## 2018 - 2019 Major Map

**Materials Science and Engineering, BSE**

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

### Term 1 - 16 Credit Hours

<table>
<thead>
<tr>
<th>Critical course signified by</th>
<th>Hours</th>
<th>Minimum Grade</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>FSE 100: Introduction to Engineering</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAT 265: Calculus for Engineers I (MA)</td>
<td>3</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>ASU 101-MSE: The ASU Experience</td>
<td></td>
<td></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>C</td>
<td></td>
</tr>
<tr>
<td>ENG 101: First-Year Composition or ENG 102: First-Year Composition OR ENG 105: Advanced First-Year Composition OR ENG 107: First-Year Composition or ENG 108: First-Year Composition</td>
<td>3</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>Social-Behavioral Sciences (SB) AND Global Awareness (G)</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum 2.00 GPA ASU Cumulative.</td>
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</tbody>
</table>

**Term hours subtotal:** 16

- An SAT, ACT, Accuplacer, IELTS, or TOEFL 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 freshman students.
- ASU 101-MSE and FSE 100 required for freshmen and should be completed first semester. Non-freshmen: see advisor for petitioning replacement electives.
- If student takes ENG 105 a 3 hr applicable elective must also be taken prior to graduation. See Advisor.
- Prep for success using the **Freshman Guide**.
- Join a Fulton community.
- Explore engineering and technical professions.

### Term 2 - 16 Credit Hours

<table>
<thead>
<tr>
<th>Critical course signified by</th>
<th>Hours</th>
<th>Minimum Grade</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAT 266: Calculus for Engineers II (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>C</td>
<td></td>
</tr>
<tr>
<td>PHY 121: University Physics I: Mechanics (SQ)</td>
<td>3</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>PHY 122: University Physics Laboratory I (SQ)</td>
<td>1</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>ENG 101: First-Year Composition or ENG 102: First-Year Composition OR ENG 105: Advanced First-Year Composition OR ENG 107: First-Year Composition or ENG 108: First-Year Composition</td>
<td>3</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>Humanities, Arts and Design (HU) AND Cultural Diversity in the U.S. (C)</td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Complete CHM 114 OR CHM 116 course(s).
- Complete ENG 101 OR ENG 105 OR ENG 107 course(s).
- Minimum 2.00 GPA ASU Cumulative.

**Term hours subtotal:** 16

### Term 3 - 32 Credit Hours

<table>
<thead>
<tr>
<th>Critical course signified by</th>
<th>Hours</th>
<th>Minimum Grade</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAT 267: Calculus for Engineers III (MA)</td>
<td>3</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>MSE 215: Materials Synthesis</td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Create a **Handshake** profile.
- Get involved with EPICS, the Generator Labs, and the **Fulton Start-Up Center**.
### Term 4 48 - 63 Credit Hours

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
<th>Minimum Grade</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAT 275: Modern Differential Equations (MA)</td>
<td>3</td>
<td>C</td>
<td>For additional information about Advanced Science Electives options, please go to: Advanced Science Electives</td>
</tr>
<tr>
<td>MAT 343: Applied Linear Algebra</td>
<td>3</td>
<td>C</td>
<td>• Prep for success using the Sophomore Guide.</td>
</tr>
<tr>
<td>MSE 211: Introduction to Mechanics of Materials</td>
<td>3</td>
<td></td>
<td>• 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.</td>
</tr>
<tr>
<td>Advanced Science Elective</td>
<td>3</td>
<td></td>
<td>• Network at student organization competitions or professional societies.</td>
</tr>
<tr>
<td>Minimum 2.00 GPA ASU Cumulative.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Term hours subtotal: 15

### Term 5 63 - 79 Credit Hours

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
<th>Minimum Grade</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSE 355: Structure and Defects</td>
<td>3</td>
<td>C</td>
<td>• For additional information about Advanced Science Electives options, please go to: Advanced Science Electives</td>
</tr>
<tr>
<td>MSE 330: Thermodynamics of Materials</td>
<td>3</td>
<td></td>
<td>• Pursue an undergraduate research experience</td>
</tr>
<tr>
<td>MSE 356: Structures, Properties, and Defects Lab</td>
<td>1</td>
<td></td>
<td>• Apply for internships.</td>
</tr>
<tr>
<td>MSE 415: Mathematical and Computer Methods in Materials (CS)</td>
<td>3</td>
<td></td>
<td>• Attend career fairs and events</td>
</tr>
<tr>
<td>MSE 457: Quantum Mechanics for Understanding Properties of Atoms and Solids</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Humanities, Arts and Design (HU)</td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Term hours subtotal: 16

