

MECHANICAL ENGINEERING, BS

for the degree of Bachelor of Science in Mechanical Engineering

The Mechanical Engineering program at Illinois (accredited by the Engineering Accreditation Commission of ABET (<https://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 to design, manufacture, and control 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 the engineering underpinnings of the modern world around them.

Current Program Educational Objectives

for the degree of Bachelor of Science in Mechanical Engineering

Graduation Requirements

Minimum hours required for graduation: 128 hours.

[Minimum Overall GPA: 2.0](#)

[Minimum Technical GPA: 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.

University Requirements

Minimum of 40 hours of upper-division coursework, generally at the 300- or 400-level. These hours can be drawn from all elements of the degree.

Students should consult their academic advisor for additional guidance in fulfilling this requirement.

The university and residency requirements can be found in the Student Code (<https://studentcode.illinois.edu/article3/part8/3-801/>) (§ 3-801) and in the Academic Catalog (<http://catalog.illinois.edu/general-information/degree-general-education-requirements/>).

General Education Requirements

Follows the campus General Education (Gen Ed) requirements (<https://courses.illinois.edu/gened/DEFAULT/DEFAULT/>). Some Gen Ed requirements may be met by courses required and/or electives in the program.

Code	Title	Hours
	Composition I	4-6
	Advanced Composition	3
	fulfilled by ME 470	
	Humanities & the Arts (6 hours)	6

Natural Sciences & Technology (6 hours)	6
fulfilled by CHEM 102, PHYS 211, PHYS 212	
Social & Behavioral Sciences (6 hours)	6
fulfilled by ECON 102 or ECON 103, and any other course approved as Social & Behavioral Sciences	
Cultural Studies: Non-Western Cultures (1 course)	3
Cultural Studies: US Minority Cultures (1 course)	3
Cultural Studies: Western/Comparative Cultures (1 course)	3
Quantitative Reasoning (2 courses, at least one course must be Quantitative Reasoning I)	6-10
fulfilled by MATH 220 or MATH 221; and MATH 231, MATH 241, MATH 285, PHYS 211, PHYS 212	
Language Requirement (Completion of the third semester or equivalent of a language other than English is required)	0-15

Major Requirements

Orientation and Professional Development

Code	Title	Hours
ENG 100	Grainger Engineering Orientation Seminar (External transfer students take ENG 300.)	1
ME 290	Seminar	0
Total Hours		1

Introductory Economics Elective

Code	Title	Hours
ECON 102	Microeconomic Principles	3
or ECON 103	Macroeconomic Principles	
Total Hours		3

Foundational Mathematics and Science

Code	Title	Hours
CHEM 102	General Chemistry I	3
CHEM 103	General Chemistry Lab I	1
MATH 221	Calculus I (MATH 220 may be substituted. MATH 220 is appropriate for students with no background in calculus. 4 of 5 credit hours count towards degree.)	4
MATH 231	Calculus II	3
MATH 241	Calculus III	4
MATH 257	Linear Algebra with Computational Applications	3
MATH 285	Intro Differential Equations	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 (CS 124 or ECE 220 may be substituted.)	3
ECE 205	Electrical and Electronic Circuits (ECE 110 and either ECE 210 or ECE 211 may be substituted.)	3

