
















2024 - 2025 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 (MATH OR MA) | 3 | C | <ul style="list-style-type: none"> 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 (SCIT OR SQ) OR CHM 116: General Chemistry II (SCIT OR 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 (HUAD) | 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 242: Elementary Linear Algebra | 2 | C | <ul style="list-style-type: none"> Create a Handshake profile. Get involved with EPICS, the Generator Labs, and the Fulton Start-Up Center. |
|  MAT 266: Calculus for Engineers II (MATH OR MA) | 3 | C | |
|  PHY 121: University Physics I: Mechanics (SCIT OR SQ) | 3 | C | |
|  PHY 122: University Physics Laboratory I (SCIT OR 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 | |
| MAE 215: Introduction to Programming in MATLAB | 1 | C | |
| American Institutions (AMIT) | 3 | | |
|  Complete ENG 101 OR ENG 105 OR ENG 107 course(s). | | | |
|  Minimum 2.00 GPA ASU Cumulative. | | | |
| Term hours subtotal: | 16 | | |

| Term 3 32 - 46 Credit Hours Critical course signified by  | Hours | Minimum Grade | Notes |
|--|-------|---------------|---|
|  MAE 201: Mechanics of Particles and Rigid Bodies I: Statics | 3 | C | <ul style="list-style-type: none"> Prep for success using the Sophomore Guide. |
|  MAT 267: Calculus for Engineers III (MATH OR MA) | 3 | C | |
|  MAT 275: Modern Differential Equations (MATH OR MA) | 3 | C | |
|  PHY 131: University Physics II: Electricity and Magnetism (SCIT OR SQ) | 3 | C | |

| | | |
|--|----|---|
| PHY 132: University Physics Laboratory II (SCIT OR SQ) | 1 | C |
| MAE 214: Computer-Aided Engineering I | 1 | C |
| Complete CHM 114 OR CHM 116 course(s). | | |
| Complete First-Year Composition requirement. | | |
| Minimum 2.00 GPA ASU Cumulative. | | |
| Complete Mathematics (MATH) 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 | <ul style="list-style-type: none"> 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 (QTRS OR CS) | 3 | C | |
| Term hours subtotal: | 16 | | |

| Term 5 62 - 77 Credit Hours Necessary course signified by | Hours | Minimum Grade | Notes |
|--|-------|---------------|---|
| MEE 322: Structural Mechanics | 3 | C | <ul style="list-style-type: none"> Plan for success using the Junior Guide. Network at student organization competitions or professional societies. |
| CHM 231: Elementary Organic Chemistry (SCIT OR 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: | 15 | | |

| Term 6 77 - 91 Credit Hours Necessary course signified by | Hours | Minimum Grade | Notes |
|---|-------|---------------|--|
| MAE 318: System Dynamics and Control I | 3 | C | <ul style="list-style-type: none"> Research and prepare for graduate school. Apply for an engineering 4+1 program. Develop a professional profile online. Upper Division SUST track course must be selected from the course list at the bottom of the major map. |
| MEE 340: Heat Transfer | 3 | C | |
| MEE 323: Computer-Aided Engineering II | 2 | C | |
| MEE 342: Principles of Mechanical Design | 3 | C | |
| Upper Division SUST Track Course | 3 | | |
| Term hours subtotal: | 14 | | |

| Term 7 91 - 107 Credit Hours Necessary course signified by | Hours | Minimum Grade | Notes |
|--|-------|---------------|--|
| MEE 445: Energy Systems Design I | 1 | C | <ul style="list-style-type: none"> 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. |
| MEE 482: Intermediate Thermodynamics | 3 | C | |
| ASB 344: Technology and Society (SOBE OR L or SB) OR SOC 334: Technology and Society (SOBE OR L or SB) | 3 | | |
| MAE 417: System Dynamics and Control II | 3 | C | |
| Upper Division Energy and Environment Technical Elective | 3 | C | |
| Global Communities, Societies and Individuals (GCSI) | 3 | | |
| Term hours subtotal: | 16 | | |

| Term 8 107 - 120 Credit Hours Necessary course signified by | Hours | Minimum Grade | Notes |
|---|-------|---------------|-------|
| MEE 446: Energy Systems Design II | 2 | C | |
| MEE 491: Experimental Mechanical Engineering (L) | 2 | C | |

| | | |
|---|----|---|
| PUP 411: Environment, Justice and Cities (CIVI) | 3 | |
| Upper Division Technical Elective | 3 | C |
| Humanities, Arts and Design (HUAD) | 3 | |
| Term hours subtotal: | 13 | |

- For additional information about Upper Division Technical Electives, please go to: [Upper Division Technical Electives](#).
- Upper Division HUAD track course must be selected from the course list at the bottom of the major map.

