required, 25 of which are specified in Major and/or Support.
- If any of the remaining 18 Units is used to satisfy a Major or Support requirement, additional units of Free Electives may be needed to complete the total units required for the degree.
- See the complete GE course listing (https://catalog.calpoly.edu/academic-standards-policies/general-requirements-bachelors-degree/#generaleducationtext).
- A grade of C- or better is required in one course in each of the following GE Areas: 1A (English Composition), 1B (Critical Thinking), 1C (Oral Communication), and 2 (Mathematics and Quantitative Reasoning).

Lower-Division General Education

Area 1	**English Communication and Critical Thinking**	
1A	Written Communication (3 units in Support) [1]	0
1B	Critical Thinking (3 units in Support) [1]	0
1C	Oral Communication (3 units in Major) [1]	0
Area 2	**Mathematics and Quantitative Reasoning**	
2	Mathematics and Quantitative Reasoning (3 units in Support) [1]	0
Area 3	**Arts and Humanities**	
3A	Arts	3
3B	Humanities: Literature, Philosophy, Languages other than English	3
Area 4	**Social and Behavioral Sciences (Area 4 courses must come from at least two different course prefixes.)**	
4A	American Institutions (Title 5, Section 40404 Requirement) (3 units in Support) [1]	0
4B	Social and Behavioral Sciences (3 units in Support) [1]	0
Area 5	**Physical and Life Sciences**	
5A	Physical Sciences (3 units in Support) [1]	0
5B	Life Sciences	3
5C	Laboratory (may be embedded in a 5A or 5B course) (1 units in Support) [1]	0
Area 6	**Ethnic Studies**	
6	Ethnic Studies	3
Upper-Division General Education		
Upper-Division 2/5	Mathematics and Quantitative Reasoning or Physical and Life Sciences	3
Upper-Division 3	Arts and Humanities	3
Upper-Division 4	Social and Behavioral Sciences (Area 4 courses must come from at least two different course prefixes.) (3 units in Support) [1]	0
Total Units		**18**

[1] Required in Major or Support; also satisfies General Education (GE) requirement.

Coming soon