ECE 206	Electrical and Electronic Circuits Lab	1	ABE 497	Independent Study (As Approved)	1 to 4
ME 170	Computer-Aided Design	3	ABE 498	Special Topics (As Approved)	1 to 4
ME 270	Design for Manufacturability	3	ADV 462	Computational Advertising Infrastructure	3 or 4
ME 200	Thermodynamics	3	ADV 492	Tech and Advertising Campaigns	3
ME 310	Fundamentals of Fluid Dynamics	4	AE 352	Aerospace Dynamical Systems	3
ME 320	Heat Transfer	4	AE 402	Orbital Mechanics	3 or 4
ME 330	Engineering Materials	4	AE 403	Spacecraft Attitude Control	3 or 4
ME 340	Dynamics of Mechanical Systems	3.5	AE 410	Computational Aerodynamics	3 or 4
ME 360	Signal Processing	3.5	AE 412	Viscous Flow & Heat Transfer	4
ME 370	Mechanical Design I	3	AE 416	Applied Aerodynamics	3 or 4
ME 371	Mechanical Design II	3	AE 419	Aircraft Flight Mechanics	3 or 4
ME 470	Senior Design Project	3	AE 420	Finite Element Analysis	3 or 4
TAM 210	Introduction to Statics	2	AE 428	Mechanics of Composites	3
TAM 212	Introductory Dynamics	3	AE 433	Aerospace Propulsion	3 or 4
TAM 251	Introductory Solid Mechanics	3	AE 434	Rocket Propulsion	3 or 4
Total Hours		52	AE 435	Electric Space Propulsion	3 or 4
Technical Electives			AE 442	Aerospace Systems Design I	3
Code	Title	Hours	AE 443	Aerospace Systems Design II	3
Science elective(s), chosen from one of the following:		4	AE 451	Aeroelasticity	3 or 4
CHEM 104 & CHEM 105	General Chemistry II and General Chemistry Lab II		AE 452	Introduction to Nonlinear Dynamics and Vibrations	4
MCB 150	Molec & Cellular Basis of Life		AE 454	Systems Dynamics & Control	3 or 4
PHYS 213 & PHYS 214	Univ Physics: Thermal Physics and Univ Physics: Quantum Physics		AE 456	Global Nav Satellite Systems	4
Statistics elective, one course chosen from:		3	AE 460	Aerodynamics & Propulsion Lab	2
IE 300	Analysis of Data		AE 461	Structures & Control Lab	2
STAT 400	Statistics and Probability I		AE 468	Optical Remote Sensing	3
MechSE electives chosen from the departmentally approved list below.		6	AE 480	Hypersonic Aerothermodynamics	3 or 4
All 400 level ME courses, except 470 and potentially 497, 498 (As Approved)			AE 482	Introduction to Robotics	4
All 400 level TAM courses, except potentially 497, 498 (As Approved)			AE 483	Autonomous Systems Lab	2
Technical electives chosen from the departmentally approved list below.		6	AE 485	Spacecraft Environment and Interactions	3 or 4
ABE 361	Functional Analysis and Design of Agricultural Machine Systems	3	AE 497	Independent Study (As Approved)	1 to 4
ABE 430	Project Management (As Approved)	2	AE 498	Special Topics (As Approved)	1 to 4
ABE 436	Renewable Energy Systems	3 or 4	ANSC 445	Statistical Methods	4
ABE 445	Statistical Methods	4	ASRM 402	Actuarial Statistics II	4
ABE 452	Engineering for Disaster Resilience (As Approved)	3 or 4	ASRM 410	Investments and Financial Markets	3 or 4
ABE 454	Environmental Soil Physics	3	ASRM 450	Methods of Applied Statistics	3 or 4
ABE 455	Erosion and Sediment Control	2	ASRM 451	Basics of Statistical Learning	3 or 4
ABE 456	Land & Water Resources Engrg	3 or 4	ASRM 453	Applied Bayesian Analysis	3 or 4
ABE 457	NPS Pollution Processes	2	ASRM 461	Loss Models	4
ABE 459	Drainage and Water Management	3 or 4	ASRM 469	Casualty Actuarial Mathematics	3 or 4
ABE 466	Engineering Off-Road Vehicles	3	ASRM 471	Life Contingencies I	4
ABE 469	Capstone Design Experience	4	ASRM 472	Life Contingencies II	3
ABE 476	Indoor Air Quality Engineering	4	ATMS 301	Atmospheric Thermodynamics	3
ABE 483	Engineering Properties of Food Materials	3	ATMS 302	Atmospheric Dynamics I	3
ABE 488	Bioprocessing Biomass for Fuel	4	ATMS 304	Radiative Transfer-Remote Sens	3
			ATMS 306	Cloud Physics	3
			ATMS 312	Atmospheric Dynamics II	3
			ATMS 405	Boundary Layer Processes	4
			ATMS 406	Tropical Meteorology	4
			ATMS 410	Radar Remote Sensing	4
			ATMS 411	Satellite Remote Sensing	4
			ATMS 420	Atmospheric Chemistry	4

