The Engineering Mechanics program at Illinois (accredited by the Engineering Accreditation Commission of ABET (https://www.abet.org/)) is a major that focuses on the principles of mechanics that underpin design and engineering in diverse industries including materials, energy, biotechnology, civil, and aerospace to name a few. Students learn rigorous mathematical, scientific, and engineering principles in subject areas such as statics, dynamics, strength of materials, and fluid dynamics. Further, Engineering Mechanics students learn how to apply these basic principles in modern engineering design through laboratory and project work. The program also benefits from a cohesive secondary field which students can tailor to fit their academic and career objectives. Engineering Mechanics is well suited for students with an interest in analysis and design, and physical principles.

Current Program Educational Objectives (https://mechse.illinois.edu/undergraduate/)

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

Code | Title | Hours
--- | --- | ---
ENG 100 | Grainger Engineering Orientation Seminar (External transfer students take ENG 300.) | 1
TAM 195 | Mechanics in the Modern World | 1
ME 290 | Seminar | 0
Total Hours | 2

Foundational Mathematics and Science

Code | Title | Hours
--- | --- | ---
CHEM 102 | General Chemistry I | 3
CHEM 103 | General Chemistry Lab I | 1
CHEM 104 | General Chemistry II | 3
CHEM 105 | General Chemistry Lab II | 1
MATH 221 | 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.) | 4

Engineering Mechanics Technical Core

Code | Title | Hours
--- | --- | ---
CS 101 | Intro Computing: Engrg & Sci (CS 124 or ECE 220 may be substituted.) | 3
ECE 205 | Electrical and Electronic Circuits (ECE 110 and either ECE 210 or ECE 211 may be substituted.) | 3
ME 170 | Computer-Aided Design | 3
ME 200 | Thermodynamics | 3
ME 470 | Senior Design Project | 3
TAM 211 | Statics | 3
TAM 212 | Introductory Dynamics | 3
TAM 251 | Introductory Solid Mechanics | 3
TAM 252 | Solid Mechanics Design | 1
TAM 270 | Design for Manufacturability | 3
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 | 40

Secondary Field Option Electives

Code | Title | Hours
--- | --- | ---
MATH 231 | Calculus II | 3
MATH 241 | Calculus III | 4
MATH 257 | Linear Algebra with Computational Applications | 3
MATH 441 | Differential Equations | 3
MATH 442 | Intro Partial Diff Equations | 3
PHYS 211 | University Physics: Mechanics | 4
PHYS 212 | University Physics: Elec & Mag | 4
PHYS 213 | Univ Physics: Thermal Physics | 2
PHYS 214 | Univ Physics: Quantum Physics | 2
Total Hours | 47

Information listed in this catalog is current as of 06/2023
MCB 150  Molec & Cellular Basis of Life          4
MCB 151  Molec & Cellular Laboratory          1
TAM 461  Cellular Biomechanics                4

Approved Courses
ECE 473  Fund of Engrg Acoustics              3 or 4
ECE 380  Biomedical Imaging                   3
ME 481  Whole-Body Musculoskel Biomech        3 or 4
ME 482  Musculoskel Tissue Mechanics          3 or 4
ME 483  Mechanobiology                        4
BIOP 401  Introduction to Biophysics          3
TAM 497  Independent Study                    1 to 3

Computational Mechanics
Required Courses
CS 357  Numerical Methods I                   3
ME 471  Finite Element Analysis                3 or 4

Approved Courses
CS 450  Numerical Analysis                    3 or 4
CS 457  Numerical Methods II                  3
ME 412  Numerical Thermo-Fluid Mech            2 to 4
TAM 497  Independent Study                    1 to 3

Engineering Science and Applied Mathematics
Required Courses
MATH 446  Applied Complex Variables           3-4
or MATH 448  Complex Variables
Any 400 level MATH course, excluding MATH 415, MATH 441, and MATH 442          3 or 4

Approved Courses
AE 353  Aerospace Control Systems             3
AE 402  Orbital Mechanics                      3 or 4
CEE 491  Decision and Risk Analysis           3 or 4
ECE 329  Fields and Waves I                   3
ECE 330  Power Ckts & Electromechanics        3
ECE 473  Fund of Engrg Acoustics              3 or 4
PHYS 402  Light                               3 or 4
TAM 497  Independent Study                    1 to 3

