University of Kentucky

Mechanical Engineering

College of Engineering

The mechanical engineer's training is the broadest among the several fields of engineering. The mechanical engineer uses the techniques of mathematics combined with a specialized knowledge of the thermal and energy sciences, solid and fluid mechanics, and the properties of materials. This information is supplemented by an understanding of manufacturing processes, the design and control of systems, and the economics of the technological community.

Admission to the program is selective. Students should refer to the UK *Bulletin* for general information concerning admission and graduation requirements.

Degree Requirements

The following curriculum meets the requirements for a Bachelor of Science in Mechanical Engineering, provided the student satisfies the graduation requirements of the College of Engineering.

Freshman Year

First Semester	Hours
EGR 101 Engineering Exploration I § †	1
EGR 102 Fundamentals of Engineering Computing	2
CIS/WRD 110 Composition and Communication I	3
MA 113 Calculus I	4
PHY 231 General University Physics	4
PHY 241 General University Physics Laboratory	1

Second Semester	
EGR 103 Engineering Exploration II § †	2
MA 114 Calculus II	4
CIS/WRD 111 Composition and Communication II	3
CHE 105 General College Chemistry I	4
UK Core* – Social Sciences	3

Sophomore Year

First Semester	Hours
MA 213 Calculus III	4
PHY 232 General University Physics	4
PHY 242 General University Physics Laboratory	1
EM 221 Statics	3
ME 205 Computer Aided Engineering Graphics	3
Guided Elective	
or	
UK Core* – Humanities	3

Second Semester	
ME 220 Engineering Thermodynamics I	3
ME 251 Introduction to Materials and Manufacturing Processes	3
MA 214 Calculus IV	3
EM 313 Dynamics	3
Guided Elective	
or	
UK Core* – Humanities	
Guided Elective	
or	
UK Core* – Statistical Inferential Reasoning.	
Recommended:	
STA 210 Making Sense of Uncertainty: An Introduction to Statistical Reasoning	
or	
STA 381 Engineering Statistics – A Conceptual Approach	3

Junior Year

First Semester	Hours
EM 302 Mechanics of Deformable Solids	3
EE 305 Electrical Circuits and Electronics	3
ME 330 Fluid Mechanics	3
ME 340 Introduction to Mechanical Systems	3
WRD 204 Technical Writing**	3

Second Semester	
ME 310 Engineering Experimentation I	3
ME 321 Engineering Thermodynamics II	3
ME 325 Elements of Heat Transfer	3
ME 344 Mechanical Design	3
Mathematics Elective***	3

Senior Year

First Semester	Hours
ME 411 ME Capstone Design I	3
ME 311 Engineering Experimentation II	3
ME 440 Design of Control Systems	3
ME 501 Mechanical Design with Finite Element Methods	
or	
ME 590 Computational Fluid Dynamics	3
Technical Elective††	3

Second Semester	
ME 412 ME Capstone Design II	3
Technical Elective††	3
Technical Elective††	3
UK Core* – Citizenship - US	3
UK Core* – Global Dynamics	3

§ *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.*

**To be selected from UK Core courses in consultation with the academic advisor.*

***Graduation Composition and Communication Requirement (GCCR) course.*

****Mathematics Elective – choose one course from approved list.*

††*Technical Electives – choose 9 hours from approved list.*

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Mechanical Engineering • 2

Mathematics Elective **Hours**

Choose one course from the following:

MA 320 Introductory Probability....3
MA 321 Introduction to Numerical Methods....3
MA 322 Matrix Algebra and Its Applications....3
MA 416G Introduction to Optimization....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 **Hours**

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

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.*