

NUCL 420
Radiation Interaction with Materials and Applications
Fall 2020

CRN: 69254

Course Credits: 3

Location: MWF 9:30-10:20am Grissom Hall 102

Instructor: Prof. T. Sizyuk POTR 376A 49-44262
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Office Hours: Thursday, 3:00-4:30 pm (online)
Other days or times are available for the consultation by email.

ONLINE COURSE INFO: **Brightspace.** <https://purdue.brightspace.com/>

Course Description: The course covers the fundamentals of radiation interaction with materials and applications. The course introduces students to the types of radiation and radiation sources, physical mechanisms of ion interaction with solids, radiation damage, ion beam mixing, applications in nuclear fission and fusion reactors and materials modification and synthesis by ion beams.

Textbook: *Ion-Solid Interactions: Fundamentals and Applications*, M. Nastasi, J. W. Mayer and J. K. Hirvonen.

Learning Outcomes. By the end of the course, students will be able to:

1. identify, formulate and solve complex engineering problems by applying fundamental principles of radiation/material interactions;
2. apply modeling techniques to predict radiation damage in bulk, on surfaces and at interfaces;
3. outline the concepts of radiation damage in both fission and fusion reactors;
4. outline technological applications of ion interactions with materials.

Pre-requisite: NUCL 320

Classification: Required