THE OHIO STATE UNIVERSITY
COLLEGE OF ENGINEERING

Advanced Metallic Materials and Processing

MATSCEN 6757

Credit Hours:
2.00 - 2.00

Course Levels:
Graduate (5000-8000 level)

Course Components:
Lecture

Course Description:
A graduate class in design, processing and simulation of advanced metallic materials including alloys (ferrous and non-ferrous) and metal matrix composites.

Prerequisites and Co-requisites:
Prereq: Grad standing in AeroEng, ISE, MatScEn, MechEng, NuclrEn, or WeldEng; or permission of instructor.

Course Goals / Objectives:
- To teach design methods for advanced metallic materials including ferrous and non-ferrous alloys, emerging functional alloys and metal matrix composites.
- To teach advanced processing technologies for metallic materials including solidification-based, thermomechanical and powder-based processes.
- To teach Integrated Computational Materials Engineering (ICME) methodology for metallic materials, processing and case studies.

Course Topics:

- Advanced ferrous alloys (including advanced high strength steels)
- Advanced non-ferrous alloys (including light alloys and super alloys)
- Emerging and functional alloys (including bio-metals and high-entropy alloys)
- Metal matrix composites
- Solidification science and solidification-based processes
- Deformation mechanisms and thermomechanical processes
- Advanced processes (including multi-material and additive manufacturing)
- Thermodynamic and kinetic modeling and experimental techniques
- Solidification modeling and experimental techniques
- Deformation modeling and experimental techniques
- Microstructure modeling and validation
- ICME case studies

Designation:

Elective
Required