2021 - 2022 Major Map
Mechanical Engineering (Energy and Environment), BSE

School/College: Ira A. Fulton Schools of Engineering
ESMAEEBSE

Term 1 0 - 16 Credit Hours Critical course signified by	Hours	Minimum Grade	Notes
MAT 265: Calculus for Engineers I (MA)	3	C	• 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 the first semester. Non-first year students: see advisor for petitioning replacement electives. • If ENG 105 is taken, a 3 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-MEE: 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	C	
Humanities, Arts and Design (HU) AND Cultural Diversity in the U.S. (C)	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
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	• Create a Handshake profile. • Get involved with EPICS, the Generator Labs, and the Fulton Start-Up Center.
MAT 242: Elementary Linear Algebra	2	C	
MAT 266: Calculus for Engineers II (MA)	3	C	
PHY 121: University Physics I: Mechanics (SQ)	3	C	
PHY 122: University Physics Laboratory I (SQ)	1	C	
MAE 215: Introduction to Programming in MATLAB	1	C	
Social-Behavioral Sciences (SB) AND Historical Awareness (H)	3		
Minimum 2.00 GPA ASU Cumulative.			
Complete ENG 101 OR ENG 105 OR ENG 107 course(s).			
Term hours subtotal:	16		

Term 3 32 - 46 Credit Hours Critical course signified by	Hours	Minimum	Notes

			Grade	
!	MAE 201: Mechanics of Particles and Rigid Bodies I: Statics	3	C	• Prep for success using the Sophomore Guide.
!	MAT 267: Calculus for Engineers III (MA)	3	C	
!	MAT 275: Modern Differential Equations (MA)	3	C	
!	PHY 131: University Physics II: Electricity and Magnetism (SQ)	3	C	
	MAE 214: Computer-Aided Engineering I	1	C	
	PHY 132: University Physics Laboratory II (SQ)	1	C	
!	Complete CHM 114 OR CHM 116 course(s).			
!	Minimum 2.00 GPA ASU Cumulative.			
	Complete Mathematics (MA) requirement.			
	Term hours subtotal:	14		

Term 4 46 - 62 Credit Hours Critical course signified by !	**Hours**	**Minimum Grade**	**Notes**
! MAE 202: Mechanics of Particles and Rigid Bodies II: Dynamics	3	C	• Pursue an undergraduate research experience. • Apply for internships. • Attend career fairs and events.
! MAE 213: Mechanics of Materials	3	C	
! MAE 241: Introduction to Thermodynamics	3	C	
EEE 202: Circuits I	4	C	
MAE 384: Advanced Mathematical Methods for Engineers (CS)	3	C	
Term hours subtotal:	16		

Term 5 62 - 78 Credit Hours Necessary course signified by ★	**Hours**	**Minimum Grade**	**Notes**
★ MEE 322: Structural Mechanics	3	C	• Plan for success using the Junior Guide. • Network at student organization competitions or professional societies.
★ MEE 324: Structural Mechanics Laboratory	1	C	
CHM 231: Elementary Organic Chemistry (SQ) OR CHM 233: General Organic Chemistry I	3	C	
MAE 242: Introduction to Fluid Mechanics	3	C	
MAE 301: Applied Experimental Statistics	3	C	
MSE 250: Structure and Properties of Materials	3	C	
Term hours subtotal:	16		

Term 6 78 - 93 Credit Hours Necessary course signified by ★	**Hours**	**Minimum Grade**	**Notes**
★ MAE 318: System Dynamics and Control I	4	C	• Research and prepare for graduate school.

★	MEE 340: Heat Transfer	3	C
	MAE 400: Engineering Profession (L)	3	C
	MEE 323: Computer-Aided Engineering II	2	C
	MEE 342: Principles of Mechanical Design	3	C
★	Complete Cultural Diversity in the U.S. (C) AND Global Awareness (G) AND Historical Awareness (H) course(s).		
	Term hours subtotal:	15	

- Apply for an engineering 4+1 program.
- Develop a professional profile online.

