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.

HOW TO GET IN

Students must complete the Certificate Declaration Form (https://engineering.wisc.edu/programs/certificates/nuclear-engineering-materials/declaration/). Contact Professor Adrien Couet, Department of Nuclear Engineering & Engineering Physics, 921 Engineering Research Building, for further information.

REQUIREMENTS

Code	Title	Credits
Required courses (4 credits - must be taken for a letter grade)		
N E/M S & E 423	Nuclear Engineering Materials [1]	3
N E 424	Nuclear Materials Laboratory	1
Elective courses (minimum 12 credits - must be taken for a letter grade)		
CIV ENGR 445	Steel Structures I	3
CIV ENGR 447	Concrete Structures I	3
E M A 303	Mechanics of Materials	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 460	Introduction to Computational Materials Science and Engineering	3
M S & E/M E 462	Welding Metallurgy	3
M S & E 463	Materials for Elevated Temperature Service	3
M S & E 570	Properties of Solid Surfaces	3
N E 541	Radiation Damage in Metals	3
N E 545	Materials Degradation in Advanced Nuclear Reactor Environments	3

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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, students are expected to take one of the two of these courses as prerequisites for the certificate.

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.

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.