University of Kentucky

Materials Engineering

College of Engineering

The materials engineer is responsible for the preparation, fabrication, selection, use, and reuse of existing materials, and for the development of new and improved materials. The professional in this field is often called on to consider metals, ceramics and polymers. The engineer considers chemical, electronic, magnetic, optical, and mechanical properties of materials.

Admission to the degree 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 B.S. in Materials Engineering, provided the student satisfies the graduation requirements of the College of Engineering.

Freshman Year

First Semester

MSE 101 Materials Engineering 1
CHE 105 General College Chemistry I 3
ENG 101 Writing I 3
MA 113 Calculus I 4
CS 221 First Course in Computer Science for Engineers 2
University Studies* 3

Second Semester

MSE 102 Metals Technology 1
CHE 107 General College Chemistry II 3
CHE 115 General Chemistry Laboratory 3
MA 114 Calculus II 4
ENG 102 Writing II 3
University Studies* 3

Sophomore Year

First Semester

MSE 201 Materials Science 3
CME 200 Process Principles 3
MA 213 Calculus III 4
PHY 231 General University Physics 4
PHY 241 General University Physics Laboratory 1
COM 181 Basic Public Speaking 3

Second Semester

MSE 301 Materials Science II 3
MSE 351 Material Thermodynamics 3
PHY 232 General University Physics 4
EM 221 Statics 3
MA 214 Calculus IV 3

Junior Year

First Semester

MSE 401G Metal and Alloys 4
MSE 404G Polymeric Materials 3
MSE 450 Transport Phenomena for Materials Engineers 3
CHE 236 Survey of Organic Chemistry 3
EM 302 Mechanics of Deformable Solids 3

Second Semester

MSE 403G Ceramic Engineering 4
MSE 402G Electronic Materials and Processing 3
PHY 361 Principles of Modern Physics 3
STA 381 Introduction to Engineering Statistics 3
University Studies* 3

Senior Year

First Semester

MSE 436 Material Failure Analysis 3
MSE 581 Quality Control 3
EE 305 Electrical Circuits and Electronics 3
Materials Elective*** 3
University Studies* 3
University Studies* 3

Second Semester

MSE 480 Materials Design 3
MSE 538 Deformation Processing 4
Supportive Elective** 3
Materials Elective*** 4
University Studies* 3

*To be selected from University Studies areas in Social Sciences, Humanities, Cross-Cultural and Cross-Disciplinary in consultation with the academic advisor. A minimum of 18 credits in the humanities and social sciences are required.

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

***Choose from the following materials electives below:

Materials Electives

General

MSE 535 Mechanical Properties of Materials
MSE 550 Corrosion
MSE 585 Materials Characterization Techniques
MSE 599 Topics in Materials Science and Engineering (Subtitle required)

Metals

MSE 462 Physical Metallurgy of Ferrous Materials
MSE 531 Powder Metallurgy
MSE 542 Extractive Metallurgy

Polymers

MSE 506 Mechanics of Composite Materials
MSE/CME 554 Chemical and Physical Processing of Polymer Systems
MSE 556 Introduction to Composite Materials
MSE/CME 558 Principles of Polymer Characterization and Analysis

Electronics

MSE 566 Hybrid Microelectronics
MSE 568 Fiber Optics
MSE 569 Electronic Packaging Systems and Manufacturing Processes