BS7257 - MECHANICAL ENGINEERING

Program Overview

Overview: Ohio University’s Mechanical Engineering major program has four educational objectives:<br>

1. Prepare graduates for engineering careers and advanced education<br>
2. Graduate mechanical engineers with technical skills<br>   * including a grasp of engineering knowledge and an ability to apply knowledge to solve contemporary engineering problems<br>
3. Graduate mechanical engineers with skills to perform in the work environment<br>
   * including technical communication, teamwork, and decision making<br>
4. Graduate mechanical engineers who are informed and aware of contemporary issues and the impact of engineering on society.<br>

Mechanical engineering is an extremely diverse profession that is concerned with<br>
(1) the economical and ecological conversion of energy from natural sources to provide power, heating, cooling, and propulsion;<br>
(2) the design of all types of machines, engines, and vehicles;<br>
(3) the processing of materials into useful products; and<br>
(4) the development of systems for using machines and resources.<br>

Professional activities include research, development, design, testing, production, operation and maintenance, marketing and sales, technical management, and administration.<br>

The mechanical engineering curriculum is designed to provide a solid foundation in higher mathematics and basic sciences, followed by extensive instruction in the classical mechanical engineering disciplines. Design and project experiences dealing with real engineering problems are integrated into the curriculum to help students:<br>
(1) apply their own creativity in formulating alternative engineering solutions;<br>
(2) develop an ability to work independently and/or in teams, which is an important skill for continued growth as a practicing engineer;<br>
(3) bridge the gap between the acquisition of engineering knowledge in required courses and the application of that knowledge to solve engineering problems.<br>

The design experience begins in the freshman year, wherein students are introduced to elements of engineering design. This often involves the design and construction of a device to perform a specified task. Throughout the sophomore, junior, and senior years, mechanical engineering students are required to solve design problems in many of the required engineering courses and across the spectrum of disciplines encompassed by the mechanical engineering profession. Senior mechanical engineering students are challenged in a year-long sequence of formal design courses involving a capstone senior design project, which requires the construction and testing of a working product prototype. The capstone project requires application of fundamental engineering knowledge as well as knowledge of engineering economy and social issues, such as product safety and reliability. Students are required to submit written technical reports, as well as give oral presentations describing project results. This is in accord with the Department’s objective of producing engineers who have good communication skills, as well as excellent technical skills. The design experience is enhanced by providing students with technologically modern lab facilities and computational tools.<br>

In addition to engineering courses, the Department requires significant studies in the humanities and social sciences to establish a breadth and depth of awareness and education. The humanity and social science requirements are consistent with the Department’s objective of graduating individuals with a well-rounded education.

Admissions Information: Freshman/First-Year Admission

No requirements beyond University admission requirements. Students should take four years of mathematics and a year of chemistry and physics in high school, if possible.

Change of Major/Minor/Certificate Policy

Students must have a GPA greater than 2.0 for all courses at Ohio University, for all courses in Russ College, and for all courses in Mechanical Engineering. Students must also have successfully completed all required courses in three or fewer attempts, and have no required course that they’ve attempted twice without success. For some courses, success means a grade of at least C or C- to satisfy future prerequisites.

External Transfer Admission

In addition to university guidelines, students should have earned a C or better grade in a college math course equivalent to Math 113 or higher and a C or better grade in a chemistry course equivalent to Chem 121 or higher or a physics course equivalent to Phys 201 or higher.
Opportunities Upon Graduation:
From automobiles and airplanes to wind turbines and power plants to artificial hearts and search-and-rescue robots, mechanical engineers design solutions to help us transport and power our world and make a meaningful difference in people's lives. Mechanical engineers work in design, manufacturing, research, and sales for companies such as Boeing, Toyota and General Electric. Some of our graduates have been hired by professional racing teams and experimental aircraft manufacturers. Mechanical engineering graduates also can use their degree as a solid background for advanced studies in engineering, law, medicine, or business.

Curriculum

Nature of Changes:
The changes to your program curriculum MAKES the comparison of the minimum number of credit hours in the quarter-based and semester-based curricular less meaningful for most of your curricular components.

Explanation:
Our previous curriculum was not designed in terms of curricular components. Also, we took a holistic approach to the semester curriculum redesign and did not constrain ourselves to course transitions. Therefore, the quarter hours for curricular components are not listed and we will describe our changes from an overall perspective rather than component by component.

