# Materials Science and Engineering Degree

Students must also complete the Undergraduate Registration Requirement [link](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 [link](https://catalogs.northwestern.edu/undergraduate/engineering-applied-science/#requirementstext)
- **4** engineering analysis and computer proficiency courses [link](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

#### Design and Communications Courses (6 units)

- **3** design and communications courses [link](https://catalogs.northwestern.edu/undergraduate/engineering-applied-science/#requirementstext)

#### Basic Engineering Courses (5 units)

- **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 [link](https://catalogs.northwestern.edu/undergraduate/engineering-applied-science/#requirementstext)

#### Social Sciences/Humanities Courses (7 units)

- **7** social sciences/humanities courses [link](https://catalogs.northwestern.edu/undergraduate/engineering-applied-science/#requirementstext)

#### Unrestricted Electives (5 units)

- **5** unrestricted electives [link](https://catalogs.northwestern.edu/undergraduate/engineering-applied-science/#requirementstext)

### Major Program (16 units)

- **11** required courses:
  - MAT_SCI 316-1 & MAT_SCI 316-2 Microstructural Dynamics and Microstructural Dynamics
  - MAT_SCI 331-0 Soft Materials
  - MAT_SCI 332-0 Mechanical Behavior of Solids
  - MAT_SCI 351-1 & MAT_SCI 351-2 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 & MAT_SCI 396-2 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
  - No more than 2 of the 5 units 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.

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1. See general requirements [link](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.