



Course Outcome Summary

Required Program Core Course

MATL 121 Nuclear Plant Materials

Course Information

Division	ASET
Contact Hours	60
Theory	30
Lab Hours	30
Total Credits	3

Prerequisites: MATH 090 or qualifying score on accepted placement tests.

Course Description

This is an introductory course on materials for nuclear power plants. The major topics include the atomic structures, phase diagrams, types and classification of alloys, mechanical properties with emphasis on the brittle fracture, effect of environment on the degradation of properties and how to evaluate the safe working stresses. Plant material problems and selection of appropriate materials for various components will also be discussed. Laboratory experience will be gained in mechanical testing, microscopy, corrosion testing.

This course is a required core course for students pursuing an AAS in Nuclear Engineering Technology

Program Outcomes Addressed by this Course:

Upon successful completion of this course, students should be able to meet the program outcomes listed below:

Describe and apply the culture of safety, continuous improvement, and peer checking

- A. Identify typical power plant components and explain their function**
- B. Describe different sources of radiation, their effects on organic matter, methods of detection, and shielding**
- C. Recognize the assumptions made and limits of analysis to the application of technology, including social and ethical implications**



Course Outcomes

In order to evidence success in this course, the students will be able to:

1. Apply knowledge of atomic structure, isotopes, radioactivity and physics of nuclear fission.
Applies to Program Outcome
 - B. Describe different sources of radiation, their effects on organic matter, methods of detection, and shielding.
2. Recognize the mechanisms of hydrogen embrittlement.
Applies to Program Outcome
 - B. Describe different sources of radiation, their effects on organic matter, methods of detection, and shielding.
3. Understand and apply the rules of material compatibility to nuclear power plant environment and its effect on materials used in the industry.
Applies to Program Outcome
 - B. Describe different sources of radiation, their effects on organic matter, methods of detection, and shielding.
 - C. Recognize the assumptions made and limits of analysis to the application of technology, including social and ethical implications.
4. Apply knowledge of plant materials (fuels, cladding, shielding) for their selection and use.
Applies to Program Outcome
 - A. Identify typical power plant components and explain their function.
 - B. Describe different sources of radiation, their effects on organic matter, methods of detection, and shielding.
5. Demonstrate an understanding of how to overcome challenges using certain materials in the nuclear industry.
Applies to Program Outcome
 - A. Identify typical power plant components and explain their function.
 - B. Describe different sources of radiation, their effects on organic matter, methods of detection, and shielding.
 - C. Recognize the assumptions made and limits of analysis to the application of technology, including social and ethical implications

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