### Complete 15 hours (five courses) of technical electives.

The purpose of these courses is to strengthen the engineering education of the student by:

- Deepening the student's understanding of engineering and/or science fundamentals,
- Helping the student learn to apply engineering fundamentals in specific areas of interest,
- Helping the student to develop critical skills related to engineering practice.

#### At least three courses (9 credit hours) must be in mechanical engineering courses, but other courses may be used as long as the following requirements are met:

- No course may be below the 300-level.
- A maximum of three credit hours in Me En 497R or other.
- All courses must be of an acceptable level from mechanical engineering, civil engineering, chemical engineering, computer engineering, electrical engineering, mathematics, statistics, physics, chemistry, or computer science, or be on the approved elective list in the department office. If a student wishes to count a course outside these areas as an elective, approval must be granted by submitting a one-page petition to the department undergraduate committee that lists all of the courses.

**Note:**Students without high school physics should start with Phscs 121.

#### Complete one of the following Mathematics Core sequences:

- **a.** Math 112* Calculus 1 4.0
  - Math 113 Calculus 2 4.0
  - Math 302 Mathematics for Engineering 1 4.0
  - Math 303 Mathematics for Engineering 2 4.0

- **b.** Math 112* Calculus 1 4.0
  - Math 113 Calculus 2 4.0
  - Math 313 Elementary Linear Algebra 3.0
  - Math 314 Calculus of Several Variables 3.0
  - Math 334 Ordinary Differential Equations 3.0

### Complete the following professional Me En Core:

- Me En 191 New Student Seminar 0.5

### Complete the following professional Me En Core:

- Me En 250 Science of Engineering Materials 3.0
- Me En 282 Manufacturing Processes 3.0
- Me En 312 Fluid Mechanics 3.0
- Me En 321 Thermodynamics 3.0
- Me En 335 Dynamic System Modeling & Analysis 3.0
- Me En 340 Heat Transfer 3.0
- Me En 363 Elementary Instrumentation 3.0
- Me En 372 Mechanical System Design Fundmntls 3.0
- Me En 373 Intro to Scientific Computing and Computer-Aided Engineering 3.0
- Me En 475 Integrated Product & Process Design 1 3.0
- Me En 476 Integrated Product & Process Design 2 3.0
- Eng T 231* Foundations of Global Leadership 3.0
- Engl 316* Technical Communication 3.0
- Stat 201 Statistics for Engineers & Scientists 3.0

### FOR UNIVERSITY CORE QUESTIONS CONTACT THE ADVISEMENT CENTER

* THESE CLASSES FILL BOTH UNIVERSITY CORE AND PROGRAM REQUIREMENTS (16 hours overlap)

