BS INDUSTRIAL ENGINEERING

Program Learning Outcomes

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/generalrequirementsbachelorsdegree/#generaleducationtext) section of this catalog, including:

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

Note: No Major or Support courses may be selected as credit/no credit.

MAJOR COURSES

IME 101	Introduction to Industrial and Manufacturing Engineering	1
IME 141	Manufacturing Processes: Net Shape	1
IME 144	Introduction to Design and Manufacturing	4
IME 156	Basic Electronics Manufacturing	2
IME 212	Introduction to Enterprise Analytics	4
IME 223	Process Improvement Fundamentals	4
IME 301	Operations Research I	4
IME 305	Operations Research II	4
IME 312	Data Management and System Design	4
IME 315	Financial Decision Making for Engineers	3
IME 319	Human Factors Engineering	3
IME 326	Engineering Test Design and Analysis	4
IME 372	Applications of Enterprise Analytics	4
IME 410	Production Planning and Control Systems	4
IME 417	Supply Chain and Logistics Management	4
IME 420	Simulation	4
IME 429	Ergonomics Laboratory	1
IME 430	Quality Engineering	4
IME 443	Facilities Planning and Design	4
IME 481 & IME 482 & IME 483	Senior Design Project I and Senior Design Project II and Senior Design Project III [1, 2]	6

Technical Electives

Select from Category A (8-13 units) & Category B (0-5 units) below: [3,4]		13
Category A		
DATA 301	Introduction to Data Science	
EE 321	Electronics	
EE 361	Electronics Laboratory	
EE 434	Automotive Engineering for a Sustainable Future	
IME 303	Project Organization and Management	
IME 331	Intermediate Metal Casting	
IME 335	Computer-Aided Manufacturing I	
IME 336	Computer-Aided Manufacturing II	
IME 356	Manufacturing Automation	
IME 400	Special Problems for Advanced Undergraduates [5]	
IME 403	Software Product Management	
IME 408	Systems Engineering	
IME 409	Economic Decision Systems	
IME 415	Service Enterprises Engineering and Management	
IME 416	Automation of Industrial Systems	
IME 418	Product-Process Design	
IME 424	Industrial Engineering in Healthcare	
IME 428	Engineering Metrology	
IME 432	Additive Manufacturing	
IME 435	Reliability for Design and Testing	
IME 451	Radio Frequency Identification and Sensing System Design	
IME 456	The Industrial Internet of Things	
IME 457	Advanced Electronic Manufacturing	
IME 458	Microelectronics and Electronics Packaging	
IME 470	Selected Advanced Topics	
IME 471	Selected Advanced Laboratory	
IME 510	Systems Engineering I	
IME 511	Systems Engineering II	
IME 520	Advanced Information Systems for Operations	
IME 527	Design of Experiments	
IME 535	Change Management for Engineering Leaders	

IME 541	Advanced Operations Research	
IME 542	Applied Reliability Engineering	
IME 543	Applied Human Factors	
IME 544	Advanced Topics in Engineering Economy	
IME 545	Advanced Topics in Simulation	
IME 549	Network Analysis and Optimization	
IME 565	Predictive Data Analytics for Engineers	
MATH 344	Linear Analysis II	
MATH 350	Mathematical Software	
ME 302	Thermodynamics I	
ME 305	Introduction to Mechatronics	
ME 341	Fluid Mechanics I	
STAT 324	Applied Regression Analysis	
STAT 330	Statistical Computing with SAS	
STAT 331	Statistical Computing with R	
STAT 414	Multilevel and Mixed Modeling	
STAT 415	Bayesian Reasoning and Methods	
STAT 416	Statistical Analysis of Time Series	
STAT 419	Applied Multivariate Statistics	
STAT 431	Advanced Statistical Computing with R	
Category B		
AG/ISLA/EDES/ ENGR/SCM/UNIV 350	The Global Environment	
BUS/ENGR 310	Introduction to Entrepreneurship	
BUS 311	Managing Technology in the International Legal Environment	
BUS 346	Principles of Marketing	
BUS 382	Leadership and Organizations	
CE 204	Mechanics of Materials I	
CE 207	Mechanics of Materials II	
CPE 202	Data Structures	
IME 239	Industrial Costs and Controls	
IME 244	Intermediate Design and Manufacturing	
IME 401	Sales Engineering	
IME 421	Engineering Management	
IME 441	Engineering Supervision I	
IME 460	Introduction to Value Chain Analysis	
ME 212	Engineering Dynamics	
PSY 350	Teamwork	

