





# Biomedical Engineering

## College of Engineering

### Freshman Year

First Semester	Hours
MA 113 Calculus I*.....	<b>MTH 211</b> ...4
PHY 231 General University Physics*.....	<b>PHS 201</b> ...4
PHY 241 General University Physics Laboratory*.....	<b>PHY 201L</b> ...1
CIS/WRD 110 Composition and Communication I*Δ.....	.....3
EGR 101 Engineering Exploration I §∇*.....	.....1
EGR 102 Fundamentals of Engineering Computing *.....	<b>CS 110</b> ...2

Second Semester	Hours
MA 114 Calculus II*.....	<b>MTH 212</b> ...4
CHE 105 General College Chemistry I*.....	<b>CHM 101</b> ...4
CIS/WRD 111 Composition and Communication II*Δ.....	.....3
EGR 103 Engineering Exploration II §*∇.....	.....2
BIO 148 Introductory Biology I*.....	.....3

### Sophomore Year

First Semester	Hours
MA 213 Calculus III.....	<b>MTH 213</b> ...4
PHY 232 General University Physics.....	<b>PHS 202</b> ...4
PHY 242 General University Physics Laboratory.....	<b>PHS 202L</b> ...1
BIO 152 Principles of Biology II.....	.....3
BME 201 Introduction to Biomedical Engineering.....	.....3
Guided Engineering Elective I [1].....	.....3

Second Semester	Hours
MA 214 Calculus IV.....	<b>MTH 305</b> ...3
CHE 107 General College Chemistry II.....	<b>CHM 101</b> ...3
PRD/BME 170 Human Anatomy for Design.....	.....3
PRD 272 Introduction to UX for Product Design.....	.....2
Guided Engineering Elective II [1].....	.....3
UK Core – Humanities.....	.....3

### Junior Year

First Semester	Hours
BME 322 Design Strategies for Biomedical Engineering.....	.....3
BME 435 Computer Modeling of Complex Systems.....	.....3
PRD/EGR 250 Computer-Aided Design: Solidworks.....	.....2
PRD 371 Ergonomics.....	.....1
Guided Engineering Elective III [1].....	.....3
UK Core – Social Sciences.....	.....3

Second Semester	Hours
STA 381 Engineering Statistics – A Conceptual Approach.....	.....3
BME 330 Experimental Methods in Biomedical Engineering.....	.....3
PRD/BME 350 Materials and Processes.....	.....3
PRD 372 UX + UI for Product Design.....	.....1
BME Basic Elective I [2].....	.....3
UK Core – Citizenship - USA.....	.....3

### Senior Year

First Semester	Hours
BME 420 Senior Design Project in Biomedical Engineering I.....	.....3
PRD/BME 451 Integrated Entrepreneurship in Product Design.....	.....2
PGY 206 Elementary Physiology.....	.....3
PGY 207 Case Studies in Physiology.....	.....1
BME Basic Elective II [2].....	.....3
BME Advanced Elective I [3].....	.....3

Second Semester	Hours
BME 421 Senior Design Project in Biomedical Engineering II ∞.....	.....3
BME Basic Elective III [2].....	.....3
BME Basic Elective IV [2].....	.....3
BME Advanced Elective II [3].....	.....3
UK Core – Global Dynamics.....	.....3

\*Courses are required for Engineering Standing. A cumulative UK GPA of at least 2.5 and successful completion of the following courses with at least a 2.5 GPA: BIO 148, BIO 152, BME 201, CHE 105, CIS 110 / WRD 110, CIS 111 / WRD 111, EGR 101, EGR 102, EGR 103, MA 113, MA 114, MA 213, PHY 231, PHY 241, PHY 232 and PHY 242. If the course is repeated, the best grade will be used for calculation of GPA in the above listed courses.

Δ Students taking ENG 101 (ENG 101) and ENG 102 (ENG 102) should also complete COM 252, COM 281, or COM 287.

§ Transfer students will take EGR 215, Introduction to the Practice of Engineering for Transfer Students, in place of EGR 101 and EGR 103.

