ENGINEERING MECHANICS, BS

for the degree of Bachelor of Science in Engineering Mechanics

Graduation Requirements

Minimum Technical GPA (https://go.grainger.illinois.edu/TechnicalGPA/): 2.0
TGPA is required for required Engineering courses and any technical elective courses. See Technical GPA (https://go.grainger.illinois.edu/TechnicalGPA/) to clarify requirements.

Minimum Overall GPA: 2.0
Minimum hours required for graduation: 128 hours
General education: Students must complete the Campus General Education requirements including the campus general education language requirement. ME 470 and TAM 324 will each satisfy a core course requirement and the Campus General Education Advanced Composition requirement.

Orientation and Professional Development

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENG 100</td>
<td>Grainger Engineering Orientation Seminar (External transfer students take ENG 300.)</td>
<td>1</td>
</tr>
<tr>
<td>TAM 195</td>
<td>Mechanics in the Modern World</td>
<td>1</td>
</tr>
<tr>
<td>ME 290</td>
<td>Seminar</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td><strong>Total Hours</strong></td>
<td><strong>2</strong></td>
</tr>
</tbody>
</table>

Foundational Mathematics and Science

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 102</td>
<td>General Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 103</td>
<td>General Chemistry Lab I</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 104</td>
<td>General Chemistry II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 105</td>
<td>General Chemistry Lab II</td>
<td>1</td>
</tr>
<tr>
<td>MATH 221</td>
<td>Calculus I (MATH 220 may be substituted. MATH 220 is appropriate for students with no background in calculus. 4 of 5 credit hours count towards degree.)</td>
<td>4</td>
</tr>
<tr>
<td>MATH 231</td>
<td>Calculus II</td>
<td>3</td>
</tr>
<tr>
<td>MATH 241</td>
<td>Calculus III</td>
<td>4</td>
</tr>
<tr>
<td>MATH 257</td>
<td>Linear Algebra with Computational Applications</td>
<td>3</td>
</tr>
<tr>
<td>MATH 441</td>
<td>Differential Equations</td>
<td>3</td>
</tr>
<tr>
<td>MATH 442</td>
<td>Intro Partial Diff Equations</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 211</td>
<td>University Physics: Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 212</td>
<td>University Physics: Elec &amp; Mag</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 213</td>
<td>Univ Physics: Thermal Physics</td>
<td>2</td>
</tr>
<tr>
<td>PHYS 214</td>
<td>Univ Physics: Quantum Physics</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td><strong>Total Hours</strong></td>
<td><strong>40</strong></td>
</tr>
</tbody>
</table>

Engineering Mechanics Technical Core

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 101</td>
<td>Intro Computing: Engrg &amp; Sci (CS 124 or ECE 220 may be substituted.)</td>
<td>3</td>
</tr>
<tr>
<td>ECE 205</td>
<td>Electrical and Electronic Circuits (ECE 110 and either ECE 210 or ECE 211 may be substituted.)</td>
<td>3</td>
</tr>
<tr>
<td>ME 170</td>
<td>Computer-Aided Design</td>
<td>3</td>
</tr>
<tr>
<td>ME 200</td>
<td>Thermodynamics</td>
<td>3</td>
</tr>
<tr>
<td>ME 470</td>
<td>Senior Design Project</td>
<td>3</td>
</tr>
<tr>
<td>TAM 211</td>
<td>Statics</td>
<td>3</td>
</tr>
<tr>
<td>TAM 212</td>
<td>Introductory Dynamics</td>
<td>3</td>
</tr>
<tr>
<td>TAM 251</td>
<td>Introductory Solid Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>TAM 252</td>
<td>Solid Mechanics Design</td>
<td>1</td>
</tr>
<tr>
<td>TAM 270</td>
<td>Design for Manufacturability</td>
<td>3</td>
</tr>
</tbody>
</table>

Information listed in this catalog is current as of 04/2022
TAM 324  Behavior of Materials  4
TAM 335  Introductory Fluid Mechanics  4
TAM 412  Intermediate Dynamics  4
TAM 445  Continuum Mechanics  4
TAM 470  Computational Mechanics  3

Total Hours  47

**Secondary Field Option Electives**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Secondary field electives selected from departmentally approved courses for Secondary Field Options. Each secondary field generally specifies two required courses and two additional courses from a list of approved elective courses. For each of the secondary fields, the required and approved elective courses specified for each are listed below. To add flexibility to the program and to accommodate particular interests, the student may fashion an individualized secondary field option. The only requirements are that the courses be related to mechanics, form a coherent and cohesive group, include at least two engineering courses, and total at least 12 hours of advanced-level coursework that are distinct from required courses in the Engineering Mechanics curriculum. This can include 500-level courses, if the student has the adequate preparation, for any of the secondary field elective courses. Each student must formally declare their choice of secondary field with a Mechanical Science and Engineering Undergraduate Programs Office advisor using a Secondary Field Options form.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>12</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Biomechanics

**Required Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCB 150</td>
<td>Molec &amp; Cellular Basis of Life</td>
<td>4</td>
</tr>
<tr>
<td>MCB 151</td>
<td>Molec &amp; Cellular Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>TAM 461</td>
<td>Cellular Biomechanics</td>
<td>4</td>
</tr>
</tbody>
</table>