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 Mech            2 to 4
TAM 497  Independent Study                    1 to 3

Mechanics of Materials
Required Courses
TAM 242  Mechanics of Structural Metals       3 or 4
TAM 248  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 242  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  Title                                    Hours

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

for the degree of Bachelor of Science in Engineering Mechanics

Sample Sequence
This sample sequence is intended to be used only as a guide for degree completion. All students should work individually with their academic advisors to decide the actual course selection and sequence that works best for them based on their academic preparation and goals. Enrichment programming such as study abroad, minors, internships, and so on may impact the structure of this four-year plan. Course availability is not guaranteed during the semester indicated in the sample sequence. The curriculum sequence can also be viewed via dynamic and static curricular maps (https://grainger.illinois.edu/academics/undergraduate/majors-and-minors/engineering-mechanics-map/), which include prerequisite sequencing.

Students must fulfill their Language Other Than English requirement by successfully completing a third level of a language other than English. See the corresponding section on the Degree and General Education Requirements (http://catalog.illinois.edu/general-information/degree-general-education-requirements/). ME 470 and TAM 324 will each satisfy
a core course requirement and the Campus General Education Advanced Composition requirement.

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

### First Year

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester Hours</th>
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</thead>
<tbody>
<tr>
<td>TAM 195</td>
<td>1 CS 101 (CS 124 or ECE 220 may be substituted.)</td>
</tr>
<tr>
<td>MATH 221 (MATH 220 may be substituted)</td>
<td>4 MATH 231</td>
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<td>CHEM 102</td>
<td>3 PHYS 211</td>
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<tr>
<td>CHEM 103</td>
<td>1 General Education course (choose a Humanities or Social/Behavioral Science course with Cultural Studies designation)</td>
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<tr>
<td>ENG 100</td>
<td>1 ME 170 or Composition I course</td>
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<td>Composition I course or ME 170</td>
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<tr>
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### Second Year

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<tr>
<td>TAM 211</td>
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<tr>
<td>MATH 257</td>
<td>3 MATH 241</td>
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<tr>
<td>CHEM 104</td>
<td>3 PHYS 212</td>
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<td>CHEM 105</td>
<td>1 TAM 251</td>
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<tr>
<td>TAM 270</td>
<td>3 TAM 252</td>
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<tr>
<td>ME 290</td>
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### Third Year

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<tr>
<td>TAM 335</td>
<td>4 TAM 324</td>
</tr>
<tr>
<td>MATH 441</td>
<td>3 TAM 412</td>
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<tr>
<td>ME 200</td>
<td>3 PHYS 213</td>
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### Fourth Year

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<th>Second Semester Hours</th>
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<tr>
<td>MATH 442</td>
<td>3 Secondary Field elective course or ME 470</td>
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<tr>
<td>ME 470 (or Secondary Field elective course)</td>
<td>3 Secondary Field elective course</td>
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<tr>
<td>TAM 470</td>
<td>3 Secondary Field elective course</td>
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<td>3 General Education course (choose a Humanities or Social/Behavioral Science course with Cultural Studies designation)</td>
</tr>
<tr>
<td>General Education course (choose a Humanities or Social/Behavioral Science course)</td>
<td>3 Free elective course</td>
</tr>
<tr>
<td><strong>Total</strong></td>
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</tr>
</tbody>
</table>

**Total Hours 128**

_for the degree of Bachelor of Science Major in Engineering Mechanics_

Student learning outcomes are based on learning outcomes in line with the ABET accreditation process.

Engineering Mechanics graduates will have:

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
3. An ability to communicate effectively with a range of audiences.
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.

Information listed in this catalog is current as of 06/2023
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.

6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.

7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

For the degree of Bachelor of Science in Engineering Mechanics

Mechanical Science & Engineering Website (http://mechse.illinois.edu/)
Mechanical Science & Engineering Faculty (https://mechse.illinois.edu/people/faculty/)

The Grainger College of Engineering Admissions (https://grainger.illinois.edu/admissions/)
The Grainger College of Engineering (https://grainger.illinois.edu/)