Curricular Components:

<table>
<thead>
<tr>
<th></th>
<th>Semester Hrs</th>
<th>Quarter Hrs</th>
<th>Equivalent Semester Hrs</th>
<th>Percent Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math and Basic Sciences</td>
<td>32.0</td>
<td>0.0</td>
<td>0.0</td>
<td>100.0%</td>
</tr>
<tr>
<td>Science Elective</td>
<td>2.0</td>
<td>0.0</td>
<td>0.0</td>
<td>100.0%</td>
</tr>
<tr>
<td>Engineering Fundamentals</td>
<td>21.0</td>
<td>0.0</td>
<td>0.0</td>
<td>100.0%</td>
</tr>
<tr>
<td>Mechanical Engineering Core</td>
<td>40.0</td>
<td>0.0</td>
<td>0.0</td>
<td>100.0%</td>
</tr>
<tr>
<td>Mechanical Engineering Colloquia</td>
<td>4.0</td>
<td>0.0</td>
<td>0.0</td>
<td>100.0%</td>
</tr>
<tr>
<td>Other Engineering and Technology</td>
<td>9.0</td>
<td>0.0</td>
<td>0.0</td>
<td>100.0%</td>
</tr>
<tr>
<td>Technical Electives</td>
<td>6.0</td>
<td>0.0</td>
<td>0.0</td>
<td>100.0%</td>
</tr>
<tr>
<td>General Education</td>
<td>14.0</td>
<td>0.0</td>
<td>0.0</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Min. Credit Hours:

<table>
<thead>
<tr>
<th></th>
<th>Semester Hrs</th>
<th>Equivalent Semester Hrs</th>
<th>Percent Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>126.0</td>
<td>128.0</td>
<td>-1.56</td>
</tr>
</tbody>
</table>

Summary of Changes:
In order to address the need to reduce the total number of courses in our semester program, and to better integrate applications and physical demonstrations with theory, and to allow a better focus on overall themes such as energy, we organized our curriculum in sequences that include applications and lab experiences within them, and have a culminating design or application experience. The Kinematics and Controls Sequence, the Heat and Fluid Transport sequence, and the Mechanical Design sequence are examples of these sequences. Along with this change, we reduced the number of independent lab classes, but added a Mechatronics course to the Linear Systems Sequence with a strong applied lab component to respond to industry trends and keep our curriculum updated, and added an Engineering Statistics course to increase emphasis on that topic. Some apparent changes are actually not changes in content but rather changes in how the engineering college administers the general engineering courses. The content is transitioned in those courses, but many have moved from departmentally administered to college administered courses. To make the total number of hours in the curriculum approximately the same as the quarter curriculum, several courses had to be removed. All of these course deletion decisions were based on outcome assessment data and were backed up by student input. For example, the University public speaking course was dropped because students are getting sufficient learning experiences within our program to meet our outcomes for oral presentation skills. The replacement of some Physics and Chemistry requirements with a Science elective still satisfies our accreditation requirements but allows students more scheduling flexibility, especially those students interested in the biomedical or biomechanical fields.

Supplemental Information

Quarter Curriculum [http://oak.cats.ohiou.edu/~giesey/q2s/ocean/docs/BS7257_DARS.pdf](http://oak.cats.ohiou.edu/~giesey/q2s/ocean/docs/BS7257_DARS.pdf)

Related Materials [ME_UGProgram_Template.pdf](http://oak.cats.ohiou.edu/~giesey/q2s/ocean/docs/BS7257_DARS.pdf)

Patron Departments

<table>
<thead>
<tr>
<th>Department</th>
<th>Nature of Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM - Chemistry and Biochemistry</td>
<td>We are only requiring one semester of the CHEM 15XX series. The second semester is an option in a science elective 'select from' list.</td>
</tr>
<tr>
<td>COMS - Communication Studies, School of ISE - Industrial and Systems Engineering</td>
<td>We are no longer requiring COMS 103 in our program. We are adding the ISE 3200 Engineering Statistics as a required course in our curriculum.</td>
</tr>
<tr>
<td>PHYS - Physics and Astronomy</td>
<td>We are only requiring one semester of the Physics 205X series. The second semester is an option in a science elective 'select from' list. We used to require a full year of Physics.</td>
</tr>
</tbody>
</table>

Page 2 of 4
Math and Basic Sciences

32.0 Semester Hours

Complete all of the required courses listed below, plus additional courses defined in the science elective to meet the 32 minimum total hours requirement for Math and Basic Sciences.

