

# MECHANICAL ENGINEERING (BS) (SAN LUIS OBISPO CAMPUS)

## 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
<b>MAJOR COURSES</b>		
ME 1125	Introduction to Mechanical Engineering <sup>1</sup>	1
ME 1148	Engineering Design Communication <sup>2</sup>	2
ME 2212	Engineering Dynamics	3
ME 2240	Applied Programming for Mechanical Engineering	1
ME 2248	Design Using Solid Modeling	1
ME 3234	Design Thinking and Creativity (Upper-Division 4) <sup>3</sup>	3
ME 3236	Engineering Measurement and Data Analysis (Upper-Division 2/5) <sup>3</sup>	3
ME 3302	Thermodynamics	3
ME 3328	Design for Strength and Stiffness	4
ME 3329	Mechanical Systems Design	3
ME 3341 & ME 3342	Fluid Mechanics and Fluid Mechanics Laboratory <sup>4</sup>	4
ME 3343	Heat Transfer	4
ME 4440	Thermal System Design	3
<b>General Curriculum in Mechanical Engineering or Concentration</b>		
(See General Curriculum in Mechanical Engineering and list of Concentrations below)		22-23
<b>SUPPORT COURSES</b>		
Select from the following: (5B) <sup>3</sup>		3
BIO 1111	General Biology	
BIO 2213	Life Science for Engineers	
BIO 2215	Biodiversity of California	
BIO 2217	Wildlife Conservation Biology	
CHEM 1120	Fundamentals of Chemical Structure and Properties (5A & 5C) <sup>3</sup>	4
EE 2115 & 2115L	Circuits & Electronics for Non-Majors and Circuits & Electronics Laboratory for Non-Majors	4
ENGR 2211	Introduction to Mechanics	4
IME 1141 or IME 1142 or IME 1149	Introduction to Metal Casting and Prototyping Materials Joining Introduction to Manufacturing Processes: Metal Casting and Joining	1
IME 1143	Introduction to Design and Manufacturing	2
MATE 1220 & MATE 1215	Principles of Materials Engineering for Non-Majors and Materials Laboratory I	3
MATH 1261	Calculus I (2) <sup>3</sup>	4
MATH 1262	Calculus II	4
MATH 2263	Calculus III	3

MATH 2341	Linear Analysis	4
PHYS 1141	General Physics I	4
PHYS 1143	General Physics II	4
<b>GENERAL EDUCATION (GE)</b>		
(See GE program requirements below)		27
<b>FREE ELECTIVES</b>		
Free Electives		0
<b>Total Units</b>		<b>128-129</b>

- <sup>1</sup> Transfer students and change of major students take ME 2225 in lieu of ME 1125.
- <sup>2</sup> ME 1148 and IME 1143 intended to be taken concurrently in the same term.
- <sup>3</sup> Required in Major or Support; also satisfies General Education (GE) requirement.
- <sup>4</sup> ME 3341 and ME 3342 intended to be taken concurrently in the same term.

**Concentrations**
**General Curriculum in Mechanical Engineering**

Code	Title	Units
<b>REQUIRED COURSES</b>		
ME 3317	Vibrations and System Modeling	4
ME 4417	Mechanical Controls and Implementations	3
ME 4460	Senior Design Project I <sup>1</sup>	2
ME 4461	Senior Design Project II <sup>1</sup>	2
<b>Technical Electives</b>		
Select from the following: <sup>2,3,4</sup>		11-12
Select 8-12 units from the following ME courses:		
ME 3305	Mechatronics I	
ME 3313	Intermediate Dynamics	
ME 3315	Energy Conversion	
ME 3355	Introduction to Sustainable Energy Usage in Buildings	
Any ME 4000 or 5000 level course with the exception of required (major) and senior project courses.		
Select 0 - 4 units from:		
Any 3000-4000 level or 5000 level course in the College of Engineering with the exception of GE Upper-Division 2 or 5, ENGR 3301, senior project, thesis, special problems, and co-op courses.		
<b>Total Units</b>		<b>22-23</b>

<sup>1</sup> ENGR 4460 and ENGR 4461 (4), or ENGR 4463 and ENGR 4464 (4) may substitute for ME 4460 and ME 4461 (4).

<sup>2</sup> Consultation with advisor is recommended prior to selecting Technical Electives. 3000 level Technical Electives cannot be used for graduate credit in the blended BS+MS Mechanical Engineering program.

<sup>3</sup> ME 4470, ME 4471, ME 5570, and ME 5571 are variable topic courses and may or may not count as ME Technical Electives. Contact the instructor for additional information. A course substitution form may be required.

<sup>4</sup> ME 4400 and ME 5500 are independent study courses and may be acceptable for Technical Elective credit. A course substitution form is required.