### Term 6 79 - 93 Credit Hours

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
<th>Minimum Grade</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSE 420: Physical Metallurgy</td>
<td>3</td>
<td></td>
<td>• Research and prepare for graduate school</td>
</tr>
<tr>
<td>MSE 335: Materials Kinetics and Processing</td>
<td>3</td>
<td></td>
<td>• Apply for an engineering 4+1 program.</td>
</tr>
<tr>
<td>MSE 421: Physical Metallurgy Laboratory</td>
<td>1</td>
<td></td>
<td>• Develop a professional profile online.</td>
</tr>
<tr>
<td>MSE 450: Introduction to Materials Characterization</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MSE 451: Introduction to Materials Characterization Lab</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MSE 458: Introduction to Electronic, Magnetic, and Optical Properties</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Complete Cultural Diversity in the U.S. (C) AND Global Awareness (G) AND Historical Awareness (H) course(s).</td>
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</tr>
</tbody>
</table>

Term hours subtotal: 14

### Term 7 93 - 106 Credit Hours

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
<th>Minimum Grade</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSE 489: Capstone Design Project I (L)</td>
<td>1</td>
<td></td>
<td>• For additional information about Materials Elective options, please go to: Materials Elective</td>
</tr>
<tr>
<td>MSE 440: Mechanical Behavior of Materials</td>
<td>3</td>
<td></td>
<td>• Plan for success using the Senior Guide.</td>
</tr>
<tr>
<td>MSE 482: Materials Engineering Design (L)</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Materials Elective</td>
<td>6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Term hours subtotal: 14
Math or Science Elective

AST 111: Introduction to Solar Systems
Astronomy (SQ)

AST 112: Introduction to Stars, Galaxies, and
Cosmology (SQ)

BIO 130: Introduction to Environmental
Science (SQ)

BIO 201: Human Anatomy and Physiology I
(SG)

CHM 113: General Chemistry I (SQ)

CHM 231: Elementary Organic Chemistry
(SQ)

GLG 101: Introduction to Geology I
(Physical) (SQ)

MAT 211: Mathematics for Business Analysis

MAT 243: Discrete Mathematical Structures

PHY 201: Mathematical Methods in Physics I
(CS)

Advanced Science Elective

Contact your advisor for additional course
options to be reviewed through department
petition.

Advanced Science Elective

Complete 2 courses:

Technical Elective

Upper Division Humanities, Arts and Design (HU) OR Upper
Division Social-Behavioral Sciences (SB)

Technical Electives

CEE 353: Civil Engineering Materials

CHB 494: Special Topics

EE 202: Circuits I

EE 241: Fundamentals of Electromagnetics

EE 352: Properties of Electronic Materials

EE 435: Fundamentals of CMOS and MEMS

EE 436: Fundamentals of Solid-State
Devices

FSE 301: Entrepreneurship and Value
Creation

FSE 394: EPICS Gold II

FSE 494: EPICS Gold: EPICS in Action

IEE 300: Economic Analysis for Engineers

IEE 369: Work Analysis and Design (L)

IEE 385: Engineering Statistics: Probability

IEE 437: Human Factors Engineering

IEE 474: Quality Control

MAE 494: Special Topics

MEE 322: Structural Mechanics

MEE 342: Principles of Mechanical Design

• For additional information about Advanced
Science Electives and Technical Electives,
please go to: Advanced Science Electives
and Technical Electives

• For more information about Math or Science
Elective course options, Materials Elective
course options, Advanced Science
Elective course options, or Technical Elective
course options, please go to: MSE
Elective Course Options

Hide Course List(s)/Track Group(s)
PHY 201: Mathematical Methods in Physics I (CS)  
PHY 334: Advanced Laboratory I (L)  

Contact your advisor for additional course options to be reviewed through department petition.

MSE 475: Fundamentals of Microelectronics Packaging  
MSE 484: Internship  
MSE 494: Special Topics  

Advanced Science Elective

For MSE 492/493/498/499 courses, please work with your advisor for prior approval.

Contact your advisor for additional course options to be reviewed through department petition.

Materials Elective

Please choose two courses from the following options:

- MSE 470: Polymers and Composites
- MSE 471: Introduction to Ceramics
- MSE 494: Polymer Syn & Prop
- BME 318: Biomaterials

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

General University Requirements Legend

General Studies Core Requirements:
- Literacy and Critical Inquiry (L)
- Mathematical Studies (MA)
- Computer/Statistics/Quantitative Applications (CS)
- Humanities, Arts and Design (HU)
- Social-Behavioral Sciences (SB)
- Natural Science - Quantitative (SQ)
- Natural Science - General (SG)

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

First-Year Composition

General Studies designations listed on the major map are current for the 2018 - 2019 academic year.