# 2021 - 2022 Major Map

**Biomedical Engineering (Biomedical Devices), BSE**

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

## Term 1 0 - 15 Credit Hours

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
<th>Minimum Grade</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASU 101-BME: The ASU Experience</td>
<td>1</td>
<td>C</td>
<td>- Required First-Year Seminar for all students.</td>
</tr>
<tr>
<td>CHM 114: General Chemistry for Engineers (SQ)</td>
<td>4</td>
<td>C</td>
<td>- If ENG 105 is taken, a three credit hour elective must also be taken prior to graduation. See advisor.</td>
</tr>
<tr>
<td>MAT 265: Calculus for Engineers I (MA)</td>
<td>3</td>
<td>C</td>
<td>- Prep for success using the First-Year Student Guide.</td>
</tr>
<tr>
<td>BME 100: Introduction to Biomedical Engineering</td>
<td>3</td>
<td>C</td>
<td>- Explore engineering and technical professions.</td>
</tr>
<tr>
<td>BME 182: Biomedical Engineering Product Design and Development I</td>
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<tr>
<td>ENG 101 or ENG 102: First-Year Composition OR</td>
<td>3</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>ENG 105: Advanced First-Year Composition OR</td>
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<tr>
<td>ENG 107 or ENG 108: First-Year Composition</td>
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</tbody>
</table>

**Minimum 2.00 GPA ASU Cumulative.**

Term hours subtotal: **15**

## Term 2 15 - 31 Credit Hours

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
<th>Minimum Grade</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIO 181: General Biology I (SQ)</td>
<td>4</td>
<td>C</td>
<td>- Create a Handshake profile.</td>
</tr>
<tr>
<td>MAT 266: Calculus for Engineers II (MA)</td>
<td>3</td>
<td>C</td>
<td>- Get involved with EPICS, the Generator Labs, and the Fulton Start-Up Center.</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>BME 122: Statistics for Biomedical Engineers</td>
<td>2</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>ENG 101 or ENG 102: First-Year Composition OR</td>
<td>3</td>
<td>C</td>
<td></td>
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<tr>
<td>ENG 105: Advanced First-Year Composition OR</td>
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<tr>
<td>ENG 107 or ENG 108: First-Year Composition</td>
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</tbody>
</table>

**Complete BME 100 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 31 - 46 Credit Hours

<table>
<thead>
<tr>
<th>Course</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>- Prep for success using the Sophomore Guide.</td>
</tr>
<tr>
<td>PHY 131: University Physics II: Electricity and Magnetism (SQ)</td>
<td>3</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>PHY 132: University Physics Laboratory II (SQ)</td>
<td>1</td>
<td>C</td>
<td></td>
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<tr>
<td>BME 210: Programming for Biomedical Engineers: Introduction to Computers, Programming and Data (CS)</td>
<td>3</td>
<td>C</td>
<td></td>
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<tr>
<td>BME 213: Biomedical and Bioengineering Ethics</td>
<td>1</td>
<td>C</td>
<td></td>
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<tr>
<td>Term</td>
<td>Credit Hours</td>
<td>Critical course signified by</td>
<td>Hours</td>
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<tr>
<td>Term 4 46 - 61</td>
<td></td>
<td><strong>BME 200: Conservation Principles in Biomedical Engineering</strong></td>
<td>3</td>
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<td></td>
<td></td>
<td><strong>MAT 275: Modern Differential Equations (MA)</strong></td>
<td>3</td>
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<td><strong>BME 235: Physiology for Engineers</strong></td>
<td>4</td>
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<td><strong>BME 282: Biomedical Engineering Product Design and Development II</strong></td>
<td>1</td>
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<td><strong>EEE 202: Circuits I</strong></td>
<td>4</td>
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<tr>
<td>Term hours subtotal:</td>
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<tr>
<td>Term 5 61 - 75</td>
<td></td>
<td><strong>BME 350: Signals and Systems for Bioengineers</strong></td>
<td>3</td>
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<td><strong>BME 331: Transport Phenomena for Biomedical Engineering</strong></td>
<td>4</td>
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<td><strong>CHM 231: Elementary Organic Chemistry (SQ) AND CHM 235: Elementary Organic Chemistry Laboratory (SQ)</strong></td>
<td>4</td>
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<tr>
<td>Term hours subtotal:</td>
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<tr>
<td>Term 6 75 - 90</td>
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<td><strong>BME 370: Microcomputer Applications in Biomedical Engineering</strong></td>
<td>3</td>
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<td><strong>BME 301: Numerical Methods in Biomedical Engineering</strong></td>
<td>2</td>
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<td><strong>BME 316: Biomechanics for Biomedical Engineers</strong></td>
<td>3</td>
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<td><strong>BME 340: Thermodynamics for Biomedical Engineers</strong></td>
<td>3</td>
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<td><strong>BME 382: Biomedical Engineering Product Design and Development III</strong></td>
<td>1</td>
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<tr>
<td>Term hours subtotal:</td>
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<td>Term 7 90 - 104</td>
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<td><strong>BME 417: Biomedical Engineering Capstone Design I (L)</strong></td>
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<td><strong>BME 413: Biomedical Instrumentation (L)</strong></td>
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<td><strong>BME 423: Biomedical Instrumentation Laboratory (L)</strong></td>
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<td><strong>Upper Division Related Elective</strong></td>
<td>3</td>
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<td></td>
<td><strong>Upper Division Humanities, Arts and Design (HU) OR Upper Division Social-Behavioral Sciences (SB)</strong></td>
<td>3</td>
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<td><strong>Complete Cultural Diversity in the U.S. (C) AND Global Awareness (G) AND Historical Awareness (H) course(s).</strong></td>
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<tr>
<td>Term hours subtotal:</td>
<td></td>
<td></td>
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</tbody>
</table>
Upper Division Related Electives

ACC 382: Accounting and Financial Analysis
BCH 361: Advanced Principles of Biochemistry
BCH 367: Elementary Biochemistry Laboratory
BCH 461: General Biochemistry
BCH 462: General Biochemistry
BCH 467: Analytical Biochemistry Laboratory (L)
BIO 302: Cancer--Mother of All Diseases (L)
BIO 312: Bioethics (HU) or PHI 320: Bioethics (HU)
BIO 331: Animal Behavior
BIO 340: General Genetics or MBB 347: Molecular Genetics: From Genes to Proteins
BIO 345: Evolution
BIO 355: Introduction to Computational Molecular Biology (CS) or MAT 355: Introduction to Computational Molecular Biology (CS) or MBB 355: Introduction to Computational Molecular Biology (CS)
BIO 360: Animal Physiology
BIO 440: Functional Genomics or MBB 440: Functional Genomics
BIO 451: Cell Biotechnology: Cell Culture, Immunocytochemistry and Bioimaging
BIO 467: Neurobiology
BME 394: Honors Research
BME 394: SBHSE Research Projects
BME 490: Biomedical Engineering Capstone Design II (L)
BME 492: Honors Directed Study

Upper Division Related Electives continued

EDP 310: Developing as a Leader (SB)
EDP 310: Emotional Intelligence (SB)
EDP 310: Gender Development (SB)
EDP 310: Learning and Memory (SB)
EDP 310: Motivation (SB)
EDP 310: Understanding the Brain (SB)
EEE 307: Signal Processing for Digital Culture
EEE 334: Circuits II
EEE 350: Random Signal Analysis
EEE 352: Properties of Electronic Materials
EEE 407: Digital Signal Processing
EEE 480: Feedback Systems
EEE 481: Computer-Controlled Systems
ENT 305: Principles of Entrepreneurship
FIN 300: Fundamentals of Finance
FIN 380: Personal Financial Management
FSE 301: Entrepreneurship and Value Creation or ENT 360: Entrepreneurship and Value Creation
HCR 350: Introduction to Clinical Research
IEE 300: Economic Analysis for Engineers
IEE 320: Extreme Excel
IEE 369: Work Analysis and Design (L)
IEE 381: Lean Six Sigma Methodology
IEE 431: Engineering Administration (L)
IND 464: Collaborative Design Development I (L)
MEE 322: Structural Mechanics
MEE 340: Heat Transfer
MGT 300: Organization and Management Leadership
MGT 302: Principles of International Business (G)
MGT 380: Management and Strategy for Nonmajors
MIC 360: Bacterial Physiology
MIC 420: Immunology: Molecular and Cellular Foundations or BIO 420: Immunology: Molecular and Cellular Foundations
MKT 300: Marketing and Business Performance
MKT 370: Professional Sales and Relationship Management
MKT 390: Essentials of Marketing
MKT 391: Essentials of Selling
MSE 301: Materials and Civilization
MSE 330: Thermodynamics of Materials
MSE 335: Materials Kinetics
MSE 355: Structure and Defects
MSE 356: Thin Film and Microelectronic Devices Lab
MSE 415: Mathematical and Computer Methods in Materials (CS)
MSE 420: Advanced Metallurgical Alloys and Processes
MSE 421: Physical Metallurgy Laboratory

Hide Course List(s)/Track Group(s)

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EDP 310: Gender Development (SB)
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MSE 415: Mathematical and Computer Methods in Materials (CS)
MSE 420: Advanced Metallurgical Alloys and Processes
MSE 421: Physical Metallurgy Laboratory

Term 8 104 - 120 Credit Hours Necessary course signified by ✭ Hours Grade Notes
BME 490: Biomedical Engineering Capstone Design II (L) 4 C
Upper Division Related Elective 3 C
Humanities, Arts and Design (HU) AND Cultural Diversity in the U.S. (C) 3
Humanities, Arts and Design (HU) AND Historical Awareness (H) 3
Social-Behavioral Sciences (SB) AND Global Awareness (G) 3
Term hours subtotal: 16

• Select your Upper Division Related Elective courses from the approved list found below or here.
• The general studies requirements for HU or SB and the awareness areas do not have to be taken in exact combinations (as outlined on major map). By the end of term 8, all need to be completed, however the combinations may vary.
Notes:

- First-Year Composition: All students are placed in ENG 101 unless submission of SAT, ACT, Accuplacer, IELTS, or TOEFL score, or college-level transfer credit or test credit equivalent to ASU's first-year composition course(s), determine otherwise. Students on Polytechnic, Downtown Phoenix and West Campuses are encouraged to complete the Directed Self-Placement survey to choose the first-year composition option they believe best suits their needs. Visit: https://cisa.asu.edu/DSP
- Mathematics Placement Assessment score determines placement in first mathematics course.
General Studies designations listed on the major map are current for the 2021 - 2022 academic year.

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 2021 - 2022 academic year.