



THE OHIO STATE UNIVERSITY
COLLEGE OF ENGINEERING

Essentials of Materials Science for High School Educators

MATSCEN 6700

Credit Hours:

2.00 - 2.00

Course Levels:

Graduate (5000-8000 level)

Course Components:

Lecture

Course Description:

Provides academic background and quantitative examples to the demonstrations in the ASM Materials Foundation Materials Camps for Teachers. This requires the students in this class to deploy related content in their high school classroom settings.

Prerequisites and Co-requisites:

Prereq: Graduate Non-Degree status, or permission of instructor.

Course Goals / Objectives:

- To provide a basic yet fundamental understanding of the physical phenomena governing the development of structure and properties in engineering materials including metals, polymers, ceramics, glasses and composites.
 - Content included is intended to extend material covered in the ASM Materials camp and to provide a foundation for high school instructors aspiring to teach a course in materials science.
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Course Topics:

- Materials and Society – importance of materials to civilization.
 - Materials based on bonding, structure and length scales
 - Fundamentals of Metals: process-structure-properties
 - Phase Diagrams and Application
 - Fundamentals of Polymers: process-structure-properties
 - Fundamentals of Ceramics and glasses: process-structure-properties
 - Fundamentals of Composites: process-structure-properties
 - Scientific foundation: Thermodynamics, Kinetics, Enthalpy and Entropy
 - Manufacturing and materials – turning materials into products.
 - Sustainability, recyclability and environmental impact of materials.
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Designation:

Elective