

# **CERAMIC AND MATERIALS ENGINEERING**

## **Bachelor of Science**

The School of Materials Science and Engineering offers undergraduate degrees in Ceramic and Materials Engineering, Polymer and Fiber Chemistry, and Textile Management.

Ceramic and materials engineers design, develop, and participate in the manufacture of both standard and new materials intended for use in a wide variety of industries with diverse applications. These range from the semiconductor to the aerospace and finally to the traditional ceramics industry. The broad scope of industrial responsibilities handled by ceramic and materials engineers requires knowledge in mathematics, science, engineering, and the social sciences, skills in problem solving, engineering analysis, design, and written and oral communication.

The baccalaureate program integrates laboratory with classroom experiences to prepare students for life-long learning. Courses covering thermodynamics, kinetics, mechanical behavior, processing, and characterization of materials prepare students for careers in industry and/or for graduate school.

In addition to the common educational objectives of all engineering programs, baccalaureate degree graduates in Ceramic and Materials Engineering will be able to

- demonstrate learning consistent with Accreditation Board for Engineering and Technology Engineering Criteria 2000 for ceramic and materials engineering programs.
- function easily and well in the laboratory and plant environments and
- serve the local, national, and international ceramic and materials communities

Specifically, the Accreditation Board for Engineering and Technology Engineering Criteria 2000 requires that baccalaureate degree graduates in Ceramic and Materials Engineering be able to

- apply advanced scientific and engineering principles to ceramic and materials engineering systems
- demonstrate an integrated understanding of the scientific and engineering principles underlying structure, properties, processing, and performance relationships
- apply this understanding to the solution of ceramic and materials engineering selection and design problems and
- apply appropriate experimental, statistical, and computational methods to advantage in the solution of ceramic and materials problems.

## **Freshman Year**

### **First Semester**

- 2 - CES 102 Engineering Disciplines and Skills
- 4 - CH 101 General Chemistry
- 3 - ENGL 103 Accelerated Composition
- 4 - MTHSC 106 Calculus of One Variable I
- 3 - Arts and Humanities Requirement1 *or*  
3 - Social Science Requirement1

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### **Second Semester**

- 4 - CH 102 General Chemistry
- 2 - ENGR 130 Engineering Fundamentals
- 4 - MTHSC 108 Calculus of One Variable II
- 3 - PHYS 122 Physics with Calculus I
- 3 - Arts and Humanities Requirement1 *or*  
3 - Social Science Requirement1

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## **Sophomore Year**

### **First Semester**

- 3 - C M E 210 Introduction to Materials Science
- 4 - MTHSC 206 Calculus of Several Variables
- 3 - PHYS 221 Physics with Calculus II
- 6 - Arts and Humanities Requirement1 *or*  
6 - Social Science Requirement1

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### **Second Semester**

- 1 - C M E 241 Metrics Lab.
- 2 - E G 209 Intro. to Engr./Computer Graphics
- 3 - E M 201 Engineering Mechanics: Statics
- 4 - MTHSC 208 Intro. to Ordinary Diff. Equations
- 3 - TEXT 324 Textile Statistics
- 3 - Arts and Humanities Requirement1 *or*  
3 - Social Science Requirement1

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## **Junior Year**

### **First Semester**

- 3 - C M E 319 Materials Processing I
- 3 - C M E 326 Thermodynamics of Materials
- 3 - C M E 327 Transport Phenomena
- 3 - COMM 250 Public Speaking
- 3 - ENGL 314 Technical Writing

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### **Second Semester**

- 3 - C M E 328 Phase Diagrams for Materials Processing and Applications
- 2 - C M E 342 Structure/Property Lab.
- 3 - C M E 361 Process. of Metals and Composites
- 3 - C M E 422 Mechanical Behavior of Materials
- 3 - I E 384 Engineering Economic Analysis
- 3 - PFC 303 Textile Chemistry

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**Senior Year****First Semester**

- 3 - C M E 402 Solid State Materials
  - 3 - C M E 413 Noncrystalline Materials
  - 3 - C M E 432 Manufacturing Processes and Syst.
  - 1 - C M E 441 Manufacturing Lab.
  - 3 - PFC 415 Intro. to Polymer Science and Engr.
  - 3 - Research Requirement<sup>2</sup>
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**Second Semester**

- 3 - C M E 407 Senior Capstone Design
  - 3 - C M E 416 Electronic Properties of Materials
  - 3 - C M E 424 Optical Materials and Applications
  - 3 - C M E 433 Combustion Systems and Environmental Emissions
  - 1 - C M E 445 Practice of Materials Engineering
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125 Total Semester Hours

1 See Policy on Humanities and Social Sciences for Engineering Curricula. Six of these credit hours must also satisfy General Education Cross-Cultural Awareness and Science and Technology in Society Requirements.

2 See advisor.