

Materials Engineering

College of Engineering

The materials engineer is responsible for the selection, preparation and application of existing materials and for the development of new and improved materials. Materials engineers study the relationships between atomic and/or molecular constitution, microstructure and physical properties including mechanical, thermal, electrical, and optical behavior. Classes of materials include metals, ceramics, polymers, and electronic 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	Hours
EGR 101 Engineering Exploration I Δ §	1
EGR 102 Fundamentals of Engineering Computing	2
CHE 105 General College Chemistry I or PHY 231 General University Physics ●	4
CHE 111 General College Chemistry Lab I	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
PHY 231 General University Physics or CHE 105 General College Chemistry I ●	4
PHY 241 General University Physics Laboratory	1
UK Core (Social Sciences)	3

Sophomore Year

First Semester	Hours
MSE 201 Materials Science	3
CHE 107 General College Chemistry II	3
CHE 113 General College Chemistry II	2
MA 213 Calculus III	4
EM 221 Statics	3
MSE 202 Materials Science Laboratory	1

Second Semester

MSE 301 Materials Science II	3
MSE 351 Materials Thermodynamics	3
MA 214 Calculus IV	4
PHY 232 General University Physics	4
CHE 236 Survey of Organic Chemistry	3

Junior Year

First Semester	Hours
MSE 401G Metal and Alloys	3
MSE404G Polymeric Materials	3
CME 200 Process Principles	3
EM 302 Mechanics of Deformable Solids	3
STA 381 Engineering Statistics: A Conceptual Approach	3
UK Core (Humanities)	3

Second Semester

MSE 402G Electronic Materials and Processing	3
MSE 403G Ceramic Engineering and Processing	3
MSE 407 Materials Laboratory I ***	3
MSE 535 Mechanical Properties of Materials	3
PHY 361 Principles of Modern Physics	3

Senior Year

First Semester	Hours
MSE 408 Materials Laboratory II	3
MSE 436 Material Failure Analysis	3
MSE 585 Materials Characterization Techniques	3
EE 305 Electrical Circuits and Electronics	3
Technical Elective** (MSE prefix)	3
UK Core (Citizenship – USA)	3

Second Semester

MSE 480 Materials Design	3
MSE 538 Metals Processing	3
Technical Elective **	3
Supportive Elective*	3
UK Core (Global Dynamics)	3

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

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

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

● Based on advisor consult

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

**Technical Electives – Total of 6 credit hours must be chosen. Technical electives are to be selected from a technical discipline, with approval from the Director of Undergraduate Studies. At least 3 credit hours must come from a course with a MSE prefix. MSE 395 (Research) may count for one elective, but not both. Recommended technical electives include but are not limited to:

- MSE 395 Independent Work in Materials Engineering
- MSE 506 Mechanics of Composite Materials
- MSE 531 Powder Metallurgy
- MSE/CME 554 Chemical and Physical Processing of Polymer Systems
- MSE 556 Introduction to Composite Materials
- MSE 569 Electronic Packaging Systems and Manufacturing Processes
- MSE 599 Topics in Materials Science and Engineering (Subtitle required)
- CHE 580 Topics in Chemistry
- CME 542 Electric Power Generation Technologies
- MA 322 Matrix Algebra and Its Applications
- MA 422 Numerical Solutions of Equations
- MA 432G Methods of Applied Mathematics I
- ME/MFS 503 Lean Manufacturing Principles and Practices

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 for questions about the accreditation of University of Kentucky.