Materials in Society: The Science of Stuff

Contributing Units: Department of Chemistry and Materials Science and Engineering

OVERVIEW

From alternative energy to quantum computers, the future of technology requires materials innovation and use. The next generation of engaged citizens, businesspeople, innovators, and policy makers will have to consider the impact of materials and technology on communities and cultures.

This minor provides the interdisciplinary knowledge required for students to enter the workforce and guide the future of technological advances from a global and holistic perspective – considering the environment, social equity, and the limitations of material. This is a great way for students to fulfill their Natural Sciences and Quantitative and Computational Thinking requirements.

WHO IS IT FOR?

This minor is for students who interests and career paths can benefit from a broad and interdisciplinary view of the science behind the use of materials in society. This minor is appropriate for all students who have in interest in the basic science that drives the technology and products used in society every day. Basic concepts of materials science and chemistry are covered in the required courses, but at an introductory level and in less depth than in traditional College of Science and Engineering courses. Both focus on discussion of materials of everyday products we use and discard, and the societal effects of 'end of life' of materials. Issues related to ethics, environmental sustainability, economics, social equity, politics and policy, design psychology, history and culture are integrated and highlighted in more depth than in typical STEM courses and curricula.

MINOR STRUCTURE

A collaboration between the Economical and Sustainable Materials Destination Area, the Department of Chemistry, and the Department of Materials Science and Engineering

CORE TWO-COURSE SERIES

> *focused on material choice, creation, and disposal*

- **'Materials in Everyday Life' MSE 1014**: Introductory/foundational experience (hosted by MSE) Introducing students to the basic science behind materials structure, properties and processing; Materials will be discussed based on historical, economic, political, cultural, environmental and ethical considerations
- **'Postconsumer Materials/Class of Trash' CHEM 3054**: Mid-level experience (hosted by CHEM) Introducing students to 'end of life' concepts; Students will gain appreciation for factors driving the use and end-of-life options for common materials

ELECTIVE COURSE SERIES

> *three interdisciplinary components connecting material choices to the areas below*

- **Social Equity** (Choose 1)
  PHIL 1304, Morality and Justice; STS 2454, Science Technology and the Environment; STS 3334, Energy and Society; STS 3284, Technology and Disability; ENGL 2564, Writing and Social Justice
- **Policy** (Choose 1)
  STS 2444, Global Science and Technology Policy; SPIA 2554, Collaborative Policy Making and Planning; SPIA 4464, Data and the Art of Policy Making and Planning; FREC 4174, Climate Change and International Policy; FREC 4464, Water Resources Policy and Economics
- **Scientific Advances** (Choose 1)
  MINE 2114, Energy and Raw Materials; CHEM 1015/1016, Chemistry in Context; GEOS 1024, Earth Resources, Society and the Environment; ENSC 1015, Foundations of Environmental Science; ENSC 1016, Foundations of Environmental Science; GEOS 1004, Introduction to Earth Science

CAPSTONE COURSE

> *integrating concepts to address current topics in materials and society*

'Capstone in Materials in Society'. CHEM 4054: The objective for this course is for students to solve one large open-ended problem in interdisciplinary teams to apply previously learned concepts in materials science, social equity, and policy.

At the conclusion of the capstone experience, students will be able to analyze the reciprocal impact of science and society, evaluate the credibility and the use/misuse of scientific information, discuss contemporary ethical dimensions of materials mining, manufacturing, use and disposal, collaborate to develop proposals in an interdisciplinary team setting, and defend proposals and supporting methodology in reports and presentations.

CORE + INTEGRATIVE CONCEPTS

Concept 1a
> Climate Change and International Policy

Concept 2
> Critical Thinking in the Humanities

Concept 3
> Reasoning in the Social Sciences

Concept 4
> Resoning in the Natural Sciences

Concept 5a
> Advanced/Applied Quantitative and Computational Thinking

Concept 6d
> Technology and Disability

Concept 7
> Critical Analysis of Equity and Identity in the United States

Integrative Concepts
> Ethical Reasoning
> Intercultural and Global Awareness

REQUIRED COURSES

CORE
Materials in Everyday Life · MSE 1014
↓
Postconsumer Materials · CHEM 3054

ELECTIVE
1 Social Equity Course
1 Policy Course
1 Scientific Advances Course

CAPSTONE
Capstone in Materials in Society
CHEM 4054

CONTACT

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