BS MECHANICAL ENGINEERING

Program Learning Outcomes

The general program outcomes listed below are from our accrediting body, ABET, http://www.ABET.org. The 3 or 4 skills listed under each outcome were defined by the faculty in the ME program. Students who demonstrate proficiency in these skills satisfy the program outcomes.

1. An ability to apply knowledge of mathematics, science, and engineering
   a. The student will be able to evaluate basic geometrical quantities and mathematical expressions.
   b. The student will have knowledge of basic sciences and associated analysis techniques.
   c. The student will be proficient with basic analyses associated with other disciplines.

2. An ability to design and conduct experiments, as well as to analyze and interpret data
   a. The student will be proficient with the selection and basic operation of common instrumentation used in engineering measurement.
   b. The student will be able to design and conduct an experiment and compare the results to those predicted by an analytical model.
   c. The student will be able to interpret and discuss the results.

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
   a. The student will be able to recognize a need and develop appropriate design specifications.
   b. The student will be able to develop component, system, or process concept solutions based on above specifications.
   c. The student will be able to use analysis to refine the design of a component, a system, or a process.
   d. The student will be able to build a functional prototype and assess if it meets performance specifications.

4. An ability to function on multidisciplinary teams
   a. The student will recognize the value of a broad skill set resulting from a multidisciplinary team.
   b. The student will be able to communicate effectively with colleagues in other disciplines.
   c. The student will be able to identify when problems occur due to poor interactions among team members and identify ways to improve team dynamics.

5. An ability to identify, formulate, and solve engineering problems
   a. The student will be able to identify faulty products or processes and develop an engineering solution.
   b. The student will be able to select appropriate models for analyzing a system.
   c. The student will be able to analyze their models and interpret their results.

6. An understanding of professional and ethical responsibility
   a. The student will have knowledge of ASME code of ethics.
   b. The student will be able to identify health and safety concerns associated with their design.
   c. The student will be able to identify situations with ethical concerns.

7. An ability to communicate effectively
   a. The student will be able to write an effective memorandum, letter, abstract, and project report.
   b. The student will be able to give a coherent and effective oral presentation.
   c. The student will be able to critique writing samples and oral presentations and identify both strong points and weak points in grammar, clarity, and organization.

8. The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
   a. The student will be aware of society's need for engineering solutions.
   b. The student will be aware of the environmental and economic impact of their engineering solutions.
   c. The student will be able to identify possible unintended negative global or societal consequences of proposed engineering solutions.

9. A recognition of the need for, and an ability to engage in life-long learning
   a. The student will be able to understand the limitations of their knowledge.
   b. The student will be able to find and use appropriate technical resources.
   c. The student will be able to identify their need for additional education.

10. A knowledge of contemporary issues
    a. The student will be able to identify important contemporary regional, national, or global issues.
    b. The student will be able to discuss the historical roots of important contemporary regional, national, or local issues.
    c. The student will be able to discuss ways engineers are contributing or might contribute to the solution of regional, national, or global problems.

11. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice
    a. The student will be proficient with computer-based design simulation and analysis tools.
    b. The student will be able to perform parametric studies of proposed designs.
    c. The student will be able to develop a computer algorithm to solve a numerical problem.

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 upper division courses
• Graduation Writing Requirement (GWR)
• 2.0 GPA
• U.S. Cultural Pluralism (USCP)

Note: No major, support or concentration courses may be selected as credit/no credit.

