

MECHANICAL ENGINEERING, BS

for the degree of Bachelor of Science in Mechanical Engineering

department website: <http://mechse.illinois.edu/>
department faculty: Mechanical Science & Engineering Faculty (<https://mechse.illinois.edu/people/faculty/>)
overview of college admissions & requirements: The Grainger College of Engineering (<https://grainger.illinois.edu/admissions/>)
college website: <https://grainger.illinois.edu/>
Current Program Educational Objectives: <https://mechse.illinois.edu/undergraduate/> (<https://mechse.illinois.edu/undergraduate/>)

The Mechanical Engineering program at Illinois (accredited by the Engineering Accreditation Commission of ABET, www.abet.org) is one of the most diverse engineering majors and plays a major role in advancing almost every industry. Students study physical principles behind how forces act on bodies of solids or fluids and the interaction of these bodies with their environments through exchanges of energy. Further, Mechanical Engineering students learn how to apply these basic principles in designing, manufacturing, and controlling machines and complex systems. Examples include systems that apply loads, transport matter and energy, and convert one form of energy to another. Mechanical Engineering is a broad major that is well suited for students interested in how the world around them moves and changes.

for the degree of Bachelor of Science in Mechanical Engineering

Graduation Requirements

Minimum Technical GPA (<https://go.grainger.illinois.edu/TechnicalGPA/>): **2.0**

TGPA is required for required Engineering courses and any technical elective courses. See Technical GPA (<https://go.grainger.illinois.edu/TechnicalGPA/>) to clarify requirements.

Minimum Overall GPA: 2.0

Minimum hours required for graduation: 128 hours

General education: Students must complete the Campus General Education (<https://courses.illinois.edu/gened/DEFAULT/DEFAULT/>) **requirements including the campus general education language requirement. One of the SBS courses must be an introductory economics course (ECON 102 or ECON 103). Specific Advanced Composition courses required for this degree are listed below.**
Orientation and Professional Development

| Code | Title | Hours |
|-------------|--------------------------------------|-------|
| ENG 100 | Engineering Orientation ¹ | 0 |
| ME 290 | Seminar | 0 |
| Total Hours | | 0 |

Foundational Mathematics and Science

| Code | Title | Hours |
|----------|--------------------------------------|-------|
| CHEM 102 | General Chemistry I | 3 |
| CHEM 103 | General Chemistry Lab I ² | 1 |
| MATH 221 | Calculus I ³ | 4 |

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| MATH 231 | Calculus II | 3 |
| MATH 241 | Calculus III | 4 |
| MATH 257 | Linear Algebra with Computational Applications ⁴ | 3 |
| MATH 285 | Intro Differential Equations ⁵ | 3 |
| PHYS 211 | University Physics: Mechanics | 4 |
| PHYS 212 | University Physics: Elec & Mag | 4 |
| Total Hours | | 29 |

Mechanical Engineering Technical Core

| Code | Title | Hours |
|-------------|---|-------|
| CS 101 | Intro Computing: Engrg & Sci ⁶ | 3 |
| ECE 205 | Electrical and Electronic Circuits ⁷ | 3 |
| ECE 206 | Electrical and Electronic Circuits Lab | 1 |
| ME 170 | Computer-Aided Design | 3 |
| ME 270 | Design for Manufacturability | 3 |
| ME 200 | Thermodynamics | 3 |
| ME 310 | Fundamentals of Fluid Dynamics | 4 |
| ME 320 | Heat Transfer | 4 |
| ME 330 | Engineering Materials | 4 |
| ME 340 | Dynamics of Mechanical Systems | 3.5 |
| ME 360 | Signal Processing | 3.5 |
| ME 370 | Mechanical Design I | 3 |
| ME 371 | Mechanical Design II | 3 |
| ME 470 | Senior Design Project ⁸ | 3 |
| TAM 210 | Introduction to Statics | 2 |
| TAM 212 | Introductory Dynamics ⁹ | 3 |
| TAM 251 | Introductory Solid Mechanics | 3 |
| Total Hours | | 52 |

Technical Electives

| Code | Title | Hours |
|---|---|--------|
| Science elective(s), chosen from one of the following: | | 4 |
| CHEM 104 & CHEM 105 | General Chemistry II and General Chemistry Lab II ² | |
| MCB 150 | Molec & Cellular Basis of Life | |
| PHYS 213 & PHYS 214 | Univ Physics: Thermal Physics and Univ Physics: Quantum Physics | |
| Statistics elective, one course chosen from: ¹⁰ | | 3 |
| IE 300 | Analysis of Data | |
| STAT 400 | Statistics and Probability I | |
| MechSE electives chosen from a departmentally approved list. See list below | | 6 |
| Technical electives chosen from a departmentally approved list below. | | 6 |
| ABE 430 | Project Management ¹¹ | 2 |
| ABE 436 | Renewable Energy Systems | 3 or 4 |
| ABE 445 | Statistical Methods | 4 |
| ABE 455 | Erosion and Sediment Control | 2 |
| ABE 456 | Land & Water Resources Engrg | 3 or 4 |
| ABE 459 | Drainage and Water Management | 3 or 4 |
| ABE 463 | Electrohydraulic Systems | 3 |
| ABE 466 | Engineering Off-Road Vehicles | 3 |