Term 7 93 - 106 Credit Hours Necessary course signified by ★	Hours	Minimum Grade	Notes
★ MEE 445: Energy Systems Design I	1	C	
★ MEE 482: Intermediate Thermodynamics	3	C	
MAE 417: System Dynamics and Control II OR MEE 491: Experimental Mechanical Engineering (L)	3	C	
PUP 190: Sustainable Cities ((HU or SB) & G) OR GPH 314: Global Change (HU & G)	3		
Upper Division Energy and Environment Technical Elective	3	C	
Term hours subtotal:	13		

- For additional information about Upper Division Energy and Environment Technical Electives, please see: Upper Division Energy and Environment Technical Electives.
- Plan for success using the Senior Guide.
- Apply for full-time positions.
- Complete an in person or virtual practice interview.

Term 8 106 - 120 Credit Hours Necessary course signified by ★	Hours	Minimum Grade	Notes
★ MEE 446: Energy Systems Design	2	C	
MAE 417: System Dynamics and Control II OR MEE 491: Experimental Mechanical Engineering (L)	3	C	
SOS 171: The Thread of Energy (SB & G) OR GCU 364: Energy in the Global Arena (SB & G)	3		
Upper Division Technical Elective	3	C	
Upper Division Humanities, Arts and Design (HU) OR Upper Division Social-Behavioral Sciences (SB)	3		
Term hours subtotal:	14		

- For additional information about Upper Division Technical Electives, please go to: Upper Division Technical Electives.

- For additional information about Upper Division Energy and Environment Technical Electives, & Upper Division Technical Electives, please go to: Upper Division Energy and Environment Technical Electives & Upper Division Technical Electives

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

Upper Division Energy and Environment Technical Electives
ATE 521: Building Environmental Science

Upper Division Technical Electives
AEE OR MAE OR MEE Upper Division Elective

Upper Division Technical Electives continued
MAT 300: Mathematical Structures (L)

ATE 556: Architectural Technology V

ATE 560: Building Energy Analysis

ATE 582: Environmental Control Systems

BIO 320: Fundamentals of Ecology

CEE 361: Introduction to Environmental Engineering

CEE 440: Hydrology

CEE 494: Energy Efficient Buildings and Systems

CEE 494: Sustainable Energy and Material Use

CEE 494: Sustainable Energy Technologies

CHE 473: Fuel Cells and Biofuel Cells

CHE 478: Biomass Energy Conversion Technology

CHM 302: Environmental Chemistry

EEE 360: Energy Systems and Power Electronics

EEE 460: Nuclear Power Engineering

EEE 463: Electrical Power Plants

EVE 302: Environmental Engineering Fundamentals: Physical and Chemical Processes

MAE 494: Energy Efficiency

MAE 494: Solar Thermal Engineering

MEE 434: Internal Combustion Engines

MEE 440: Renewable Energy: Mechanical Systems

MEE 441: Wind Energy

MSE 460: Nanomaterials in Energy Production and Storage

MSE 494: Electrochemical Energy Storage and Conversion

By approval only:

MAE 484: Internship

MAE 492: Honors Directed Study

MAE 493: Honors Thesis (L)

MAE 498: Pro-Seminar or MAE 499: Individualized Instruction

*Students who do not meet the enrollment requirements for these courses may be allowed to enroll with instructor consent. Courses not listed here require a program petition prior to enrollment. Please check with your advisor. A max of 3 credits from MAE 484/498/499 can be applied toward the TE requirements.

