



**THE OHIO STATE UNIVERSITY**  
COLLEGE OF ENGINEERING

# Electroceramics

## MATSCEN 5571

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**Credit Hours:**

3.00

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**Course Levels:**

Undergraduate (1000-5000 level)

Graduate (5000-8000 level)

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**Course Components:**

Lecture

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**Course Description:**

Functional ceramics covering electrical, magnetic and optical properties of oxides. Emphasis is on the processing-microstructure-property correlation.

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**Prerequisites and Co-requisites:**

Prereq: 3271, or permission of instructor.

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**Course Goals / Objectives:**

- Learn basics of electrical, optical and magnetic properties of ceramic materials
- Learn how processing affect crystal structure, microstructure and properties of functional ceramics
- Learn how point defects influence properties of functional ceramics
- Learn non-lithographic processing routes to create ceramic nano-structures and their potential applications

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**Course Topics:**

- Review of band theory and electrical conductivity
  - Resistors, varistors and thermistors
  - Dielectrics, ferro- and piezo-electrics
  - Magnetic ceramics, ferro- and ferri-magnetics
  - Optical properties, optical waveguides and fiber-optics
  - Electro-optics, magneto-optics
  - Nano-structured oxides and their applications
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**Designation:**

Elective