NUC K260 Nuclear Materials Science

☒ Required ☐ Elective

Catalog Description: This course will acquaint the student with constitution, properties and characteristics of engineering materials and provide a foundation for stress analysis on structures in equilibrium with emphasis on applications to nuclear power, including effects of material irradiation.

Prerequisites: MAT K254, NUC K100, NUC K110/111, NUC K117, NUC K118

Textbook(s) or other materials: Mechanics of Materials, Beers and Johnson, 3rd Edition

Course learning outcomes/Expected performance criteria:

- Develop a working understanding of physical metallurgy skills in metallographic techniques.
- Study forces on structures in equilibrium, primarily two dimensional structures.
- Develop concepts of centroids, center of gravity and moment of inertia.
- Develop understanding of mechanics of materials including: stress-strain, torsion, bending, buckling, fatigue, creep, pressure, vessel strength, and weld strength.
- Understand the basis for selection of typical nuclear power plant materials.
- Understand the effects of material irradiation on nuclear materials.

Topics covered:

COURSE TOPICS/CONTENT

		HOURS
1.	Structural Imperfections and Atom Movement	4
2.	Metallic Phases and their Properties	4
3.	Modification of Properties	4
4.	Statics of Rigid Bodies in Two Dimensions	3
5.	Centroids and Centers of Gravity	3
6.	Moments of Inertia	3
7.	Mechanics of Materials	3
8.	Basis for Selection of Typical Nuclear Power Plant Materials	3
9.	Effects of Material Irradiation	3
TOTAL HOURS		30

Class/Lab schedule: 2 lecture sessions per week

Relationship of course to Criterion 5 and Program Outcomes:

Prepared by: James R. Sherrard Date: