

# B.S. in Industrial Engineering

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(120 credits minimum)

**First Year**

| <b>1st Semester</b> |   | <b>Credits</b> |
|---------------------|---|----------------|
| CS 115              | Introduction to Computer Science I in C++             | 3              |
| FED 101             | Fundamentals of Engineering Design                    | 2              |
| ENGL 101            | English Composition: Introduction to Academic Writing | 3              |
| MATH 111            | Calculus I  | 4              |
| PHYS 111            | Physics I   | 3              |
| PHYS 111A           | Physics I Lab   | 1              |
| FYS SEM             | First-Year Student Seminar                            | 0              |
| <b>Term Credits</b> |   | <b>16</b>      |

**2nd Semester**

|                     |   |           |
|---------------------|---|-----------|
| ECON 201            | Economics   | 3         |
| ENGL 102            | English Composition: Introduction to Writing for Research | 3         |
| MATH 112            | Calculus II   | 4         |
| PHYS 121            | Physics II  | 3         |
| PHYS 121A           | Physics II Lab  | 1         |
| <b>Term Credits</b> |   | <b>14</b> |

**Second Year****1st Semester**

|                              |   |           |
|------------------------------|---|-----------|
| IE 203                       | Applications of Computer Graphics in Industrial Engineering | 2         |
| MECH 320                     | Statics and Strength of Materials                           | 3         |
| CHEM 121                     | Fundamentals of Chemical Principles I                       | 3         |
| MATH 222                     | Differential Equations                                      | 4         |
| Select one of the following: |   | 3         |
| HUM 211                      | The Pre-Modern World  |           |
| HUM 212                      | The Modern World  |           |
| HIST 213                     | The Twentieth-Century World                                 |           |
| <b>Term Credits</b>          |   | <b>15</b> |

**2nd Semester**

|                     |   |           |
|---------------------|---|-----------|
| IE 224              | Production Process Design                 | 3         |
| MECH 236            | Dynamics                                  | 2         |
| MATH 211            | Calculus III A *                          | 3         |
| CHEM 122            | Fundamentals of Chemical Principles II ** | 3         |
| IE 331              | Applied Statistical Methods               | 3         |
| COM 312             | Oral Presentations                        | 3         |
| <b>Term Credits</b> |   | <b>17</b> |

**Third Year****1st Semester**

|                     |   |           |
|---------------------|---|-----------|
| IE 355              | Human Factors                               | 3         |
| IE 335              | Engineering Cost Analysis and Control       | 3         |
| IE 439              | Deterministic Models in Operations Research | 3         |
| ME 339              | Fundamentals of Mechanical Design           | 3         |
| ECE 405             | Electrical Engineering Principles           | 3         |
| <b>Term Credits</b> |   | <b>15</b> |

**2nd Semester**

|        |  |   |
|--------|--|---|
| IE 334 | Engineering Economy and Capital Investment | 3 |
| IE 339 | Work Measurement and Standards             | 3 |
| IE 440 | Stochastic Models in Operations Research   | 3 |

|  |   |            |
|--|---|------------|
| IE 445   | Industrial Simulation                   | 3          |
| History and Humanities GER 300+ level ( <a href="http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/ger-300-level/">http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/ger-300-level/</a> )          |   | 3          |
| <b>Term Credits</b>  |   | <b>15</b>  |
| <b>Fourth Year</b>   |   |            |
| <b>1st Semester</b>  |   |            |
| IE Technical Elective 1  |   | 3          |
| IE 443   | Senior Project I                        | 2          |
| IE 461   | Product Quality Assurance               | 3          |
| IE 441   | Information and Knowledge Engineering   | 3          |
| Humanities and Social Science Senior Seminar GER ( <a href="http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/hss-capstone/">http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/hss-capstone/</a> ) |   | 3          |
| <b>Term Credits</b>  |   | <b>14</b>  |
| <b>2nd Semester</b>  |   |            |
| IE 444   | Senior Project II                       | 2          |
| IE 459   | Supply Chain and Production Planning    | 3          |
| IE 466   | Material Handling and Facilities Layout | 3          |
| IE Technical Elective 2  |   | 3          |
| IE Technical Elective 3  |   | 3          |
| <b>Term Credits</b>  |   | <b>14</b>  |
| <b>Total Credits</b>   |   | <b>120</b> |

### Industrial Engineering Technical Elective-

Students in industrial engineering select 9 credits of technical electives. With the undergraduate advisor's approval, upper level technical courses from other departments may be used as technical electives. Graduate courses having an IE, EM or MNE prefix and courses taken for the BS/MS program are also acceptable, provided that the requirements for taking such courses are met. Select three courses from the following list:

| Code   | Title                                       | Credits |
|--------|---|---------|
| IE 447 | Legal Aspects of Engineering                | 3       |
| IE 449 | Industrial Robotics                         | 3       |
| IE 453 | Computer Integrated Manufacturing           | 3       |
| IE 455 | Robotics and Programmable Logic Controllers | 3       |
| IE 463 | Invention and Entrepreneurship              | 3       |
| IE 469 | Reliability in Engineering Systems          | 3       |
| IE 473 | Safety Engineering                          | 3       |

### Co-op

Two co-op courses taken in sequence replace a technical elective. In industrial engineering, In Industrial Engineering, IE 310 Co-op Work Experience I is taken without credit, and IE 411 Co-op Work Experience II is taken for degree credit, with IE 310 Co-op Work Experience I as a prerequisite.

\* Students can take MATH 213 (<http://catalog.njit.edu/search/?P=MATH%20213>) (Calculus III B) instead of MATH 211 (<http://catalog.njit.edu/search/?P=MATH%20211>).

\*\* Students can take BIOL 200 (Concepts in Biology) instead of CHEM 122 (<https://catalog.njit.edu/search/?P=CHEM%20122>).

See the **General Education Requirements** "Refer to the General Education Requirements for specific information for GER courses"

*This curriculum represents the maximum number of credits per semester for which a student is advised to register. A full-time credit load is 12 credits. First-year students are placed in a curriculum that positions them for success which may result in additional time needed to complete curriculum requirements. Continuing students should consult with their academic advisor to determine the appropriate credit load.*