# 2018 - 2019 Major Map
## Industrial Engineering, BSE

**School/College:** Ira A. Fulton Schools of Engineering  
**Location:** Tempe campus

### Term 1 - 0 - 15 Credit Hours **Critical course signified by 🟠**

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
<th>Minimum Grade</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAT 265: Calculus for Engineers I (MA)</td>
<td>3</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>ASU 101-IEE: The ASU Experience</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENG 101 or ENG 102: First-Year Composition OR ENG 105: Advanced First-Year Composition OR ENG 107 or ENG 108: First-Year Composition</td>
<td>3</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>FSE 100: Introduction to Engineering</td>
<td>2</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>Basic Science Elective</td>
<td>3-4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social-Behavioral Sciences (SB) AND Global Awareness (G)</td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Minimum 2.00 GPA ASU Cumulative.**

Term hours subtotal: **15-16**

### Term 2 - 15 - 31 Credit Hours **Critical course signified by 🟠**

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
<th>Minimum Grade</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSE 110: Principles of Programming with Java (CS)</td>
<td>3</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>MAT 266: Calculus for Engineers II (MA)</td>
<td>3</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>CHM 114: General Chemistry for Engineers (SQ) OR CHM 116: General Chemistry II (SQ)</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENG 101 or ENG 102: First-Year Composition OR ENG 105: Advanced First-Year Composition OR ENG 107 or ENG 108: First-Year Composition</td>
<td>3</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>Humanities, Arts and Design (HU) AND Historical Awareness (H)</td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Complete ENG 101 OR ENG 105 OR ENG 107 course(s).**

**Minimum 2.00 GPA ASU Cumulative.**

Term hours subtotal: **16**

### Term 3 - 31 - 46 Credit Hours **Critical course signified by 🟠**

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
<th>Minimum Grade</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSE 205: Object-Oriented Programming and Data Structures (CS)</td>
<td>3</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>IEE 210: Introduction to Industrial Engineering</td>
<td>3</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>MAT 267: Calculus for Engineers III (MA)</td>
<td>3</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>MSE 250: Structure and Properties of Materials</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Humanities, Arts and Design (HU) AND Cultural Diversity in the U.S. (C)</td>
<td>3</td>
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</tr>
</tbody>
</table>

**Complete Mathematics (MA) requirement.**

**Minimum 2.00 GPA ASU Cumulative.**

Term hours subtotal: **15**

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- An SAT, ACT, Accuplacer, TOEFL or IELTS score determines placement into first-year composition courses.
- ASU Mathematics Placement Assessment score determines placement in mathematics course.
- ASU 101 or College specific equivalent First Year Seminar required of all students and should be taken in the first semester.
- Prep for success using the [Freshman Guide](#).
- Join a Fulton community.
- Explore engineering and technical professions.

- Students with credit for CHM 113 must take CHM 116.
- Create a [Handshake profile](#).
- Get involved with EPICS, the Generator Labs, and the [Fulton Start-Up Center](#).

- Prep for success using the [Sophomore Guide](#).
- Consult the [Resume, Presentation, and Resource Library](#) for tips on how to create a technical resume, job shadow, do informational interviews and mentor with alumni.
### Term 4 46 - 62 Credit Hours

<table>
<thead>
<tr>
<th>Critical course signified by</th>
<th>Hours</th>
<th>Minimum Grade</th>
<th>Notes</th>
</tr>
</thead>
</table>
| ECN 211: Macroeconomic Principles (SB) | 3 | C | **- Pursue an undergraduate research experience.**  
**- Apply for internships.**  
**- Attend career fairs and events.** |
| IEE 380: Probability and Statistics for Engineering Problem Solving (CS) | 3 | C | |
| MAT 275: Modern Differential Equations (MA) | 3 | C | |
| PHY 121: University Physics I: Mechanics (SQ) | 3 | C | |
| PHY 122: University Physics Laboratory I (SQ) | 1 | C | |
| IEE 305: Information Systems Engineering (CS) | 3 | C | |

