



**THE OHIO STATE UNIVERSITY**  
COLLEGE OF ENGINEERING

# Structure and Defects in Materials

## MATSCEN 6747

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**Credit Hours:**

3.00 - 3.00

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**Course Levels:**

Graduate (5000-8000 level)

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**Course Components:**

Lecture

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**Course Description:**

Elements of crystallography, structure and defects in solids.

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**Prerequisites and Co-requisites:**

Prereq: Grad standing in Chem, Engr, or Physics; or permission of instructor.

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**Course Goals / Objectives:**

- Introduce students to the basics of crystallography and structural imperfections in crystalline and non-crystalline materials

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**Course Topics:**

- Introduction to lattice geometry, unit cells, planes and directions, Miller indices, zones and the zone rule, and symmetry elements.
  - Crystal systems, space lattices (Bravais lattices), the stereographic projection and point groups.
  - Stereographic projection and point groups (continued), crystal systems.
  - Crystal systems (continued), Laue groups, space groups, crystal structures.
  - Tensors, and their relation to crystal structures - Neumann's Principle.
  - Stress, strain, and elasticity. Glide and dislocations.
  - Dislocations in crystals, point defects.
  - Interfaces in materials.
  - Interfaces in materials - topological theory of interfacial defects.
  - Mid-term and final examinations.
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**Designation:**

Elective

Required