

MATSCEN 5571.72 (Approved): Electroceramics II: Dielectric, Magnetic, and Optical Ceramics

Course Description

Dielectric, Magnetic, and Optical Ceramics and their applications in devices. Emphasis on the processing-microstructure-property correlation.

Prior Course Number: MSE614

Transcript Abbreviation: Electroceramics II

Grading Plan: Letter Grade

Course Deliveries: Classroom, 100% at a distance, Greater or equal to 50% at a distance, Less than 50% at a distance

Course Levels: Undergrad, Graduate

Student Ranks: Junior, Senior, Masters, Doctoral

Course Offerings: Autumn, Spring

Flex Scheduled Course: Never

Course Frequency: Every Year

Course Length: 7 Week

Credits: 1.5

Repeatable: No

Time Distribution: 3.0 hr Lec

Expected out-of-class hours per week: 6.0

Graded Component: Lecture

Credit by Examination: No

Admission Condition: No

Off Campus: Never

Campus Locations: Columbus

Prerequisites and Co-requisites: MATSCEN 3271 or permission of instructor.

Exclusions: Not open to students with credit for MSE 614 or MATSCEN 5571

Cross-Listings:

Course Rationale: Splitting existing 14 week course, MATSCEN 5571, into two 7 week offerings to permit focus on sub-areas within electronic materials.

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: 14.3101

Subsidy Level: Baccalaureate Course

Programs

Abbreviation	Description
MATSCEN	Materials Science and Engineering

General Information

MATSCEN 5571.71 is not a prerequisite to enroll in 5571.72. This course deals with electronic ceramics and is built on the fundamentals learned in MATSCEN 3271.

Course Goals

Students will learn basics of dielectric, optical and magnetic properties of ceramic materials
Students will learn how processing affect crystal structure, microstructure and properties of functional ceramics.
Students will learn how point defects influence properties of functional ceramics.

Course Topics

Topic	Lec	Rec	Lab	Cli	IS	Sem	FE	Wor
Basics of dielectrics	2.0							
Dielectric materials; ferro-, piezo and pyro-electrics	4.0							
Basics of magnetics	2.0							
Magnetic ceramics: ferro- and ferri-magnetics	4.0							
Optical properties and materials	5.0							
Electro-optics, magneto-optics	4.0							

Representative Assignments

Homework problems will be assigned based on lecture content.
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Grades

Aspect	Percent
Mini-quizzes and quizzes	50%
Final	50%

Representative Textbooks and Other Course Materials

Title	Author
<i>Electroceramics</i>	Moulson and Herbert

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.

Course Contribution		College Outcome
**	k	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

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