

# Materials Science & Engineering

- Bachelor of Science (B.S.)
- Program Curriculum



## Mathematics/Science coursework **28-31 cr.**

CHEM 1110 - General Chemistry I &	
CHEM 1120 - General Chemistry II <b>or</b>	8 cr.
CHEM 1130 - General Chemistry I & II	5 cr.
• course also satisfies UNIFI Scientific Reasoning requirement.	
MATH 1420 - Calculus I	4 cr.
• course also satisfies UNIFI Quantitative Reasoning requirement.	
MATH 1421 - Calculus II	4 cr.
MATH 2422 - Calculus III	4 cr.
PHYSICS 1701 - Physics I for Science & Engineering	4 cr.
• course also satisfies UNIFI Scientific Reasoning requirement.	
PHYSICS 1702 - Physics II for Science & Engineering	4 cr.
PHYSICS 2700 - Mathematical Methods of Science & Eng. <b>or</b>	
MATH 3425 - Differential Equations	3 cr.

## Materials Science & Engineering Core **51 cr.**

CHEM/PHYSICS 4200 - Nanoscience	3 cr.
ENGR 1000 - Introduction to Eng. & Professional Practice	3 cr.
ENGR 2080 - Statics	2 cr.
ENGR 2089 - Engineering Seminar	1 cr.
ENGR 2180 - Strength of Materials	2 cr.
ENGR 4235 - Material Transformation & Modeling	3 cr.
ENGR 4500 - Senior Design	3 cr.
PHIL 1560 - Science, Technology & Ethics	3 cr.
• course also satisfies UNIFI Responsibility requirement.	
PHYSICS 4750 - Physics of Modern Materials	3 cr.
PHYSICS 4760 - Computational Materials Science	3 cr.
PHYSICS 4900 - Thermodynamics & Statistical Mechanics	4 cr.
STAT 3751 - Probability & Statistics	3 cr.
TECH 1024 - Engineering Design with CAD	3 cr.
TECH 2072 - Engineering Materials	3 cr.
TECH 3127 - Applied Thermodynamics	3 cr.
TECH 3132 - Metallurgy & Phase Transitions	3 cr.
TECH 3136 - Principles of Metal Casting	3 cr.
TECH 3192 - Non-Destructive Evaluation of Materials	3 cr.

## Technical Writing requirement **3 cr.**

ENGLISH 3772 - Technical Writing for Eng. Technologists	3 cr.
---	-------

## Technical Electives **12 cr.**

Students are required to complete 12 credits of coursework approved by their academic advisor.

## UNI Foundational Inquiry **37 cr.**

Written Communications	3 cr.
Oral Communications	3 cr.
Quantitative Reasoning	3 cr.
• requirement completed with MATH 1420.	
Human Condition (Domestic)	3 cr.
Human Condition (Global)	3 cr.
Scientific Reasoning	4 cr.
• requirement completed with PHYSICS 1701.	
Human Expression	3 cr.
Responsibility	3 cr.
• requirement completed with PHIL 1560.	
UNIFI Elective	3 cr.
• requirement completed with CHEM 1110 or CHEM 1130.	
UNIFI Elective	3 cr.
UNIFI Elective	3 cr.
UNIFI Elective	3 cr.

Inspired by the University of Northern Iowa mission to engage students in high-quality and high-impact learning experiences within a challenging and supportive environment, UNI's new general education requirements are designed to ensure that students' foundational learning experiences lead to a lifetime full of potential. For more information, visit [unifi.uni.edu](http://unifi.uni.edu).

## Credit Totals

Math/Science coursework	28 cr.
Materials Science & Engineering Core	51 cr.
UNI Foundational Inquiry (UNIFI)	37 cr.
Technical Writing requirement	3 cr.
Technical Electives	12 cr.
Credits counted twice (major & UNIFI)	-13 cr.
<b>Total</b>	<b>118 cr.</b>
University Electives needed	2 cr.
<b>Grand Total</b>	<b>120 cr.</b>

## Department of Applied Engineering & Technical Management

University of Northern Iowa  
 25 Industrial Technology Center  
 Cedar Falls, IA 50614-0178  
 Phone: (319) 273-2561 | E-mail: [appliedengineering@uni.edu](mailto:appliedengineering@uni.edu)

## Important ALEKS Test Information

The ALEKS test is a math placement test that all UNI students must complete prior to enrolling in certain math & science courses. Below are the scores required for the math & science requirements in this program:

