# Archived Curriculum Fall 2014 - Summer 2016

**Mechanical Engineering**

Accredited by the Engineering Accreditation Commission of ABET, www.abet.org

## 1. University Requirements: (23-24)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>WRT 101</td>
<td>Writing, Rhetoric and American Cultures (WRA)</td>
<td>4</td>
</tr>
<tr>
<td>HUM 101</td>
<td>Integrative Studies in Humanities (IAH)</td>
<td>8</td>
</tr>
<tr>
<td>ISS 101</td>
<td>Integrative Studies in Social Sciences (ISS)</td>
<td>8</td>
</tr>
<tr>
<td>BIO 101</td>
<td>Bioscience (one of the following):</td>
<td></td>
</tr>
<tr>
<td></td>
<td>BS 161, ENT 205, MMG 201,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PLB 105, PSL 250, ZOL 141</td>
<td>3-4</td>
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</table>

## 2. College Requirements: (30)

<table>
<thead>
<tr>
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<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CEM 141</td>
<td>General Chemistry</td>
<td>4</td>
</tr>
<tr>
<td>EGR 101</td>
<td>Introduction to Engineering Design</td>
<td>2</td>
</tr>
<tr>
<td>EGR 102</td>
<td>Introduction to Engineering Modeling</td>
<td>2</td>
</tr>
<tr>
<td>MTH 132</td>
<td>Calculus I</td>
<td>3</td>
</tr>
<tr>
<td>MTH 133</td>
<td>Calculus II</td>
<td>4</td>
</tr>
<tr>
<td>MTH 234</td>
<td>Multivariable Calculus</td>
<td>4</td>
</tr>
<tr>
<td>MTH 235</td>
<td>Differential Equations</td>
<td>3</td>
</tr>
<tr>
<td>PHY 183</td>
<td>Physics for Scientists &amp; Engineers I</td>
<td>4</td>
</tr>
<tr>
<td>PHY 184</td>
<td>Physics for Scientists &amp; Engineers II</td>
<td>4</td>
</tr>
</tbody>
</table>

## 3. Major Requirements: (64)

#### a. Complete all of the following courses: (13)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE 221</td>
<td>Statics</td>
<td>3</td>
</tr>
<tr>
<td>CEM 161</td>
<td>Chemistry Laboratory I</td>
<td>1</td>
</tr>
<tr>
<td>ECE 345</td>
<td>Electronic Instrumentation and Systems</td>
<td>3</td>
</tr>
<tr>
<td>MSE 250</td>
<td>Materials Science and Engineering</td>
<td>3</td>
</tr>
<tr>
<td>STT 351</td>
<td>Probability and Statistics for Engineering</td>
<td>3</td>
</tr>
</tbody>
</table>

#### b. Complete all of the following courses: (39)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME 280</td>
<td>Graphic Communications</td>
<td>2</td>
</tr>
<tr>
<td>ME 201</td>
<td>Thermodynamics</td>
<td>3</td>
</tr>
<tr>
<td>ME 222</td>
<td>Mechanics of Deformable Solids</td>
<td>3</td>
</tr>
<tr>
<td>ME 332</td>
<td>Fluid Mechanics (W)</td>
<td>4</td>
</tr>
<tr>
<td>ME 361</td>
<td>Dynamics</td>
<td>3</td>
</tr>
<tr>
<td>ME 371</td>
<td>Mechanical Design I</td>
<td>3</td>
</tr>
<tr>
<td>ME 391</td>
<td>Mechanical Engineering Analysis</td>
<td>3</td>
</tr>
<tr>
<td>ME 410</td>
<td>Heat Transfer</td>
<td>3</td>
</tr>
<tr>
<td>ME 412</td>
<td>Heat Transfer Laboratory (W)</td>
<td>2</td>
</tr>
<tr>
<td>ME 451</td>
<td>Control Systems (W)</td>
<td>4</td>
</tr>
<tr>
<td>ME 461</td>
<td>Mechanical Vibrations (W)</td>
<td>3</td>
</tr>
<tr>
<td>ME 471</td>
<td>Mechanical Design II</td>
<td>3</td>
</tr>
<tr>
<td>ME 481</td>
<td>Mechanical Engr Design Projects (W)</td>
<td>3</td>
</tr>
</tbody>
</table>