## Energy Resources

Code	Title	Units
<b>REQUIRED COURSES</b>		
ME 3315	Energy Conversion	3
ME 3317	Vibrations and System Modeling	4
ME 4417	Mechanical Controls and Implementations	3
ME 4460	Senior Design Project I	2
ME 4461	Senior Design Project II	2
<b>Technical Electives</b>		
Select from the following:		8-9
EE 3255 & 3255L	Electric Machines and Power Systems and Electric Machines and Power Systems Laboratory	
EE 4420	Sustainable Energy Generation	
ME 4437	Nuclear Energy Power Generation	
ME 4438	Nuclear Power Plant Design and Operation	
ME 4439	Nuclear Energy Resources	
ME 4443	Turbomachinery	
ME 4444	Design and Analysis of Internal Combustion Engines	
ME 4450	Solar Thermal Power Systems	
ME 4455	Building Energy Performance and Modeling	
ME 4488	Wind Power Engineering	
ME 5541	Advanced Thermodynamics	
<b>Total Units</b>		<b>22-23</b>

**Sustainable Technology for the Built Environment (HVAC&R)**

<b>Code</b>	<b>Title</b>	<b>Units</b>
<b>REQUIRED COURSES</b>		
ME 3317	Vibrations and System Modeling	4
ME 4417	Mechanical Controls and Implementations	3
ME 3355	Introduction to Sustainable Energy Usage in Buildings	3
ME 4455	Building Energy Performance and Modeling	3
ME 4456	HVAC&R Air and Water Distribution for Sustainable Building Environments	3
ME 4457	Environmentally Efficient and Sustainable Refrigeration Systems	3
ME 4465	HVAC&R Senior Design Project I	2
ME 4466	HVAC&R Senior Design Project II	2
<b>Total Units</b>		<b>23</b>

## Mechatronics

Code	Title	Units
<b>REQUIRED COURSES</b>		
ME 3305	Mechatronics I	4
ME 3319	Introduction to System Dynamics	4
ME 4305	Mechatronics II	3
ME 4419	Advanced Control Systems	3
ME 4460	Senior Design Project I	2
ME 4461	Senior Design Project II	2
<b>Technical Electives</b>		
Select from the following:		4-5
ME 3313	Intermediate Dynamics	
ME 4423	Robotics: Fundamentals and Applications	
ME 4452	Machine Learning in Mechanical Engineering	
ME 5305	Mechatronics III	
ME 5506	System Dynamics	
<b>Total Units</b>		<b>22-23</b>

## Manufacturing

Code	Title	Units
<b>REQUIRED COURSES</b>		
ME 3317	Vibrations and System Modeling	4
ME 4417	Mechanical Controls and Implementations	3
ME 4460	Senior Design Project I	2
ME 4461	Senior Design Project II	2
IME 3327	Test Design and Analysis in Manufacturing Engineering	4
IME 3330	Fundamentals of Manufacturing Engineering	4
Manufacturing Electives		
Select from the following:		3-4
IME 3331	Intermediate Metal Casting	
IME 3336	Advanced Computer Aided Manufacturing	
IME 3356	Manufacturing and Process Automation	
IME 4418	Product and Process Development	
IME 4428	Engineering Metrology	
IME 4432	Additive Manufacturing	
IME 4435	Reliability for Design and Testing	
IME 4450	Computer-Aided Manufacturing and Process Analysis	
IME 5543	Applied Human Factors	
MATE 4434 & MATE 4435	Micro/Nano Fabrication and Micro/Nano Fabrication Laboratory	
ME 3305	Mechatronics I	
ME 4380	Composites Manufacturing, Machining, and Testing	
ME 4480	Composite Materials Analysis and Design	
<b>Total Units</b>		<b>22-23</b>

## General Education (GE) Requirements

### General Education (GE) Requirements

- 43 units required, 16 of which are specified in Major and/or Support.
- If any of the remaining 27 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

<b>Area 1</b>	<b>English Communication and Critical Thinking</b>	
1A	Written Communication	3
1B	Critical Thinking	3
1C	Oral Communication	3
<b>Area 2</b>	<b>Mathematics and Quantitative Reasoning</b>	
2	Mathematics and Quantitative Reasoning (3 units in Support) <sup>1</sup>	0
<b>Area 3</b>	<b>Arts and Humanities</b>	
3A	Arts	3
3B	Humanities: Literature, Philosophy, Languages other than English	3
<b>Area 4</b>	<b>Social and Behavioral Sciences (Area 4 courses must come from at least two different course prefixes.)</b>	
4A	American Institutions (Title 5, Section 40404 Requirement)	3
4B	Social and Behavioral Sciences	3
<b>Area 5</b>	<b>Physical and Life Sciences</b>	
5A	Physical Sciences (3 units in Support) <sup>1</sup>	0
5B	Life Sciences (3 units in Support) <sup>3</sup>	0
5C	Laboratory (may be embedded in a 5A or 5B course) (1 units in Support) <sup>1</sup>	0
<b>Area 6</b>	<b>Ethnic Studies</b>	
6	Ethnic Studies	3
<b>Upper-Division General Education</b>		
Upper-Division 2/5	Mathematics and Quantitative Reasoning or Physical and Life Sciences (3 units in Major) <sup>1</sup>	0
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 Major) <sup>1</sup>	0
<b>Total Units</b>		<b>27</b>

<sup>1</sup> Required in Major or Support; also satisfies General Education (GE) requirement.