

Industrial Engineering and Business Administration, BSIE

The combined major in industrial engineering and business administration is designed to educate students in topics of both disciplines and the interface between them. Industrial engineering involves the design and analysis of systems that include people, equipment, and materials and their interactions and performance in the workplace. An industrial engineer collects this information and evaluates alternatives to make decisions that best advance the goals of the enterprise. Northeastern University's D'Amore-McKim School of Business offers students an opportunity to develop the skills needed to lead in today's technologically driven business world. We deliver a curriculum that combines knowledge in technology and data analytics with human skills such as critical thinking, creativity, and an entrepreneurial mindset. Students in this program will combine the disciplines in order to address complex problems with robust analysis, implementation of technology, and strong leadership.

Program Requirements

- Concentrations and course offerings may vary by campus and/or by program modality. Please consult with your advisor or admissions coach for the course availability each term at your campus or within your program modality.
- Certain options within the program may be *required* at certain campuses or for certain program modalities. Please consult with your advisor or admissions coach for requirements at your campus or for your program modality.

Complete all courses listed below unless otherwise indicated. Also complete any corequisite labs, recitations, clinicals, or tools courses where specified and complete any additional courses needed beyond specific college and major requirements to satisfy graduation credit requirements.

Universitywide Requirements

All undergraduate students are required to complete the Universitywide Requirements (<https://catalog.northeastern.edu/undergraduate/university-academics/university-wide-requirements/>).

NUpath Requirements

All undergraduate students are required to complete the NUpath Requirements (<https://catalog.northeastern.edu/undergraduate/university-academics/nupath/>).

All NUpath requirements are satisfied by this combined major.

Industrial Engineering Requirements

| Code | Title | Hours |
|-------------------------------------------------------------------------------|----------------------------------------------------------------------|-------|
| Required Engineering | | |
| IE 2310 and IE 2311 | Introduction to Industrial Engineering and Recitation for IE 2310 | 4 |
| IE 3412 or MATH 3081 | Engineering Probability and Statistics Probability and Statistics | 4 |
| IE 4510 | Simulation Modeling and Analysis | 4 |
| IE 4512 | Engineering Economy | 4 |
| IE 4515 | Operations Research | 4 |
| IE 4516 | Quality Assurance | 4 |
| IE 4520 | Stochastic Modeling | 4 |
| IE 4522 and IE 4523 | Human-Machine Systems and Lab for IE 4522 | 5 |
| IE 4525 | Logistics and Supply Chain Management | 4 |
| IE 4530 and IE 4531 | Manufacturing Systems and Techniques and Lab for IE 4530 | 5 |
| Senior Capstone Design Project | | |
| MEIE 4701 | Capstone Design 1 | 1 |
| MEIE 4702 | Capstone Design 2 | 5 |
| Supplemental Credit | | |
| 2 semester hours from the following count toward the engineering requirement: | | 2 |
| GE 1501 | Cornerstone of Engineering 1 ¹ | |

3 semester hours from the following count toward the engineering requirement: 3

GE 1502 Cornerstone of Engineering 2¹

Business Requirements

| Code | Title | Hours |
|-----------------------------------|--------------------------------------------------------------|-------|
| Required Business Courses | | |
| ACCT 1201 | Financial Accounting and Reporting | 4 |
| ECON 1115 | Principles of Macroeconomics | 4 |
| or ECON 1116 | Principles of Microeconomics | |
| INTB 1203 | International Business and Global Social Responsibility | 4 |
| ORGB 3201 | Organizational Behavior | 4 |
| STRT 4501 | Strategy in Action | 4 |
| Required Business Elective | | |
| Complete one of the following: | | 4 |
| ACCT 2301 | Profit Analysis for Managers and Advisors | |
| INNO 2301 | Innovation! | |
| MISM 2301 | Introduction to Information Systems and Digital Technologies | |
| MKTG 2201 | Introduction to Marketing | |

Business Concentration

Complete one of the following business concentrations:

- Accounting (<https://catalog.northeastern.edu/undergraduate/business/concentrations/accounting/>)
- Accounting and Advisory Services (<https://catalog.northeastern.edu/undergraduate/business/concentrations/accounting-advisory-services/>)
- Brand Management (<https://catalog.northeastern.edu/undergraduate/business/concentrations/brand-management/>)
- Business Analytics (<https://catalog.northeastern.edu/undergraduate/business/concentrations/business-analytics/>)
- Corporate Innovation (<https://catalog.northeastern.edu/undergraduate/business/concentrations/corporate-innovation/>)
- Entrepreneurial Startups (<https://catalog.northeastern.edu/undergraduate/business/concentrations/entrepreneurial-startups/>)
- Family Business (<https://catalog.northeastern.edu/undergraduate/business/concentrations/family-business/>)
- Finance (<https://catalog.northeastern.edu/undergraduate/business/concentrations/finance/>)
- Fintech (<https://catalog.northeastern.edu/undergraduate/business/concentrations/fintech/>)
- Healthcare Management and Consulting (<https://catalog.northeastern.edu/undergraduate/business/concentrations/healthcare-management-consulting/>)
- Management (<https://catalog.northeastern.edu/undergraduate/business/concentrations/management/>)
- Management Information Systems (<https://catalog.northeastern.edu/undergraduate/business/concentrations/management-information-systems/>)
- Marketing (<https://catalog.northeastern.edu/undergraduate/business/concentrations/marketing/>)
- Marketing Analytics (<https://catalog.northeastern.edu/undergraduate/business/concentrations/marketing-analytics/>)
- Social Innovation and Entrepreneurship (<https://catalog.northeastern.edu/undergraduate/business/concentrations/social-innovation-entrepreneurship/>)
- Supply Chain Management (<https://catalog.northeastern.edu/undergraduate/business/concentrations/supply-chain-management/>)

Supporting Courses: Mathematics/Science

Complete all mathematics/science courses with a minimum of 30 semester hours.

| Code | Title | Hours |
|---------------------------------------------|------------------------------------------------------------------------------------------------------|-------|
| Required Mathematics/Science | | |
| CHEM 1151 and CHEM 1153 | General Chemistry for Engineers and Recitation for CHEM 1151 | 4 |
| MATH 1341 | Calculus 1 for Science and Engineering | 4 |
| MATH 1342 | Calculus 2 for Science and Engineering | 4 |
| MATH 2321 | Calculus 3 for Science and Engineering | 4 |
| MATH 2341 | Differential Equations and Linear Algebra for Engineering | 4 |
| PHYS 1151 and PHYS 1152 and PHYS 1153 | Physics for Engineering 1 and Lab for PHYS 1151 and Interactive Learning Seminar for PHYS 1151 | 5 |

Supplemental Credit

1 semester hour from the following counts toward the mathematics/science requirement: 1

| | | |
|---------|-------------------------------------------|--|
| GE 1501 | Cornerstone of Engineering 1 ¹ | |
|---------|-------------------------------------------|--|

Professional Development

| Code | Title | Hours |
|---------------------------------|---------------------------------------------|-------|
| Professional Development | | |
| ENCP 2000 | Introduction to Engineering Co-op Education | 1 |
| ENCP 3000 | Professional Issues in Engineering | 1 |
| GE 1000 | First-Year Seminar | 1 |

Additional Required Courses

1 semester hour from the following counts toward the professional development requirement: 1

| | | |
|---------|-------------------------------------------|--|
| GE 1501 | Cornerstone of Engineering 1 ¹ | |
|---------|-------------------------------------------|--|

1 semester hour from the following counts toward the professional development requirement: 1

| | | |
|---------|-------------------------------------------|--|
| GE 1502 | Cornerstone of Engineering 2 ¹ | |
|---------|-------------------------------------------|--|

Writing Requirements

| Code | Title | Hours |
|----------------------------------------------------|-------------------------------------------------------------|-------|
| A grade of C or higher is required in each course: | | |
| ENGW 1111 | First-Year Writing | 4 |
| ENGW 3302 | Advanced Writing in the Technical Professions | 4 |
| or ENGW 3315 | Interdisciplinary Advanced Writing in the Disciplines | |
| or ENGW 3304 | Advanced Writing in the Business Administration Professions | |