#### c. Senior Electives: (9)

Complete a minimum of nine credits from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME 416</td>
<td>Computer Asstd Design of Thermal Sys</td>
<td>3</td>
</tr>
<tr>
<td>ME 417</td>
<td>Design of Alternative Energy Systems</td>
<td>3</td>
</tr>
<tr>
<td>ME 422</td>
<td>Introduction to Combustion</td>
<td></td>
</tr>
<tr>
<td>ME 423</td>
<td>Intermed Mech of Deformable Solids</td>
<td>3</td>
</tr>
<tr>
<td>ME 425</td>
<td>Experimental Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>ME 426</td>
<td>Introduction to Composite Materials</td>
<td>3</td>
</tr>
<tr>
<td>ME 440</td>
<td>Aerospace Engineering Fundamentals</td>
<td>3</td>
</tr>
<tr>
<td>ME 442</td>
<td>Turbomachinery</td>
<td>3</td>
</tr>
<tr>
<td>ME 444</td>
<td>Automotive Engines</td>
<td>3</td>
</tr>
<tr>
<td>ME 445</td>
<td>Automotive Powertrain Design</td>
<td>3</td>
</tr>
<tr>
<td>ME 456</td>
<td>Mechatronic System Design</td>
<td>3</td>
</tr>
<tr>
<td>ME 464</td>
<td>Intermediate Dynamics</td>
<td>3</td>
</tr>
<tr>
<td>ME 465</td>
<td>Computer Aided Optimal Design</td>
<td>3</td>
</tr>
<tr>
<td>ME 475</td>
<td>Computer Aided Design of Structures</td>
<td>3</td>
</tr>
<tr>
<td>ME 477</td>
<td>Manufacturing Processes</td>
<td>3</td>
</tr>
<tr>
<td>ME 478</td>
<td>Product Development</td>
<td>3</td>
</tr>
<tr>
<td>ME 490</td>
<td>Independent Study in Mechanical Engr</td>
<td>1-4</td>
</tr>
<tr>
<td>ME 491</td>
<td>Selected Topics in Mechanical Engr</td>
<td>1-4</td>
</tr>
<tr>
<td>ME 494</td>
<td>Biofluid Mechanics and Heat Transfer</td>
<td>3</td>
</tr>
<tr>
<td>ME 495</td>
<td>Tissue Mechanics</td>
<td>3</td>
</tr>
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</table>

#### d. Design-Intensive courses. Complete a minimum of three additional credits from:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME 416</td>
<td>Computer Asstd Design of Thermal Sys</td>
<td>3</td>
</tr>
<tr>
<td>ME 417</td>
<td>Design of Alternative Energy Systems</td>
<td>3</td>
</tr>
<tr>
<td>ME 442</td>
<td>Turbomachinery</td>
<td>3</td>
</tr>
<tr>
<td>ME 445</td>
<td>Automotive Powertrain Design</td>
<td>3</td>
</tr>
<tr>
<td>ME 456</td>
<td>Mechatronic System Design</td>
<td>3</td>
</tr>
<tr>
<td>ME 465</td>
<td>Computer Aided Optimal Design</td>
<td>3</td>
</tr>
<tr>
<td>ME 475</td>
<td>Computer Aided Design of Structures</td>
<td>3</td>
</tr>
<tr>
<td>ME 497</td>
<td>Biomechanical Design in Product Dev</td>
<td>3</td>
</tr>
</tbody>
</table>
Concentrations:
The Department offers concentrations in biomechanical engineering, engineering mechanics, global engineering, and manufacturing engineering to students wishing an area of specialization in their degree. The concentrations are available to, but not required of, any student enrolled in the Bachelor of Science degree program in mechanical engineering. NOTE: Completing the Bachelor of Science degree in mechanical engineering with a concentration may require more than 128 credits. Upon completion of the required courses for one of these concentrations, certification will appear on the student’s official transcript.

Biomechanical Engineering Concentration (16)
To earn a Bachelor of Science degree in Mechanical Engineering with a biomechanical engineering concentration, students must complete requirements 1., 2., 3.a., 3.b., and 3.d. above and the following:

Both of the following courses (7):
BS 161 Cells and Molecular Biology 3
PSL 250 Introductory Physiology 4

Select nine credits from the following courses (9):
ME 494 Biofluid Mechanics and Heat Transfer 3
ME 495 Tissue Mechanics 3
ME 497 Biomechanical Design in Product Dev 3
MSE 425 Biomaterials and Biocompatibility 3
ME 490 and ME 491 may be used, subject to Department approval.