∇ Students must complete both EGR 101 and EGR 103 to fulfill the UK Core Arts and Creativity requirement. Transfer students may satisfy the UK Core Arts and Creativity requirement by taking EGR 215.

∞ Graduation Composition and Communication Requirement (GCCR) course.

[1] Guided Engineering Elective options: CME 200, CME 320, EE 211, EE 305, EM 221, EM 302, EM 313, ME 340

[2] Basic BME Elective options: BME 440, BME 455, BME 464, BME 465, BME 470, BME 472, BME 473, BME 476, BME 477, BME 488, BME 491

[3] Advanced BME Elective options: BME 532, BME 540, BME 571, BME 573, BME 395

§ Online Chemistry courses do not transfer. Chemistry classes and labs must be in person.

University of Kentucky is accredited by the Southern Association of Colleges and Schools Commission on Colleges to award associate, baccalaureate, masters, and doctorate degrees. Contact the Commission on Colleges at 1866 Southern Lane, Decatur, Georgia 30033-4097, call 404-679-4500, or online at [www.sacscoc.org](http://www.sacscoc.org) for questions about the accreditation of University of Kentucky.













# Electrical Engineering

## College of Engineering

### Freshman Year

First Semester	Hours
EGR 101 Engineering Exploration I § †.....	1
EGR 102 Fundamentals of Engineering Computing.....	CS 110...2
PHY 231 General University Physics.....	PHS 201...4
PHY 241 General University Physics Laboratory.....	PHS 201L...1
CIS/WRD 110 Composition and Communication I Δ.....	3
MA 113 Calculus I.....	MTH 211...4
<b>Second Semester</b>	
EGR 103 Engineering Exploration II § †.....	2
CIS/WRD 111 Composition and Communication II Δ.....	3
MA 114 Calculus II.....	MTH 212...4
CHE 105 General College Chemistry I.....	CHM 101...4
CS 215 Introduction to Program Design, Abstraction, and Problem Solving.....	CIS 111...4

### Sophomore Year

First Semester	Hours
MA 213 Calculus III.....	MTH 213...4
PHY 232 General University Physics.....	PHS 202...4
PHY 242 General University Physics Laboratory.....	PHS 202L...1
EE 211 Circuits I.....	4
EE/CPE 282 Digital Logic Design.....	4
<b>Second Semester</b>	
MA 214 Calculus IV.....	MTH 305...3
EE 223 AC Circuits.....	4
EE/CPE 287 Introduction to Embedded Systems.....	4
UK Core – Social Sciences.....	3
UK Core – Humanities.....	3

### Junior Year

First Semester	Hours
EE 415G Electromechanics.....	3
EE 421G Signals and Systems.....	3
Elective EE Laboratory [L].....	2
EE 461G Introduction to Electronics.....	3
MA 320 Introductory Probability	
or	
STA 381 Engineering Statistics – A Conceptual Approach.....	3
Technical Elective [T].....	3
<b>Second Semester</b>	
EE 468G Introduction to Engineering Electromagnetics.....	4
Elective EE Laboratory [L].....	2
Engineering/Science Elective [E].....	3
Technical Elective [T].....	3
UK Core – Citizenship - USA.....	3

### Senior Year

First Semester	Hours
EE/CPE 490 ECE Capstone Design I∞.....	3
EE Technical Elective**.....	3
EE Technical Elective**.....	3
Math/Statistics Elective [M].....	3
UK Core – Global Dynamics.....	3
<b>Second Semester</b>	
EE/CPE 491 ECE Capstone Design II.....	3
EE Technical Elective**.....	3
EE Technical Elective**.....	3
Engineering/Science Elective [E].....	3
UK Core – Statistical Inferential Reasoning.....	3

\*Courses are required for Engineering Standing. A cumulative UK GPA of at least 2.5 and successful completion of all pre-major courses. Successful completion of the following courses with at least a 2.5 GPA: CIS 110/WRD 110, CHE 105, CS 215, EE 211, EE 282/CPE 282, and PHY 231. If a course is repeated, the best grade will be used for calculation of GPA in the above listed courses.

Δ Students taking ENG 101 (ENG 101) and ENG 102 (ENG 102) should also complete COM 252, COM 281, or COM 287.