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| ABE 469 | Industry-Linked Design Project | 4 | CEE 310 | Transportation Engineering | 3 |
| ABE 474 | Indoor Environmental Control | 3 or 4 | CEE 330 | Environmental Engineering | 3 |
| ABE 476 | Indoor Air Quality Engineering | 4 | CEE 340 | Energy and Global Environment | 3 |
| ABE 483 | Engineering Properties of Food Materials | 3 | CEE 350 | Water Resources Engineering | 3 |
| ABE 488 | Bioprocessing Biomass for Fuel | 4 | CEE 360 | Structural Engineering | 3 |
| ABE 497 | Independent Study ¹² | 1 to 4 | CEE 380 | Geotechnical Engineering | 3 |
| ABE 498 | Special Topics ¹³ | 1 to 4 | CEE 398 | Special Topics ¹³ | 0 to 4 |
| AE 352 | Aerospace Dynamical Systems | 3 | CEE 401 | Concrete Materials | 4 |
| AE 402 | Orbital Mechanics | 3 or 4 | CEE 405 | Asphalt Materials I | 3 or 4 |
| AE 403 | Spacecraft Attitude Control | 3 or 4 | CEE 406 | Pavement Design I | 3 or 4 |
| AE 410 | Computational Aerodynamics | 3 or 4 | CEE 407 | Airport Design | 3 or 4 |
| AE 412 | Viscous Flow & Heat Transfer | 4 | CEE 408 | Railroad Transportation Engrg | 3 or 4 |
| AE 416 | Applied Aerodynamics | 3 or 4 | CEE 409 | Railroad Track Engineering | 3 or 4 |
| AE 419 | Aircraft Flight Mechanics | 3 or 4 | CEE 410 | Railway Signaling & Control | 3 or 4 |
| AE 420 | Finite Element Analysis | 3 or 4 | CEE 411 | RR Project Design & Constr | 3 or 4 |
| AE 428 | Mechanics of Composites | 3 | CEE 412 | High-Speed Rail Engineering | 3 or 4 |
| AE 433 | Aerospace Propulsion | 3 or 4 | CEE 415 | Geometric Design of Roads | 4 |
| AE 434 | Rocket Propulsion | 3 or 4 | CEE 416 | Traffic Capacity Analysis | 3 or 4 |
| AE 442 | Aerospace Systems Design I | 3 | CEE 417 | Urban Transportation Planning ¹¹ | 4 |
| AE 443 | Aerospace Systems Design II | 3 | CEE 418 | Public Transportation Systems | 3 or 4 |
| AE 451 | Aeroelasticity | 3 or 4 | CEE 420 | Construction Productivity | 3 or 4 |
| AE 454 | Systems Dynamics & Control | 3 or 4 | CEE 421 | Construction Planning | 3 or 4 |
| AE 456 | Global Nav Satellite Systems | 4 | CEE 422 | Construction Cost Analysis | 3 or 4 |
| AE 460 | Aerodynamics & Propulsion Lab | 2 | CEE 424 | Sustainable Const Methods | 4 |
| AE 461 | Structures & Control Lab | 2 | CEE 430 | Ecological Quality Engineering | 2 |
| AE 482 | Introduction to Robotics | 4 | CEE 434 | Environmental Systems I | 3 |
| AE 483 | Autonomous Systems Lab | 2 | CEE 437 | Water Quality Engineering | 3 |
| AE 497 | Independent Study ¹² | 1 to 4 | CEE 438 | Science & Environmental Policy | 3 |
| AE 498 | Special Topics (Depending on topic) ¹³ | 1 to 4 | CEE 440 | Fate Cleanup Environ Pollutant | 4 |
| ASRM 410 | Investments and Financial Markets | 3 or 4 | CEE 442 | Environmental Engineering Principles, Physical | 4 |
| ASRM 461 | Loss Models | 3 | CEE 443 | Env Eng Principles, Chemical | 4 |
| ASRM 469 | Casualty Actuarial Mathematics | 3 or 4 | CEE 444 | Env Eng Principles, Biological | 4 |
| ASRM 471 | Life Contingencies I | 4 | CEE 445 | | 4 |
| ASRM 472 | Life Contingencies II | 3 | CEE 446 | Air Quality Engineering | 4 |
| BIOC 406 | Gene Expression & Regulation | 3 | CEE 447 | Atmospheric Chemistry | 4 |
| BIOC 440 | Physical Chemistry Principles | 4 | CEE 449 | Environmental Engineering Lab | 3 |
| BIOC 446 | Physical Biochemistry | 3 | CEE 450 | Surface Hydrology | 3 |
| BIOC 455 | Technqs Biochem & Biotech | 4 | CEE 451 | Environmental Fluid Mechanics | 3 |
| BIOE 380 | Biomedical Imaging | 3 | CEE 452 | Hydraulic Analysis and Design | 3 |
| BIOE 414 | Biomedical Instrumentation | 3 | CEE 453 | Urban Hydrology and Hydraulics | 4 |
| BIOE 415 | Biomedical Instrumentation Lab | 2 | CEE 457 | Groundwater | 3 |
| BIOE 416 | Biosensors | 3 | CEE 458 | Water Resources Field Methods | 4 |
| BIOE 461 | Cellular Biomechanics | 4 | CEE 460 | Steel Structures I | 3 |
| BIOE 476 | Tissue Engineering | 3 | CEE 461 | Reinforced Concrete I | 3 |
| BIOE 479 | Cancer Nanotechnology | 3 | CEE 462 | Steel Structures II | 3 or 4 |
| BIOE 481 | Whole-Body Musculoskel Biomech | 3 or 4 | CEE 463 | Reinforced Concrete II | 3 or 4 |
| BIOE 482 | Musculoskel Tissue Mechanics | 3 or 4 | CEE 465 | Design of Structural Systems | 3 |
| BIOE 497 | Individual Study ¹² | 1 to 4 | CEE 467 | Masonry Structures | 3 or 4 |
| BIOE 498 | Special Topics ¹³ | 1 to 4 | CEE 468 | Prestressed Concrete | 3 or 4 |
| BIOP 401 | Introduction to Biophysics | 3 | CEE 469 | Wood Structures | 3 or 4 |
| BIOP 419 | Brain, Behavior & Info Process | 3 | CEE 470 | Structural Analysis | 4 |
| BIOP 432 | Photosynthesis | 3 | | | |

