# Mechanical Engineering

College of Engineering

A mechanical engineering 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 Δ § | 1 |
| EGR 102 Fundamentals of Engineering Computing | 2 |
| PHY 231 General University Physics or CHE 105 General College Chemistry I● | 4 |
| PHY 241 General University Physics Laboratory‡ | 1 |
| CIS/WRD 110 Composition and Communication I | 3 |
| MA 113 Calculus I | 4 |

| Second Semester | |
|---|---|
| EGR 103 Engineering Exploration II Δ | 2 |
| CIS/WRD 111 Composition and Communication II | 3 |
| MA 114 Calculus II | 4 |
| CHE 105 General College Chemistry I or PHY 231 General University Physics● | 4 |
| UK Core (Social Sciences) | 3 |

### Sophomore Year

| First Semester | Hours |
|---|---|
| PHY 232 General University Physics | 4 |
| PHY 242 General University Physics Laboratory | 1 |
| MA 213 Calculus III | 4 |
| CHE 107 General College Chemistry II or UK Core (Humanities) | 3 |
| ME 205 Computer Aided Engineering Graphics | 3 |
| EM 221 Statics | 3 |

| Second Semester | |
|---|---|
| ME 220 Engineering Thermodynamics I | 3 |
| ME 251 Manufacturing Engineering | 3 |
| MA 214 Calculus IV | 3 |
| EM 313 Dynamics | 3 |
| UK Core (Humanities) or CHE 107 General College Chemistry II | 3 |
| UK Core (Statistical Inferential Reasoning) | 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 |
| Math 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 | 3 |
| Technical Elective† | 3 |

| Second Semester | |
|---|---|
| ME 412 ME Capstone Design II | 3 |
| Technical Electives† | 3 |
| Technical Electives† | 3 |
| Supportive Elective ** | 3 |
| UK Core (Global Dynamics) | 3 |
| UK Core (Citizenship USA) | |

Δ *Both classes must be taken to fulfill UK Core: Arts & Creativity requirement.*

● *Based on advisor consult*

‡*Only if enrolled in Physics 231*

§ *Transfer students who declare a major will take EGR 112 Engineering Exploration for Transfer Students in place of EGR 101.*

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

***Supportive elective is any university course, excluding more elementary versions of required courses, such as precalculus mathematics or PHY 211.*

†*Technical Electives – Choose 9 hours from the following:*

ME 380 Topics in Mechanical Engineering (Variable Topics)
ME 395 Independent Work in Mechanical Engineering
ME/MFS 503 Lean Manufacturing Principles and Practices
ME/MFS 505 Modeling of Manufacturing Processes and Machines
ME/MSE 506 Mechanics of Composite Materials
ME/MFS 507 Design for Manufacturing
ME 510 Vibro-Acoustic Design in Mechanical Systems
ME/MFS 512 Manufacturing Systems
ME 513 Mechanical Vibrations
ME 514 Computational Techniques in Mechanical System Analysis
ME 515 Rotordynamics of Turbomachinery
ME 516 Systems Engineering
ME 527 Applied Mathematics in the Natural Sciences I
ME 530 Gas Dynamics
ME 531 Fluid Dynamics I
ME 532 Advanced Strength of Materials

CONTINUED

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ME 548 Aerodynamics of Turbomachinery
ME 549 Power Generation
ME/MSE 556 Introduction to Composite Materials
ME 560 Engineering Optics
ME 563 Basic Combustion Phenomena
ME 565 Scale Modeling in Engineering
ME/BAE 580 Heating, Ventilating and Air-Conditioning
ME 599 Topics in Mechanical Engineering (Subtitle required)
MFS 599 Topics in Manufacturing Systems Engineering (Subtitle required)
EGR 599 Topics in Engineering
MSE 201 Materials Science
BAE 502 Modeling of Biological Systems
BME 501 Foundations of Biomedical Engineering
BME 530 Biomedical Instrumentation

*** Mathematics Elective
MA 320 Introductory Probability
MA 321 Introduction to Numerical Methods
MA 322 Matrix Algebra and Its Applications
MA 416G Introduction to Optimization
MA 432G Methods of Applied Mathematics I
MA 433G Introduction to Complex Variables
MA 481G Differential Equations
STA 381 Engineering Statistics- A Conceptual Approach