ATMS 424	Atmospheric Convection	4	CEE 434	Environmental Systems I	3
BADM 460	Business Process Modeling	3	CEE 437	Water Quality Engineering	3
BADM 461	Tech, Eng, & Mgt Final Project	4	CEE 438	Science & Environmental Policy	3
BIOC 406	Gene Expression & Regulation	3	CEE 440	Fate Cleanup Environ Pollutant	4
BIOC 446	Physical Biochemistry	3	CEE 442	Environmental Engineering Principles, Physical	4
BIOC 455	Technqs Biochem & Biotech	4	CEE 443	Env Eng Principles, Chemical	4
BIOE 380	Biomedical Imaging	3	CEE 444	Env Eng Principles, Biological	4
BIOE 414	Biomedical Instrumentation	3	CEE 447	Atmospheric Chemistry	4
BIOE 415	Biomedical Instrumentation Lab	2	CEE 449	Environmental Engineering Lab	3
BIOE 416	Biosensors	3	CEE 450	Surface Hydrology	3
BIOE 427	Biomedical Ultrasound Imaging	3	CEE 451	Environmental Fluid Mechanics	3
BIOE 430	Intro Synthetic Biology	3 or 4	CEE 452	Hydraulic Analysis and Design	3
BIOE 461	Cellular Biomechanics	4	CEE 453	Urban Hydrology and Hydraulics	4
BIOE 467	Biophotonics	3	CEE 457	Groundwater	3
BIOE 476	Tissue Engineering	3	CEE 458	Water Resources Field Methods	4
BIOE 479	Cancer Nanotechnology	3	CEE 460	Steel Structures I	3
BIOE 480	Magnetic Resonance Imaging	3 or 4	CEE 461	Reinforced Concrete I	3
BIOE 481	Whole-Body Musculoskel Biomech	3 or 4	CEE 462	Steel Structures II	3 or 4
BIOE 482	Musculoskel Tissue Mechanics	3 or 4	CEE 463	Reinforced Concrete II	3 or 4
BIOE 485	Computational Mathematics for Machine Learning and Imaging	4	CEE 465	Design of Structural Systems	3
BIOE 497	Individual Study (As Approved)	1 to 4	CEE 467	Masonry Structures	3 or 4
BIOE 498	Special Topics (As Approved)	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	CEE 471	Structural Mechanics	3 or 4
CEE 310	Transportation Engineering	3	CEE 472	Structural Dynamics I	3 or 4
CEE 320	Construction Engineering	3	CEE 473	Wind Effects on Structures	4
CEE 330	Environmental Engineering	3	CEE 474	Mechanics of Additive Manufacturing	3 or 4
CEE 340	Energy and Global Environment	3	CEE 483	Soil Mechanics and Behavior	4
CEE 350	Water Resources Engineering	3	CEE 484	Applied Soil Mechanics	3 or 4
CEE 360	Structural Engineering	3	CEE 490	Computer Methods	3 or 4
CEE 380	Geotechnical Engineering	3	CEE 491	Decision and Risk Analysis	3 or 4
CEE 398	Special Topics (As Approved)	0 to 4	CEE 497	Independent Study (As Approved)	1 to 16
CEE 401	Concrete Materials	4	CEE 498	Special Topics (As Approved)	1 to 4
CEE 405	Asphalt Materials I	3 or 4	CHBE 413	Data Science for Chemistry and Engineering	4
CEE 406	Pavement Design I	3 or 4	CHBE 422	Mass Transfer Operations	4
CEE 407	Airport Design	3 or 4	CHBE 424	Chemical Reaction Engineering	3
CEE 408	Railroad Transportation Engrg	3 or 4	CHBE 451	Transport Phenomena	3
CEE 409	Railroad Track Engineering	3 or 4	CHBE 452	Chemical Kinetics & Catalysis	3
CEE 410	Railway Signaling & Control	3 or 4	CHBE 453	Electrochemical Engineering	2 or 3
CEE 411	RR Project Design & Constr	3 or 4	CHBE 456	Polymer Science & Engineering	3
CEE 412	High-Speed Rail Engineering	3 or 4	CHBE 458	Synthetic Nanomaterials	3
CEE 415	Geometric Design of Roads	4	CHBE 459	Polymer Rheology	3
CEE 416	Traffic Capacity Analysis	3 or 4	CHBE 461	Functional Materials Assembly	3
CEE 417	Urban Transportation Planning (As Approved)	4	CHBE 471	Biochemical Engineering	3 or 4
CEE 418	Public Transportation Systems	3 or 4	CHBE 472	Techniques in Biomolecular Eng	3 or 4
CEE 419	Transportation Economics	4	CHBE 473	Biomolecular Engineering	3 or 4
CEE 420	Construction Productivity	3 or 4	CHBE 474	Metabolic Engineering	3 or 4
CEE 421	Construction Planning	3 or 4	CHBE 475	Tissue Engineering	3
CEE 422	Construction Cost Analysis	3 or 4	CHBE 476	Biotransport	3

