<table>
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<tr>
<th>Done</th>
<th>Course</th>
<th>Course Name</th>
<th>Notes</th>
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<tr>
<td></td>
<td>Math 220-1</td>
<td>Single-variable Differential Calculus</td>
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<td>Math 220-2</td>
<td>Single-variable Integral Calculus</td>
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<td>Math 228-1</td>
<td>Multivariable Diff. Calc. for Eng.</td>
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<td>Math 228-2</td>
<td>Multivariable Int. Calc. for Eng.</td>
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**Mathematics Requirement (4 credits)**

- Math 220-1: Single-variable Differential Calculus
- Math 220-2: Single-variable Integral Calculus
- Math 228-2: Multivariable Int. Calc. for Eng.

**Engineering Analysis and Computer Proficiency (4 credits)**

- Gen Eng 205-1: EA 1
- Gen Eng 205-2: EA 2
- Gen Eng 205-3: EA 3
- Gen Eng 205-4: EA 4

**Basic Sciences (4 credits)**

- See reverse for details on acceptable courses

**Design and Communications (3 credits)**

- DSGN 106-1/Engl 106-1: DTC 1
- Communications Course: Chosen from COMM_ST 112, PERF_ST 103 or PERF_ST 203

**Basic Engineering (5 credits)**

- COMP_SCI 211: Fundamentals of Computer Programming II
- COMP_SCI 217: Data Management & Information Processing
- CIV_ENV 205: Systems Eng.

**2 additional courses from two different areas**

- Basic Engineering Choice
- Basic Engineering Choice

**Theme Courses (7 credits)**

- Theme
- Theme
- Theme
- Theme
- Theme
- Theme
- Theme

**IEMS Major Program: Methods Core + PL + Project (9 credits)**

- COMP_SCI 111: Fundamentals of Computer Programming I
- IEMS 202: Probability
- IEMS 303: Statistics
- IEMS 304: Statistical Learning for Data Analysis
- IEMS 313: Foundations of Optimization
- IEMS 315: Stochastic Models
- IEMS 317: Discrete-Event Systems Simulation
- IEMS 394: IE Client Project Challenge

**IEMS Major Program: IE/OR Electives (2 credits)**

- IE/OR Elective
- IE/OR Elective

**IEMS Major Program: Management Science Electives (2 credits)**

- Elective-M5
- Elective-M5

**IEMS Major Program: General Technical Electives (3 credits)**

- Elective-GTE
- Elective-GTE
- Elective-GTE

**Unrestricted Electives (5 credits)**

- See reverse for details on requirements

Full details can be found in the Undergraduate Catalog for 2020-2021 (catalogs.northwestern.edu)
### Basic Science Courses

Four units, including courses from at least two areas. At most 2 units from Earth Sciences and Astronomy; no more than 3 units from any other area. Lab courses may count only in combination with their corresponding lecture courses.

**Physics**
- PHYSICS 135-2 & 136-2 General Physics & Laboratory
- PHYSICS 135-3 & 136-3 General Physics & Laboratory
- PHYSICS 239 Foundations of Modern Physics

**Chemistry**
- CHEM 131 or 151 or 171 (General/Accelerated/Advanced) Chemistry I
- CHEM 141 or 161 or 181 (Gen/Acc/Adv) General Chemistry Laboratory 1
- CHEM 132 or 152 or 172 (General/Accelerated/Advanced) Chemistry II
- CHEM 142 or 162 or 182 (Gen/Acc/Adv) Laboratory 2
- CHEM 210-1 Organic Chemistry
- CHEM 210-2 Organic Chemistry

**Biological Sciences**
- BIOL_SCI 215 Genetics & Molecular Biology
- BIOL_SCI 217 Physiology
- BIOL_SCI 219 Cell Biology
- BIOL_SCI 220 Genetics & Molecular Processes Laboratory
- BIOL_SCI 221 Cellular Process Laboratory
- BIOL_SCI 222 Investigative Laboratory

**Chem_Eng**
- CHEM_ENG 275 Molecular & Cell Biology for Engineers
- CIV_ENV 202 Biological & Ecological Principles

### Earth Sciences and Astronomy

- ASTRON 220 Introduction to Astrophysics
- CIV_ENV 203 Earth in the Anthropocene
- EARTH 201 Earth Systems Revealed
- EARTH 202 Earth’s Interior
- EARTH 203 Earth System History

### Basic Engineering Courses

Five basic engineering courses must come from four distinct areas. COMP_SCI 211 & COMP_SCI 217, required, are in the Computer Programming area. Civ_Env 205, required, is in the Systems Engineering area.

