

# MANUFACTURING ENGINEERING (BS)

## 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 Requirements (GWR)
- U.S. Cultural Pluralism (USCP)

Note: No Major or Support 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>		
IME 1101	Introduction to Industrial and Manufacturing Engineering	1
IME 1140	Technical Graphics Communication for Design and Manufacturing	1
IME 1141	Introduction to Metal Casting and Prototyping	1
IME 1142	Materials Joining	1
IME 1143	Introduction to Design and Manufacturing	2
IME 1156	Introduction to Modern Electronics Manufacturing	2
IME 1223	Process Improvement Fundamentals	4
IME 2243	Intermediate Design and Manufacturing	2
IME 2315	Financial Decision Making for Engineers	2
IME 3327	Test Design and Analysis in Manufacturing Engineering	4
IME 3330	Fundamentals of Manufacturing Engineering	4
IME 3356	Manufacturing and Process Automation	4
IME 4418	Product and Process Development	4
IME 4450	Computer-Aided Manufacturing and Process Analysis	4
IME 4461	Senior Project - Design I	2
IME 4462	Senior Project - Design II	2
<b>Technical Electives</b>		
Select from the following:		9
BMED 3410	Biomechanics	
BMED 4434	Micro/Nano Fabrication	
BMED 4435	Micro/Nano Fabrication Laboratory	
IME 3302	Operations Research and Management	
IME 3303	Project Organization and Management	
IME 3331	Intermediate Metal Casting	
IME 3332	Advanced Materials Joining	
IME 3336	Advanced Computer Aided Manufacturing	
IME 3410	Production Planning and Control Systems	
IME 3420	Process and System Simulation	
IME 3443	Facilities Design and Warehousing	
IME 4319	Human Factors and Ergonomics in Engineering and Systems Design	
IME 4400	Special Problems for Advanced Undergraduates	
IME 4401	Sales Engineering	
IME 4408	Systems Engineering	
IME 4415	Service Enterprises Engineering and Management	
IME 4417	Supply Chain and Logistics Management	
IME 4428	Engineering Metrology	
IME 4432	Additive Manufacturing	

IME 4435	Reliability for Design and Testing	
IME 4441	Engineering Supervision	
IME 4456	Sensing Systems and the Industrial Internet of Things	
IME 4460	Value Chain Analysis	
IME 4470	Special Advanced Topics	
IME 4471	Special Advanced Laboratory	
IME 5510	Model-Based Systems Engineering	
IME 5520	Advanced Information Systems for Operations	
IME 5527	Design of Experiments for Industrial Applications	
IME 5541	Advanced Operations Research	
IME 5543	Applied Human Factors	
IME 5544	Advanced Engineering Economy	
IME 5545	Advanced Simulation	
ITP 3341	Packaging Polymers and Processing	
MATE 3401	Advanced Materials Characterization	
ME 3302	Thermodynamics	
ME 3313	Intermediate Dynamics	
ME 3328	Design for Strength and Stiffness	
ME 3341	Fluid Mechanics	
ME 3315	Energy Conversion	
ME 4480	Composite Materials Analysis and Design	
<b>SUPPORT COURSES</b>		
CSC 1032	Programming for Scientists and Engineers	3
CHEM 1120	Fundamentals of Chemical Structure and Properties (5A & 5C) <sup>1</sup>	4
EE 2115 & 2115L	Circuits & Electronics for Non-Majors and Circuits & Electronics Laboratory for Non-Majors	4
ENGR 2211	Introduction to Mechanics	4
ENGR 2212	Introduction to Engineering Dynamics	2
MATE 1210 & MATE 1215	Principles of Materials Engineering for Majors and Materials Laboratory I	4
MATH 1151 or MATH 2341	Linear Algebra Linear Analysis	3-4
MATH 1261	Calculus I (2) <sup>1</sup>	4
MATH 1262	Calculus II	4
MATH 2263	Calculus III	3
PHYS 1141	General Physics I	4
PHYS 1143	General Physics II	4
STAT 3210	Engineering Statistics (Upper-Division 2/5) <sup>1</sup>	3
<b>GENERAL EDUCATION (GE)</b>		
(See GE program requirements below)		33
<b>FREE ELECTIVES</b>		
Free Electives		0
<b>Total Units</b>		<b>128-129</b>

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

## General Education (GE) Requirements

### General Education (GE) Requirements

- 43 units required, 10 of which are specified in Major and/or Support.
- If any of the remaining 33 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
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 Support) <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
<b>Total Units</b>		<b>33</b>

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