

MATERIALS SCIENCE MAJOR

Students must also complete the Undergraduate Registration Requirement (<https://catalogs.northwestern.edu/undergraduate/requirements-policies/undergraduate-registration-requirement>) and the degree requirements of their home school.

Students majoring in materials science in Weinberg College choose from two tracks: general materials or soft materials.

Requirements include foundation courses in mathematics and science and advanced electives. Course descriptions for materials science courses are listed in the McCormick School (<https://catalogs.northwestern.edu/undergraduate/engineering-applied-science/materials-science-engineering>) chapter of this catalog.

Course	Title
Program Courses (13 units)	
Laboratory components of general and organic chemistry courses require separate registration and bear separate credit; see the chemistry section for details.	
5 core courses:	
MAT_SCI 201-0 or MAT_SCI 301-0	Introduction to Materials Materials Science Principles
MAT_SCI 315-0	Phase Equilibria & Diffusion of Materials
MAT_SCI 316-1 & MAT_SCI 316-2	Microstructural Dynamics and Microstructural Dynamics
MAT_SCI 351-1	Introductory Physics of Materials
5 courses in the chosen track:	
General Materials Track (p. 2)	
Soft Materials Track (p. 2)	
3 advanced electives:	
At least 1 in materials science chosen from: ¹	
MAT_SCI 332-0	Mechanical Behavior of Solids
MAT_SCI 333-0	Composite Materials
MAT_SCI 336-0	Chemical Synthesis of Materials
MAT_SCI 337-0	Conducting Polymers
MAT_SCI 340-0	Ceramic Processing
MAT_SCI 341-0	Introduction to Modern Ceramics
MAT_SCI 351-2	Introductory Physics of Materials
MAT_SCI 355-0	Electronic Materials
MAT_SCI 360-0	Introduction to Electron Microscopy
MAT_SCI 361-0	Crystallography & Diffraction
MAT_SCI 370-0	Biomaterials
MAT_SCI 371-0	Biomaterials: Hierarchical Architecture & Function
MAT_SCI 376-0	Nanomaterials
MAT_SCI 380-0	Intro Surface Science & Spectroscopy
MAT_SCI 381-0	Materials for Energy-Efficient Technology
MAT_SCI 382-0	Electrochemical Energy Materials and Devices
MAT_SCI 385-0	Electronic and Thermal Properties of Materials
MAT_SCI 390-0	Materials Design
MAT_SCI 391-0	Process Design
MAT_SCI 397-0	Special Topics in Materials Science and Engineering
At least 1 in another department chosen from the following:	
CHEM 210-3 or CHEM 212-3	Organic Chemistry Organic Chemistry
CHEM 307-0	Materials and Nanochemistry
CHEM 333-0	Inorganic Chemistry
CHEM 342-2	Quantum Mechanics and Spectroscopy