**Approved Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECE 473</td>
<td>Fund of Engrg Acoustics</td>
<td>3 or 4</td>
</tr>
<tr>
<td>ECE 380</td>
<td>Biomedical Imaging</td>
<td>3</td>
</tr>
<tr>
<td>ME 481</td>
<td>Whole-Body Musculoskel Biomech</td>
<td>3 or 4</td>
</tr>
<tr>
<td>ME 482</td>
<td>Musculoskel Tissue Mechanics</td>
<td>3 or 4</td>
</tr>
<tr>
<td>ME 483</td>
<td>Mechanobiology</td>
<td>4</td>
</tr>
<tr>
<td>BIOP 401</td>
<td>Introduction to Biophysics</td>
<td>3</td>
</tr>
<tr>
<td>TAM 497</td>
<td>Independent Study</td>
<td>1 to 3</td>
</tr>
</tbody>
</table>

### Computational Mechanics

**Required Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 357</td>
<td>Numerical Methods I</td>
<td>3</td>
</tr>
<tr>
<td>ME 471</td>
<td>Finite Element Analysis</td>
<td>3 or 4</td>
</tr>
</tbody>
</table>

**Approved Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 450</td>
<td>Numerical Analysis</td>
<td>3 or 4</td>
</tr>
<tr>
<td>CS 457</td>
<td>Numerical Methods II</td>
<td>3</td>
</tr>
<tr>
<td>ME 412</td>
<td>Numerical Thermo-Fluid Mechs</td>
<td>2 to 4</td>
</tr>
<tr>
<td>TAM 497</td>
<td>Independent Study</td>
<td>1 to 3</td>
</tr>
</tbody>
</table>

### Engineering Science and Applied Mathematics

**Required Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 446</td>
<td>Applied Complex Variables</td>
<td>3-4</td>
</tr>
<tr>
<td>or MATH 448</td>
<td>Complex Variables</td>
<td></td>
</tr>
</tbody>
</table>

Any 400 level MATH course, excluding MATH 415, MATH 441, and MATH 442

**Approved Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>AE 353</td>
<td>Aerospace Control Systems</td>
<td>3</td>
</tr>
<tr>
<td>AE 402</td>
<td>Orbital Mechanics</td>
<td>3 or 4</td>
</tr>
<tr>
<td>CEE 491</td>
<td>Decision and Risk Analysis</td>
<td>3 or 4</td>
</tr>
<tr>
<td>ECE 329</td>
<td>Fields and Waves I</td>
<td>3</td>
</tr>
<tr>
<td>ECE 330</td>
<td>Power Ckts &amp; Electromechanics</td>
<td>3</td>
</tr>
<tr>
<td>ECE 473</td>
<td>Fund of Engrg Acoustics</td>
<td>3 or 4</td>
</tr>
<tr>
<td>PHYS 402</td>
<td>Light</td>
<td>3 or 4</td>
</tr>
</tbody>
</table>

*Information listed in this catalog is current as of 04/2022*
<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>TAM 497</td>
<td>Independent Study</td>
<td>1 to 3</td>
</tr>
</tbody>
</table>

### Experimental Mechanics

**Required Courses**

- TAM 456 | Experimental Stress Analysis | 3
- ECE 206 | Electrical and Electronic Circuits Lab | 1

**Approved Courses**

- CS 357 | Numerical Methods I | 3
- ECE 473 | Fund of Engrg Acoustics | 3 or 4
- ME 360 | Signal Processing | 3.5
- PHYS 402 | Light | 3 or 4
- TAM 497 | Independent Study | 1 to 3

### Fluid Mechanics

**Required Courses**

- TAM 435 | Intermediate Fluid Mechanics | 4
- ME 410 | Intermediate Gas Dynamics | 3 or 4

**Approved Courses**

- AE 412 | Viscous Flow & Heat Transfer | 4
- CEE 451 | Environmental Fluid Mechanics | 3
- CEE 453 | Urban Hydrology and Hydraulics | 4
- ECE 473 | Fund of Engrg Acoustics | 3 or 4
- ME 412 | Numerical Thermo-Fluid Mechs | 2 to 4
- TAM 497 | Independent Study | 1 to 3

### Mechanics of Materials

**Required Courses**

- TAM 424 | Mechanics of Structural Metals | 3 or 4
- TAM 428 | Mechanics of Composites | 3

**Approved Courses**

- CEE 310 | Transportation Engineering | 3
- MSE 401 | Thermodynamics of Materials | 3
- MSE 455 | Macromolecular Solids | 3
- MSE 489 | Matl Select for Sustainability | 3 or 4
- NPRE 330 | Materials in Nuclear Engineering | 3
- TAM 497 | Independent Study | 1 to 3

### Solid Mechanics

**Required Courses**

- TAM 424 | Mechanics of Structural Metals | 3 or 4
- TAM 451 | Intermediate Solid Mechanics | 4

**Approved Courses**

- CEE 360 | Structural Engineering | 3
- CEE 460 | Steel Structures I | 3
- CEE 461 | Reinforced Concrete I | 3
- CS 357 | Numerical Methods I | 3
- ECE 473 | Fund of Engrg Acoustics | 3 or 4
- TAM 497 | Independent Study | 1 to 3

### Free Electives

**Code**

<table>
<thead>
<tr>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
</table>

Additional course work, subject to the Grainger College of Engineering restrictions to Free Electives, so that there are at least 128 credit hours earned toward the degree. (https://go.grainger.illinois.edu/FreeElectives/)

**Total Hours of Curriculum to Graduate**

128