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|----------|---------------------------------------|---------|---------|--|--------|
| CEE 471 | Structural Mechanics | 3 or 4 | CS 374 | Introduction to Algorithms & Models of Computation | 4 |
| CEE 472 | Structural Dynamics I | 3 or 4 | CS 410 | Text Information Systems | 3 or 4 |
| CEE 483 | Soil Mechanics and Behavior | 4 | CS 411 | Database Systems | 3 or 4 |
| CEE 484 | Applied Soil Mechanics | 3 or 4 | CS 412 | Introduction to Data Mining | 3 or 4 |
| CEE 491 | Decision and Risk Analysis | 3 or 4 | CS 413 | Intro to Combinatorics | 3 or 4 |
| CEE 497 | Independent Study ¹² | 1 to 16 | CS 414 | Multimedia Systems | 3 or 4 |
| CEE 498 | Special Topics ¹³ | 1 to 4 | CS 418 | Interactive Computer Graphics | 3 or 4 |
| CHBE 422 | Mass Transfer Operations | 4 | CS 419 | Production Computer Graphics | 3 or 4 |
| CHBE 424 | Chemical Reaction Engineering | 3 | CS 420 | Parallel Progrmg: Sci & Engrg | 3 or 4 |
| CHBE 451 | Transport Phenomena | 3 | CS 421 | Programming Languages & Compilers | 3 or 4 |
| CHBE 452 | Chemical Kinetics & Catalysis | 3 | CS 422 | Programming Language Design | 3 or 4 |
| CHBE 453 | Electrochemical Engineering | 2 or 3 | CS 423 | Operating Systems Design | 3 or 4 |
| CHBE 456 | Polymer Science & Engineering | 3 | CS 424 | Real-Time Systems | 3 or 4 |
| CHBE 457 | Microelectronics Processing | 3 | CS 425 | Distributed Systems | 3 or 4 |
| CHBE 471 | Biochemical Engineering | 3 or 4 | CS 426 | Compiler Construction | 3 or 4 |
| CHBE 472 | Techniques in Biomolecular Eng | 3 or 4 | CS 427 | Software Engineering I | 3 or 4 |
| CHBE 473 | Biomolecular Engineering | 3 or 4 | CS 428 | Software Engineering II | 3 or 4 |
| CHBE 474 | Metabolic Engineering | 3 or 4 | CS 429 | Software Engineering II, ACP | 3 |
| CHBE 475 | Tissue Engineering | 3 | CS 431 | Embedded Systems | 3 or 4 |
| CHBE 476 | Biotransport | 3 | CS 433 | Computer System Organization | 3 or 4 |
| CHEM 232 | Elementary Organic Chemistry I | 3 or 4 | CS 436 | Computer Networking Laboratory | 3 or 4 |
| CHEM 233 | Elementary Organic Chem Lab I | 2 | CS 438 | Communication Networks | 3 or 4 |
| CHEM 236 | Fundamental Organic Chem I | 4 | CS 439 | Wireless Networks | 3 or 4 |
| CHEM 237 | Structure and Synthesis | 2 | CS 440 | Artificial Intelligence | 3 or 4 |
| CHEM 312 | Inorganic Chemistry | 3 | CS 445 | Computational Photography | 3 or 4 |
| CHEM 315 | Instrumental Chem Systems Lab | 2 | CS 446 | Machine Learning | 3 or 4 |
| CHEM 317 | Inorganic Chemistry Lab | 3 | CS 447 | Natural Language Processing | 3 or 4 |
| CHEM 332 | Elementary Organic Chem II | 4 | CS 450 | Numerical Analysis | 3 or 4 |
| CHEM 420 | Instrumental Characterization | 2 | CS 457 | Numerical Methods II | 3 |
| CHEM 436 | Fundamental Organic Chem II | 3 | CS 460 | Security Laboratory | 3 or 4 |
| CHEM 437 | Organic Chemistry Lab | 3 | CS 461 | Computer Security I | 4 |
| CHEM 438 | Advanced Organic Chemistry | 3 | CS 463 | Computer Security II | 3 or 4 |
| CHEM 440 | Physical Chemistry Principles | 4 | CS 465 | User Interface Design | 4 |
| CHEM 442 | Physical Chemistry I | 4 | CS 466 | Introduction to Bioinformatics | 3 or 4 |
| CHEM 444 | Physical Chemistry II | 4 | CS 467 | Social Visualization | 3 or 4 |
| CHEM 445 | Physical Principles Lab I | 2 | CS 468 | Tech and Advertising Campaigns | 3 |
| CHEM 447 | Physical Principles Lab II | 2 | CS 473 | Algorithms | 4 |
| CHEM 450 | Astrochemistry | 4 | CS 475 | Formal Models of Computation | 3 or 4 |
| CHEM 451 | Astrochemistry Laboratory | 3 or 4 | CS 476 | Program Verification | 3 or 4 |
| CHEM 460 | Green Chemistry | 3 or 4 | CS 477 | Formal Software Development Methods | 3 or 4 |
| CHEM 472 | Physical Biochemistry | 3 | CS 481 | Advanced Topics in Stochastic Processes & Applications | 3 or 4 |
| CHEM 474 | Drug Discovery & Development | 3 | CS 483 | Applied Parallel Programming | 4 |
| CHEM 480 | Polymer Chemistry | 3 or 4 | CS 484 | Parallel Programming | 3 or 4 |
| CHEM 482 | Polymer Physics | 3 or 4 | CS 498 | Special Topics ¹³ | 1 to 4 |
| CHEM 483 | Solid State Structural Anlys | 4 | CSE 401 | Numerical Analysis | 3 or 4 |
| CHEM 488 | Surfaces and Colloids | 3 or 4 | CSE 402 | Parallel Progrmg: Sci & Engrg | 3 or 4 |
| CHEM 497 | Individual Study Senior ¹² | 1 to 3 | CSE 412 | Numerical Thermo-Fluid Mechs | 2 to 4 |
| CS 225 | Data Structures | 4 | CSE 441 | Introduction to Optimization | 3 or 4 |
| CS 233 | Computer Architecture | 4 | CSE 450 | Computational Mechanics | 3 or 4 |
| CS 241 | System Programming | 4 | CSE 451 | Finite Element Analysis | 3 or 4 |
| CS 242 | Programming Studio | 3 | | | |
| CS 357 | Numerical Methods I | 3 | | | |