Two additional courses must be chosen from two of the areas below:

**Computer Architecture & Numerical Methods**
- COMP_ENG 203 Intro to Computer Eng.
- COMP_ENG 205 Fundamentals of Computer Software
- ES_APPM 346 Modeling & Computation

**Electrical Science**
- ELEC_ENG 202 Intro to Electrical Eng.
- ELEC_ENG 270 Applications of Electronic Devices
- ELEC_ENG 221 Fundamentals of Circuits
- ELEC_ENG 222 Fundamentals of Signals & Systems
- ELEC_ENG 223 Fundamentals of Solid State Engineering
- ELEC_ENG 224 Fundamentals of Electromagnetics & Photonics
- MECH_ENG 233 Electronics Design

**Fluids & Solids**
- CHEM_ENG 321 Fluid Mechanics
- CIV_ENV 236 Mechanics of Materials I
- MECH_ENG 241 Fluid Mechanics I
- BMD_ENG 270 Fluid Mechanics
- BMD_ENG 271 Intro to Biomechanics

**Materials Science and Engineering**
- MAT_SCI 201 Introduction to Materials
- MAT_SCI 301 Materials Science Principles

**Thermodynamics**
- BMD_ENG 250 Thermodynamics
- CHEM_ENG 211 Thermodynamics
- MAT_SCI 314 Thermodynamics of Materials
- MAT_SCI 315 Phase Equilibria and Diffusion
- MECH_ENG 222 Thermo & Statistical Mechanics I
- MECH_ENG 322 Thermo & Statistical Mechanics II

### IE/OR Elective Options

- IEMS 307 Quality Improvement by Exper. Des.
- IEMS 308 Data Science and Analytics
- IEMS 351 Optimization Methods for Data Science
- IEMS 365 Analytics for Social Good
- IEMS 373 Intro. to Financial Engineering
- IEMS 381 Supply Chain Modeling
- IEMS 382 Production Plan & Sched
- IEMS 383 Service Ops. Mgmt.
- IEMS 385 Health Systems Eng.

### Management Science Elective Options

- IEMS 252 Engineering Entrepreneurship
- IEMS 341 Social Network Analysis
- IEMS 342 Organizational Behavior
- IEMS 343 Project Management for Engineers
- IEMS 344 Leading Organizations and Teams
- IEMS 345 Negotiations and Conflict Resolution
- IEMS 395 Special Topics: Whole-brain Leadership

*Note that other 395 courses may not count here*

### General Technical Elective Options

The following courses MAY BE USED as technical electives.

Any 200-level or higher course in McCormick, excluding CRDV and PRDV courses

Any 200-level or higher course in Biology, Chemistry, or Physics

Any 300-level or higher course in Math, Statistics, or MMSS

- Comp_Sci 150 Fundamentals of Programming 1.5
- Econ 309 Elements of Public Finance
- Econ 331 Economics of Risk and Uncertainty
- Econ 336 Analytic Methods for Public Policy Analysis
- Econ 339 Labor Economics
- Econ 349 Industrial Economics
- Econ 350 Monopoly, Competition, and Public Policy
- Econ 355 Transportation Economics and Public Policy
- Econ 360-2 Investments
- Econ 362 International Finance
- Econ 380-1,2 Game Theory
- Econ 381-1,2 Econometrics
- Econ 383 Economic Forecasting
- ICM 302 Integrated Marketing Communications Strategy
- ISEN 220 Intro to Energy Systems for the 21st Century
- ISEN 230 Climate Change and Sustainability

The following courses MAY NOT BE USED as technical electives.

- Chem 201 Chemistry of Nature and Culture
- Math 310-1 Probability and Stochastic Processes
- Math 311-1 MENU: Probability & Stochastic Processes
- Math 314 Probability and Statistics for Econometrics
- Math 385 Probability and Statistics for MMSS
- Math 386-1 Econometrics for MMSS
- Physics 311-1 Mathematical Tools for the Physical Sciences
- Physics 311-2 Mathematical Tools for the Physical Sciences
- Physics 335 Physics of Magic
- Stat 320-1 Statistical Methods I
- Stat 338 Probability and Statistics for ISP

### Theme Requirements

The theme requirement consists of seven courses in humanities and social sciences. At least three courses (the "theme") must be related in content.

Requires at least two courses in social sciences, and at least two courses in humanities.

See the McCormick Undergraduate Engineering website for information on eligible course.

Note that the following courses may NOT be used towards theme:

Any BUS, INST or Kellogg course

<table>
<thead>
<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>ECON 281</td>
<td>ECON 381-1</td>
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<td>ECON 380-1</td>
<td>ECON 381-2</td>
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<tr>
<td>ECON 380-2</td>
<td>ENGLISH 106-2</td>
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<tr>
<td>ECON 381-1</td>
<td>GEOG 341</td>
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<tr>
<td>ECON 381-2</td>
<td>PSYCH 201</td>
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### Special Topics: Whole-brain Leadership

- IEMS 395