

# 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
<b>Materials Engineering Requirements</b>		<b>(43)</b>
MMAE 100	Introduction 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	Structure and Properties of Materials I	3
MMAE 370	Materials Laboratory I	3
MMAE 372	Aerospace Materials Lab	3
MMAE 373	Instrumentation and Measurements Laboratory	4
MMAE 463	Structure and Properties of Materials II	3
MMAE 465	Electrical, Magnetic, and Optical Properties of Materials	3
MMAE 472	Advanced Aerospace Materials	3
MMAE 476	Materials Laboratory II	3
MMAE 485	Manufacturing Processes	3
<b>Materials Science Requirement</b>		<b>(3)</b>
MS 201	Materials Science	3
<b>Mathematics Requirements</b>		<b>(18)</b>
MATH 151	Calculus I	5
MATH 152	Calculus II	5
MATH 251	Multivariate and Vector Calculus	4
MATH 252	Introduction to Differential Equations	4
<b>Physics Requirements</b>		<b>(11)</b>
PHYS 123	General Physics I: Mechanics	4
PHYS 221	General Physics II: Electricity and Magnetism	4
PHYS 224	General Physics III for Engineers	3
<b>Chemistry Requirement</b>		<b>(4)</b>
CHEM 124	Principles of Chemistry I with Laboratory	4
<b>Computer Science Requirement</b>		<b>(2)</b>
CS 104	Introduction to Computer Programming for Engineers	2
<b>Technical Electives</b>		<b>(9)</b>
Select nine credit hours <sup>1</sup>		9
<b>Engineering Elective</b>		<b>(3)</b>
Select three credit hours <sup>2</sup>		3
<b>Humanities and Social Sciences Requirements</b>		<b>(21)</b>
See Illinois Tech Core Curriculum, sections B and C		21
<b>Interprofessional Projects (IPRO)</b>		<b>(6)</b>

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See Illinois Tech Core Curriculum, section E	6
<b>Free Elective</b>	<b>(6)</b>
Select six credit hours	6
<b>Total Credit Hours</b>	<b>126</b>

- <sup>1</sup> 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.
- <sup>2</sup> 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
<b>15</b>		<b>17</b>	
		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
<b>17</b>		<b>16</b>	
		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
<b>16</b>		<b>15</b>	
		Year 4	
Semester 1	Credit Hours	Semester 2	Credit Hours
MMAE 476	3	MMAE 472	3
MMAE 485	3	I PRO Elective II	3
I PRO Elective I	3	Technical Elective <sup>1</sup>	3
Technical Elective <sup>1</sup>	3	Engineering Elective <sup>2</sup>	3
Technical Elective <sup>1</sup>	3	Social Sciences Elective (300+)	3
<b>15</b>		<b>15</b>	

**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).