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| CSE 461 | Computational Aerodynamics | 3 or 4 | ECE 467 | Biophotonics | 3 |
| ECE 329 | Fields and Waves I | 3 | ECE 468 | Optical Remote Sensing | 3 |
| ECE 330 | Power Ckts & Electromechanics | 3 | ECE 469 | Power Electronics Laboratory | 2 |
| ECE 333 | Green Electric Energy | 3 | ECE 470 | Introduction to Robotics | 4 |
| ECE 340 | Semiconductor Electronics | 3 | ECE 472 | Biomedical Ultrasound Imaging | 3 |
| ECE 342 | Electronic Circuits | 3 | ECE 473 | Fund of Engrg Acoustics | 3 or 4 |
| ECE 343 | Electronic Circuits Laboratory | 1 | ECE 476 | Power System Analysis | 3 |
| ECE 380 | Biomedical Imaging | 3 | ECE 478 | Formal Software Development Methods | 3 or 4 |
| ECE 385 | Digital Systems Laboratory | 3 | ECE 480 | Magnetic Resonance Imaging | 3 or 4 |
| ECE 395 | Advanced Digital Projects Lab | 2 or 3 | ECE 481 | Nanotechnology | 4 |
| ECE 401 | Signal and Image Analysis | 4 | ECE 482 | Digital IC Design | 3 |
| ECE 402 | Electronic Music Synthesis | 3 | ECE 483 | Analog IC Design | 3 |
| ECE 403 | Audio Engineering | 3 | ECE 485 | MEMS Devices & Systems | 3 |
| ECE 408 | Applied Parallel Programming | 4 | ECE 486 | Control Systems | 4 |
| ECE 411 | Computer Organization & Design | 4 | ECE 487 | Intro Quantum Electr for EEs | 3 |
| ECE 412 | Microcomputer Laboratory | 3 | ECE 488 | Compound Semicond & Devices | 3 |
| ECE 414 | Biomedical Instrumentation | 3 | ECE 489 | Robot Dynamics and Control | 4 |
| ECE 415 | Biomedical Instrumentation Lab | 2 | ECE 490 | Introduction to Optimization | 3 or 4 |
| ECE 416 | Biosensors | 3 | ECE 491 | Numerical Analysis | 3 or 4 |
| ECE 417 | Multimedia Signal Processing | 4 | ECE 492 | Parallel Progrmg: Sci & Engrg | 3 or 4 |
| ECE 418 | Image & Video Processing | 4 | ECE 493 | Advanced Engineering Math | 3 or 4 |
| ECE 419 | Security Laboratory | 3 or 4 | ECE 495 | Photonic Device Laboratory | 3 |
| ECE 420 | Embedded DSP Laboratory | 2 | ECE 498 | Special Topics in ECE ¹³ | 0 to 4 |
| ECE 422 | Computer Security I | 4 | ECON 302 | Inter Microeconomic Theory ¹¹ | 3 |
| ECE 424 | Computer Security II | 3 or 4 | IE 310 | Deterministic Models in Optimization | 3 |
| ECE 425 | Intro to VLSI System Design | 3 | IE 311 | Operations Research Lab | 1 |
| ECE 428 | Distributed Systems | 3 or 4 | IE 330 | Industrial Quality Control | 3 |
| ECE 431 | Electric Machinery | 4 | IE 340 | Human Factors | 4 |
| ECE 432 | Advanced Electric Machinery | 3 | IE 360 | Facilities Planning and Design | 3 |
| ECE 435 | Computer Networking Laboratory | 3 or 4 | IE 410 | Advanced Topics in Stochastic Processes & Applications | 3 or 4 |
| ECE 437 | Sensors and Instrumentation | 3 | IE 411 | Optimization of Large Systems | 3 or 4 |
| ECE 438 | Communication Networks | 3 or 4 | IE 412 | OR Models for Mfg Systems | 3 or 4 |
| ECE 439 | Wireless Networks | 3 or 4 | IE 413 | Simulation | 3 or 4 |
| ECE 441 | Physcs & Modeling Semicond Dev | 3 | IE 420 | Financial Engineering | 3 or 4 |
| ECE 444 | IC Device Theory & Fabrication | 4 | IE 430 | Economic Found of Quality Syst | 3 or 4 |
| ECE 447 | Active Microwave Ckt Design | 3 | IE 431 | Design for Six Sigma | 3 |
| ECE 448 | Artificial Intelligence | 3 or 4 | IE 445 | Human Performance and Cognition in Context ¹¹ | 3 or 4 |
| ECE 451 | Adv Microwave Measurements | 3 | IE 497 | Independent Study ¹² | 1 to 4 |
| ECE 452 | Electromagnetic Fields | 3 | IE 498 | Special Topics ¹³ | 1 to 4 |
| ECE 453 | Wireless Communication Systems | 4 | MATH 347 | Fundamental Mathematics | 3 |
| ECE 454 | Antennas | 3 | MATH 357 | Numerical Methods I | 3 |
| ECE 455 | Optical Electronics | 3 or 4 | MATH 403 | Euclidean Geometry | 3 or 4 |
| ECE 456 | Global Nav Satellite Systems | 4 | MATH 412 | Graph Theory | 3 or 4 |
| ECE 457 | Microwave Devices & Circuits | 3 | MATH 413 | Intro to Combinatorics | 3 or 4 |
| ECE 458 | Applic of Radio Wave Propag | 3 | MATH 414 | Mathematical Logic | 3 or 4 |
| ECE 459 | Communications Systems | 3 | MATH 417 | Intro to Abstract Algebra | 3 or 4 |
| ECE 460 | Optical Imaging | 4 | MATH 418 | Intro to Abstract Algebra II | 3 or 4 |
| ECE 462 | Logic Synthesis | 3 | MATH 423 | Differential Geometry | 3 or 4 |
| ECE 463 | Digital Communications Lab | 2 | MATH 424 | Honors Real Analysis | 3 |
| ECE 464 | Power Electronics | 3 | MATH 425 | Honors Advanced Analysis | 3 |
| ECE 465 | Optical Communications Systems | 3 | | | |
| ECE 466 | Optical Communications Lab | 1 | | | |