- PHYSICS 1511: 45
- STAT 1772: 50
- MATH 1420: 76

# Materials Science & Engineering

- Bachelor of Science (B.S.)
- Program Curriculum



## Example course sequence for *first-year, freshmen* students

<b>Fall 1</b>		<b>Spring 1</b>	
CHEM 1110 - General Chemistry I	3 cr.	UNIFI Written Communication course	3 cr.
MATH 1420 - Calculus I	4 cr.	CHEM 1120 - General Chemistry II*	4 cr.
PHYSICS 1701 - Physics I for Science & Engineering <sup>FO</sup>	4 cr.	MATH 1421 - Calculus II*	4 cr.
ENGR 1000 - Introduction to Engineering	3 cr.	PHYSICS 1702 - Physics II for Science & Engineering <sup>SO</sup>	4 cr.
<b>Total: 14 cr.</b>		<b>Total: 14 cr.</b>	
<b>Fall 2</b>		<b>Spring 2</b>	
UNIFI Oral Communication course	3 cr.	UNIFI elective course	3 cr.
MATH 2422 - Calculus III	4 cr.	TECH 2072 - Engineering Materials <sup>SO</sup>	3 cr.
TECH 1024 - Engineering Design with CAD <sup>FO</sup>	3 cr.	ENGR 2180 - Strength of Materials <sup>^</sup>	2 cr.
ENGR 2080 - Statics <sup>^</sup>	2 cr.	PHYSICS 2700 - Mathematics Methods of Science & Engineering <sup>SO</sup>	3 cr.
ENGT 2089 - Engineering Seminar <sup>^</sup>	1 cr.	STAT 3751 - Probability & Statistics <sup>SO</sup>	3 cr.
ENGLISH 3772 - Technical Writing for Eng. Technologists <sup>^</sup>	3 cr.	Technical elective course	3 cr.
<b>Total: 17 cr.</b>		<b>Total: 17 cr.</b>	
<b>Fall 3</b>		<b>Spring 3</b>	
UNIFI Human Condition (Global) course	3 cr.	UNIFI Human Expression course	3 cr.
UNIFI Human Condition (Domestic) course	3 cr.	TECH 3127 - Applied Thermodynamics <sup>SO</sup>	3 cr.
TECH 3132 - Metallurgy & Phase Transitions <sup>^</sup>	3 cr.	TECH 3192 - Non-Destructive Evaluation of Materials <sup>^</sup>	3 cr.
CHEM 4200 - Nanoscience <sup>FO</sup>	3 cr.	PHYSICS 4760 - Computational Materials Science <sup>SO</sup>	3 cr.
Technical elective course	3 cr.	PHYSICS 4900 - Thermodynamics & Statistical Mechanics <sup>SO</sup>	4 cr.
<b>Total: 15 cr.</b>		<b>Total: 16 cr.</b>	
<b>Fall 4</b>		<b>Spring 4</b>	
PHIL 1560 - Science, Technology & Ethics	3 cr.	UNIFI elective course	3 cr.
TECH 3136 - Principles of Metal Casting <sup>FO</sup>	3 cr.	UNIFI elective course	3 cr.
ENGR 4235 - Material Transformation & Modeling <sup>^</sup>	3 cr.	ENGR 4500 - Senior Design <sup>^</sup>	3 cr.
PHYSICS 4750 - Physics of Modern Materials <sup>FO</sup>	3 cr.	Technical elective course	3 cr.
Technical elective course	3 cr.	University elective course	2 cr.
<b>Total: 15 cr.</b>		<b>Total: 14 cr.</b>	

## Example course sequence for *transfer students with an A.A. or A.S. degree*

<b>Fall 1</b>		<b>Spring 1</b>	
CHEM 1110 - General Chemistry I	4 cr.	CHEM 1120 - General Chemistry II*	4 cr.
MATH 1420 - Calculus I	4 cr.	MATH 1421 - Calculus II*	4 cr.
PHYSICS 1701 - Physics I for Science & Engineering <sup>FO</sup>	4 cr.	PHYSICS 1702 - Physics II for Science & Engineering <sup>SO</sup>	4 cr.
ENGR 1000 - Introduction to Engineering	3 cr.	TECH 3127 - Applied Thermodynamics <sup>SO</sup>	3 cr.
TECH 1024 - Engineering Design with CAD <sup>FO</sup>	3 cr.	ENGLISH 3772 - Technical Writing for Eng. Technologists <sup>^</sup>	3 cr.
<b>Total: 18 cr.</b>		<b>Total: 18 cr.</b>	
<b>Fall 2</b>		<b>Spring 2</b>	
MATH 2422 - Calculus III	4 cr.	TECH 2072 - Engineering Materials <sup>SO</sup>	3 cr.
ENGR 2080 - Statics <sup>^</sup>	2 cr.	ENGR 2180 - Strength of Materials <sup>^</sup>	2 cr.
ENGT 2089 - Engineering Seminar <sup>^</sup>	1 cr.	PHYSICS 2700 - Mathematics Methods of Science & Engineering <sup>SO</sup>	3 cr.
TECH 3132 - Metallurgy & Phase Transitions <sup>^</sup>	3 cr.	STAT 3751 - Probability & Statistics <sup>SO</sup>	3 cr.
CHEM 4200 - Nanoscience <sup>FO</sup>	3 cr.	Technical elective course	3 cr.
PHYSICS 4750 - Physics of Modern Materials <sup>FO</sup>	3 cr.	<b>Total: 14 cr.</b>	
<b>Total: 16 cr.</b>			
<b>Fall 3</b>		<b>Spring 3</b>	
PHIL 1560 - Science, Technology & Ethics	3 cr.	TECH 3192 - Non-Destructive Evaluation of Materials <sup>^</sup>	3 cr.
TECH 3136 - Principles of Metal Casting <sup>FO</sup>	3 cr.	PHYSICS 4760 - Computational Materials Science <sup>SO</sup>	3 cr.
ENGR 4235 - Material Transformation & Modeling <sup>^</sup>	3 cr.	PHYSICS 4900 - Thermodynamics & Statistical Mechanics <sup>SO</sup>	4 cr.
Technical elective course	3 cr.	ENGR 4500 - Senior Design <sup>^</sup>	3 cr.
Technical elective course	3 cr.	Technical elective course	3 cr.
<b>Total: 15 cr.</b>		<b>Total: 16 cr.</b>	

### Department of Applied Engineering & Technical Management

University of Northern Iowa  
 25 Industrial Technology Center  
 Cedar Falls, IA 50614-0178  
 Phone: (319) 273-2561 || E-mail: appliedengineering@uni.edu

#### Legend

<sup>^</sup> - course requires a prerequisite.  
<sup>%</sup> - course requires a co-requisite.  
<sup>FO</sup> - course is only offered in the fall.  
<sup>SO</sup> - course is only offered in the spring.