CHBE 478	Bioenergy Technology	3	CS 427	Software Engineering I	3 or 4
CHEM 232	Elementary Organic Chemistry I	3 or 4	CS 428	Software Engineering II	3 or 4
CHEM 233	Elementary Organic Chem Lab I	2	CS 429	Software Engineering II, ACP	3
CHEM 236	Fundamental Organic Chem I	4	CS 431	Embedded Systems	3 or 4
CHEM 237	Structure and Synthesis	2	CS 433	Computer System Organization	3 or 4
CHEM 312	Inorganic Chemistry	3	CS 436	Computer Networking Laboratory	3 or 4
CHEM 315	Instrumental Chem Systems Lab	2	CS 437	Topics in Internet of Things	3 or 4
CHEM 317	Inorganic Chemistry Lab	3	CS 438	Communication Networks	3 or 4
CHEM 332	Elementary Organic Chem II	4	CS 439	Wireless Networks	3 or 4
CHEM 420	Instrumental Characterization	2	CS 440	Artificial Intelligence	3 or 4
CHEM 436	Fundamental Organic Chem II	3	CS 441	Applied Machine Learning	3 or 4
CHEM 437	Organic Chemistry Lab	3	CS 442	Trustworthy Machine Learning	3 or 4
CHEM 440	Physical Chemistry Principles	4	CS 443	Reinforcement Learning	3 or 4
CHEM 442	Physical Chemistry I	4	CS 444	Deep Learning for Computer Vision	3 or 4
CHEM 444	Physical Chemistry II	4	CS 445	Computational Photography	3 or 4
CHEM 445	Physical Principles Lab I	2	CS 446	Machine Learning	3 or 4
CHEM 447	Physical Principles Lab II	2	CS 447	Natural Language Processing	3 or 4
CHEM 452	Data Science for Chemistry and Engineering	4	CS 448	Audio Computing Laboratory	3 or 4
CHEM 460	Green Chemistry	3 or 4	CS 450	Numerical Analysis	3 or 4
CHEM 472	Physical Biochemistry	3	CS 460	Security Laboratory	3 or 4
CHEM 480	Polymer Chemistry	3 or 4	CS 461	Computer Security I	4
CHEM 482	Polymer Physics	3 or 4	CS 463	Computer Security II	3 or 4
CHEM 483	Solid State Structural Anlys	4	CS 465	User Interface Design	4
CHEM 488	Surfaces and Colloids	3 or 4	CS 466	Introduction to Bioinformatics	3 or 4
CHEM 497	Individual Study Senior (As Approved)	1 to 3	CS 467	Social Visualization	3 or 4
CPSC 489	Photosynthesis	3	CS 468	Tech and Advertising Campaigns	3
CS 225	Data Structures	4	CS 469	Computational Advertising Infrastructure	3 or 4
CS 233	Computer Architecture	4	CS 473	Algorithms	4
CS 242	Programming Studio	3	CS 474	Logic in Computer Science	3 or 4
CS 340	Introduction to Computer Systems	3	CS 475	Formal Models of Computation	3 or 4
CS 341	System Programming	4	CS 476	Program Verification	3 or 4
CS 357	Numerical Methods I	3	CS 477	Formal Software Development Methods	3 or 4
CS 374	Introduction to Algorithms & Models of Computation	4	CS 481	Advanced Topics in Stochastic Processes & Applications	3 or 4
CS 407	Cryptography	3 or 4	CS 482	Simulation	3 or 4
CS 409	The Art of Web Programming	3 or 4	CS 483	Applied Parallel Programming	4
CS 410	Text Information Systems	3 or 4	CS 484	Parallel Programming	3 or 4
CS 411	Database Systems	3 or 4	CS 498	Special Topics (As Approved)	1 to 4
CS 412	Introduction to Data Mining	3 or 4	CSE 401	Numerical Analysis	3 or 4
CS 413	Intro to Combinatorics	3 or 4	CSE 402	Parallel Progrmg: Sci & Engrg	3 or 4
CS 414	Multimedia Systems	3 or 4	CSE 408	Applied Parallel Programming	4
CS 415	Game Development	3 or 4	CSE 412	Numerical Thermo-Fluid Mechs	2 to 4
CS 418	Interactive Computer Graphics	3 or 4	CSE 414	Algorithms	4
CS 419	Production Computer Graphics	3 or 4	CSE 422	Computer System Organization	3 or 4
CS 420	Parallel Progrmg: Sci & Engrg	3 or 4	CSE 423	Operating Systems Design	3 or 4
CS 421	Programming Languages & Compilers	3 or 4	CSE 426	Software Engineering I	3 or 4
CS 422	Programming Language Design	3 or 4	CSE 427	Interactive Computer Graphics	3 or 4
CS 423	Operating Systems Design	3 or 4	CSE 428	Statistical Computing	3 or 4
CS 424	Real-Time Systems	3 or 4	CSE 429	Software Engineering II	3 or 4
CS 425	Distributed Systems	3 or 4	CSE 440	Statistical Data Management	3 or 4
CS 426	Compiler Construction	3 or 4	CSE 441	Introduction to Optimization	3 or 4
			CSE 448	Advanced Data Analysis	4