MAJOR COURSES

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME 128</td>
<td>Introduction to Mechanical Engineering I</td>
<td>1</td>
</tr>
<tr>
<td>ME 129</td>
<td>Introduction to Mechanical Engineering II</td>
<td>1</td>
</tr>
<tr>
<td>ME 130</td>
<td>Introduction to Mechanical Engineering III</td>
<td>1</td>
</tr>
<tr>
<td>ME 163</td>
<td>Freshmen Orientation to Mechanical Engineering</td>
<td>1</td>
</tr>
<tr>
<td>ME 211</td>
<td>Engineering Statics</td>
<td>3</td>
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<tr>
<td>ME 212</td>
<td>Engineering Dynamics</td>
<td>3</td>
</tr>
<tr>
<td>ME 234</td>
<td>Philosophy of Design</td>
<td>3</td>
</tr>
<tr>
<td>ME 236</td>
<td>Measurement and Engineering Data Analysis</td>
<td>3</td>
</tr>
<tr>
<td>ME 251</td>
<td>Introduction to Detailed Design with Solid Modeling</td>
<td>2</td>
</tr>
<tr>
<td>ME 302</td>
<td>Thermodynamics I</td>
<td>3</td>
</tr>
<tr>
<td>ME 303</td>
<td>Thermodynamics II</td>
<td>3</td>
</tr>
<tr>
<td>ME 318</td>
<td>Mechanical Vibrations</td>
<td>4</td>
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<tr>
<td>ME 326</td>
<td>Intermediate Dynamics</td>
<td>4</td>
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<tr>
<td>ME 328</td>
<td>Design for Strength and Stiffness</td>
<td>4</td>
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<tr>
<td>ME 329</td>
<td>Mechanical Systems Design</td>
<td>4</td>
</tr>
<tr>
<td>ME 341</td>
<td>Fluid Mechanics I</td>
<td>3</td>
</tr>
<tr>
<td>ME 347</td>
<td>Fluid Mechanics II</td>
<td>4</td>
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<tr>
<td>ME 350</td>
<td>Heat Transfer</td>
<td>4</td>
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<tr>
<td>ME 420</td>
<td>Thermal System Design</td>
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<tr>
<td>ME 422</td>
<td>Mechanical Control Systems</td>
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Concentration: 21-23

SUPPORT COURSES

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<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
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</thead>
<tbody>
<tr>
<td>BIO 213 &amp; BMED 213</td>
<td>Life Science for Engineers and Bioengineering Fundamentals (B2)</td>
<td>4</td>
</tr>
<tr>
<td>CE 204</td>
<td>Mechanics of Materials I</td>
<td>3</td>
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<tr>
<td>CE 207</td>
<td>Mechanics of Materials II</td>
<td>2</td>
</tr>
<tr>
<td>CHEM 124</td>
<td>General Chemistry for Physical Science and Engineering I (B3/B4)</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 125</td>
<td>General Chemistry for Physical Science and Engineering II</td>
<td>4</td>
</tr>
<tr>
<td>CSC 231</td>
<td>Programming for Engineering Students</td>
<td>2-3</td>
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<tr>
<td>or CSC 234</td>
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<td></td>
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<tr>
<td>EE 201</td>
<td>Electric Circuit Theory</td>
<td>3</td>
</tr>
<tr>
<td>EE 251</td>
<td>Electric Circuits Laboratory</td>
<td>1</td>
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<tr>
<td>EE 321</td>
<td>Electronics</td>
<td>3</td>
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<td>EE 361</td>
<td>Electronics Laboratory</td>
<td>1</td>
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<tr>
<td>ENGL 149</td>
<td>Technical Writing for Engineers (A3)</td>
<td>4</td>
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Concentrations (select one)

- General (http://catalog.calpoly.edu/collegesandprograms/collegeofengineering/mechanicalengineering/bsmechanicalengineering/generalconcentration)
- Mechatronics (http://catalog.calpoly.edu/collegesandprograms/collegeofengineering/mechanicalengineering/bsmechanicalengineering/mechatronicsconcentration)
- Manufacturing (http://catalog.calpoly.edu/collegesandprograms/collegeofengineering/mechanicalengineering/bsmechanicalengineering/manufacturingconcentration)

General Education (GE) Requirements

- 72 units required, 32 of which are specified in Major and/or Support.
- See the complete GE course listing (http://catalog.calpoly.edu/generallistings/bachelorsdegree/#generaleducationtext).
- Minimum of 8 units required at the 300 level.
<table>
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<tr>
<th>A3</th>
<th>Reasoning, Argumentation and Writing (4 units in Support)</th>
<th>0</th>
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</table>

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

**Area C**  
Arts and Humanities  
C1 Literature | 4 |  
C2 Philosophy | 4 |  
C3 Fine/Performing Arts | 4 |  
C4 Upper-division elective | 4 | 

**Area D/E**  
Society and the Individual  
D1 The American Experience (Title 5, Section 40404 requirement) (40404) | 4 |  
D2 Political Economy | 4 |  
D3 Comparative Social Institutions | 4 |  
D4 Self Development (CSU Area E) | 4 |  

Total units 40

1 Required in Support; also satisfies GE