

BACHELOR OF SCIENCE IN MATERIALS SCIENCE AND ENGINEERING

The materials science and engineering program aims to develop an understanding of the structure, properties, processing, and service behavior of engineering materials, including metallic, ceramic, polymeric, and composite materials. This understanding fosters both development of new materials and improvement of existing materials in order to optimize manufactured products. Laboratory experience is an important part of the program and emphasizes microstructural characterization using modern analytical techniques, such as optical and electron microscopy and x-ray diffraction, materials processing, determination of the physical and mechanical behavior of materials, and materials and process selection.

Graduating students find employment opportunities in a wide range of industries requiring knowledge of materials development and/or optimization, processing, and selection.

Required Courses

| Code | Title | Credit Hours |
|---|--------------------------------|--------------|
| Materials Engineering Requirements | | (46) |
| MMAE 100 | Intro to the Profession | 3 |
| MMAE 202 | Mechanics of Solids | 3 |
| MMAE 232 | Design for Innovation | 3 |
| MMAE 320 | Thermodynamics | 3 |
| MMAE 350 | Computational Mechanics | 3 |
| MMAE 365 | Strctr & Propts of Materials I | 3 |
| MMAE 370 | Materials Laboratory I | 3 |
| MMAE 372 | Aerospace Materials Lab | 3 |
| MMAE 373 | Instrumentation/Measurmnt Lab | 4 |
| MMAE 463 | Strctr&Propts of Mtrl II | 3 |
| MMAE 465 | Electrl,Mgntc & Optic | 3 |
| MMAE 470 | Intro to Polymer Science | 3 |
| MMAE 472 | Advanced Aerospace Materials | 3 |
| MMAE 476 | Materials Laboratory II | 3 |
| MMAE 485 | Manufacturing Processes | 3 |
| Materials Science Requirement | | (3) |
| MS 201 | Materials Science | 3 |
| Mathematics Requirements | | (18) |
| MATH 151 | Calculus I | 5 |
| MATH 152 | Calculus II | 5 |
| MATH 251 | Multivariate & Vector Calculus | 4 |
| MATH 252 | Introduction to Diff Equations | 4 |
| Physics Requirements | | (11) |
| PHYS 123 | General Physics I: Mechanics | 4 |
| PHYS 221 | Gen Physics II: Elect&Magntism | 4 |
| PHYS 224 | Gen Physics III for Engrns | 3 |
| Chemistry Requirement | | (4) |
| CHEM 124 | Princ of Chemistry I with Lab | 4 |
| Computer Science Requirement | | (2) |
| CS 104 | Intro to Comp Prgm for Engrs | 2 |
| Technical Electives | | (6) |
| Select six credit hours ¹ | | 6 |
| Engineering Elective | | (3) |
| Select three credit hours ² | | 3 |
| Humanities and Social Sciences Requirements | | (21) |
| See Illinois Tech Core Curriculum, sections B and C | | 21 |

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| Interprofessional Projects (IPRO) | (6) |
| See Illinois Tech Core Curriculum, section E | 6 |
| Free Elective | (6) |
| Select six credit hours | 6 |
| Total Credit Hours | 126 |

- ¹ A technical elective is a 300- or higher-level course in any engineering discipline (other than required MMAE courses or their equivalent) or in mathematics, chemistry, physics, or computer science. However, not all such courses are acceptable as technical electives. Students should consult their faculty adviser for a determination of which courses are acceptable. In addition, ECE 218, ECON 423, INTM 437 and INTM 438 are permitted. Any substitutions require written approval by the department.
- ² An engineering elective is a 300- or higher-level course in any engineering discipline (other than required MMAE courses or their equivalents).

Bachelor of Science in Materials Science and Engineering Curriculum

| | | Year 1 | |
|--|--------------|-----------------------------------|--------------|
| Semester 1 | Credit Hours | Semester 2 | Credit Hours |
| MMAE 100 | 3 | MS 201 | 3 |
| MATH 151 | 5 | MATH 152 | 5 |
| CHEM 124 | 4 | PHYS 123 | 4 |
| Humanities 200-level Course | 3 | CS 104 | 2 |
| | | Social Sciences Elective | 3 |
| | | 15 | 17 |
| | | Year 2 | |
| Semester 1 | Credit Hours | Semester 2 | Credit Hours |
| MMAE 202 | 3 | MMAE 350 | 3 |
| MMAE 232 | 3 | MATH 252 | 4 |
| MATH 251 | 4 | PHYS 224 | 3 |
| PHYS 221 | 4 | Humanities Elective (300+) | 3 |
| Humanities or Social Sciences Elective | 3 | Free Elective | 3 |
| | | 17 | 16 |
| | | Year 3 | |
| Semester 1 | Credit Hours | Semester 2 | Credit Hours |
| MMAE 320 | 3 | MMAE 372 | 3 |
| MMAE 365 | 3 | MMAE 463 | 3 |
| MMAE 370 | 3 | MMAE 465 | 3 |
| MMAE 373 | 4 | Free Elective | 3 |
| Social Sciences Elective (300+) | 3 | Humanities Elective (300+) | 3 |
| | | 16 | 15 |
| | | Year 4 | |
| Semester 1 | Credit Hours | Semester 2 | Credit Hours |
| MMAE 470 | 3 | MMAE 472 | 3 |
| MMAE 476 | 3 | I PRO Elective II | 3 |
| MMAE 485 | 3 | Technical Elective ¹ | 3 |
| I PRO Elective I | 3 | Engineering Elective ² | 3 |
| Technical Elective ¹ | 3 | Social Sciences Elective (300+) | 3 |
| | | 15 | 15 |

Total Credit Hours: 126

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This program is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET).