

2020 - 2021 Major Map

Materials Science and Engineering, BSE

School/College: [Ira A. Fulton Schools of Engineering](#)
ESMSEBSE

Term 1 0 - 16 Credit Hours Critical course signified by 	Hours	Minimum Grade	Notes
 MAT 265: Calculus for Engineers I (MA)	3	C	- 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.
ASU 101-MSE: The ASU Experience	1		
CHM 114: General Chemistry for Engineers (SQ) OR CHM 116: General Chemistry II (SQ)	4	C	
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	3	C	
FSE 100: Introduction to Engineering	2		
Social-Behavioral Sciences (SB) AND Global Awareness (G)	3		
 Minimum 2.00 GPA ASU Cumulative.			
Term hours subtotal:	16		

Term 2 16 - 32 Credit Hours Critical course signified by 	Hours	Minimum Grade	Notes
 MAT 266: Calculus for Engineers II (MA)	3	C	- Create a Handshake profile. - Get involved with EPICS, the Generator Labs, and the Fulton Start-Up Center.
 PHY 121: University Physics I: Mechanics (SQ)	3	C	
 PHY 122: University Physics Laboratory I (SQ)	1	C	
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	3	C	
MSE 250: Structure and Properties of Materials	3	C	
Humanities, Arts and Design (HU) AND Cultural Diversity in the U.S. (C)	3		
 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 - 48 Credit Hours Critical course signified by 	Hours	Minimum Grade	Notes
 MAT 267: Calculus for Engineers III (MA)	3	C	- For additional information about Math or Science Electives, please go to: Math or Science Electives. - Prep for success using the Sophomore Guide.
 PHY 131: University Physics II: Electricity and Magnetism (SQ)	3	C	
 PHY 132: University Physics Laboratory II (SQ)	1	C	
MSE 215: Materials Synthesis	3		
Math or Science Elective	3-4		
Social-Behavioral Sciences (SB) AND Historical Awareness (H)	3		
 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 Critical course signified by 	Hours	Minimum Grade	Notes
 MAT 275: Modern Differential Equations (MA)	3	C	- For additional information about Advanced Science Electives options, please go to: Advanced Science Electives. - Pursue an undergraduate research experience. - Apply for internships. - Attend career fairs and events.
 MAT 343: Applied Linear Algebra	3	C	
 MSE 211: Introduction to Mechanics of Materials	3	C	
IEE 380: Probability and Statistics for Engineering Problem Solving (CS)	3		
Advanced Science Elective	3		
 Minimum 2.00 GPA ASU Cumulative.			
Term hours subtotal:	15		

Term 5 63 - 79 Credit Hours Necessary course signified by 	Hours	Minimum Grade	Notes
 MSE 355: Structure and Defects	3	C	- Plan for success using the Junior Guide. - Network at student organization competitions or professional societies.
MSE 330: Thermodynamics of Materials	3		
MSE 356: Structures, Properties, and Defects Lab	1		
MSE 415: Mathematical and Computer Methods in Materials (CS)	3		
MSE 457: Quantum Mechanics for Understanding Properties of Atoms and Solids	3		
Humanities, Arts and Design (HU)	3		
Term hours subtotal:	16		

Term 6 79 - 93 Credit Hours Necessary course signified by ★	Hours	Minimum Grade	Notes
★ MSE 335: Materials Kinetics	3		- For additional information about Materials Elective options, please go to: Materials Elective. - Research and prepare for graduate school. - Apply for an engineering 4+1 program. - Develop a professional profile online.
MSE 421: Physical Metallurgy Laboratory	1		
MSE 450: Introduction to Materials Characterization	3		
MSE 451: Introduction to Materials Characterization Lab	1		
MSE 458: Electronic, Magnetic, and Optical Properties	3		
Upper Division Materials Elective	3		
★ 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 Necessary course signified by ★	Hours	Minimum Grade	Notes
★ MSE 489: Capstone Design Project I (L)	1		- For additional information about Materials Elective options, please go to: Materials Elective. - Plan for success using the Senior Guide. - Use Handshake to apply for full-time positions. - Complete an in person or virtual practice interview.
MSE 440: Mechanical Behavior of Materials	3		
MSE 482: Materials Engineering Design (L)	3		
<i>Complete 2 courses:</i> Upper Division Materials Elective	6		
Term hours subtotal:		13	

Term 8 106 - 120 Credit Hours Necessary course signified by ★	Hours	Minimum Grade	Notes
★ MSE 490: Capstone Design Project II (L)	2		For additional information about Advanced Science Electives and Technical Electives, please go to: Advanced Science Electives and Technical Electives.
Advanced Science Elective	3		
<i>Complete 2 courses:</i> Technical Elective	6		
Upper Division Humanities, Arts and Design (HU) OR Upper Division Social-Behavioral Sciences (SB)	3		
Term hours subtotal:		14	

- 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](#).

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

Math or Science Elective

Advanced Science Elective

Materials Elective

AST 111: Introduction to Solar Systems Astronomy (SQ)	ABS 225: Soils (SQ)	Please choose three courses from the following options:
AST 112: Introduction to Stars, Galaxies, and Cosmology (SQ)	ABS 350: Applied Statistics (CS)	BME 318: Biomaterials
BIO 130: Introduction to Environmental Science (SQ)	AST 321: Introduction to Planetary and Stellar Astrophysics (SQ)	MSE 420: Physical Metallurgy
BIO 201: Human Anatomy and Physiology I (SG)	AST 322: Introduction to Galactic and Extragalactic Astrophysics (SQ)	MSE 470: Polymers and Composites
CHM 113: General Chemistry I (SQ)	AST 421: Astrophysics I	MSE 471: Introduction to Ceramics
CHM 231: Elementary Organic Chemistry (SQ)	BCH 341: Physical Chemistry with a Biological Focus	MSE 494: Polymer Synthesis, Characterization, & Processing
CHM 233: General Organic Chemistry I	BCH 361: Advanced Principles of Biochemistry	
GLG 101: Introduction to Geology I (Physical) (SQ)	BIO 201: Human Anatomy and Physiology I (SG)	
MAT 211: Mathematics for Business Analysis	BIO 320: Fundamentals of Ecology	
MAT 243: Discrete Mathematical Structures	CHM 231: Elementary Organic Chemistry (SQ) or CHM 233: General Organic Chemistry I	
PHY 201: Mathematical Methods in Physics I (CS)	CHM 302: Environmental Chemistry	
Advanced Science Elective	CHM 325: Analytical Chemistry	
Contact your advisor for additional course options to be reviewed through department petition.	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	
	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

SES 311: Essentials of Astrobiology: Exploration for Life in the Universe

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.

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 next to courses on the major map were valid for the 2020 - 2021 academic year. Please refer to the course catalog for current General Studies designations at time of class registration. General Studies credit is applied according to the designation the course carries at the time the class is taken.