**Term hours subtotal:** 16

### Term 5 62 - 77 Credit Hours

<table>
<thead>
<tr>
<th>Necessary course signified by</th>
<th>Hours</th>
<th>Minimum Grade</th>
<th>Notes</th>
</tr>
</thead>
</table>
**- Network at student organization competitions or professional societies.** |
| IEE 300: Economic Analysis for Engineers | 3 | C | |
| MAE 201: Mechanics of Particles and Rigid Bodies I: Statics | 3 | | |
| PHY 131: University Physics II: Electricity and Magnetism (SQ) | 3 | | |
| PHY 132: University Physics Laboratory II (SQ) | 1 | | |
| MAT 242: Elementary Linear Algebra OR MAT 342: Linear Algebra OR MAT 343: Applied Linear Algebra | 2-3 | C | |

**Term hours subtotal:** 15-16

### Term 6 77 - 93 Credit Hours

<table>
<thead>
<tr>
<th>Necessary course signified by</th>
<th>Hours</th>
<th>Minimum Grade</th>
<th>Notes</th>
</tr>
</thead>
</table>
| IEE 321: Ethics and Technical Communication | 1 | C | **- Research and prepare for graduate school.**  
**- Apply for a Fulton Schools 4+1 program.**  
**- Develop a professional profile online.**  
**- Effective fall 2019, IEE 376 also requires IEE 210 with a C better as a prerequisite.** |
| IEE 376: Operations Research Deterministic Techniques/Applications | 3 | C | |
| IEE 369: Work Analysis and Design (L) | 3 | C | |
| Engineering Science Elective | 3-4 | | |
| Upper Division Career Focus Study Area | 3 | C | |
| Upper Division Humanities, Arts and Design (HU) OR Upper Division Social-Behavioral Sciences (SB) | 3 | | |
| Complete Cultural Diversity in the U.S. (C) AND Global Awareness (G) AND Historical Awareness (H) course(s). | | | |

**Term hours subtotal:** 16-17

### Term 7 93 - 108 Credit Hours

<table>
<thead>
<tr>
<th>Necessary course signified by</th>
<th>Hours</th>
<th>Minimum Grade</th>
<th>Notes</th>
</tr>
</thead>
</table>
| IEE 485: Systems Design Capstone I (L) | 3 | C | **- Plan for success using the Senior Guide.**  
**- Use Handshake to apply for full-time positions.**  
**- Complete an in-person or virtual practice interview.**  
**- Effective spring 2019, IEE 485 also requires IEE 321 with a C or better as a prerequisite.**  
**- Effective fall 2019, IEE 485 will also require IEE 369 with a C or better as a prerequisite.**  
**- Effective fall 2019, IEE 475 also requires IEE 385 with a C or better as a prerequisite.** |
| IEE 470: Stochastic Operations Research | 3 | C | |
| IEE 474: Quality Control | 3 | C | |
| IEE 475: Simulating Stochastic Systems (CS) | 3 | C | |
| Upper Division Career Focus Study Area | 3 | C | |

**Term hours subtotal:** 15
Select a minimum of nine semester hours from one of the following Career Focus Study Areas. Students will need to submit a Career Focus Proposal Form prior to taking classes. Please note that some of these courses may require additional prerequisites. All course options should be discussed with an advisor, as classes have prerequisites and are sequential.

Visit the CIDSE website for additional information about Career Focus Study Area and Technical Elective courses.

The curriculum updates referred to in some terms of the major map occurred because the Ira A. Fulton Engineering programs are **required** by our accreditation agency ABET to follow a curriculum continuous improvement process to keep up with technology changes and feedback from industry constituents. The changes were made to better prepare students for future success in the capstone courses for the degree.