Engineering Mechanics Concentration (12)
To earn a Bachelor of Science degree in Mechanical Engineering with a engineering mechanics concentration, students must complete requirements 1., 2., and 3.a., and 3.b. above and the following:

ME 423 Intermed Mechanics of Deform Solids 3
ME 425 Experimental Mechanics 3
ME 464 Intermediate Dynamics 3
ME 475 Computer Aided Design of Structures 3

Manufacturing Engineering Concentration (13)
To earn a Bachelor of Science degree in Mechanical Engineering with a manufacturing engineering concentration, students must complete requirements 1., 2., 3.a., 3.b., and 3.d. above and the following:

All of the following courses (10):
EC 210 Economics Principles Using Calculus 3
ME 372 Machine Tool Laboratory 1
ME 477 Manufacturing Processes 3
ME 478 Product Development 3

Select one of the following courses (3):
CHE 472 Composite Materials Processing 3
ECE 415 Computer Aided Manufacturing 3
ME 426 Introduction to Composite Materials 3

Global Engineering (12)
To earn a Bachelor of Science degree in Mechanical Engineering with a global engineering concentration, students must complete requirements 1., 2., 3.a., and 3.b. above and 12 credits of approved mechanical engineering courses from a MSU co-sponsored Study Abroad institution. At least 3 credits must include a team design project.

Other Electives (Variable)

Total Credits Required for Degree 128

The requirements listed on opposite page apply to students admitted to the major of Mechanical Engineering in the Department of Mechanical Engineering beginning Fall 2014. The Department of Mechanical Engineering (ME) constantly reviews program requirements and reserves the right to make changes as necessary. Consequently, each student is strongly encouraged to consult with his/her advisor to obtain assistance in planning an appropriate schedule of courses. Students who have questions about Mechanical Engineering should contact the Mechanical Engineering Department Advising Office, 2560 Engineering Building, phone (517) 355-3338.

Some courses may have prerequisites, which are not otherwise required in the program. Students should check course descriptions to ensure they are aware of prerequisites.
# Mechanical Engineering

## Sample Program

### Freshman Year

<table>
<thead>
<tr>
<th></th>
<th>Fall Credits</th>
<th>Spring Credits</th>
</tr>
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<tbody>
<tr>
<td>Bioscience</td>
<td>3/4</td>
<td>CEM 161 1</td>
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<tr>
<td>CEM 141</td>
<td>4</td>
<td>EGR 102 2</td>
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<tr>
<td>EGR 100</td>
<td>2</td>
<td>MTH 133 4</td>
</tr>
<tr>
<td>ISS 2XX</td>
<td>4</td>
<td>PHY 183 4</td>
</tr>
<tr>
<td>MTH 132</td>
<td>3</td>
<td>WRA 1XX 4</td>
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<tr>
<td><strong>Total</strong></td>
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### Sophomore Year

<table>
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<tbody>
<tr>
<td></td>
<td>CE 221 3</td>
<td>IAH 201-210 4</td>
</tr>
<tr>
<td>Elective</td>
<td>4</td>
<td>ME 201 3</td>
</tr>
<tr>
<td>ME 280</td>
<td>2</td>
<td>ME 222 3</td>
</tr>
<tr>
<td>MTH 234</td>
<td>4</td>
<td>MSE 250 3</td>
</tr>
<tr>
<td>PHY 184</td>
<td>4</td>
<td>MTH 235 3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>17</strong></td>
<td><strong>16</strong></td>
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### Junior Year

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Elective</td>
<td>4</td>
<td>ECE 345 3</td>
</tr>
<tr>
<td>ISS 3XX</td>
<td>4</td>
<td>Elective 3</td>
</tr>
<tr>
<td>ME 361</td>
<td>3</td>
<td>IAH 211 or higher 4</td>
</tr>
<tr>
<td>ME 391</td>
<td>3</td>
<td>ME 332 4</td>
</tr>
<tr>
<td>STT 351</td>
<td>3</td>
<td>ME 371 3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
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### Senior Year

<table>
<thead>
<tr>
<th></th>
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<th>Spring Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME 410</td>
<td>3</td>
<td>ME 412 2</td>
</tr>
<tr>
<td>ME 461</td>
<td>3</td>
<td>ME 451 4</td>
</tr>
<tr>
<td>ME 471</td>
<td>3</td>
<td>ME 481 3</td>
</tr>
<tr>
<td>Senior Elective</td>
<td>3</td>
<td>Senior Elective 3</td>
</tr>
<tr>
<td>Senior Elective</td>
<td>3</td>
<td>Senior Elective 3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>15</strong></td>
<td><strong>15</strong></td>
</tr>
</tbody>
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### Program Educational Objectives for the Undergraduate Program in Mechanical Engineering

Department of Mechanical Engineering
Michigan State University

(Approved by the Department Faculty December 10, 2015)

Be competent and ethical engineers practicing in a diverse range of activities

Use their mechanical engineering education as a stimulus for personal and professional growth

Be recognized for their capability, creativity, and application of knowledge

Be independent and critical thinkers who identify problems and develop effective solutions.