

MATERIALS ENGINEERING

Nearly all technological progress requires the ability to engineer materials to meet specific needs. Materials engineers study the relationships between the underlying structure, processing, properties and performance of materials and employ this insight to formulate new or improved materials for use across a variety of industries. The modern materials engineering discipline encompasses metals, ceramics, polymers and composites, electronic materials and biomaterials. Materials characterization—the use of state-of-the-art instruments to determine material composition and structure—plays a key role in materials engineering practice.

Pursuing Materials Engineering at UK

Students enrolled in materials engineering at the University of Kentucky enjoy the benefits of studying at the Commonwealth's flagship research institution with an energetic faculty committed to each individual student's educational and professional success. Materials engineering students at UK experience an environment where faculty are readily accessible inside and outside the classroom, and where students have the chance to grow personally and professionally through hands-on research projects, industrial cooperative education and service opportunities. Our alumni follow diverse paths; while many enter industrial positions, others pursue advanced engineering and professional degrees at prestigious institutions across the nation.

In our ABET-accredited program, you'll study a wide range of subjects, including mathematics, chemistry and physics, as well as core engineering topics related to the central classes of materials (metals, ceramics, polymers and electronic materials), their characterization, processing and implementation in engineering design. Electives address specialized topics in materials engineering and include courses on biomaterials, composites, corrosion, energy storage, materials manufacturing and nanomaterials technology.

First-Year Engineering Program

The University of Kentucky First-Year Engineering program is designed to remove as much guesswork from your major selection as possible. Instead of pushing through a major you don't like, or adding time and expense by changing majors, you can make an informed choice thanks to hands-on, team experiences that expose you to all of our engineering disciplines from the start. If you are

certain about your major, the program is still highly beneficial as it exposes you to other engineering disciplines that you will encounter in the workforce and teaches you skills that you will use throughout the remainder of your engineering curricula. If you are unsure about your major, you may enroll as "undeclared engineering" and choose your major during the second semester.

All incoming freshmen and transfer engineering students take part in the First-Year Engineering program. Freshmen students take a two-semester series which includes an overview of engineering disciplines, computer programming, computer-aided design, MATLAB, engineering design and analysis, project management, ethics in engineering, teamwork and oral and written technical communication. Transfer students complete a course series their first semester focused on similar topics. Studies have shown that students who participate in a First-Year Engineering Program are more successful in upper level engineering courses and are more inclined to graduate with an engineering degree.

Students may directly enroll as pre-engineering students in their chosen major; however, there are minimum admission requirements. Minimum freshman entry requirements are an ACT math score of 23 or a SAT math score of 570. Additionally, students must meet the university's minimum ACT/SAT reading and writing requirements to be admitted to the College of Engineering. Students not eligible to directly enroll in engineering should contact the director of recruitment at visit@engr.uky.edu for alternate pathways.

Experiential Education

Many of our students pursue undergraduate research, working side-by-side with faculty and graduate students on experimental and computational problems. Students can earn academic credit for their efforts, as well as an hourly wage or summer stipend. By working in the hands-on environment of materials engineering research, students have an opportunity to apply their classroom knowledge solving real-world problems.

In addition, a substantial percentage of our students undertake co-op placements or summer internships to gain valuable experience in industries that employ materials engineers. The Engineering Career Development Group is your one-stop shop for assisting you

FOR MORE INFORMATION, VISIT THESE WEBSITES:

Materials Engineering: www.engr.uky.edu/cme **College of Engineering:** www.engr.uky.edu **Visit Engineering:** www.engr.uky.edu/visit

University of Kentucky: www.uky.edu **Admissions:** www.uky.edu/admissions **Scholarships:** www.uky.edu/scholarships

Materials Engineering Curriculum Sample

This is a sample list of classes a student could take to pursue a degree in materials engineering. In addition to the materials engineering curriculum, students must complete the pre-engineering requirements and general education coursework, called UK Core.

Note: This sample represents one of several paths to a College of Engineering degree. Consult the departmental websites for details on specific paths.

Freshman Year

Engineering Exploration I and II	3
Fundamentals of Engr Computing	2
Calculus I and II	8
Composition & Communication I and II	6
Chemistry I and Physics I and labs	10
UK Core course	3
Total hours	32

Sophomore Year

Materials Science I and II and lab	7
Calculus III and IV	7
Physics II	4
Chemistry II and lab	5
Survey of Organic Chemistry	3
Materials Thermodynamics	3
Statics	3
Total hours	32

Junior Year

Metals & Alloys	3
Polymeric Materials	3
Process Principles	3
Mechanics of Deformable Solids	3
Intro to Statistical Reasoning	3
Ceramic Engineering and Processing	3
Electronic Materials and Processing	3
Principles of Modern Physics	3
Mechanical Properties of Materials	3
Materials Lab I	3
UK Core course	3
Total hours	33

Senior Year

Materials Characterization Techniques	3
Material Failure Analysis	3
Electrical Circuits & Electronics	3
Materials Design	3
Metals Processing	3
Materials Lab II	3
Supportive elective	3
Technical electives	6
UK Core courses	6
Total hours	33

in the development of job, co-op and internship search skills, and building career networks to eventually help you secure a rewarding career in your chosen field of study.

Student Involvement

Strong, active professional and honorary student organizations are an integral part of the educational experience in the College of Engineering at UK. The Department of Chemical and Materials Engineering is home to the student chapter of Material Advantage, as well as the Alpha Sigma Mu honorary society. Members of Material Advantage gather for regular meetings featuring speakers from industry and academia, participate in field trips, networking and community service opportunities and attend regional and national professional conferences.

Many of our undergraduates participate in college-wide student organizations, including the Society of Women Engineers, the National Society of Black Engineers, Engineering Student Council and Tau Beta Pi honorary society. Our student organizations provide an opportunity to build leadership and teamwork skills, and help to develop the broad professional perspective essential for engineers in today's world.

Career Prospects in Materials Engineering

Materials engineers are responsible for the selection, preparation and implementation of existing materials and for the development of new and improved materials—they work at the forefront of rapidly changing technical areas, where the application of novel, precisely engineered materials is crucial for technological advancement.

Materials engineers are critical to all areas of engineering endeavor, and the College of Engineering at UK has a very high rate of placement for its materials engineering graduates. Our alumni work in a wide range of materials-related industries, including metals and metals processing; ceramics and electronic materials; biomaterials, implants and medical devices; automotive, aerospace, construction and telecommunications; military and security applications and sports and recreational products.

The University of Kentucky's materials engineering program is accredited by the Engineering Accreditation Commission of ABET, www.abet.org.

Revised July 2017. Information subject to change. For the most up-to-date information on the UK College of Engineering, visit www.engr.uky.edu.