MATSCEN 7850 (Approved): Structural Transformations

Course Description

Structural transformations in materials with emphasis on basic phenomena. Selected topics will be developed based on classical approaches and recent advances.

Prior Course Number: 850
Transcript Abbreviation: Struc Transform
Grading Plan: Letter Grade
Course Deliveries: Classroom
Course Levels: Graduate
Student Ranks: Masters, Doctoral
Course Offerings: Autumn, Spring
Flex Scheduled Course: Never
Course Frequency: Every Year
Course Length: 14 Week
Credits: 2.0
Repeatable: No
Time Distribution: 2.0 hr Lec
Expected out-of-class hours per week: 4.0
Graded Component: Lecture
Credit by Examination: No
Admission Condition: No
Off Campus: Never
Campus Locations: Columbus
Prerequisites and Co-requisites: MATSCEN-6730, MATSCEN-6737.
Exclusions: Not open to students with credit for MATSCEN-850
Cross-Listings:

Course Rationale: Existing course.

The course is required for this unit's degrees, majors, and/or minors: No
The course is a GEC: No
The course is an elective (for this or other units) or is a service course for other units: Yes

Subject/CIP Code: 14.1801
Subsidy Level: Doctoral Course

Programs

Abbreviation	Description
MATSCEN	Materials Science and Engineering

Course Topics

Topic	Lec	Rec	Lab	Cli	IS	Sem	FE	Wor
Introduction and classification of phase transformations								
Phase stability								
Order-disorder transformations								
Spinodal decomposition and continuous ordering								

Topic	Lec	Rec	Lab	Cli	IS	Sem	FE	Wor
Precipitation from solid solutions (nucleation, growth and coarsening)								
Coherency elastic strain and coherency transformations								
Martensitic transformations and dislocation dynamics								
Massive transformations, recrystallization and grain growth								
Computational thermodynamics and kinetics of phase transformations								

Grades

Aspect	Percent
Assignment	50%
Exam	50%

ABET-EAC Criterion 3 Outcomes

Course Contribution		College Outcome
	a	An ability to apply knowledge of mathematics, science, and engineering.
	b	An ability to design and conduct experiments, as well as to analyze and interpret data.
	c	An ability to design a system, component, or process to meet desired needs.
	d	An ability to function on multi-disciplinary teams.
	e	An ability to identify, formulate, and solve engineering problems.
	f	An understanding of professional and ethical responsibility.
	g	An ability to communicate effectively.
	h	The broad education necessary to understand the impact of engineering solutions in a global and societal context.
	i	A recognition of the need for, and an ability to engage in life-long learning.
	j	A knowledge of contemporary issues.
	k	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Prepared by: Mark Cooper