CSE 450	Computational Mechanics	3 or 4	ECE 457	Microwave Devices & Circuits	3
CSE 451	Finite Element Analysis	3 or 4	ECE 458	Applic of Radio Wave Propag	3
CSE 461	Computational Aerodynamics	3 or 4	ECE 459	Communications Systems	3
CSE 485	Atomic Scale Simulations	3 or 4	ECE 460	Optical Imaging	4
ECE 329	Fields and Waves I	3	ECE 461	Digital Communications	3
ECE 330	Power Ckts & Electromechanics	3	ECE 462	Logic Synthesis	3
ECE 333	Green Electric Energy	3	ECE 463	Digital Communications Lab	2
ECE 340	Semiconductor Electronics	3	ECE 464	Power Electronics	3
ECE 342	Electronic Circuits	3	ECE 465		
ECE 343	Electronic Circuits Laboratory	1	ECE 466		
ECE 350	Fields and Waves II	3	ECE 467	Biophotonics	3
ECE 374	Introduction to Algorithms & Models of Computation	4	ECE 468	Optical Remote Sensing	3
ECE 380	Biomedical Imaging	3	ECE 469	Power Electronics Laboratory	2
ECE 385	Digital Systems Laboratory	3	ECE 470	Introduction to Robotics	4
ECE 391	Computer Systems Engineering	4	ECE 472	Biomedical Ultrasound Imaging	3
ECE 395	Advanced Digital Projects Lab	2 or 3	ECE 473	Fund of Engrg Acoustics	3 or 4
ECE 401	Signal Processing	4	ECE 476	Power System Analysis	3
ECE 402	Electronic Music Synthesis	3	ECE 478	Formal Software Development Methods	3 or 4
ECE 403	Audio Engineering	3	ECE 479	IoT and Cognitive Computing	4
ECE 407	Cryptography	3 or 4	ECE 480	Magnetic Resonance Imaging	3 or 4
ECE 408	Applied Parallel Programming	4	ECE 481	Nanotechnology	4
ECE 410	Neural Circuits and Systems	3 or 4	ECE 482	Digital IC Design	3
ECE 411	Computer Organization & Design	4	ECE 483	Analog IC Design	3
ECE 414	Biomedical Instrumentation	3	ECE 486	Control Systems	4
ECE 415	Biomedical Instrumentation Lab	2	ECE 487	Intro Quantum Electr for EEs	3
ECE 416	Biosensors	3	ECE 488	Compound Semicond & Devices	3
ECE 417	Multimedia Signal Processing	4	ECE 489	Robot Dynamics and Control	4
ECE 418	Image & Video Processing	4	ECE 490	Introduction to Optimization	3 or 4
ECE 419	Security Laboratory	3 or 4	ECE 491	Numerical Analysis	3 or 4
ECE 420	Embedded DSP Laboratory	2	ECE 492	Parallel Progrmg: Sci & Engrg	3 or 4
ECE 422	Computer Security I	4	ECE 493	Advanced Engineering Math	3 or 4
ECE 424	Computer Security II	3 or 4	ECE 495	Photonic Device Laboratory	3
ECE 425	Intro to VLSI System Design	3	ECE 498	Special Topics in ECE (As Approved)	1 to 4
ECE 428	Distributed Systems	3 or 4	ECON 302	Inter Microeconomic Theory (As Approved)	3
ECE 431	Electric Machinery	4	EPSY 456	Human Performance and Cognition in Context (As Approved)	3 or 4
ECE 435	Computer Networking Laboratory	3 or 4	ETMA 430	Project Management (As Approved)	2
ECE 437	Sensors and Instrumentation	3	GEOL 450	Investigating the Earth's Interior	3
ECE 438	Communication Networks	3 or 4	GEOL 451	Environmental Geophysics	4
ECE 439	Wireless Networks	3 or 4	GEOL 454	Introduction to Seismology	3 or 4
ECE 441	Physcs & Modeling Semicond Dev	3	GEOL 460	Geochemistry	3
ECE 443	LEDs and Solar Cells	4	IB 421	Photosynthesis	3
ECE 444	IC Device Theory & Fabrication	4	IE 310	Deterministic Models in Optimization	3
ECE 447	Active Microwave Ckt Design	3	IE 311	Operations Research Lab	1
ECE 448	Artificial Intelligence	3 or 4	IE 330	Industrial Quality Control	3
ECE 449	Machine Learning	3 or 4	IE 340	Human Factors	4
ECE 451	Adv Microwave Measurements	3	IE 360	Facilities Planning and Design	3
ECE 452	Electromagnetic Fields	3	IE 361	Production Planning & Control	3
ECE 453	Wireless Communication Systems	4	IE 370	Stochastic Processes and Applications	3
ECE 454	Antennas	3	IE 371	Simulation Modeling with Applications for Industrial Engineering	3
ECE 455	Optical Electronics	3 or 4	IE 400	Design & Anlys of Experiments	3 or 4
ECE 456	Global Nav Satellite Systems	4			

