BS INDUSTRIAL ENGINEERING

Program Learning Outcomes
1. An ability to apply knowledge of mathematics, science, and engineering
2. An ability to design and conduct experiments, as well as to analyze and interpret data
3. An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability (includes ability to design and develop integrated systems that include people, materials, information, equipment and energy)
4. An ability to function on multidisciplinary teams
5. An ability to identify, formulate, and solve engineering problems (including the ability to improve integrated systems of people, materials, information, equipment, and energy)
6. An understanding of professional and ethical responsibility
7. An ability to communicate effectively
8. The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
9. A recognition of the need for, and an ability to engage in life-long learning
10. A knowledge of contemporary issues
11. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice (includes the ability to integrate systems of people, materials, information, equipment, and energy using appropriate analytical, computational, and experimental practices as well as the ability to implement such systems)

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 (http://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. No course may be double counted within the curriculum.

MAJOR COURSES

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>IME 101</td>
<td>Introduction to Industrial and Manufacturing Engineering</td>
<td>1</td>
</tr>
<tr>
<td>IME 140</td>
<td>Graphics Communication and Modeling</td>
<td>2</td>
</tr>
<tr>
<td>IME 141</td>
<td>Manufacturing Processes: Net Shape</td>
<td>1</td>
</tr>
<tr>
<td>IME 144</td>
<td>Introduction to Design and Manufacturing</td>
<td>4</td>
</tr>
<tr>
<td>IME 156</td>
<td>Basic Electronics Manufacturing</td>
<td>2</td>
</tr>
<tr>
<td>IME 223</td>
<td>Process Improvement Fundamentals</td>
<td>4</td>
</tr>
<tr>
<td>IME 239</td>
<td>Industrial Costs and Controls</td>
<td>3</td>
</tr>
</tbody>
</table>

Technical Electives
Select from the following:
- AG/ISLA/ENGR/SCM/UNIV 350 The Global Environment
- BUS 310 Introduction to Entrepreneurship
- BUS 311 Managing Technology in the International Legal Environment
- BUS 346 Principles of Marketing
- BUS 382 Organizations, People, and Technology
- BUS 402 International Business Management
- CE 207 Mechanics of Materials II
- EE 361 Electronics Laboratory
- EE 434 Automotive Engineering for a Sustainable Future
- IME 142 Manufacturing Processes: Materials Joining
- IME 335 Computer-Aided Manufacturing I
- IME 356 Manufacturing Automation
- IME 400 Special Problems for Advanced Undergraduates
- IME 401 Sales Engineering
- IME 408 Systems Engineering
- IME 409 Economic Decision Systems
- IME 416 Automation of Industrial Systems
- IME 418 Product-Process Design
- IME 424 Industrial Engineering in Healthcare
- IME 428 Engineering Metrology
- IME 435 Reliability for Design and Testing
- IME 441 Engineering Supervision I
- IME 442 Engineering Supervision II
- IME 451 Radio Frequency Identification System Design
- IME 457 Advanced Electronic Manufacturing
IME 458  Microelectronics and Electronics Packaging
IME 460  Introduction to Value Chain Analysis
IME 470  Selected Advanced Topics
IME 471  Selected Advanced Laboratory
IME/AERO 510  Systems Engineering I
IME/AERO 511  Systems Engineering II
IME 520  Advanced Information Systems for Operations
IME 527  Design of Experiments
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
MATE 410  Nanoscale Engineering
MATH 344  Linear Analysis II
MATH 350  Mathematical Software
ME 302  Thermodynamics I
ME 305  Introduction to Mechatronics
ME 341  Fluid Mechanics I
PSY 350  Teamwork
STAT 324  Applied Regression Analysis
STAT 321  Probability and Statistics for Engineers and Scientists (B6) 1

GENERAL EDUCATION (GE)
(See GE program requirements below.) 36
FREE ELECTIVES
Free Electives
Total units 190

1 Required in Support; also satisfies GE.
2 Courses meeting technical electives may not be used to satisfy other major, support, or general education requirements (no double counting of coursework).
3 At least 6 units of technical electives must be upper division (300-level or above) engineering or computer science courses.
4 A maximum of 4 units of technical electives may be upper division (300-level or above) courses from outside of the College of Engineering or lower division (100 or 200 level) engineering or computer science courses.
5 Consultation with 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 advisor and IME department chair.
6 IME 400 requires a special problems form and no more than 4 total units are allowed.
7 ENGR 459, ENGR 460 and ENGR 461 (6) may substitute for IME 481 and IME 482 (5) with the one excess unit counting towards Technical Electives.
8 ENGR 463, ENGR 464 and ENGR 465 (6) may substitute for IME 481 and IME 482 (5) with the one excess unit counting towards Technical Electives.

General Education (GE) Requirements

• 72 units required, 36 of which are specified in Major and/or Support.
• See the complete GE course listing (http://catalog.calpoly.edu/generalrequirementsbachelorsdegree/#generaleducationtext).
• Minimum of 8 units required at the 300 level.

Area A  Communication
A1  Expository Writing 4
A2  Oral Communication 4
A3  Reasoning, Argumentation and Writing (4 units in Support)1

Area B  Science and Mathematics
B1  Mathematics/Statistics (8 units in Support)1 0
B2  Life Science (4 units in Support)1 0
B3  Physical Science (4 units in Support)1 0
B4  One lab taken with either a B2 or B3 course
B6  Upper-division Area B (4 units in Support)1 0

Area C  Arts and Humanities

Additional Area B units (8 units in Support)1 0

Area A  Communication
A1  Expository Writing 4
A2  Oral Communication 4
A3  Reasoning, Argumentation and Writing (4 units in Support)1

Area B  Science and Mathematics
B1  Mathematics/Statistics (8 units in Support)1 0
B2  Life Science (4 units in Support)1 0
B3  Physical Science (4 units in Support)1 0
B4  One lab taken with either a B2 or B3 course
B6  Upper-division Area B (4 units in Support)1 0

Area C  Arts and Humanities

Additional Area B units (8 units in Support)1 0
<table>
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<tr>
<th>Area</th>
<th>Course Title and Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>Literature</td>
</tr>
<tr>
<td>C2</td>
<td>Philosophy</td>
</tr>
<tr>
<td>C3</td>
<td>Fine/Performing Arts</td>
</tr>
<tr>
<td>C4</td>
<td>Upper-division elective</td>
</tr>
</tbody>
</table>

**Area D/E**

<table>
<thead>
<tr>
<th>Course Title and Notes</th>
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</thead>
<tbody>
<tr>
<td>The American Experience (Title 5, Section 40404 requirement) (40404)</td>
</tr>
<tr>
<td>Political Economy</td>
</tr>
<tr>
<td>Comparative Social Institutions</td>
</tr>
<tr>
<td>Self Development (CSU Area E) (4 units in Support)¹</td>
</tr>
</tbody>
</table>

Total units 36

¹ Required in Support; also satisfies GE