# Materials Science and Engineering Degree

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

### Course Requirements (48 units)

#### Core Courses (32 units)

- 4 mathematics courses ([https://catalogs.northwestern.edu/undergraduate/engineering-applied-science/#requirementstext](https://catalogs.northwestern.edu/undergraduate/engineering-applied-science/#requirementstext))
- 4 engineering analysis and computer proficiency courses ([https://catalogs.northwestern.edu/undergraduate/engineering-applied-science/#requirementstext](https://catalogs.northwestern.edu/undergraduate/engineering-applied-science/#requirementstext))
- 4 units of basic science:
  - PHYSICS 135-2 & PHYSICS 135-3 General Physics and General Physics
  - CHEM 131-0 & CHEM 132-0 General Chemistry 1 and General Chemistry 2
  - or CHEM 151-0 & CHEM 152-0 Accelerated General Chemistry 1 and Accelerated General Chemistry 2
  - or CHEM 171-0 & CHEM 172-0 Advanced General Inorganic Chemistry and Advanced General Physical Chemistry
- 3 design and communications courses ([https://catalogs.northwestern.edu/undergraduate/engineering-applied-science/#requirementstext](https://catalogs.northwestern.edu/undergraduate/engineering-applied-science/#requirementstext))
- 5 basic engineering courses:
  - CIV_ENV 216-0 Mechanics of Materials I
  - MAT_SCI 301-0 Materials Science Principles
  - MAT_SCI 314-0 Thermodynamics of Materials
  - MAT_SCI 315-0 Phase Equilibria & Diffusion of Materials
- 1 additional course from the remaining 5 McCormick basic engineering categories: Computer architecture and numerical methods, Computer programming, Electrical science, Probability, statistics and quality control, and Systems engineering and analysis ([https://catalogs.northwestern.edu/undergraduate/engineering-applied-science/#requirementstext](https://catalogs.northwestern.edu/undergraduate/engineering-applied-science/#requirementstext))
- 7 social sciences/humanities courses ([https://catalogs.northwestern.edu/undergraduate/engineering-applied-science/#requirementstext](https://catalogs.northwestern.edu/undergraduate/engineering-applied-science/#requirementstext))
- 5 unrestricted electives ([https://catalogs.northwestern.edu/undergraduate/engineering-applied-science/#requirementstext](https://catalogs.northwestern.edu/undergraduate/engineering-applied-science/#requirementstext))

### Major Program (16 units)

- 11 required courses:
  - MAT_SCI 316-1 Microstructural Dynamics
  - and Microstructural Dynamics
  - MAT_SCI 331-0 Soft Materials
  - MAT_SCI 332-0 Mechanical Behavior of Solids
  - MAT_SCI 351-1 Introductory Physics of Materials
  - and Introductory Physics of Materials
  - MAT_SCI 361-0 Crystallography & Diffraction
  - MAT_SCI 390-0 Materials Design
  - MAT_SCI 391-0 Process Design
  - MAT_SCI 396-1 Senior Project in Materials Science and Engineering
  - and Senior Project in Materials Science and Engineering

- 5 technical electives in engineering, natural sciences (usually chemistry or physics), and mathematics chosen to fulfill an area of concentration

1. See general requirements ([https://catalogs.northwestern.edu/undergraduate/engineering-applied-science/#requirementstext](https://catalogs.northwestern.edu/undergraduate/engineering-applied-science/#requirementstext)) for details.
2. PHYSICS 125-2 General Physics for ISP or PHYSICS 140-3 Fundamentals of Physics may be substituted for PHYSICS 135-2 General Physics. PHYSICS 125-3 General Physics for ISP or PHYSICS 140-3 Fundamentals of Physics may be substituted for PHYSICS 135-3 General Physics. Associated labs are PHYSICS 126-2 Physics for ISP Laboratory or PHYSICS 136-2 General Physics Laboratory and PHYSICS 126-3 Physics for ISP Laboratory or PHYSICS 136-3 General Physics Laboratory.

## Technical Electives

- 5 technical electives in engineering, natural sciences (usually chemistry or physics), and mathematics chosen to fulfill an area of concentration
  - No more than 2 of the 5 may be 200-level courses.
  - At least 2 of the 5 must be 300-level materials science and engineering courses.
  - Examples of programs for concentrations in biomaterials, design and manufacturing, electronic materials, metals and ceramics, nanomaterials, polymeric materials, surface science, and sustainable materials are described in a departmental manual for degree candidates.
  - No more than 1 unit of MAT_SCI 394-0 Honors Project in Materials Science or MAT_SCI 399-0 Projects may be counted.