



**THE OHIO STATE UNIVERSITY**  
COLLEGE OF ENGINEERING

# Principles of the Characterization of Materials

## MATSCEN 6715

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**Credit Hours:**

2.00 - 2.00

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**Course Levels:**

Graduate (5000-8000 level)

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**Course Components:**

Lecture

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**Course Description:**

Fundamentals of beam-solid interactions and their application to the characterizing the structure and composition of materials. The emphasis of this course will be on techniques utilizing X-ray and electron probes.

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**Prerequisites and Co-requisites:**

Prereq: Grad standing in MatScEn or WeldEng, or permission of instructor.

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**Course Goals / Objectives:**

- Techniques utilizing X-ray and electron probes

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**Course Topics:**

- Introduction to X-Ray Diffraction - Generation of X-Rays - Basic Diffraction Theory - Powder Diffractometry
  - Introduction to Transmission Electron Microscopy - Electron interaction with matter - Electron diffraction - Imaging modes and defect analysis
  - Introduction to Scanning Electron Microscopy - Electron generation - Detectors and Imaging modes - Crystallographic analysis with Orientation Microscopy
  - Spectroscopy Using Electron Probes
  - Spectroscopy Using Photon Probes
  - Spectroscopy Using Ion Probes
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**Designation:**

Elective

Required