### 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)

1. **4 mathematics courses** ([https://catalogs.northwestern.edu/undergraduate/engineering-applied-science/#requirementstext](https://catalogs.northwestern.edu/undergraduate/engineering-applied-science/#requirementstext))
2. **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))
3. **4 units of basic science:**
   - PHYSICS 135-2 & PHYSICS 136-2 & PHYSICS 135-3 & PHYSICS 136-3: General Physics and General Physics Laboratory and General Physics and General Physics Laboratory
   - CHEM 131-0 & CHEM 141-0 & CHEM 132-0 & CHEM 142-0: General Chemistry 1 and General Chemistry Laboratory 1 and General Chemistry 2 and General Chemistry Laboratory 2
   - or CHEM 151-0 & CHEM 161-0 & CHEM 152-0 & CHEM 162-0: Advanced General Inorganic Chemistry and Advanced General Inorganic Chemistry Laboratory and Advanced General Inorganic Chemistry and Advanced General Inorganic Chemistry Laboratory
   - or CHEM 171-0 & CHEM 181-0 & CHEM 172-0 & CHEM 182-0: Advanced General Physical Chemistry and Advanced General Physical Chemistry Laboratory and Advanced General Physical Chemistry Laboratory and Advanced General Physical Chemistry Laboratory

4. **3 design and communications courses** ([https://catalogs.northwestern.edu/undergraduate/engineering-applied-science/#requirementstext](https://catalogs.northwestern.edu/undergraduate/engineering-applied-science/#requirementstext))
5. **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

6. **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. **7 social sciences/humanities courses** ([https://catalogs.northwestern.edu/undergraduate/engineering-applied-science/#requirementstext](https://catalogs.northwestern.edu/undergraduate/engineering-applied-science/#requirementstext))
8. **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)**

9. **11 required courses:**
   - MAT_SCI 316-1
   - MAT_SCI 316-2
   - MAT_SCI 331-0: Soft Materials
   - MAT_SCI 332-0: Mechanical Behavior of Solids
   - MAT_SCI 351-1: Introductory Physics of Materials
   - MAT_SCI 351-2: 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

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 140-2 Fundamentals of Physics may substitute for PHYSICS 135-2 General Physics. PHYSICS 140-3 Fundamentals of Physics may substitute for PHYSICS 135-3 General Physics. Associated labs are PHYSICS 136-2 General Physics Laboratory and 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 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.