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**Term 8: 108 - 120 Credit Hours**

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
<th>Grade</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>IEE 486: Systems Design Capstone II (L)</td>
<td>3</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>IEE 461: Production Control</td>
<td>3</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>Upper Division Career Focus Study Area</td>
<td>3</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>Upper Division IEE Technical Elective</td>
<td>3</td>
<td>C</td>
<td></td>
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</tbody>
</table>

**Term hours subtotal:** 12

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**Engineering Science Elective**

- CEE 384: Numerical Methods for Engineers (CS)
- CSE 120: Digital Design Fundamentals
- CSE 240: Introduction to Programming Languages
- EEE 202: Circuits I
- MAE 240: Thermofluids I
- MAE 241: Introduction to Thermodynamics

**Basic Science Elective**

- BIO 181: General Biology I (SQ)
- BIO 182: General Biology II (SG)
- BME 111: Engineering Perspectives on Biological Systems
- CHM 113: General Chemistry I (SQ)
- GLG 101: Introduction to Geology I (Physical) (SQ)
- GLG 102: Introduction to Geology II (Historical) (SG & H)
- GLG 110: Dangerous World (SG & G)
- PHY 111: General Physics (SQ) AND PHY 113: General Physics Laboratory (SQ)

**Career Focus Study Area (Computer/Information Systems Engineering)**

- *Students should plan to take MAT 300 as a TE for this focus*

**Career Focus Study Area (Engineering Management)**

- IEE 431: Engineering Administration (L)
- IEE 454: Risk Management
- IEE 456: Introduction to Systems Engineering
- IEE 458: Project Management

**Career Focus Study Area (Global Industrial Engineering Leadership)**

**Career Focus Study Area (Electronics Manufacturing)**

- EEE 352: Properties of Electronic Materials
- EEE 353: Fundamentals of CMOS and MEMS
- EEE 356: Fundamentals of Solid-State Devices

**Career Focus Study Area (Financial Engineering)**

- IEE 412: Introduction to Financial Engineering
- IEE 431: Engineering Administration (L)
- IEE 454: Risk Management

**Career Study Focus Area (Health Care Systems Engineering)**

**Career Focus Study Area (Industrial Engineering 4+1 Program)**

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General Studies Awareness Requirements:
- Cultural Diversity in the U.S. (C)
- Global Awareness (G)
- Historical Awareness (H)

First-Year Composition

ECN 306: Survey of International Economics (SB & G)
MGT 302: Principles of International Business (G)
MGT 459: International Management (G)

Career Focus Study Area (Industrial Statistics)
IEE 381: Lean Six Sigma Methodology
STP 425: Stochastic Processes
STP 429: Experimental Statistics (CS)

IEE 421: Urban Operations Research
IEE 426: Operations Research in Healthcare
IEE 431: Engineering Administration (L)

Career Focus Study Area (Operations Research)
IEE 421: Urban Operations Research
IEE 426: Operations Research in Healthcare
MAT 300: Mathematical Structures (L)

IEE Technical Electives (May not be duplicated with Career Focus Study Area requirement courses)
CSE 494: Data Mining
FSE 301: Entrepreneurship and Value Creation

IEE 381: Lean Six Sigma Methodology
IEE 412: Introduction to Financial Engineering
IEE 421: Urban Operations Research
IEE 426: Operations Research in Healthcare
IEE 431: Engineering Administration (L)
IEE 437: Human Factors Engineering
IEE 454: Risk Management
IEE 456: Introduction to Systems Engineering
IEE 458: Project Management
IEE 477: System Dynamics and Thinking
SCM 300: Global Supply Operations
Any 300-level or higher approved Engineering or Business course with Program Chair approval.

Total Hours: 120
Upper Division Hours: 45 minimum
Major GPA: 2.00 minimum
Cumulative GPA: 2.00 minimum
Total hrs at ASU: 30 minimum
Hrs Resident Credit for Academic Recognition: 56 minimum
Total Community College Hrs: 64 maximum

Note: Students must be admitted into the 4+1 Program. See your academic advisor for details.

Three graduate-level courses (IEE 5**) of which two or more are from the Master's Core Class list.
General Studies designations listed on the major map are current for the 2018 - 2019 academic year.