- 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 Sustainability (SUST) Track Courses | Upper Division Energy and Environment Technical Electives | Upper Division Technical Electives |
|--|--|---|
| BIO 324: Environmental Ethics (SUST OR HU) or PHI 310: Environmental Ethics (SUST OR HU) | ATE 521: Building Environmental Science | AEE OR MAE OR MEE Upper Division Elective |
| CEE 400: Earth Systems Engineering and Management (SUST OR (L or HU) & H) or CNE 400: Earth Systems Engineering and Management (SUST OR (L or HU) & H) | ATE 556: Architectural Technology V | AST 321: Stellar and Planetary Astrophysics |
| CTE 310: Elements of Culture, Technology and Environment (SUST OR L or HU) | ATE 560: Building Energy Analysis | AST 322: Introduction to Galactic and Extragalactic Astrophysics |
| GPH 314: Global Change (SUST OR HU & G) | ATE 582: Environmental Control Systems | ATE 521: Building Environmental Science |
| SCN 302: Environmental Education: A Global Perspective (SUST OR L & G) | BIO 320: Fundamentals of Ecology | ATE 556: Architectural Technology V |
| SCN 307: Biomimicry: Nature's Sustainable Solutions (SUST OR G) | CEE 361: Introduction to Environmental Engineering | ATE 560: Building Energy Analysis |
| | CEE 440: Hydrology | ATE 582: Environmental Control Systems |
| | CEE 494: Energy Efficient Buildings and Systems | BIO 320: Fundamentals of Ecology |
| | CEE 494: Sustainable Energy and Material Use | BME 300: Bioengineering Product Design |
| | CEE 494: Sustainable Energy Technologies | BME 316: Biomechanics for Biomedical Engineers |
| | CHE 473: Fuel Cells and Biofuel Cells | BME 318: Biomaterials |
| | CHE 478: Biomass Energy Conversion Technology | BME 350: Signals and Systems for Bioengineers |
| | CHM 302: Environmental Chemistry | BME 467: Tissue Engineering and Regenerative Medicine |
| | EEE 360: Energy Systems and Power Electronics | BME 494: Bioenergy and Microbial Biotechnology |
| | EEE 460: Nuclear Power Engineering | BME 494: Neural Bases of Motor Control |
| | EEE 463: Electrical Power Plants | BME 494: Wearable Devices for Sport, Health, and Wellness |
| | EVE 302: Environmental Engineering Fundamentals: Physical and Chemical Processes | CEE 361: Introduction to Environmental Engineering |
| | MAE 494: Air Conditioning & Refrigeration | CEE 372: Transportation Engineering |
| | MAE 494: Energy Efficiency | CEE 400: Earth Systems Engineering and Management (SUST OR (L or HU) & H) |
| | MAE 494: Solar Thermal Engineering | CEE 440: Hydrology |
| | MEE 434: Internal Combustion Engines | CEE 441: Water Resources Engineering |
| | MEE 440: Renewable Energy: Mechanical Systems | CEE 494: Airport Design |

| | |
|--|--|
| MEE 441: Wind Energy | CEE 494: Energy Efficient Buildings and Systems |
| MSE 460: Nanomaterials in Energy Production and Storage | CEE 494: Sustainable Energy and Material Use |
| MSE 466: Electrochemical Energy Storage and Conversion | CEE 494: Sustainable Energy Technologies |
| By approval only: | CHE 468: Polymer Principles and Processing |
| MAE 484: Internship | CHE 473: Fuel Cells and Biofuel Cells |
| MAE 492: Honors Directed Study | CHE 478: Biomass Energy Conversion Technology |
| MAE 493: Honors Thesis (L) | CHE 494: Nanobiotechnology |
| MAE 499: Individualized Instruction | CHE 494: Quantum Mechanical Simulations of Chemical Process or MSE 494: Quantum Mechanical Simulations of Chemical Process |
| *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 484/499 can be applied toward the TE requirements. | CHE 494: Six Sigma Methodology/Engineering Experimentation |
| | CHM 302: Environmental Chemistry |
| | CHM 325: Analytical Chemistry |
| | CSE 475: Foundations of Machine Learning |
| | 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 |
| | EEE 463: Electrical Power Plants |
| | EEE 473: Electrical Machinery |
| | 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

EVE 303: Environmental Engineering Fundamentals: Microbiological Processes

FSE 301: Entrepreneurship and Value Creation

FSE 394: Engineering in Global Context

FSE 404: EPICS Gold: EPICS in Action

GLG 418: Geophysics

IEE 300: Economic Analysis for Engineers

IEE 305: Information Systems Engineering

IEE 376: Operations Research Deterministic Techniques/Applications

IEE 431: Engineering Administration (L)

IEE 437: Human Factors Engineering

Upper Division Technical Electives
continued

MAT 300: Mathematical Structures (L)

MAT 310: Introduction to Geometry

MAT 371: Advanced Calculus I

MAT 420: Scientific Computing

MAT 421: Applied Computational Methods
(MATH OR CS)

MAT 423: Numerical Analysis I (MATH OR
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 466: Electrochemical Energy Storage and Conversion

MSE 476: Growth and Processing of Semiconductors

MSE 494: Battery Materials Science and Engineering

MSE 494: Bioinspired Materials and Biomaterials

MSE 494: Electrochemical Materials Science

MSE 494: Failure Analysis of Metallic Materials

MSE 494: Intro to FEA for Matl Design and Characterization

MSE 494: Manufacturing Processes for Structural Materials

MSE 494: Semiconductor materials, devices, and fabrication

PHY 310: Classical Particles, Fields, and Matter I

PHY 361: Introductory Modern Physics

SES 307: Space Works I: Design, Build, Test

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

SES 350: Engineering Systems and Experimental Problem Solving (QTRS OR CS)

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

SES 494: Modeling and Analysis of Space Thermal Systems

SES 494: Space Works 4:Sim and Analysis

MAE 492: Honors Directed Study

MAE 493: Honors Thesis (L)

MAE 499: Individualized Instruction

- **Total Hours:** 120
- **Upper Division Hours:** 45 minimum
- **University Undergraduate Graduation Requirements**

Notes:

Mathematics Placement Assessment score determines placement in first mathematics course.

General Studies designations listed next to courses on the major map were valid for the 2024 - 2025 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.