- MATH 2301: Calculus I (4.0HR) (2AS) (EXPEDITED - REVIEW)
- MATH 2302: Calculus II (4.0HR) (2AS) (EXPEDITED - REVIEW)
- PHYS 2051: General Physics (5.0HR) (2NS) (EXPEDITED - REVIEW)
- CHEM 1510: Fundamentals of Chemistry I (4.0HR) (2NS) (EXPEDITED - SAVED)
- MATH 3300: Calculus III (4.0HR) (EXPEDITED - REVIEW)
- MATH 3400: Elementary Differential Equations (3.0HR) (EXPEDITED - REVIEW)
- MATH 3600: Applied Numerical Methods (3.0HR) (EXPEDITED - REVIEW)
- ISE 3200: Engineering Statistics (3.0HR) (EXPEDITED - REVIEW)

Science Elective

2.0 Semester Hours

Choose any 400 level MATH course (MATH 4*** ) or any of the following courses to meet the overall requirement for 32 credits of Math and Basic Sciences.

- PHYS 2052: General Physics (5.0HR) (2NS) (EXPEDITED - REVIEW)
- CHEM 1520: Fundamentals of Chemistry II (4.0HR) (2NS) (EXPEDITED - SAVED)
- BIOS 3010: Human Anatomy (3.0HR) (EXPEDITED - REVIEW)
- BIOS 3015: Human Anatomy Lab (1.0HR) (EXPEDITED - SAVED)
- BIOS 1300: Principles of Human Anatomy and Physiology I (4.0HR) (2NS) (EXPEDITED - SAVED)

Engineering Fundamentals

21.0 Semester Hours

Complete all of the following fundamental engineering courses.

- ET 1100: Engineering Graphics Fundamentals (2.0HR) (EXPEDITED - REVIEW)
- ET 2100: Programming in C (4.0HR) (NOI - COMPLETED)
- ET 2200: Statics (3.0HR) (EXPEDITED - REVIEW)
- ET 2240: Dynamics (3.0HR) (EXPEDITED - REVIEW)
- ET 3200: Engineering Thermodynamics (3.0HR) (EXPEDITED - REVIEW)
- ET 2220: Strength of Materials (3.0HR) (EXPEDITED - SAVED)

Mechanical Engineering Core

40.0 Semester Hours

Complete all of the following Mechanical Engineering Core Courses

- ME 1010: Mechanical Engineering - Gateway Course (3.0HR) (EXPEDITED - REVIEW)
- ME 3011: Kinematics and Dynamics of Machines (3.0HR) (EXPEDITED - REVIEW)
- ME 3012: Linear Systems Analysis and Control (3.0HR) (EXPEDITED - REVIEW)
- ME 3121: Heat and Fluid Transport I (2.0HR) (EXPEDITED - REVIEW)
- ME 3122: Heat and Fluid Transport II (3.0HR) (EXPEDITED - REVIEW)
- ME 3140: Introduction to Manufacturing Processes (3.0HR) (EXPEDITED - REVIEW)
- ME 3510: Computer Aided Design (3.0HR) (COMPOSITE - REVIEW)
- ME 3700: Machine Design (3.0HR) (EXPEDITED - REVIEW)
- ME 4210: Applied Thermal Systems Design and Analysis (3.0HR) (EXPEDITED - REVIEW)
- ME 4550: Mechatronics I (3.0HR) (EXPEDITED - REVIEW)
- ME 4701: Mechanical Engineering Capstone Design I (4.0HR) (COMPOSITE - REVIEW)
- ME 4702: Mechanical Engineering Capstone Design II (4.0HR) (3) (COMPOSITE - REVIEW)
- ME 4860: Experimental Design Lab (3.0HR) (COMPOSITE - REVIEW)

Mechanical Engineering Colloquia

4.0 Semester Hours

Take all of the following colloquia, but no more than one per academic year.

- ME 1800: Mechanical Engineering Colloquium I (1.0HR) (SEMESTER - REVIEW)
- ME 2800: Mechanical Engineering Colloquium II (1.0HR) (EXPEDITED - REVIEW)
- ME 3800: Mechanical Engineering Colloquium III (1.0HR) (EXPEDITED - REVIEW)
- ME 4800: Mechanical Engineering Colloquium IV (1.0HR) (EXPEDITED - REVIEW)

Other Engineering and Technology

9.0 Semester Hours

Take all of the following courses.

- ET 3132: Basic Electrical Engineering I (2.0HR) (NOI - COMPLETED)
Technical Electives

6.0 Semester Hours

Complete at least 6 hours total from Engineering (3***/4***), MATH 4*** or PHYS 4***. At least 3 hours must be from an ME3*** or ME4*** course or another approved elective such as ISE 4600.

General Education

14.0 Semester Hours

Complete all of the following components. Additional General Education requirements are fulfilled by other required parts of the curriculum.

1E: First-Year Composition

3.0 Semester Hours

1J: Junior Composition

3.0 Semester Hours

Tier 2CP

2.0 Semester Hours

Tier 2FA

2.0 Semester Hours

Tier 2HL

2.0 Semester Hours

Tier 2SS

2.0 Semester Hours