CHEM 342-3	Kinetics and Statistical Thermodynamics
CHEM 360-0	Nanopatterning: Top-down meets Bottom-up
EARTH 300-0	Earth and Planetary Materials
MATH 250-0	Elementary Differential Equations
MATH 351-0 or MATH 381-0	Fourier Analysis and Boundary Value Problems Fourier Analysis and Boundary Value Problems for ISP
PHYSICS 332-0	Statistical Mechanics
PHYSICS 333-1	Advanced Electricity & Magnetism
PHYSICS 333-2	Advanced Electricity & Magnetism
PHYSICS 337-0	Physics of Condensed Matter
PHYSICS 339-3	Particle and Nuclear Physics
PHYSICS 357-0	Optics Laboratory
PHYSICS 358-0	Nanolithography
Foundations in Mathematics and Science (Units depend on chemistry and mathematics sequences taken.)	
MATH 220-0 & MATH 224-0 or MATH 212-0 & MATH 213-0 & MATH 214-0	Differential Calculus of One-Variable Functions and Integral Calculus of One-Variable Functions Single Variable Calculus I and Single Variable Calculus II and Single Variable Calculus III
MATH 230-0 & MATH 234-0 & MATH 240-0 or MATH 281-1 & MATH 281-2 & MATH 281-3 or MATH 285-1 & MATH 285-2 & MATH 285-3 or MATH 290-1 & MATH 290-2 & MATH 290-3 or MATH 291-1 & MATH 291-2 & MATH 291-3	Differential Calculus of Multivariable Functions and Multiple Integration and Vector Calculus and Linear Algebra Accelerated Mathematics for ISP: First Year and Accelerated Mathematics for ISP: First Year and Accelerated Mathematics for ISP: First Year Accelerated Mathematics for MMSS: First Year and Accelerated Mathematics for MMSS: First Year and Accelerated Mathematics for MMSS: First Year MENU: Linear Algebra and Multivariable Calculus and MENU: Linear Algebra and Multivariable Calculus and MENU: Linear Algebra and Multivariable Calculus MENU: Intensive Linear Algebra and Multivariable Calculus and MENU: Intensive Linear Algebra and Multivariable Calculus
CHEM 110-0 & CHEM 131-0 & CHEM 132-0 or CHEM 151-0 & CHEM 152-0 or CHEM 171-0 & CHEM 172-0	Quantitative Problem Solving in Chemistry and General Chemistry 1 and General Chemistry 2 Accelerated General Chemistry 1 and Accelerated General Chemistry 2 Advanced General Inorganic Chemistry and Advanced General Physical Chemistry
PHYSICS 135-1 & PHYSICS 135-2 & PHYSICS 135-3 or PHYSICS 125-1 & PHYSICS 125-2 & PHYSICS 125-3	General Physics and General Physics and General Physics General Physics ISP and General Physics for ISP and General Physics for ISP

Students in the soft materials track who are interested in biomaterials and/or medicine are encouraged to take additional courses in biology.

¹ MAT_SCI 395-0 Special Topics in Materials Science and Engineering may count only with permission of the director of undergraduate studies

Tracks

General Materials Track

Course	Title
CHEM 210-1 or CHEM 212-1	Organic Chemistry
CHEM 342-1 or MAT_SCI 314-0	Thermodynamics Thermodynamics of Materials
MAT_SCI 331-0	Soft Materials
2 courses chosen from:	
MAT_SCI 332-0	Mechanical Behavior of Solids
MAT_SCI 351-2	Introductory Physics of Materials
MAT_SCI 361-0	Crystallography & Diffraction
At least 1 in another department chosen from the following:	

Soft Materials Track

Course	Title
CHEM 210-1 & CHEM 210-2 or CHEM 212-1 & CHEM 212-2	Organic Chemistry and Organic Chemistry Organic Chemistry and Organic Chemistry
CHEM 342-1 or MAT_SCI 314-0	Thermodynamics Thermodynamics of Materials
MAT_SCI 331-0	Soft Materials
MAT_SCI 370-0	Biomaterials

Honors in Materials Science

Seniors who have done outstanding work in the classroom and research laboratory may be eligible for graduation with honors in materials science. To be considered, a student must meet minimum GPA requirements, complete 2 units of research (see table), and complete a written research report.

Course	Title
<i>2 units of research selected from:</i>	
CHEM 398-0	Undergraduate Seminar
CHEM 399-0	Independent Study
MAT_SCI 396-1	Senior Project in Materials Science and Engineering
MAT_SCI 396-2	Senior Project in Materials Science and Engineering
MAT_SCI 394-0	Honors Project in Materials Science
MAT_SCI 399-0	Projects
PHYSICS 398-0	Independent Thesis Research
PHYSICS 399-0	Independent Study

These 2 units are neither required for nor counted toward the major. Students who intend to submit a senior research report should send an e-mail including the name of the research adviser to the director of undergraduate studies by fall of senior year.

Students whose theses and grades meet program criteria are recommended to the college for graduation with honors. For more information consult the program director and see Honors in the Major (<https://catalogs.northwestern.edu/undergraduate/arts-sciences/#academicoptionstext>).