

# MATSCEN 5531 (Approved): Ceramics Processing Laboratory

## Course Description

Laboratory experiments involving synthesis/fabrication and characterization of high performance technical ceramics.

**Prior Course Number:** MSE619

**Transcript Abbreviation:** Ceram Proc Lab

**Grading Plan:** Letter Grade

**Course Deliveries:** Classroom

**Course Levels:** Undergrad, Graduate

**Student Ranks:** Senior, Masters, Doctoral, Professional

**Course Offerings:** Autumn

**Flex Scheduled Course:** Never

**Course Frequency:** Every Year

**Course Length:** 14 Week

**Credits:** 1.0

**Repeatable:** No

**Time Distribution:** 3.0 hr Lab

**Expected out-of-class hours per week:** 0.0

**Graded Component:** Laboratory

**Credit by Examination:** No

**Admission Condition:** No

**Off Campus:** Never

**Campus Locations:** Columbus

**Prerequisites and Co-requisites:** Senior standing or permission of instructor.

**Exclusions:**

**Cross-Listings:**

**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:** Baccalaureate Course

## Programs

Abbreviation	Description
MATSCEN	Materials Science and Engineering

## Course Goals

Students will learn how to synthesize ceramic materials in powder, bulk and film form.
Students will learn how to synthesize ceramics by wetchemical, solid-state and vapor-phase assisted methods.
Students will learn how to characterize crystal phase and structure, microstructure and properties of ceramics.

## Course Topics

Topic	Lec	Rec	Lab	Cli	IS	Sem	FE	Wor
Experiment #1: Synthesis and characterization of ceramic particles by wet-chemical synthesis including studies of colloidal stability and sorption experiments.			6.0					
Experiment #2: Fabrication and characterization of bulk ceramics by pressing and sintering, molding and extrusion, tape-casting, quenching and glass formation.			6.0					
Experiment #3: Synthesis and characterization of nano-structured ceramics by such processes as anodization, VS, VLS, MOM and gas-solid reaction.			6.0					

## Representative Assignments

Each laboratory experiment will lead to the submission of a technical report.

## Grades

Aspect	Percent
Three laboratory reports	75%
Final	25%

## Representative Textbooks and Other Course Materials

Title	Author
<i>Principles of Ceramic Processing</i>	J. S. Reed

## 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.

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