

NUCLEAR ENGINEERING MATERIALS, CERTIFICATE

The goal of this certificate is to combine a comprehensive set of course curricula that will provide students with an understanding of the challenges and remedial measures associated with materials in nuclear energy systems. It includes courses in radiation damage, nuclear fuel performance, corrosion, and joining/welding. A laboratory course will provide hands-on experimental analysis in the areas of corrosion, welding, radiation damage, and non-destructive evaluation.

Students learn the challenges and remedial measures associated with materials in nuclear energy system and conduct experimental analysis in corrosion, welding, radiation damage, and nondestructive evaluation.

REQUIREMENTS

Code	Title	Credits
Required courses (10 credits)		
N E/M S & E 423	Nuclear Engineering Materials ¹	3
N E 424	Nuclear Materials Laboratory	1
N E 541	Radiation Damage in Metals ¹	3
M S & E/M E 435	Joining of Materials: Structural, Electronic, Bio and Nano Materials	3
or M S & E/ M E 462	Welding Metallurgy	
Elective courses (minimum 6 cr.)		
CIV ENGR 445	Steel Structures I	3
CIV ENGR 447	Concrete Structures I	3
M S & E 330	Thermodynamics of Materials	4
M S & E 352	Materials Science-Transformation of Solids	3
M S & E/N E 433	Principles of Corrosion	3
M S & E 463	Materials for Elevated Temperature Service	3
M S & E 560	Fundamentals of Atomistic Modeling	3
M S & E 570	Properties of Solid Surfaces	3

¹ Because M S & E 350 Introduction to Materials Science or M S & E 351 Materials Science-Structure and Property Relations in Solids are prerequisites for N E/M S & E 423 Nuclear Engineering Materials and N E 541 Radiation Damage in Metals, students are expected to take one of the two of these courses as prerequisites for the certificate.

LEARNING OUTCOMES

1. Identify the challenges and remedial measures associated with materials in nuclear energy systems by integrating the contents within each class into a complete understanding.
2. Describe and apply basic radiation damage, nuclear fuel performance, corrosion, and joining/welding concepts.
3. Design and conduct basic hands-on experiments in the areas of nuclear materials characterization.
4. Discuss scientifically and confidently about nuclear materials degradation issues with experts.

CERTIFICATE COMPLETION REQUIREMENT

This undergraduate certificate must be completed concurrently with the student's undergraduate degree. Students cannot delay degree completion to complete the certificate.