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### UNIVERSITY CORE AND GRADUATION REQUIREMENTS

<table>
<thead>
<tr>
<th>Requirements</th>
<th>#Classes</th>
<th>Hours</th>
<th>Classes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Doctrinal Foundation</strong></td>
<td></td>
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<tr>
<td>Book of Mormon</td>
<td>2</td>
<td>4.0</td>
<td>Rel A 121/H and 122/H</td>
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<tr>
<td>New Testament</td>
<td>1</td>
<td>2.0</td>
<td>Rel A 211/H or 212/H</td>
</tr>
<tr>
<td>Doctrine and Covenants</td>
<td>1</td>
<td>2.0</td>
<td>Rel C 324/H or 325/H</td>
</tr>
<tr>
<td><strong>The Individual and Society</strong></td>
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<td></td>
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<tr>
<td>Citizenship</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>American Heritage</td>
<td>1–2</td>
<td>3–6.0</td>
<td>from approved list</td>
</tr>
<tr>
<td>Global &amp; Cultural Awareness</td>
<td>1</td>
<td>3.0</td>
<td>Eng T 231* (Math or Language)</td>
</tr>
<tr>
<td><strong>Skills</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Effective Communication</td>
<td>1</td>
<td>3.0</td>
<td>from approved list</td>
</tr>
<tr>
<td>First-Year Writing</td>
<td>1</td>
<td>3.0</td>
<td>from approved list</td>
</tr>
<tr>
<td>Adv Written &amp; Oral Communication</td>
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<td>3.0</td>
<td>Engl 316*</td>
</tr>
<tr>
<td>Quantitative Reasoning</td>
<td>0–1</td>
<td>0–3.0</td>
<td>from approved list</td>
</tr>
<tr>
<td>Languages of Learning</td>
<td>1</td>
<td>4.0</td>
<td>Math 112*</td>
</tr>
<tr>
<td><strong>Arts, Letters, and Sciences</strong></td>
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<td></td>
<td></td>
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<tr>
<td>Civilization 1 and 2</td>
<td>2</td>
<td>6.0</td>
<td>from approved list</td>
</tr>
<tr>
<td>Arts</td>
<td>1</td>
<td>3.0</td>
<td>from approved list</td>
</tr>
<tr>
<td>Letters</td>
<td>1</td>
<td>3.0</td>
<td>from approved list</td>
</tr>
<tr>
<td>Scientific Principles &amp; Reasoning</td>
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<td>3.0</td>
<td>Bio 100*</td>
</tr>
<tr>
<td>Biological Science</td>
<td>1</td>
<td>3.0</td>
<td>CE En 204*</td>
</tr>
<tr>
<td>Physical Science</td>
<td>1</td>
<td>3.0</td>
<td>Eng T 231*</td>
</tr>
<tr>
<td>Social Science</td>
<td>1</td>
<td>3.0</td>
<td>Eng T 231*</td>
</tr>
<tr>
<td><strong>Core Enrichment: Electives</strong></td>
<td>3–4</td>
<td>6.0</td>
<td>from approved list</td>
</tr>
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<td>Religion Electives</td>
<td>Variable</td>
<td>Variable</td>
<td>personal choice</td>
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<tr>
<td>Open Electives</td>
<td>Variable</td>
<td>Variable</td>
<td>personal choice</td>
</tr>
</tbody>
</table>

### GRADUATION REQUIREMENTS:

- Minimum residence hours required: 30.0
- Minimum hours needed to graduate: 120.0

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### PROGRAM REQUIREMENTS (101.5-102.5 total hours)

- Complete the following Basic Science Core:
  - Bio 100* Principles of Biology 3.0
  - Chem 105 Gen College Chemistry 4.0
  - Phscs 123 Principles of Physics 2 3.0
  - Phscs 220 Principles of Physics 3 3.0

- Note:**Students without high school physics should start with Phscs 121.**

- Complete one of the following Mathematics Core sequences:
  - a. Math 112* Calculus 1 4.0
    - Math 113 Calculus 2 4.0
    - Math 302 Mathematics for Engineering 1 4.0
    - Math 303 Mathematics for Engineering 2 4.0
  - b. Math 112* Calculus 1 4.0
    - Math 113 Calculus 2 4.0
    - Math 313 Elementary Linear Algebra 3.0
    - Math 314 Calculus of Several Variables 3.0
    - Math 334 Ordinary Differential Equations 3.0

- Complete the following professional Me En Core:
  - Me En 103 Engineering Mechanics—Statics 3.0
  - Me En 203 Engineering Mechanics—Materials 3.0
  - Me En 204* Engineering Mechanics—Dynamics 3.0
  - EC En 301 Elements of Electrical Engineering 3.0
  - Me En 172 Engineering Graphics—Princ. & Appl. 3.0
  - Me En 191 New Student Seminar 0.5

- Complete the following professional Me En Core:
  - Me En 250 Science of Engineering Materials 3.0
  - Me En 282 Manufacturing Processes 3.0
  - Me En 312 Fluid Mechanics 3.0
  - Me En 321 Thermodynamics 3.0
  - Me En 335 Dynamic System Modeling & Analysis 3.0
  - Me En 340 Heat Transfer 3.0
  - Me En 363 Elementary Instrumentation 3.0
  - Me En 372 Mechanical System Design Fundmntls 3.0
  - Me En 373 Intro to Scientific Computing and Computer-Aided Engineering 3.0
  - Me En 475 Integrated Product & Process Design 1 3.0
  - Me En 476 Integrated Product & Process Design 2 3.0

- Complete the following supporting courses:
  - Eng T 231* Foundations of Global Leadership 3.0
  - Engl 316* Technical Communication 3.0
  - Stat 201 Statistics for Engineers & Scientists 3.0

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For students entering the degree program during the 2014–2015 curricular year.

