# 2020 - 2021 Major Map

Materials Science and Engineering, BSE

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

<table>
<thead>
<tr>
<th>Term 1 0 - 16 Credit Hours</th>
<th>Critical course signified by</th>
<th>Hours</th>
<th>Minimum Grade</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MAT 265: Calculus for Engineers I (MA)</strong></td>
<td>3</td>
<td>C</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>ASU 101-MSE: The ASU Experience</strong></td>
<td>1</td>
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<tr>
<td><strong>CHM 114: General Chemistry for Engineers (SQ)</strong> OR CHM 116: General Chemistry II (SQ)</td>
<td>4</td>
<td>C</td>
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<tr>
<td><strong>ENG 101: First-Year Composition or ENG 102: First-Year Composition OR ENG 105: Advanced First-Year Composition OR ENG 107: First-Year Composition</strong></td>
<td>3</td>
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<tr>
<td><strong>FSE 100: Introduction to Engineering</strong></td>
<td>2</td>
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<tr>
<td><strong>Social-Behavioral Sciences (SB) AND Global Awareness (G)</strong></td>
<td>3</td>
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<tr>
<td><strong>Minimum 2.00 GPA ASU Cumulative.</strong></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.
- Mathematics Placement Assessment score determines placement in mathematics course.
- ASU 101 or college-specific equivalent First-Year Seminar required of all first-year students.
- FSE 100 is required for first-year students and should be completed in the first semester. Non-first year students: see advisor for petitioning replacement electives.
- If students take ENG 105, a 3 credit hour applicable elective must also be taken prior to graduation. See advisor.
- Prep for success using the First-Year Student Guide.
- Join a Fulton community.
- Explore engineering and technical professions.

<table>
<thead>
<tr>
<th>Term 2 16 - 32 Credit Hours</th>
<th>Critical course signified by</th>
<th>Hours</th>
<th>Minimum Grade</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MAT 266: Calculus for Engineers II (MA)</strong></td>
<td>3</td>
<td>C</td>
<td></td>
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<tr>
<td><strong>PHY 121: University Physics I: Mechanics (SQ)</strong></td>
<td>3</td>
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<tr>
<td><strong>PHY 122: University Physics Laboratory I (SQ)</strong></td>
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</tr>
<tr>
<td><strong>ENG 101: First-Year Composition or ENG 102: First-Year Composition OR ENG 105: Advanced First-Year Composition OR ENG 107: First-Year Composition</strong></td>
<td>3</td>
<td>C</td>
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<tr>
<td><strong>MSE 250: Structure and Properties of Materials</strong></td>
<td>3</td>
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<tr>
<td><strong>Humanities, Arts and Design (HU) AND Cultural Diversity in the U.S. (C)</strong></td>
<td>3</td>
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<tr>
<td><strong>Complete CHM 114 OR CHM 116 course(s).</strong></td>
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</tr>
<tr>
<td><strong>Complete ENG 101 OR ENG 105 OR ENG 107 course(s).</strong></td>
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<tr>
<td><strong>Minimum 2.00 GPA ASU Cumulative.</strong></td>
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Term hours subtotal: 16

- Create a Handshake profile.
- Get involved with EPICS, the Generator Labs, and the Fulton Start-Up Center.
## Term 3 32 - 48 Credit Hours

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Hours</th>
<th>Minimum Grade</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAT 267</td>
<td>Calculus for Engineers III (MA)</td>
<td>3</td>
<td>C</td>
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<tr>
<td>PHY 131</td>
<td>University Physics II: Electricity and Magnetism (SQ)</td>
<td>3</td>
<td>C</td>
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<tr>
<td>PHY 132</td>
<td>University Physics Laboratory II (SQ)</td>
<td>1</td>
<td>C</td>
<td></td>
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<tr>
<td>MSE 215</td>
<td>Materials Synthesis</td>
<td>3</td>
<td>C</td>
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</tr>
<tr>
<td>MSE Elective</td>
<td>Math or Science Elective</td>
<td>3-4</td>
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<tr>
<td>SB</td>
<td>Social-Behavioral Sciences (SB)</td>
<td>3</td>
<td></td>
<td></td>
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<tr>
<td>H</td>
<td>Historical Awareness (H)</td>
<td>3</td>
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</tbody>
</table>

- Complete MSE 250 course(s).
- Minimum 2.00 GPA ASU Cumulative.
- Complete Mathematics (MA) requirement.

**Term hours subtotal:** 16-17

## Term 4 48 - 63 Credit Hours

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Hours</th>
<th>Minimum Grade</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAT 275</td>
<td>Modern Differential Equations (MA)</td>
<td>3</td>
<td>C</td>
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<tr>
<td>MAT 343</td>
<td>Applied Linear Algebra</td>
<td>3</td>
<td>C</td>
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</tr>
<tr>
<td>MSE 211</td>
<td>Introduction to Mechanics of Materials</td>
<td>3</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>IEE 380</td>
<td>Probability and Statistics for Engineering Problem Solving (CS)</td>
<td>3</td>
<td></td>
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<tr>
<td>MSE Elective</td>
<td>Advanced Science Elective</td>
<td>3</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Minimum 2.00 GPA ASU Cumulative.</td>
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**Term hours subtotal:** 15

## Term 5 63 - 79 Credit Hours

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Hours</th>
<th>Minimum Grade</th>
<th>Notes</th>
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</thead>
<tbody>
<tr>
<td>MSE 355</td>
<td>Structure and Defects</td>
<td>3</td>
<td>C</td>
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<tr>
<td>MSE 356</td>
<td>Structures, Properties, and Defects Lab</td>
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<tr>
<td>MSE 415</td>
<td>Mathematical and Computer Methods in Materials (CS)</td>
<td>3</td>
<td></td>
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<tr>
<td>MSE 457</td>
<td>Quantum Mechanics for Understanding Properties of Atoms and Solids</td>
<td>3</td>
<td></td>
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</tr>
<tr>
<td>HU</td>
<td>Humanities, Arts and Design (HU)</td>
<td>3</td>
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</table>

- Complete Cultural Diversity in the U.S. (C) AND Global Awareness (G) AND Historical Awareness (H) course(s).

