NRE 2110 Introduction to Nuclear and Radiological Engineering (Required)

Catalog Description: NRE 2110 Introduction to Nuclear and Radiological Engineering (2-0-2)
Prerequisites: None
Introduction to nuclear and radiological engineering; nuclear energy production and radiation technologies; their role and importance to society; their environmental impact.

Textbook: Nuclear Energy: An Introduction to the Concepts, Systems, and Application of Nuclear Processes, R. L. Murray, Butterworth-Heinemann, 2001.

Topics Covered:

1. World energy consumption - present and projected
2. World energy resources
3. Environmental impact of different energy sources
4. History of nuclear science and applications
5. Description of nuclear reactors
6. Reactor physics terminology
7. Interaction of radiation with matter
8. Safety of nuclear reactors
9. World nuclear power industry
10. Radioactive waste
11. Radiation types, sources, and detection
12. Applications of radiation in industry and medicine
13. Biological effects of radiation
14. Nuclear fusion
15. Advanced nuclear reactors
16. Nuclear Facility Regulation

Course Outcomes:

Outcome 1: To provide a comprehensive introduction to the field of nuclear engineering and its important role in society

- 1.1 The students will demonstrate an introductory knowledge of present and potential nuclear power systems.
- 1.2 The students will demonstrate an introductory knowledge of nuclear technology for medical, research and industrial applications.

Outcome 2: To develop skills for effective oral and written communication with audiences of varying background within the context of nuclear engineering.

- 2.1 The students will demonstrate an ability to efficiently and effectively document and summarize, in writing, knowledge of topics within nuclear and radiological engineering using appropriate disciplinary language.
- 2.2 The students will demonstrate an ability to effectively present introductory material about nuclear and radiological engineering in a clear and engaging oral presentation.

Outcome 3: To develop critical skills for professional practice in nuclear and radiological engineering.

- 3.1 The students will demonstrate effective practices for working in teams.
- 3.2 The students will demonstrate an ability to frame engineering problems and choose appropriate models to address those problems.
- 3.3 The students will demonstrate the ability to effectively utilize reflective practice and self-assessment as required for lifelong learning.

Outcome 4: To develop a perspective about the importance of social issues relating to nuclear and radiological engineering.

- 4.1 The students will demonstrate the ability to engage with the public and collect meaningful data about perceptions relating to contemporary issues in nuclear and radiological engineering.
- 4.2 The students will demonstrate an ability to reflect on the importance of how societal views impact nuclear and radiological engineering processes and applications.

Correlation between Course Outcomes and Program Educational Outcomes:

NRE 2110 Introduction to Nuclear and Radiological Engineering	Outcome a			Outcome b	Outcome c	Outcome d	Outcome e	Outcome f	Outcome g	Outcome h	Outcome i	Outcome j	Outcome k
Course Outcomes	i	ii	iii										
Course Outcome 1.1		x	x							x			
Course Outcome 1.2		x								x			
Course Outcome 2.1									x				
Course Outcome 2.2									x				
Course Outcome 3.1						x							
Course Outcome 3.2							x						
Course Outcome 3.3											x		
Course Outcome 4.1								x	x	x		x	
Course Outcome 4.2										x		x	

Prepared by: Tris Utschig
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