Required General Elective

| Code | Title | Hours |
|----------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-------|
| Complete 4 semester hours of academic, nonremedial, nonrepetitive courses. It is recommended to select a course that fulfills the NUPath DD requirement. | | 4 |

Integrative Course

| Code | Title | Hours |
|--------------------------------------------------------------------------------------|-------------------|-------|
| This course is already required above and also fulfills the integrative requirement: | | |
| MEIE 4702 | Capstone Design 2 | |

Major GPA Requirement

2.000 minimum GPA required in IE, ME, MEIE, and business courses

Program Requirement

136 total semester hours required

¹ Students can substitute Engineering Design (GE 1110) and Engineering Problem Solving and Computation (GE 1111) for Cornerstone of Engineering 1 (GE 1501) and Cornerstone of Engineering 2 (GE 1502).

Plan of Study

Sample Plan of Study: Four Years, Two Co-ops in Spring/ Summer 1

| Year 1 | | | | | | | |
|----------------------------|-------|-----------------------------------------------|-------|-------------|-------|------------------------------|-------|
| Fall | Hours | Spring | Hours | Summer 1 | Hours | Summer 2 | Hours |
| ACCT 1201 | | 4 INTB 1203 | | 4 ENGW 1111 | | 4 MATH 2341 and MATH 2342 | 4 |
| CHEM 1151 and CHEM 1153 | | 4 GE 1502 | | 4 MATH 2321 | | 4 ECON 1115 | 4 |
| GE 1000 | | 1 MATH 1342 | | 4 | | | |
| GE 1501 | | 4 PHYS 1151 and PHYS 1152 and PHYS 1153 | | 5 | | | |
| MATH 1341 | | 4 | | | | | |
| | | 17 | | 17 | | 8 | 8 |

Year 2

| Fall | Hours | Spring | Hours | Summer 1 | Hours | Summer 2 | Hours |
|------------------------|-------|-----------|-------|----------|-------|----------------------------|----------|
| Business bucket core | | 4 Co-op | | 0 Co-op | | 0 ENGW 3302, 3315, or 3304 | 4 |
| ENCP 2000 | | 1 | | | | ORGB 3201 | 4 |
| IE 2310 and IE 2311 | | 4 | | | | | |
| IE 3412 or MATH 3081 | | 4 | | | | | |
| IE 4512 | | 4 | | | | | |
| | | 17 | | 0 | | 0 | 8 |

Year 3

| Fall | Hours | Spring | Hours | Summer 1 | Hours | Summer 2 | Hours |
|------------------------------------|-------|-----------|-------|----------|-------|--------------------------------------|----------|
| Business concentration elective | | 4 Co-op | | 0 Co-op | | 0 Business concentration elective | 4 |
| IE 4510 | | 4 | | | | STRT 4501 | 4 |
| IE 4515 | | 4 | | | | | |
| IE 4516 | | 4 | | | | | |
| | | 16 | | 0 | | 0 | 8 |

Year 4

| Fall | Hours | Spring | Hours |
|------------------------------------|-------|--------------------------------------|-----------|
| Business concentration elective | | 4 Business concentration elective | 4 |
| ENCP 3000 | | 1 DD NUpath | 4 |
| IE 4520 | | 4 IE 4530 and IE 4531 | 5 |
| IE 4522 and IE 4523 | | 5 MEIE 4702 | 5 |
| IE 4525 | | 4 | |
| MEIE 4701 | | 1 | |
| | | 19 | 18 |

Total Hours: 136

Sample Plan of Study: Four Years, Two Co-ops in Summer 2/Fall**Year 1**

| Fall | Hours | Spring | Hours | Summer 1 | Hours | Summer 2 | Hours |
|----------------------------|-------|-----------------------------------------------|-------|-------------|-------|------------------------------|----------|
| ACCT 1201 | | 4 GE 1502 | | 4 ENGW 1111 | | 4 ECON 1115 | 4 |
| CHEM 1151 and CHEM 1153 | | 4 INTB 1203 | | 4 MATH 2321 | | 4 MATH 2341 and MATH 2342 | 4 |
| GE 1501 | | 4 MATH 1342 | | 4 | | | |
| GE 1000 | | 1 PHYS 1151 and PHYS 1152 and PHYS 1153 | | 5 | | | |
| MATH 1341 | | 4 | | | | | |
| | | 17 | | 17 | | 8 | 8 |

Year 2

| Fall | Hours | Spring | Hours | Summer 1 | Hours | Summer 2 | Hours |
|------------------------|-------|--------------------------------------|-------|----------------------------|-------|----------|----------|
| Business bucket core | | 4 Business concentration elective | | 4 ENGW 3302, 3315, or 3304 | | 4 Co-op | 0 |
| IE 2310 and IE 2311 | | 4 ENCP 2000 | | 1 ORGB 3201 | | 4 | |
| IE 3412 or MATH 3081 | | 4 IE 4510 | | 4 | | | |
| IE 4512 | | 4 IE 4515 | | 4 | | | |
| | | IE 4516 | | 4 | | | |
| | | 16 | | 17 | | 8 | 0 |

| Year 3 | | | | | | | |
|---------------|--------------|-----------------------------------|--------------|-----------------------------------|--------------|-----------------|--------------|
| Fall | Hours | Spring | Hours | Summer 1 | Hours | Summer 2 | Hours |
| Co-op | | 0 Business concentration elective | | 4 Business concentration elective | | 4 Co-op | 0 |
| | | IE 4520 | | 4 MEIE 4701 | | 1 | |
| | | IE 4522 and IE 4523 | | 5 STRT 4501 | | 4 | |
| | | IE 4525 | | 4 | | | |
| | | 0 | | 17 | | 9 | 0 |
| Year 4 | | | | | | | |
| Fall | Hours | Spring | Hours | Summer 1 | Hours | Summer 2 | Hours |
| Co-op | | 0 Business concentration elective | | 4 | | | |
| | | DD NUpath | | 4 | | | |
| | | ENCP 3000 | | 1 | | | |
| | | IE 4530 and IE 4531 | | 5 | | | |
| | | MEIE 4702 | | 5 | | | |
| | | 0 | | 19 | | | |

Total Hours: 136

Sample Plan of Study: Five Years, Three Co-ops in Spring/Summer 1

| Year 1 | | | | | | | |
|---------------------------------|--------------|-----------------------------------------|--------------|-----------------|--------------|-----------------------------------|--------------|
| Fall | Hours | Spring | Hours | Summer 1 | Hours | Summer 2 | Hours |
| ACCT 1201 | | 4 GE 1502 | | 4 Vacation | | Vacation | |
| CHEM 1151 and CHEM 1153 | | 4 INTB 1203 | | 4 | | | |
| GE 1000 | | 1 MATH 1342 | | 4 | | | |
| GE 1501 | | 4 PHYS 1151 and PHYS 1152 and PHYS 1153 | | 5 | | | |
| MATH 1341 | | 4 | | | | | |
| | | 17 | | 17 | | 0 | 0 |
| Year 2 | | | | | | | |
| Fall | Hours | Spring | Hours | Summer 1 | Hours | Summer 2 | Hours |
| ECON 1115 or 1116 | | 4 Co-op | | 0 Co-op | | 0 Vacation | |
| ENCP 2000 | | 1 | | | | | |
| ENGW 1111 | | 4 | | | | | |
| IE 2310 and IE 2311 | | 4 | | | | | |
| MATH 2321 | | 4 | | | | | |
| | | 17 | | 0 | | 0 | 0 |
| Year 3 | | | | | | | |
| Fall | Hours | Spring | Hours | Summer 1 | Hours | Summer 2 | Hours |
| Business bucket core | | 4 Co-op | | 0 Co-op | | 0 ENGW 3302, 3315, or 3304 | 4 |
| IE 3412 | | 4 | | | | ORGB 3201 | 4 |
| IE 4512 | | 4 | | | | | |
| MATH 2341 and MATH 2342 | | 4 | | | | | |
| | | 16 | | 0 | | 0 | 8 |
| Year 4 | | | | | | | |
| Fall | Hours | Spring | Hours | Summer 1 | Hours | Summer 2 | Hours |
| Business concentration elective | | 4 Co-op | | 0 Co-op | | 0 Business concentration elective | 4 |

| | | | | |
|-----------|-----------|----------|-----------|----------|
| ENCP 3000 | 1 | | STRT 4501 | 4 |
| IE 4510 | 4 | | | |
| IE 4515 | 4 | | | |
| IE 4516 | 4 | | | |
| | 17 | 0 | 0 | 8 |

Year 5

| Fall | Hours | Spring | Hours | | | | |
|---------------------------------|-----------|---------------------------------|-----------|--|--|--|--|
| Business concentration elective | 4 | Business concentration elective | 4 | | | | |
| IE 4520 | 4 | DD NUpath | 4 | | | | |
| IE 4522 and IE 4523 | 5 | IE 4530 and IE 4531 | 5 | | | | |
| IE 4525 | 4 | MEIE 4702 | 5 | | | | |
| MEIE 4701 | 1 | | | | | | |
| | 18 | | 18 | | | | |

Total Hours: 136

Sample Plan of Study: Five Years, Three Co-ops in Summer 2/ Fall**Year 1**

| Fall | Hours | Spring | Hours | Summer 1 | Hours | Summer 2 | Hours |
|-------------------------|-----------|---------------------------------------|-----------|------------|----------|----------|----------|
| ACCT 1201 | | 4 GE 1502 | | 4 Vacation | | Vacation | |
| CHEM 1151 and CHEM 1153 | 4 | INTB 1203 | 4 | | | | |
| GE 1000 | 1 | MATH 1342 | 4 | | | | |
| GE 1501 | 4 | PHYS 1151 and PHYS 1152 and PHYS 1153 | 5 | | | | |
| MATH 1341 | 4 | | | | | | |
| | 17 | | 17 | | 0 | | 0 |

Year 2

| Fall | Hours | Spring | Hours | Summer 1 | Hours | Summer 2 | Hours |
|-------------------------|-----------|-------------------------|-----------|----------|----------|----------|----------|
| ECON 1115 or 1116 | 4 | Business bucket core | 4 | Vacation | | Co-op | 0 |
| ENGW 1111 | 4 | ENCP 2000 | 1 | | | | |
| IE 2310 and IE 2311 | 4 | IE 3412 | 4 | | | | |
| MATH 2321 and MATH 2322 | 4 | IE 4512 | 4 | | | | |
| | | MATH 2341 and MATH 2342 | 4 | | | | |
| | 16 | | 17 | | 0 | | 0 |

Year 3

| Fall | Hours | Spring | Hours | Summer 1 | Hours | Summer 2 | Hours |
|-------|----------|---------------------------------|-----------|--------------------------|----------|----------|----------|
| Co-op | 0 | Business concentration elective | 4 | ENGW 3302, 3315, or 3304 | 4 | Co-op | 0 |
| | | ENCP 3000 | 1 | ORGB 3201 | 4 | | |
| | | IE 4510 | 4 | | | | |
| | | IE 4515 | 4 | | | | |
| | | IE 4516 | 4 | | | | |
| | 0 | | 17 | | 8 | | 0 |

Year 4

| Fall | Hours | Spring | Hours | Summer 1 | Hours | Summer 2 | Hours |
|-------|-------|---------------------------------|-------|---------------------------------|-------|----------|-------|
| Co-op | 0 | Business concentration elective | 4 | Business concentration elective | 4 | Co-op | 0 |
| | | IE 4520 | 4 | MEIE 4701 | 1 | | |

| | | | | | | | |
|---------------|--------------|--------------------------------------|-----------|--------------|----------|--|----------|
| | | IE 4522 and IE 4523 | 5 | STRT 4501 | 4 | | |
| | | IE 4525 | 4 | | | | |
| | | 0 | 17 | | 9 | | 0 |
| Year 5 | | | | | | | |
| Fall | Hours | Spring | | Hours | | | |
| Co-op | | 0 Business concentration elective | 4 | | | | |
| | | DD NUpath | 4 | | | | |
| | | IE 4530 and IE 4531 | 5 | | | | |
| | | MEIE 4702 | 5 | | | | |
| | | 0 | 18 | | | | |

Total Hours: 136