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| MATH 427 | Honors Abstract Algebra | 3 | MSE 470 | Design and Use of Biomaterials | 3 |
| MATH 428 | Honors Topics in Mathematics ¹³ | 3 | MSE 473 | Biomolecular Materials Science | 3 |
| MATH 432 | Set Theory and Topology | 3 or 4 | MSE 474 | Biomaterials and Nanomedicine | 3 |
| MATH 442 | Intro Partial Diff Equations | 3 or 4 | MSE 480 | Surfaces and Colloids | 3 or 4 |
| MATH 444 | Elementary Real Analysis | 3 or 4 | MSE 481 | Electron Microscopy | 3 or 4 |
| MATH 446 | Applied Complex Variables | 3 or 4 | MSE 484 | Composite Materials | 3 or 4 |
| MATH 447 | Real Variables | 3 or 4 | MSE 485 | Atomic Scale Simulations | 3 or 4 |
| MATH 448 | Complex Variables | 3 or 4 | MSE 487 | Materials for Nanotechnology | 3 or 4 |
| MATH 450 | Numerical Analysis | 3 or 4 | MSE 488 | Optical Materials | 3 or 4 |
| MATH 453 | Number Theory | 3 or 4 | MSE 489 | Matl Select for Sustainability | 3 or 4 |
| MATH 464 | Statistics and Probability II | 3 or 4 | MSE 497 | Independent Study ¹² | 1 to 4 |
| MATH 473 | Algorithms | 4 | MSE 498 | Special Topics ¹³ | 1 to 4 |
| MATH 475 | Formal Models of Computation | 3 or 4 | NPRE 402 | Nuclear Power Engineering | 3 or 4 |
| MATH 481 | Vector and Tensor Analysis | 3 or 4 | NPRE 412 | Nuclear Power Econ & Fuel Mgmt | 3 or 4 |
| MATH 482 | Linear Programming | 3 or 4 | NPRE 421 | Plasma and Fusion Science | 3 |
| MATH 484 | Nonlinear Programming | 3 or 4 | NPRE 423 | Plasma Laboratory | 2 |
| MATH 487 | Advanced Engineering Math | 3 or 4 | NPRE 429 | Plasma Engineering | 3 |
| MATH 489 | Dynamics & Differential Eqns | 3 or 4 | NPRE 431 | Materials in Nuclear Engrg | 3 |
| MATH 490 | Advanced Topics in Mathematics ¹³ | 1 to 4 | NPRE 435 | Radiological Imaging | 3 |
| MATH 492 | Undergraduate Research in Math ¹² | 1 to 3 | NPRE 441 | Radiation Protection | 4 |
| MCB 401 | Cellular Physiology | 3 | NPRE 442 | Radioactive Waste Management | 3 |
| MCB 402 | Sys & Integrative Physiology | 3 | NPRE 444 | Nuclear Analytical Methods Lab | 2 or 3 |
| MCB 403 | Cell & Membrane Physiology Lab | 1 or 2 | NPRE 446 | Radiation Interact w/Matter I | 3 |
| MCB 404 | Sys & Integrative Physiol Lab | 1 to 2 | NPRE 447 | Radiation Interact w/Matter II | 3 |
| MCB 450 | Introductory Biochemistry | 3 | NPRE 448 | Nuclear Syst Engrg & Design | 4 |
| MCB 493 | Special Topics Mol Cell Biol ¹³ | 1 to 4 | NPRE 451 | NPRE Laboratory | 3 |
| All 400 level ME courses, except 470 and potentially 497, 498 ^{12,13} | | | NPRE 455 | Neutron Diffusion & Transport | 4 |
| MSE 304 | Electronic Properties of Matls | 3 | NPRE 457 | Safety Anlys Nucl Reactor Syst | 3 or 4 |
| MSE 307 | Materials Laboratory I | 3 | NPRE 461 | Probabilistic Risk Assessment | 3 or 4 |
| MSE 308 | Materials Laboratory II | 3 | NPRE 470 | Fuel Cells & Hydrogen Sources | 3 |
| MSE 401 | Thermodynamics of Materials | 3 | NPRE 475 | Wind Power Systems | 3 or 4 |
| MSE 402 | Kinetic Processes in Materials | 3 | NPRE 498 | Special Topics ¹³ | 1 to 4 |
| MSE 403 | Synthesis of Materials | 3 | PHYS 330 | Atmospheric Dynamics II | 3 |
| MSE 405 | Microstructure Determination | 3 | PHYS 401 | Classical Physics Lab | 3 |
| MSE 406 | Thermal-Mech Behavior of Matls | 3 | PHYS 402 | Light | 3 or 4 |
| MSE 420 | Ceramic Materials & Properties | 3 | PHYS 403 | Modern Experimental Physics | 4 or 5 |
| MSE 421 | Ceramic Processing | 3 or 4 | PHYS 404 | Electronic Circuits | 4 or 5 |
| MSE 422 | Electrical Ceramics | 3 | PHYS 406 | Acoustical Physics of Music | 4 |
| MSE 440 | Mechanical Behavior of Metals | 3 | PHYS 427 | Thermal & Statistical Physics | 4 |
| MSE 441 | Metals Processing | 3 | PHYS 435 | Electromagnetic Fields I | 3 |
| MSE 443 | Design of Engineering Alloys | 3 | PHYS 436 | Electromagnetic Fields II | 3 |
| MSE 445 | Corrosion of Metals | 3 or 4 | PHYS 460 | Condensed Matter Physics | 4 |
| MSE 450 | Polymer Science & Engineering | 3 or 4 | PHYS 466 | Atomic Scale Simulations | 3 or 4 |
| MSE 453 | Plastics Engineering | 3 | PHYS 470 | Subatomic Physics | 4 |
| MSE 455 | Macromolecular Solids | 3 | PHYS 475 | Introduction to Biophysics | 3 or 4 |
| MSE 456 | Mechanics of Composites | 3 | PHYS 485 | Atomic Phys & Quantum Theory | 3 |
| MSE 457 | Polymer Chemistry | 3 or 4 | PHYS 486 | Quantum Physics I | 4 |
| MSE 458 | Polymer Physics | 3 or 4 | PHYS 487 | Quantum Physics II | 4 |
| MSE 460 | Electronic Materials I | 3 | PHYS 496 | Communicating in Physics—Writing Papers and Giving Talks ¹¹ | 3 |
| MSE 461 | Electronic Materials II | 3 | PHYS 497 | Individual Study ¹² | 1 to 4 |
| MSE 466 | Materials in Electrochem Syst | 3 | PHYS 498 | Special Topics in Physics ¹³ | 1 to 4 |