§ Transfer students will take EGR 215, Introduction to the Practice of Engineering for Transfer Students, in place of EGR 101 and EGR 103.

† Students must complete both EGR 101 and EGR 103 to fulfill the UK Core Arts and Creativity requirement. Transfer students may satisfy the UK Core Arts and Creativity requirement by taking EGR 215.

[M] **Math/Statistics Elective:** Any upper-division (300-level or higher) math or statistics course excluding MA 308 and MA 310 (3 credit hours total).

[E] **Engineering/Science Electives:** Any engineering, physics, computer science, or math course at the 200-level or higher; other than an electrical engineering course and excluding MA 308, MA 310, and more elementary versions of required courses (6 credit hours total). Cooperative education credit may not be used to satisfy this requirement.

[T] **Technical elective** may be selected from upper-division (300-level or higher) engineering, mathematics, statistics, computer science, physics, or other technically-related fields excluding MA 308, MA 310, EE 305, and more elementary versions of required courses, to be selected in consultation with the academic advisor (6 credit hours total).

[L] **Electrical Engineering Laboratory Elective:** EE 416G, EE 422G, EE 462G (4 credit hours total).

∞ Graduation Composition and Communication Requirement (GCCR) course.

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# Electrical Engineering • 2

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\*\*EE Technical Electives (must be 500-level courses). Courses recommended as electrical engineering technical electives are listed below (each course is 3 credit hours):

EE 503 Power Electronics  
EE 511 Introduction to Communication Systems  
EE 512 Digital Communication Systems  
EE 513 Audio Signals and Systems  
EE 517 Advanced Electromechanics  
EE 518 Electric Drives  
EE 522 Antenna Design  
EE 523 Microwave Circuit Design  
EE 525 Numerical Methods and Electromagnetics  
EE 527 Electromagnetic Compatibility  
EE 531 Alternative and Renewable Energy Systems  
EE 532 Smart Grid: Automation and Control of Power Systems  
EE 533 Advanced Power System Protection  
EE 535 Power Systems: Generation, Operation and Control  
EE 536 Power System Fault Analysis and Protection  
EE 537 Electric Power Systems I  
EE 538 Electric Power Systems II  
EE 539 Power Distribution Systems  
EE 543 Solar Cell Devices and Systems for Electrical Energy Generation  
EE 546 Electric Power System Fundamentals  
EE 560 Semiconductor Device Design  
EE 566 Engineering Optics  
EE 567 Introduction to Lasers and Masers  
EE 568 Fiber Optics  
EE 569 Electronic Packaging Systems and Manufacturing Processes  
EE 571 Feedback Control Design  
EE 572 Digital Control of Dynamic Systems  
EE 582 Hardware Description Languages and Programmable Logic  
EE 584 Introduction of VLSI Testing and Design  
EE 585 Fault Tolerant Computing  
EE 586 Communication and Switching Networks  
EE 587 Microcomputer Systems Design  
EE 588 Real-Time Computer Systems  
EE 589 Advanced VLSI  
EE 599 Topics in Electrical Engineering (Subtitle required)

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# Mechanical Engineering • 2

## Mathematics Elective

Choose one course from the following:

MA 320 Introductory Probability.....	3
MA 321 Introduction to Numerical Methods.....	MTH340...3
MA 322 Matrix Algebra and Its Applications.....	MTH308...3
MA 416G Introduction to Optimization.....	MTH 415...3
MA 432G Methods of Applied Mathematics I.....	3
MA 433G Introduction to Complex Variables.....	3
MA 481G Differential Equations.....	3
STA 381 Engineering Statistics – A Conceptual Approach.....	3