IE 410	Advanced Topics in Stochastic Processes & Applications	3 or 4	MCB 419	Brain, Behavior & Info Process	3
IE 411	Optimization of Large Systems	3 or 4	MCB 446	Physical Biochemistry	3
IE 412	OR Models for Mfg Systems	3 or 4	MCB 450	Introductory Biochemistry	3
IE 413	Simulation	3 or 4	MCB 493	Special Topics Mol Cell Biol (As Approved)	1 to 4
IE 420	Financial Engineering	3 or 4	MSE 304	Electronic Properties of Matls	3
IE 430	Economic Found of Quality Syst	3 or 4	MSE 307	Materials Laboratory I	3
IE 431	Design for Six Sigma	3	MSE 308	Materials Laboratory II	3
IE 434	Deep Learning: Mathematics and Applications	3 or 4	MSE 401	Thermodynamics of Materials	3
IE 445	Human Performance and Cognition in Context (As Approved)	3 or 4	MSE 402	Kinetic Processes in Materials	3
IE 497	Independent Study (As Approved)	1 to 4	MSE 403	Synthesis of Materials	3
IE 498	Special Topics (As Approved)	1 to 4	MSE 405	Microstructure Determination	3
MATH 314	Introduction to Higher Mathematics	4	MSE 406	Thermal-Mech Behavior of Matls	3
MATH 347	Fundamental Mathematics	3	MSE 420	Ceramic Materials & Properties	3
MATH 357	Numerical Methods I	3	MSE 421	Ceramic Processing	3 or 4
MATH 403	Euclidean Geometry	3 or 4	MSE 422	Electrical Ceramics	3
MATH 412	Graph Theory	3 or 4	MSE 440	Mechanical Behavior of Metals	3
MATH 413	Intro to Combinatorics	3 or 4	MSE 441	Metals Processing	3
MATH 414	Mathematical Logic	3 or 4	MSE 443	Design of Engineering Alloys	3
MATH 417	Intro to Abstract Algebra	3 or 4	MSE 450	Polymer Science & Engineering	3 or 4
MATH 418	Intro to Abstract Algebra II	3 or 4	MSE 453	Plastics Engineering	3
MATH 423	Differential Geometry	3 or 4	MSE 455	Macromolecular Solids	3
MATH 424	Honors Real Analysis	3	MSE 456	Mechanics of Composites	3
MATH 425	Honors Advanced Analysis	3	MSE 457	Polymer Chemistry	3 or 4
MATH 427	Honors Abstract Algebra	3	MSE 458	Polymer Physics	3 or 4
MATH 428	Honors Topics in Mathematics (As Approved)	3	MSE 460	Electronic Materials I	3
MATH 432	Set Theory and Topology	3 or 4	MSE 461	Electronic Materials II	3
MATH 442	Intro Partial Diff Equations	3 or 4	MSE 464	Magnetic Materials and their Applications	3 or 4
MATH 444	Elementary Real Analysis	3 or 4	MSE 466	Electrochemical Energy Conversion	3
MATH 446	Applied Complex Variables	3 or 4	MSE 470	Design and Use of Biomaterials	3
MATH 447	Real Variables	3 or 4	MSE 473	Biomolecular Materials Science	3
MATH 448	Complex Variables	3 or 4	MSE 474	Biomaterials and Nanomedicine	3
MATH 450	Numerical Analysis	3 or 4	MSE 480	Surfaces and Colloids	3 or 4
MATH 453	Number Theory	3 or 4	MSE 481	Electron Microscopy	3 or 4
MATH 464	Statistics and Probability II	3 or 4	MSE 485	Atomic Scale Simulations	3 or 4
MATH 466	Applied Random Processes	3 or 4	MSE 487	Materials for Nanotechnology	3 or 4
MATH 473	Algorithms	4	MSE 488	Optical Materials	3 or 4
MATH 475	Formal Models of Computation	3 or 4	MSE 489	Matl Select for Sustainability	3 or 4
MATH 481	Vector and Tensor Analysis	3 or 4	MSE 497	Independent Study (As Approved)	1 to 4
MATH 482	Linear Programming	3 or 4	MSE 498	Special Topics (As Approved)	1 to 4
MATH 484	Nonlinear Programming	3 or 4	NE 410	Neural Circuits and Systems	3 or 4
MATH 487	Advanced Engineering Math	3 or 4	NEUR 419	Brain, Behavior & Info Process	3
MATH 489	Dynamics & Differential Eqns	3 or 4	NPRE 321	Introduction to Plasmas and Applications	3
MATH 490	Advanced Topics in Mathematics (As Approved)	1 to 4	NPRE 330	Materials in Nuclear Engineering	3
MATH 492	Undergraduate Research in Math (As Approved)	1 to 3	NPRE 402	Nuclear Power Engineering	3 or 4
MCB 401	Cellular Physiology	3	NPRE 412	Nuclear Power Econ & Fuel Mgmt	3 or 4
MCB 402	Sys & Integrative Physiology	3	NPRE 413	Nuclear Separations and Fuel Reprocessing	2 or 3
MCB 406	Gene Expression & Regulation	3	NPRE 421	Plasma and Fusion Science	3
			NPRE 423	Plasma Laboratory	2
			NPRE 429	Plasma Engineering	3
			NPRE 435	Radiological Imaging	3
			NPRE 441	Radiation Protection	4

