# Manufacturing and Design Engineering Degree

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.

## Course Requirements (48 units)

### Core Courses (32 units)

1. **4 mathematics courses** (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)
3. **4 units of basic science:**
   - PHYSICS 135-2 General Physics
   - PHYSICS 135-3 General Physics
   - PHYSICS 136-2 General Physics Laboratory
   - PHYSICS 136-3 General Physics Laboratory
   - CHEM 131-0 General Chemistry 1
   - CHEM 141-0 General Chemistry Laboratory 1
   - or CHEM 151-0 Accelerated General Chemistry 1
   - or CHEM 161-0 Accelerated General Chemistry Laboratory 1
   - or CHEM 171-0 Advanced General Inorganic Chemistry
   - or CHEM 181-0 Advanced General Inorganic Chemistry Laboratory

4. **3 design and communications courses** (https://catalogs.northwestern.edu/undergraduate/engineering-applied-science/#requirementstext)
5. **5 basic engineering courses:**
   - MECH_ENG 233-0 Electronics Design
   - CIV_ENV 216-0 Mechanics of Materials I
   - MAT_SCI 201-0 Introduction to Materials
   - CIV_ENV 205-0 Economics and Finance for Engineers

6. **1 additional course from any McCormick basic engineering category except Probability, Statistics & Quality Control** (https://catalogs.northwestern.edu/undergraduate/engineering-applied-science/#requirementstext)

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

8. **5 unrestricted electives** (https://catalogs.northwestern.edu/undergraduate/engineering-applied-science/#requirementstext)

### Major Program (16 units)

9. **9 core courses:**
   - DSGN 308-0 Human-Centered Product Design
   - or MECH_ENG 315-0 Theory of Machines: Design of Elements
   - IEMS 201-0 Introduction to Statistics
   - IEMS 307-0 Quality Improvement by Experimental Design
   - IEMS 310-0 Operations Research
   - IEMS 382-0 Production Planning and Scheduling
   - MAT_SCI 318-0 Materials Selection
   - MECH_ENG 240-0 Intro to Mechanical Design and Manufacturing
   - MECH_ENG 340-1 Computer Integrated Manufacturing: Manufacturing Processes
   - MECH_ENG 340-2 Computer Integrated Manufacturing: CAD/CAM
   - or MECH_ENG 340-3 Computer Integrated Manufacturing: Automation

### 3 project courses:

- DSGN 384-1 Interdisciplinary Design Projects I
  & DSGN 384-2 Interdisciplinary Design Projects II
- DSGN 386-0 Manufacturing Engineering Design (must be taken in the final spring quarter before graduation)

### 4 technical electives:

1. **2 200-level or 300-level engineering courses.**
2. **2 300-level engineering courses.**
3. **Courses numbered 395 will need a petition.**
4. **Students may only count up to two 399 course towards their tech electives.**

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1. See general requirements (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.
3. IEMS 303-0 Statistics may be substituted if an additional math course, such as IEMS 202-0 Probability, is also taken.