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| SE 400 | Engineering Law ¹¹ | 3 or 4 |
| SE 402 | Comp-Aided Product Realization | 3 or 4 |
| SE 411 | Reliability Engineering | 3 or 4 |
| SE 412 | Nondestructive Evaluation | 3 or 4 |
| SE 413 | Engineering Design Optimization | 3 or 4 |
| SE 420 | Digital Control Systems | 4 |
| SE 422 | Robot Dynamics and Control | 4 |
| SE 423 | Mechatronics | 3 |
| SE 424 | State Space Design for Control | 3 |
| SE 450 | Decision Analysis I ¹¹ | 3 or 4 |
| SE 497 | Independent Study ¹² | 0 to 4 |
| SE 498 | Special Topics ¹³ | 1 to 4 |
| STAT 409 | Actuarial Statistics II | 4 |
| STAT 410 | Statistics and Probability II | 3 or 4 |
| STAT 420 | Methods of Applied Statistics | 3 or 4 |
| STAT 424 | Analysis of Variance | 3 or 4 |
| STAT 425 | Statistical Modeling I | 3 or 4 |
| STAT 426 | Statistical Modeling II | 3 or 4 |
| STAT 428 | Statistical Computing | 3 or 4 |
| STAT 429 | Time Series Analysis | 3 or 4 |
| STAT 430 | Topics in Applied Statistics ¹³ | 3 or 4 |
| STAT 440 | Statistical Data Management | 3 or 4 |
| STAT 443 | Professional Statistics ¹¹ | 3 or 4 |
| STAT 448 | Advanced Data Analysis | 4 |
| STAT 458 | Math Modeling in Life Sciences | 3 or 4 |
| STAT 480 | Data Science Foundations | 3 or 4 |
| All 400 level TAM courses, except potentially 497,498 ^{12,13} | | |
| TE 461 | Technology Entrepreneurship ¹¹ | 3 |
| TMGT 460 | Business Process Modeling | 3 |
| TMGT 461 | Tech, Eng, & Mgt Final Project | 2 |