This is a limited-enrollment program requiring departmental admissions approval. Please see the college advisement center or department office for information regarding requirements for admission to this major.

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FOR UNIVERSITY CORE QUESTIONS CONTACT THE ADVISEMENT CENTER

* FOR PROGRAM QUESTIONS SEE YOUR FACULTY ADVISOR

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* THESE CLASSES FILL BOTH UNIVERSITY CORE AND PROGRAM REQUIREMENTS (16 hours overlap)
An option in manufacturing engineering is available. It may be completed by taking the following 15 hours of technical electives:

1. Complete 3 hours from the following:
   - Me En 585 Mfg Competitiveness: Qual & Prod 3.0
   - Mfg 532 Manufacturing Systems 3.0

2. Complete 3 hours from the following:
   - Me En 482 Mfg. Systems Analysis & Design 3.0
   - Me En 486 Automation 3.0
   - Me En 537 Advanced Mechanisms, Robotics 3.0

3. Complete 3 hours from the following:
   - Me En 452 Intermediate Materials 3.0
   - Me En 456 Composite Material Design 3.0
   - Me En 477 Design for Manufacture/Assembly 3.0
   - Me En 556 Metallurgy 3.0
   - Me En 584 Mfg Process Machine Design 3.0

4. Complete 3 additional hours from the manufacturing electives list.

5. Complete 3 additional hours from the mechanical engineering general elective list.

When combined with required courses for all mechanical engineering majors related to manufacturing, namely Me En 250, 282, 475/476, and Stat 201, this option provides a strong foundation in manufacturing engineering.

### Suggested Sequence of Courses:

#### FRESHMAN YEAR

**1st Semester**
- First-Year Writing or A Htg 3.0
- Chem 105 (FWSpSu) 4.0
- Math 112 (FWSpSu) 4.0
- Me En 191 (FW) 0.5
- Rel A 121 2.0
- **Total Hours 13.5**

**2nd Semester**
- Ce En 103 (FWSp) 3.0
- Math 113 (FWSpSu) 4.0
- Me En 172 (FWSp) 3.0
- Phscs 123 (FWSpSu) 3.0
- First-Year Writing or A Htg 3.0
- Rel A 122 2.0
- **Total Hours 18.0**

#### SOPHOMORE YEAR

**3rd Semester**
- Ce En 203 (FWSp) 3.0
- Math 302 (FWSp) 4.0
- Me En 250 (FWSp) 3.0
- Phscs 220 (FWSp) 3.0
- Rel A 211 or 212 2.0
- Bio 100 3.0
- **Total Hours 18.0**

**4th Semester**
- Eng T 231 3.0
- Ce En 204 (FWSu) 3.0
- EC En 301 3.0
- Math 303 (FWSu) 4.0
- Me En 282 (FWSu) 3.0
- **Total Hours 16.0**

#### JUNIOR YEAR

**5th Semester**
- Engl 316 (FWSpSu) 3.0
- Me En 373 (FWSp) 3.0
- Me En 321 (FWSp) 3.0
- Me En 372 (FWSp) 3.0
- Me En 363 (FWSp) 3.0
- Rel C 324 or 325 2.0
- **Total Hours 17.0**

**6th Semester**
- Me En 312 (FWSp) 3.0
- Me En 340 (FWSp) 3.0
- Me En 335 (FWSp) 3.0
- Stat 201 (FWSp) 3.0
- Letters GE 2.0
- Religion elective 2.0
- **Total Hours 17.0**

#### SENIOR YEAR

**7th Semester**
- Me En 475 (F) 3.0
- Technical elective 3.0
- Technical elective 3.0
- Technical elective 3.0
- University Core Civilization 1 elective 3.0
- Religion elective 3.0
- **Total Hours 17.0**

**8th Semester**
- Me En 476 (W) 3.0
- Technical elective 3.0
- Technical elective 3.0
- Technical elective 3.0
- University Core Civilization 2: Arts elective 3.0
- Religion elective 2.0
- **Total Hours 14.0**

