### BS in Industrial Engineering
Degree Requirements, AY 2023-2024

Full degree requirements available at catalogs.northwestern.edu

<table>
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<tr>
<th>Course</th>
<th>Course Name</th>
<th>Notes</th>
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<tr>
<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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<tr>
<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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<tr>
<td>Gen Eng 205-1</td>
<td>EA 1</td>
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<td>Gen Eng 205-2</td>
<td>EA 2</td>
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<td>Gen Eng 205-3</td>
<td>EA 3</td>
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<td>ESAM 245</td>
<td>ESAM 245</td>
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<tr>
<td>COMP_SCI 111</td>
<td>Fundamentals of Computer Programming I</td>
<td>Prerequisite for COMP_SCI 211</td>
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<td>COMP_SCI 150</td>
<td>Fundamentals of Computer Programming 1.5</td>
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<td>COMP_SCI 217</td>
<td>Data Management</td>
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<tr>
<td>IEMS 302</td>
<td>Probability</td>
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<td>IEMS 303</td>
<td>Statistics</td>
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<td>Stochastic Models</td>
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<td>Discrete-Event Systems Simulation</td>
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<td>IEMS 394</td>
<td>IE Client Project Challenge</td>
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<td>IE/OR Elective</td>
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<td>IE/OR Elective</td>
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<td>May not count course used for Prodn &amp; Logistics above</td>
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<td>Elective-MS</td>
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See "Approved GTEs" tab for details
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 301-2,3 Data Science with R **Catalog years 2021 or earlier**
Stat 301-2,3 Data Science with Python **may use these courses**

The following courses **MAY BE** USED as technical electives
Chem 131 or 151 or 171 General/Accelerated/Advanced Chemistry 1
Chem 132 or 152 or 172 General/Accelerated/Advanced Chemistry 2
Chem 210-1 Organic Chemistry
Chem 210-2 Organic Chemistry
Chem 141 or 161 or 181 General/Accelerated/Advanced Chemistry Laboratory 1
Chem 142 or 162 or 182 General/Accelerated/Advanced Chemistry Laboratory 2

**BASIC SCIENCE REQUIREMENT**

Four units from at least two areas (2019-2021); catalog years 2022+ have NO area requirements
Catalog years 2022 or later must take at least ONE course with a credit-bearing lab
Lab courses may count only in combination with their corresponding lecture courses

Courses in red are only accepted in catalog years 2022 or later
Note that lab courses are each 0.34 credit

The following courses fulfill the basic sciences requirement

**Physics**

PHYSICS 125-2 General Physics for ISP
PHYSICS 135-2 General Physics
PHYSICS 135-3 General Physics
PHYSICS 140-2 Fundamentals of Physics (uses lab 136-2)
PHYSICS 239 Foundations of Modern Physics
PHYSICS 126-2 General Physics for ISP Laboratory
PHYSICS 136-2 General Physics Laboratory
PHYSICS 136-3 General Physics Laboratory

**Chemistry**

CHEM 130 or 151 or 171 General/Accelerated/Advanced Chemistry 1
CHEM 132 or 152 or 172 General/Accelerated/Advanced Chemistry 2
CHEM 201-1 Organic Chemistry
CHEM 201-2 Organic Chemistry
CHEM 141 or 161 or 181 General/Accelerated/Advanced Chemistry Laboratory 1
CHEM 142 or 162 or 182 General/Accelerated/Advanced Chemistry Laboratory 2

**Biological Sciences**

BIOL SC 201 Molecular Biology
BIOL SC 202 Cell Biology (requires BIOL_SC 201)
BIOL SC 203 Genetics and Evolution (requires BIOL_SC 202)
CHEM ENG 275 Molecular & Cell Biology for Engineers
CIV_ENV 202 Biological & Ecological Principles
BIOL SC 150 Human Genetics
BIOL SC 232 Molecular & Cell Processes Lab (concurreant with 202)
BIOL SC 233 Genetics & Molecular Proc. Lab (concurreant with 203)
BIOL SC 234 Investigative Laboratory
COG SCI 210 Language & the Brain

**Neuroscience**

CSD 202 Neurobiology of Communication
CSD 303 (also PSYCH 327) Brain and Cognition
PSYCH 221 Introduction to Neuroscience

**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
GEOL 235 Atmosphere and Climate

**GENERAL TECHNICAL ELECTIVES**

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 301-2,3 Data Science with R **Catalog years 2021 or earlier**
Stat 301-2,3 Data Science with Python **may use these courses**
Stat 320-1 Statistical Methods I
Stat 383 Probability and Statistics for ISP

The following courses **MAY BE** USED as technical electives
Any 200-level or higher course in Mathematics, 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
BUS INST 301-0 Accounting
BUS INST 302 Marketing Management
BUS INST 303-0 Leadership in Organizations
ECON 301 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
IMC 303 Integrated Marketing Communications Strategy
ISEN 220 Intro to Energy Systems for the 21st Century
ISEN 230 Climate Change and Sustainability

May include up to 2 units of IEMS 399
At most 2 courses may be taken P/N; no other electives may be taken P/N

**THEME REQUIREMENT**

Three courses must be related
At least 2 courses from each of Social Sciences and Humanities

The following courses **MAY NOT** BE USED to ECON 381-2
Any BUS_INST course ENGLISH 106-1
Any Kellogg course ENGLISH 106-2
ECON 281 GEOG 341
ECON 380-1 PSYCH 201
ECON 380-2
ECON 381-1

The following courses **MAY BE** USED towards theme as Social Science
MMSS 211-1 Social Science Theories & Methods
MMSS 211-3 Social Science Theories & Methods
MMSS 311-2 Social Science Theories & Methods
NAV SCI 120 Sea Power and Maritime Affairs
NAV SCI 230 Leadership and Management Seminar
NAV SCI 341 Naval Leadership and Ethics
PRDV 325 Emotional Intelligence
TEACH_ED 329 Early Adolescent Development and Intervention
TRANS 310 Seminar in Transportation and Logistics

SEE LINK BELOW FOR A COMPLETE LIST OF ALLOWED/NOT ALLOWED COURSES
https://www.mccormick.northwestern.edu/students/undergraduate/social-science-humanities-theme/