Electives

| Code | Title | Hours |
|--|-------|------------|
| The Grainger College of Engineering Liberal Education course list, or additional courses from the campus General Education lists for Social and Behavioral Sciences or Humanities and the Arts ¹⁴ | | 6 |
| Free electives. Additional unrestricted course work, subject to certain exceptions as noted by the College, so that there are at least 128 credit hours earned toward the degree. ¹⁵ | | 6 |
| Total Hours of Curriculum to Graduate | | 128 |

¹ External transfer students take ENG 300 instead.

² CHEM 103 (<http://catalog.illinois.edu/search/?P=CHEM%20103>) requirement waived for students who received test-based credit (AP, IB, or proficiency) for CHEM 102 (<http://catalog.illinois.edu/search/?P=CHEM%20102>), similarly CHEM 105 (<http://catalog.illinois.edu/search/?P=CHEM%20105>) requirement waived for students who received test-based credit for CHEM 104 (<http://catalog.illinois.edu/search/?P=CHEM%20104>). Students are still required to have 128 hours minimum to graduate.

³ MATH 220 may be substituted, with four of the five credit hours applying toward the degree. MATH 220 is appropriate for students with no background in calculus.

⁴ MATH 415 (<http://catalog.illinois.edu/search/?P=MATH%20415>) may be substituted for students entering prior to Fall 2021.

⁵ MATH 284 (<http://catalog.illinois.edu/search/?P=MATH%20284>) may be substituted.

⁶ CS 124 (<http://catalog.illinois.edu/search/?P=CS%20124>) or CS 125 (<http://catalog.illinois.edu/search/?P=CS%20125>) or ECE 220 (<http://catalog.illinois.edu/search/?P=ECE%20220>) may be substituted.

⁷ ECE 110 (<http://catalog.illinois.edu/search/?P=ECE%20110>) and ECE 210 (<http://catalog.illinois.edu/search/?P=ECE%20210>) (or ECE 211 (<http://catalog.illinois.edu/search/?P=ECE%20211>)) combined may be substituted.

⁸ Advanced Composition satisfied by completing ME 470.

⁹ Transfers and Physics minor/dual degree students may substitute PHYS 325 (<http://catalog.illinois.edu/search/?P=PHYS%20325>).

¹⁰ Transfers and ECE minor/dual degree students may substitute ECE 313 (<http://catalog.illinois.edu/search/?P=ECE%20313>).

¹¹ A maximum of 3 hours of independent/individual study courses may be used to satisfy the MechSE Elective or Technical Elective requirements.

¹² Depending on the technical content, some Special Topics courses may not be approved for Technical Elective credit. Please provide a syllabus of the course to the Mechanical Science and Engineering Undergraduate Programs Office to request use of the course for Technical Elective credit prior to registering for the course.

¹³ Professional Elective course. No more than 3 hours of professional elective credit may be used to satisfy the Technical Electives requirements.

¹⁴ The Grainger College of Engineering approved liberal education course list can be found here (<https://go.grainger.illinois.edu/LiberalEducation/>). Note that these credit hours could carry the required cultural studies designation required for campus general education requirements.

¹⁵ The Grainger College of Engineering restrictions to free electives can be found here (<https://go.grainger.illinois.edu/FreeElectives/>).

for the degree of Bachelor of Science in Mechanical Engineering

Suggested Sequence

The curriculum sequence below is a suggested sequence, as all Grainger Engineering students work with a department academic advisor to achieve their educational goals, specific to their needs and preparation.