**Subtotal: Mathematics Elective..... 3**

## Technical Electives

Choose 9 hours from the following:\*

ME 380 Topics in Mechanical Engineering (Variable Topics).....	3
ME 395 Independent Work in Mechanical Engineering.....	1-3
ME 416 Automotive Painting Technology.....	3
ME 417 Sheet Metal Forming.....	3
ME 418 Automotive Assembly and Quality Control.....	3
ME 501 Mechanical Design with Finite Element Methods.....	3
ME/MFS 503 Lean Manufacturing Principles and Practices.....	3
ME/MFS 505 Modeling of Manufacturing Processes and Machines.....	3
ME/MSE 506 Mechanics of Composite Materials.....	3
ME/MFS 507 Design for Manufacturing.....	3
ME 510 Vibro-Acoustic Design in Mechanical Systems.....	3
ME/MFS 511 Machining of Materials and Applications.....	3
ME/MFS 512 Manufacturing Systems.....	3
ME 513 Mechanical Vibrations.....	3
ME 514 Computational Techniques in Mechanical System Analysis.....	3
ME 515 Rotordynamics of Turbomachinery.....	3
ME 516 Systems Engineering.....	3
ME/EE/MFS 526 Lean Operations Management I.....	3
ME 527 Applied Mathematics in the Natural Sciences I.....	3
ME 530 Gas Dynamics.....	3
ME 531 Fluid Dynamics I.....	3
ME 532 Advanced Strength of Materials.....	3
ME 542 Kinematic Synthesis of Mechanisms.....	3
ME 548 Aerodynamics of Turbomachinery.....	3
ME 549 Power Generation.....	3
ME/MFS/CME/MSE 554 Chemical and Physical Processing of Polymer Systems.....	3
ME/EE/MSE 555 Introduction to Micro-/Nano-Electromechanical Systems.....	3
ME/MFS/CME/MSE 556 Introduction to Composite Materials.....	3
ME 560 Engineering Optics.....	3
ME 563 Basic Combustion Phenomena.....	3
ME 565 Scale Modeling in Engineering.....	3
ME/EE/MSE 570 Fundamentals of Nanoelectric Devices and Materials.....	3
ME/BAE 580 Heating, Ventilating and Air-Conditioning.....	3
ME/BAE/EGR/MFS/EE 583 Industrial Energy Utilization and Assessment.....	3
ME 585 Fourier Series and Boundary Value Problems.....	3
ME 590 Applied CFD and Numerical Heat Transfer.....	3
ME 599 Topics in Mechanical Engineering (Subtitle required).....	3
MFS 599 Topics in Manufacturing Systems Engineering (Subtitle required).....	3

## Hours

## Non-ME Technical Electives

BAE 502 Modeling of Biological Systems.....	3
BAE 515 Fluid Power Systems.....	3
BAE 516 Control of Off-Road Vehicles.....	3
BME 440 Introduction to Biomedical Signal Processing.....	3
BME 472 Human Biomechanics.....	3
BME 473 Fundamentals of Biofluid Mechanics.....	3
BME 488 Introduction to Biomaterials.....	3
BME 532 Modeling of Physiological Systems.....	3
BME 540 Biomedical Instrumentation.....	3
BME 550 Introduction to Biomedical Imaging.....	3
BME 571 Mechanical Modeling of Human Motion.....	3
BME 573 Cell Mechanics and Mechanobiology.....	3
BME 579 Neural Engineering: Merging Engineering with Neuroscience.....	3
EGR 523 Concepts, Assessment Tools and Methods in Sustainable Power and Energy.....	3
EGR 537 Numerical Analysis.....	3
EGR 540 Power Economics and Public Policy.....	3
EGR 542 Electric Power Generation Technologies.....	3
EGR 546 Electric Power System Fundamentals.....	3
EGR 553 Environmental Consequence of Energy Production.....	3
MFS 509 Leadership for a Lean Enterprise.....	3
MFS/MNG 520 Industrial Automation and Control.....	3
MFS 525 Organizational Learning for Lean Manufacturing.....	3
MFS 581 Quality Control.....	3
MFS 599 Topics in Manufacturing Systems Engineering (Subtitle required).....	3
MSE 201 Materials Science.....	3
MSE/CME 552 Automotive Plastics.....	3

\*A minimum of 6 credit hours (two courses) must have an ME prefix or be cross-listed as an ME course. A maximum of 3 credit hours (one course) may be chosen from technical electives with prefixes other than ME. Exceptions only with the approval of the Director of Undergraduate Studies.