(continued on next page)
Learning Outcomes

To assure that these objectives are reached, the department has articulated twelve outcomes of the BS program. Each student graduating from this program is expected to have:

1. A basic understanding of fundamental physical phenomena and governing principles.
2. The ability to develop and solve mathematical models of fundamental physical phenomena and apply them to predict the behavior of engineering systems.
3. The ability to use engineering principles to design an innovative system, component, or process to meet desired needs.
4. The expertise to plan and conduct an experimental program and evaluate the results.
5. The ability to use modern engineering tools and techniques in engineering practice.
6. An understanding of manufacturing processes and planning.
7. Effective oral and written communication skills.
8. The ability to work with and lead others to accomplish goals.
9. An appreciation of history, philosophy, literature, science, and the fine arts and how they influence the culture and behavior of societies.
10. Personal behavior demonstrating and practicing high moral and ethical standards.
11. The ability to practice engineering in a global environment.
12. A desire for and commitment to lifelong learning and service.

All courses in the curriculum are designed to help achieve these outcomes.

The curriculum in mechanical engineering is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology, Inc. (ABET).

CAREER OPPORTUNITIES:

A bachelor of science degree in mechanical engineering provides widely recognized professional training for careers in industry, government, and other areas. Most industrial companies hire some mechanical engineers. Companies that make mechanical or energy-related products may hire mostly mechanical engineers. As a result, many mechanical engineering positions are available worldwide. Mechanical engineers have job opportunities in companies involved in such areas as aircraft and spacecraft design; manufacturing processes; product safety and reliability; solar energy; electronic equipment packaging and cooling; power plant design; jet, train, truck, and automobile engines; environmental protection; artificial intelligence; robotics; medical and hospital equipment; new material development and applications; and technical writing. Increasing numbers of positions utilize foreign language experience.

A graduate in mechanical engineering is prepared for advanced studies in the field as well as in a variety of other disciplines, including law, medicine, and business administration. Perhaps most important to graduates are the problem-solving strategies and thinking processes acquired in the study of mechanical engineering that help one to succeed in any area of endeavor.

UNDERGRADUATE ADMITTANCE REQUIREMENTS:

Any student may choose to major in mechanical engineering and to enroll in all classes in the preprofessional program (Basic Science Core and Mathematics Core Requirements).

Professional Program Acceptance:

Students must be accepted into the professional program before they may take the professional Me En core or technical electives. To apply, students must have completed the following five courses at a college or university (neither AP nor Concurrent Enrollment credit meet this requirement):

1. Phscs 123
2. One course (first course taken) from the Mathematics Core.
3. Me En 172 from the preprofessional course list (item 3 in the major requirements).
4. CE En 103 from the preprofessional course list (item 3 in the major requirements).
5. Me En 191 from the preprofessional course list (item 3 in the major requirements).

Acceptance is based on the GPA from the courses listed above. The GPA cut-off is determined by fixing the number of students admitted to the program and will vary from year to year. The current limit of students admitted per year is 160 and the GPA cut off for the past year was 3.40. Both the limit and the GPA cut-off are subject to change.

Only one repeat of each course is allowed for purposes of determining professional program acceptance. If a student has taken more than four professional application courses or has repeated any of these courses, only the grades of each of the first four courses taken or the highest grade when a course is retaken will be considered. Transfer students from institutions that do not have accredited engineering programs will be considered for provisional admission for one semester based on transferred courses but will be retained or denied based on four courses taken at BYU. The courses used will be the next four courses on the engineering flow chart following courses 1-4 listed above.

Normal application deadlines are July 1, October 1 and February 1. Applications from transfer students who have been admitted to the university may be considered at other times.

Professional program application forms are available in the college advisement center and the dept. office.

ACADEMIC STANDARDS AND CONTINUANCE:

On gaining acceptance into the professional program, students must maintain a minimum university cumulative grade point average of 2.0. No more than 6 credit hours of grades below C- in required program courses (including preprofessional and professional) may be applied toward graduation. A professional program course may not be retaken more than once.