NPRE 442	Radioactive Waste Management	3	STAT 410	Statistics and Probability II	3 or 4
NPRE 445	Interaction of Radiation with Matter	4	STAT 420	Methods of Applied Statistics	3 or 4
NPRE 448	Nuclear Syst Engrg & Design	4	STAT 424	Design of Experiments	3 or 4
NPRE 449	Nuclear Systems Engineering and Design	3	STAT 425	Statistical Modeling I	3 or 4
NPRE 451	NPRE Laboratory	3	STAT 426	Statistical Modeling II	3 or 4
NPRE 452	Advanced Radiological Science Lab	2 or 4	STAT 428	Statistical Computing	3 or 4
NPRE 455	Neutron Diffusion & Transport	4	STAT 429	Time Series Analysis	3 or 4
NPRE 457	Safety Anlys Nucl Reactor Syst	3 or 4	STAT 430	Topics in Applied Statistics (As Approved)	3 or 4
NPRE 461	Probabilistic Risk Assessment	3 or 4	STAT 431	Applied Bayesian Analysis	3 or 4
NPRE 470	Fuel Cells & Hydrogen Sources	3	STAT 432	Basics of Statistical Learning	3 or 4
NPRE 475	Wind Power Systems	3 or 4	STAT 433	Stochastic Processes	3 or 4
NPRE 498	Special Topics (As Approved)	1 to 4	STAT 434	Survival Analysis	3 or 4
NRES 445	Statistical Methods	4	STAT 437	Unsupervised Learning	3 or 4
PHYS 329	Atmospheric Dynamics I	3	STAT 440	Statistical Data Management	3 or 4
PHYS 330	Atmospheric Dynamics II	3	STAT 443	Professional Statistics (As Approved)	3 or 4
PHYS 370	Introduction to Quantum Information and Computing	3	STAT 448	Advanced Data Analysis	4
PHYS 401	Classical Physics Lab	3	STAT 480	Big Data Analytics	3 or 4
PHYS 402	Light	3 or 4	TE 461	Technology Entrepreneurship (As Approved)	3
PHYS 403	Modern Experimental Physics	4 or 5	TMGT 460	Business Process Modeling	3
PHYS 404	Electronic Circuits	4 or 5	TMGT 461	Tech, Eng, & Mgt Final Project	4
PHYS 406	Acoustical Physics of Music	4	UP 430	Urban Transportation Planning (As Approved)	4
PHYS 427	Thermal & Statistical Physics	4			
PHYS 435	Electromagnetic Fields I	3			
PHYS 436	Electromagnetic Fields II	3			
PHYS 446	Modern Computational Physics	3			
PHYS 460	Condensed Matter Physics	4			
PHYS 466	Atomic Scale Simulations	3 or 4			
PHYS 470	Subatomic Physics	4			
PHYS 475	Introduction to Biophysics	3 or 4			
PHYS 485	Atomic Phys & Quantum Theory	3			
PHYS 486	Quantum Physics I	4			
PHYS 487	Quantum Physics II	4			
PHYS 496	Communicating in Physics—Writing Papers and Giving Talks (As Approved)	3			
PHYS 497	Individual Study (As Approved)	1 to 4			
PHYS 498	Special Topics in Physics (As Approved)	1 to 4			
PSYC 358	Human Factors	4			
PSYC 456	Human Performance and Cognition in Context (As Approved)	3 or 4			
SE 400	Engineering Law (As Approved)	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 (As Approved)	3 or 4			
SE 497	Independent Study (As Approved)	0 to 4			
SE 498	Special Topics (As Approved)	1 to 4			
STAT 409	Actuarial Statistics II	4			