**Term hours subtotal:** 16

## Term 6 79 - 93 Credit Hours

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Hours</th>
<th>Minimum Grade</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSE 335</td>
<td>Materials Kinetics</td>
<td>3</td>
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<tr>
<td>MSE 421</td>
<td>Physical Metallurgy Laboratory</td>
<td>1</td>
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<tr>
<td>MSE 450</td>
<td>Introduction to Materials Characterization</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MSE 451</td>
<td>Introduction to Materials Characterization Lab</td>
<td>1</td>
<td></td>
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<tr>
<td>MSE 458</td>
<td>Electronic, Magnetic, and Optical Properties</td>
<td>3</td>
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<tr>
<td>Upper Division</td>
<td>Materials Elective</td>
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</table>

- Complete Cultural Diversity in the U.S. (C) AND Global Awareness (G) AND Historical Awareness (H) course(s).

**Term hours subtotal:** 14

## Term 7 93 - 106 Credit Hours

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Hours</th>
<th>Minimum Grade</th>
<th>Notes</th>
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<tbody>
<tr>
<td>MSE 489</td>
<td>Capstone Design Project I (L)</td>
<td>1</td>
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<tr>
<td>MSE 440</td>
<td>Mechanical Behavior of Materials</td>
<td>3</td>
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<tr>
<td>MSE 482</td>
<td>Materials Engineering Design (L)</td>
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</table>

- Complete Cultural Diversity in the U.S. (C) AND Global Awareness (G) AND Historical Awareness (H) course(s).

**Term hours subtotal:** 14

- For additional information about Materials Elective options, please go to: Materials Elective.

## Notes
- For additional information about Math or Science Electives, please go to: Math or Science Electives.
- Prep for success using the Sophomore Guide.
- For additional information about Advanced Science Electives options, please go to: Advanced Science Electives.
- For additional information about Materials Elective options, please go to: Materials Elective.
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)
CHM 233: General Organic Chemistry I
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

AST 321: Introduction to Planetary and Stellar Astrophysics (SQ)
AST 322: Introduction to Galactic and Extragalactic Astrophysics (SQ)
AST 421: Astrophysics I
BCH 341: Physical Chemistry with a Biological Focus
BCH 361: Advanced Principles of Biochemistry
BIO 201: Human Anatomy and Physiology I (SG)
CHM 231: Elementary Organic Chemistry (SQ) or CHM 233: General Organic Chemistry I
CHM 302: Environmental Chemistry
CHM 325: Analytical Chemistry
CHM 341: Elementary Physical Chemistry
CHM 345: Physical Chemistry I
CHM 346: Physical Chemistry II
CHM 433: Advanced Organic Chemistry I
ENV 410: Soil Science

Materials Elective

ABS 225: Soils (SQ)
ABS 350: Applied Statistics (CS)
AST 321: Introduction to Planetary and Stellar Astrophysics (SQ)
AST 322: Introduction to Galactic and Extragalactic Astrophysics (SQ)
AST 421: Astrophysics I
BCH 341: Physical Chemistry with a Biological Focus
BCH 361: Advanced Principles of Biochemistry
BIO 201: Human Anatomy and Physiology I (SG)
CHM 231: Elementary Organic Chemistry (SQ) or CHM 233: General Organic Chemistry I
CHM 302: Environmental Chemistry
CHM 325: Analytical Chemistry
CHM 341: Elementary Physical Chemistry
CHM 345: Physical Chemistry I
CHM 346: Physical Chemistry II
CHM 433: Advanced Organic Chemistry I
ENV 410: Soil Science

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

• Plan for success using the Senior Guide.
• Use Handshake to apply for full-time positions.
• Complete an in person or virtual practice interview.

For more information about course options for Math or Science Electives, Materials Electives, Advanced Science Electives, or Technical Electives, please go to: MSE Elective Course Options.
GLG 404: Fundamentals of Planetary Geology
GLG 418: Geophysics
PHY 201: Mathematical Methods in Physics I (CS)
PHY 334: Advanced Laboratory I (L)
PHY 361: Introductory Modern Physics

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

Technical Electives

CEE 353: Civil Engineering Materials
CHE 211: Introduction to Chemical Processing
CHE 494: Special Topics
CIS 310: Business Data Visualization
EEE 202: Circuits I
EEE 241: Fundamentals of Electromagnetics
EEE 352: Properties of Electronic Materials
EEE 435: Fundamentals of CMOS and MEMS
EEE 436: Fundamentals of Solid-State Devices
EEE 460: Nuclear Power Engineering
EEE 465: Photovoltaic Energy Conversion
EGR 219: Computational Modeling of Engineering Systems
FSE 301: Entrepreneurship and Value Creation
FSE 404: 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
MAT 300: Mathematical Structures (L)
MEE 322: Structural Mechanics
MEE 342: Principles of Mechanical Design
MSE 484: Internship
MSE 494: Special Topics
PUP 442: Environmental Planning
General Studies designations listed on the major map are current for the 2020 - 2021 academic year.

**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)

**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 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 2020 - 2021 academic year.