

# MATSCEN 5551 (Approved): Ceramic Processing

## Course Description

This course provides an overview of ceramics processing, including essential topics of: powder synthesis/characterization, colloidal/sol-gel processing, shaping/consolidation, sintering, microstructure development and nanoceramics, thin films/coating

**Prior Course Number:** MSE615

**Transcript Abbreviation:** Ceramic Processing

**Grading Plan:** Letter Grade

**Course Deliveries:** Classroom

**Course Levels:** Undergrad, Graduate

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

**Course Offerings:** Autumn

**Flex Scheduled Course:** Never

**Course Frequency:** Every Year

**Course Length:** 14 Week

**Credits:** 3.0

**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:** MSE3141, MSE3151, 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

Choose and apply appropriate powder characterization and synthesis methods.
Choose and apply appropriate colloidal and sol-gel processing methods.
Choose and apply appropriate powder consolidation and shaping methods.
Choose and apply appropriate sintering methods.
Design appropriate methods for microstructural and nanoceramics development

## Course Topics

Topic	Lec	Rec	Lab	Cli	IS	Sem	FE	Wor
Introduction and overview	3.0							
Powder synthesis and characterization	9.0							
Colloidal and sol-gel processing	6.0							
Mixing and packing of powders	3.0							
Forming, shaping and pre-sintering processing	6.0							
Solid state and liquid-state sintering	6.0							
Microstructural development and nanoceramics	4.5							
Other methods (thin films, coatings, glass-ceramics)	4.5							

## Representative Assignments

Weekly homework
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## Grades

Aspect	Percent
Homework	20%
Midterm	30%
Comprehensive final	50%

## Representative Textbooks and Other Course Materials

Title	Author
<i>Ceramic Processing</i>	M.N. Rahaman

## 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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