AST 321: Introduction to Planetary and Stellar Astrophysics (SQ)

AST 322: Introduction to Galactic and Extragalactic Astrophysics (SQ)

BIO 320: Fundamentals of Ecology

BME 300: Bioengineering Product Design

BME 316: Biomechanics for Biomedical Engineers

BME 318: Biomaterials

BME 350: Signals and Systems for Bioengineers

BME 494: Bioenergy and Microbial Biotechnology , Neural Bases of Motor Control

CEE 361: Introduction to Environmental Engineering

CEE 372: Transportation Engineering

CEE 400: Earth Systems Engineering and Management ((L or HU) & H)

CEE 440: Hydrology

CEE 494: Energy Efficient Buildings and Systems

CEE 494: Sustainable Energy and Material Use

CEE 494: Sustainable Energy Technologies

CHE 468: Polymer Principles and Processing

CHE 473: Fuel Cells and Biofuel Cells

CHE 478: Biomass Energy Conversion Technology

CHE 494: Nanobiotechnology

CHE 494: Six Sigma Methodology/Engineering Experimentation

CHM 302: Environmental Chemistry

CHM 325: Analytical Chemistry

EEE 304: Signals and Systems II

EEE 333: Hardware Design Languages and Programmable Logic

EEE 334: Circuits II

EEE 350: Random Signal Analysis

EEE 360: Energy Systems and Power Electronics

EEE 407: Digital Signal Processing

EEE 434: Quantum Mechanics for Engineers

EEE 460: Nuclear Power Engineering

MAT 310: Introduction to Geometry

MAT 371: Advanced Calculus I

MAT 420: Scientific Computing

MAT 421: Applied Computational Methods (CS)

MAT 423: Numerical Analysis I (CS)

MAT 425: Numerical Analysis II (CS)

MAT 451: Mathematical Modeling (CS)

MAT 461: Applied Complex Analysis

MAT 462: Applied Partial Differential Equations

MSE 330: Thermodynamics of Materials

MSE 355: Structure and Defects

MSE 440: Mechanical Behavior of Materials

MSE 450: Introduction to Materials Characterization

MSE 457: Quantum Mechanics for Understanding Properties of Atoms and Solids

MSE 460: Nanomaterials in Energy Production and Storage

MSE 476: Growth and Processing of Semiconductors

MSE 494: Bioinspired Materials and Biomaterials

MSE 494: Electrochemical Energy Storage and Conversion

MSE 494: Failure Analysis of Metallic Materials

MSE 494: Intro to FEA for Matl Design and Characterization

MSE 494: Manufacturing Processes for Structural Materials

PHY 310: Classical Particles, Fields, and Matter I

PHY 361: Introductory Modern Physics

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

SES 350: Engineering Systems and Experimental Problem Solving

SES 407: Space Works II: Model, Fabricate and Test

SES 494: Modeling and Analysis of Space Thermal Systems

SES 494: ASU SpaceWorks Project Level 3-Model, Test, Build

By approval only:

MAE 484: Internship

EEE 463: Electrical Power Plants

EEE 480: Feedback Systems

EEE 481: Computer-Controlled Systems

EEE 498: Foundations Machine Learning: From Theory to Pract

EEE 498: Science and Technology of Solar Cell Fabrication

EGR 317: Humanitarian Engineering Project II

EGR 433: Transforms and Systems Modeling

EGR 455: Robotic Systems I

EGR 456: Robotic Systems II

EGR 494: Engineering in Semiconductors and Microelectronics

EVE 302: Environmental Engineering Fundamentals: Physical and Chemical Processes

FSE 301: Entrepreneurship and Value Creation

GLG 418: Geophysics

FSE 394: Engineering in Global Context

IEE 300: Economic Analysis for Engineers

IEE 305: Information Systems Engineering (CS)

IEE 376: Operations Research Deterministic Techniques/Applications

IEE 437: Human Factors Engineering

IEE 431: Engineering Administration (L)

MAE 492: Honors Directed Study

MAE 493: Honors Thesis (L)

MAE 498: Pro-Seminar or MAE 499: Individualized Instruction

*Students who do not meet the enrollment requirements for these courses may be allowed to enroll with instructor consent. Courses not listed here require a program petition prior to enrollment. Please check with your advisor. A max of 3 credits from MAE 484/498/499 can be applied toward the TE requirements.

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.

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 2021 - 2022 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.