SUPPORT COURSES

Select from the following:		6
CE 204	Mechanics of Materials I	
EE 321	Electronics	
ME 212	Engineering Dynamics	
BIO 213 & BMED 213	Life Science for Engineers and Bioengineering Fundamentals (B2) [6]	4
CHEM 124	General Chemistry for Physical Science and Engineering I (B1 & B3) [6]	4

CSC 232	Computer Programming for Scientists and Engineers [7]	3
or CPE/CSC 101	Fundamentals of Computer Science	
EE 201	Electric Circuit Theory	3
EE 251	Electric Circuits Laboratory	1
ENGL 147	Writing Arguments about STEM (A3) [6]	4
MATE 210	Materials Engineering	3
MATE 215	Materials Laboratory I	1
MATH 141	Calculus I (B4) [6]	4
MATH 142	Calculus II (B4) [6]	4
MATH 143	Calculus III (Area B Electives) [6]	4
MATH 241	Calculus IV	4
MATH 244	Linear Analysis I	4
ME 211	Engineering Statics	3
PHYS 141	General Physics I (Area B Electives) [6]	4
PHYS 142	General Physics II	4
PHYS 143	General Physics III	4
PSY 201	General Psychology (E) [6]	4
or PSY 202	General Psychology	
STAT 321	Probability and Statistics for Engineers and Scientists (Upper-Division B) [6]	4

GENERAL EDUCATION (GE)

(See GE program requirements below.)	36

FREE ELECTIVES

Free Electives	0
Total units	**190**

[1] ENGR 459, ENGR 460 and ENGR 461 (6) may substitute for IME 481, IME 482 and IME 483 (6).

[2] ENGR 463, ENGR 464 and ENGR 465 (6) may substitute for IME 481, IME 482 and IME 483 (6).

[3] If a course is taken to meet the Technical Electives requirement, it cannot be double-counted to satisfy another Major or Support requirement.

[4] Consultation with an advisor is recommended prior to selecting Technical Electives; bear in mind your selections may impact pursuit of post-baccalaureate studies and/or goals. Upper-division courses not on this list may substitute as Technical Electives, if approved by an advisor and the Industrial and Manufacturing Engineering department chair.

[5] IME 400 requires a Special Problems form and no more than 4 total units are allowed.

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

[7] Excess unit from CPE/CSC 101 can count as Category B technical elective.

General Education (GE) Requirements

- 72 units required, 36 of which are specified in Major and/or Support.
- If any of the remaining 36 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/generalrequirementsbachelorsdegree/#generaleducationtext).
- A grade of C- or better is required in one course in each of the following GE Areas: A1 (Oral Communication), A2 (Written Communication), A3 (Critical Thinking), and B4 (Mathematics/Quantitative Reasoning).

Area A	English Language Communication and Critical Thinking	
A1	Oral Communication	4
A2	Written Communication	4
A3	Critical Thinking (4 units in Support) [1]	0
Area B	Scientific Inquiry and Quantitative Reasoning	
B1	Physical Science (4 units in Support) [1]	0
B2	Life Science (4 units in Support) [1]	0
B3	One lab taken with either a B1 or B2 course	
B4	Mathematics/Quantitative Reasoning (8 units in Support) [1]	0
Upper-Division B (4 units in Support) [1]		0
Area B Electives (8 units in Support) [1]		0
Area C	Arts and Humanities	
Lower-division courses in Area C must come from three different subject prefixes.		
C1	Arts: Arts, Cinema, Dance, Music, Theater	4
C2	Humanities: Literature, Philosophy, Languages other than English	4
Lower-Division C Elective - Select a course from either C1 or C2.		4
Upper-Division C		4
Area D	Social Sciences	
D1	American Institutions (Title 5, Section 40404 Requirement)	4
Area D Elective - Select either a lower-division D2 or upper-division D course.		4
Area E	Lifelong Learning and Self-Development	
Lower-Division E (4 units in Support) [1]		0
Area F	Ethnic Studies	
F	Ethnic Studies	4
Total units		**36**

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