



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 | Hours |
|---|-------|
| MSE 101 Materials Engineering | 1 |
| CHE 105 General College Chemistry I | 3 |
| ENG 104 Writing: An Accelerated Foundational Course | 4 |
| MA 113 Calculus I | 4 |
| CS 221 First Course in Computer Science for Engineers | 2 |
| University Studies* | 3 |

| Second Semester | Hours |
|--|-------|
| CHE 107 General College Chemistry II | 3 |
| CHE 115 General Chemistry Laboratory | 3 |
| MA 114 Calculus II | 4 |
| COM 181 Basic Public Speaking | 3 |
| University Studies* | 3 |

Sophomore Year

| First Semester | Hours |
|---|-------|
| MSE 201 Materials Science | 3 |
| CHE 236 Survey of Organic Chemistry | 3 |
| MA 213 Calculus III | 4 |
| PHY 231 General University Physics | 4 |
| PHY 241 General University Physics Laboratory | 1 |
| MSE 202 Materials Science Laboratory | 1 |

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

Junior Year

| First Semester | Hours |
|---|-------|
| MSE 401G Metal and Alloys | 3 |
| MSE 404G Polymeric Materials | 3 |
| CME 200 Process Principles | 3 |
| EM 302 Mechanics of Deformable Solids | 3 |
| University Studies* | 3 |

Second Semester

| | |
|--|---|
| MSE 403G Ceramic Engineering and Processing | 3 |
| MSE 402G Electronic Materials and Processing | 3 |
| PHY 361 Principles of Modern Physics | 3 |
| STA 381 Introduction to Engineering Statistics | 3 |
| MSE 535 Mechanical Properties of Materials | 3 |
| MSE 407 Materials Laboratory I | 3 |

Senior Year

| First Semester | Hours |
|---|-------|
| MSE 585 Materials Characterization Techniques | 3 |
| MSE 436 Material Failure Analysis | 3 |
| EE 305 Electrical Circuits and Electronics | 3 |
| MSE 408 Materials Laboratory II | 3 |
| Technical Elective*** | 3 |

| | |
|----------------------------------|---|
| ENG 2XX Writing Intensive Course | |
| or | |
| University Studies* | 3 |

Second Semester

| | |
|---------------------------------|---|
| MSE 480 Materials Design | 3 |
| MSE 538 Metals Processing | 3 |
| Technical Elective*** | 3 |
| Supportive Elective** | 3 |
| University Studies* | 3 |
| University Studies* | 3 |

*To be selected from University Studies areas in Social Sciences, Humanities, Cross-Cultural and Electives 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 technical electives below:

| Technical Electives | Hours |
|---|-------|
| Choose 6 credit hours from the following: | |
| MSE 395 Independent Work in Materials Engineering | 3 |
| (Or any other approved technical course) | |
| MSE 531 Powder Metallurgy | 3 |
| MSE 550 Corrosion | 3 |
| MSE 506 Mechanics of Composite Materials | 3 |
| MSE/CME 554 Chemical and Physical Processing | |
| of Polymer Systems | 3 |
| MSE 556 Introduction to Composite Materials | 4 |
| MSE 568 Fiber Optics | 3 |
| MSE 569 Electronic Packaging Systems and | |
| Manufacturing Processes | 3 |