Free Electives

Code	Title	Hours
	Additional course work, subject to the Grainger College of Engineering restrictions to Free Electives, so that there are at least 128 credit hours earned toward the degree. (https://go.grainger.illinois.edu/FreeElectives/)	11
Total Hours of Curriculum to Graduate		128

for the degree of Bachelor of Science in Mechanical Engineering

Sample Sequence

This sample sequence is intended to be used only as a guide for degree completion. All students should work individually with their academic advisors to decide the actual course selection and sequence that works best for them based on their academic preparation and goals. Enrichment programming such as study abroad, minors, internships, and so on may impact the structure of this four-year plan. Course availability is not guaranteed during the semester indicated in the sample sequence. The curriculum sequence can also be viewed via dynamic and static curricular maps (<https://grainger.illinois.edu/academics/undergraduate/majors-and-minors/mechanical-map/>), which include prerequisite sequencing.

Students must fulfill their Language Other Than English requirement by successfully completing a third level of a language other than English. See the corresponding section on the Degree and General Education Requirements (<http://catalog.illinois.edu/general-information/degree-general-education-requirements/>). One of the SBS courses must be an introductory economics course (ECON 102 or ECON 103). ME 470 will satisfy a core course requirement and the Campus General Education Advanced Composition requirement.

Free Electives: Additional course work, subject to the Grainger College of Engineering restrictions to Free Electives (<https://go.grainger.illinois.edu/FreeElectives/>), so that there are at least 128 credit hours earned toward the degree.

First Year

First Semester	Hours	Second Semester	Hours
ENG 100	3	1 CS 101 (CS 124 or ECE 220 may be substituted.)	3
MATH 221 (MATH 220 may be substituted)	3	4 MATH 231	3
CHEM 102	4	3 PHYS 211	4
CHEM 103	4	1 Science elective course	4
ECON 102 or 103 (Counts as a Social/Behavioral Science General Education course)	3-4	3 ME 170 or Composition I course	3-4
Composition I course or ME 170	3-4		
	16		17

Second Year

First Semester	Hours	Second Semester	Hours
ME 270	3	3 ME 200	3
MATH 241	3	4 MATH 285	3
PHYS 212	3	4 ECE 205 (ECE 110 and either ECE 210 or ECE 211 may be substituted.)	3
MATH 257	3	3 TAM 212	3
TAM 210	3	2 TAM 251	3
ME 290	0		
	16		15

Third Year

First Semester	Hours	Second Semester	Hours
ME 310	4	4 ME 320	4
ME 340	3.5	3.5 ME 360	3.5
ECE 206	3	1 ME 371	3
ME 330	3	4 General Education course (choose a Humanities or Social/Behavioral Science course with Cultural Studies designation)	3
ME 370	4	3 Language Other Than English (3rd level) course	4
	15.5		17.5

Fourth Year

First Semester	Hours	Second Semester	Hours
Statistics elective course	3	3 MechSE elective course	3
MechSE elective course	3	3 Technical elective course or ME 470	3
ME 470 (or Technical elective course)	3	3 Technical elective course	3
General Education course (choose a Humanities or Social/Behavioral Science course with Cultural Studies designation)	3	3 General Education course (choose a Humanities or Social/Behavioral Science course with Cultural Studies designation)	3
Free elective course	4	4 Free elective course	3
	16		15

Total Hours 128

for the degree of Bachelor of Science Major in Mechanical Engineering

Student learning outcomes are based on learning outcomes in line with the ABET accreditation process.

Mechanical Engineering graduates will have:

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
3. An ability to communicate effectively with a range of audiences.
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Current Student Learning Outcomes

for the degree of Bachelor of Science in Mechanical Engineering

Mechanical Science & Engineering Website (<https://mechse.illinois.edu/>)

Mechanical Science & Engineering Faculty (<https://mechse.illinois.edu/people/faculty/all-faculty/>)

The Grainger College of Engineering Admissions (<https://grainger.illinois.edu/admissions/>)

The Grainger College of Engineering (<https://grainger.illinois.edu/>)