Dynamic and Static curricular maps, which include prerequisite and corequisite sequencing, can be found here (<https://grainger.illinois.edu/academics/undergraduate/majors-and-minors/mechanical-map/>).

First Year

| First Semester | Hours |
|--|--------------|
| ENG 100 Engineering Orientation | 0 |
| MATH 221 ¹ Calculus I | 4 |
| CHEM 102 General Chemistry I | 3 |
| CHEM 103 General Chemistry Lab I | 1 |
| RHET 105 Writing and Research or ME 170 ² | 4-3 |
| General education elective ³ | 3 |
| Semester Hours | 15-14 |

Second Semester

| | |
|----------------------|---|
| MATH 231 Calculus II | 3 |
|----------------------|---|

| | | | |
|--|-------|---|----|
| PHYS 211 University Physics: Mechanics | 4 | General education elective ³ | 3 |
| CS 101 Intro Computing: Engrg Sci | 3 | Free elective | 3 |
| ME 170 Computer-Aided Design or RHET 105 ² | 3-4 | | |
| Science electives ⁴ | 4 | | |
| Semester Hours | 17-18 | | 15 |
| Second Year | | | |
| First Semester | | | |
| MATH 241 Calculus III | 4 | | |
| MATH 257 Linear Algebra with Computational Applications | 3 | | |
| PHYS 212 University Physics: Elec Mag | 4 | | |
| TAM 210 Introduction to Statics | 2 | | |
| ME 270 Design for Manufacturability | 3 | | |
| ME 290 Seminar | 0 | | |
| Semester Hours | 16 | | |
| Second Semester | | | |
| ECE 205 Electrical and Electronic Circuits | 3 | | |
| MATH 285 Intro Differential Equations | 3 | | |
| ME 200 Thermodynamics | 3 | | |
| TAM 212 Introductory Dynamics | 3 | | |
| TAM 251 Introductory Solid Mechanics | 3 | | |
| General education elective ³ | 3 | | |
| Semester Hours | 18 | | |
| Third Year | | | |
| First Semester | | | |
| ME 310 Fundamentals of Fluid Dynamics | 4 | | |
| ME 330 Engineering Materials | 4 | | |
| ME 340 Dynamics of Mechanical Systems | 3.5 | | |
| ME 370 Mechanical Design I | 3 | | |
| ECE 206 Electrical and Electronic Circuits Lab | 1 | | |
| Semester Hours | 15.5 | | |
| Second Semester | | | |
| ME 320 Heat Transfer | 4 | | |
| ME 360 Signal Processing | 3.5 | | |
| ME 371 Mechanical Design II | 3 | | |
| General education elective ³ | 3 | | |
| Free elective | 3 | | |
| Semester Hours | 16.5 | | |
| Fourth Year | | | |
| First Semester | | | |
| MechSE elective ⁵ | 3 | | |
| Statistics elective ⁶ | 3 | | |
| ME 470 Senior Design Project (or Technical elective) ⁷ | 3 | | |
| General education elective ³ | 6 | | |
| Semester Hours | 15 | | |
| Second Semester | | | |
| Technical Elective (or ME 470) ⁷ | 3 | | |
| MechSE elective ⁵ | 3 | | |
| Technical elective ⁷ | 3 | | |

¹ MATH 220 may be substituted, with four of the five credit hours applying toward the degree. MATH 220 is appropriate for students with no background in calculus.

² RHET 105 (or an alternative Composition I sequence) is taken either in the first or second semester of the first year, according to the student's UIN (Spring if your UIN is Odd). ME 170 is taken the other semester. Composition I guidelines can be found at <http://catalog.illinois.edu/general-information/degree-general-education-requirements/under-written-communication-requirement>.

³ Students must take 6 hours from the campus General Education Social and Behavioral Sciences list, 6 hours from campus General Education Humanities and the Arts list, and 6 hours from a liberal education list approved by the college or from the campus General Education lists for Social and Behavioral Sciences or Humanities and the Arts. ECON 102 or ECON 103 must be one of the Social and Behavioral Sciences courses. Students must also complete the campus cultural studies requirement by completing (i) one western/comparative culture(s) course, (ii) one non-western culture(s) course, and (iii) one U.S. Minority Culture(s) course from the General Education cultural studies lists. Most students select general education courses that simultaneously satisfy these cultural studies requirements.

⁴ Science elective(s) – 4 hours required. Choose from CHEM 104 + CHEM 105, MCB 150, or PHYS 213 + PHYS 214. If MCB 150 is taken, then MCB 151 is recommended. Note that PHYS 213 and PHYS 214 will normally be taken in the fourth semester or later, since they have PHYS 211 and PHYS 212, respectively, as prerequisites, in addition to MATH 241.

⁵ MechSE electives – 6 hours required. Choose from a departmentally approved list of MechSE Electives (<http://mechanical.illinois.edu/undergraduate/bs-mechanical-engineering/#METechElectives>).

⁶ Statistics elective – 3 hours required. Choose either IE 300 or STAT 400.

⁷ Technical electives – 6 hours required. Choose from a departmentally approved list of Technical Electives. (<https://mechse.illinois.edu/undergraduate/bs-mechanical-engineering/#METechElectives>)