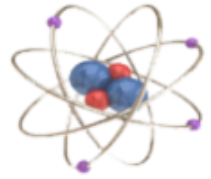


NUCLEAR POWER - THE CORE

NU-100



Instructor



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Course Description

This course will familiarize present and prospective nuclear professionals with the principals involved in the generation of nuclear power. The course will begin with a fundamental treatment of atoms as a whole and move on to address how Uranium atoms are used to generate nuclear energy. Upon completion of this course the learner will understand the fundamental concepts behind nuclear fission and reactor kinetics and how those concepts work to produce thermal energy in a nuclear reactor.

Course Goals

The following are the goals NU 100: Nuclear Power – The Core

1. Understand the Bohr model and standard notation of an atom and be able to determine the number of protons, neutrons and electrons from the Periodic Table of Elements and from the standard notation of the element's isotopes.
2. Understand the structure of the atom and the forces which are present within the nucleus of the atom. They will be able to explain how these forces react to produce energy within the nuclear core.
3. Know the four specific types of radiation produced in the core and how this radiation is produced. They will be able to explain the radioactive decay of elements and identify, using a Chart of Nuclides, how each element decays.
4. Explain the life cycle of the neutron and the effects of a moderator on neutrons. Additionally, they will know the difference between prompt and delayed neutrons.

Course Location and Login Information

This is an online course delivered in Moodle. To access the course, simply log in as a guest and use the password "nuclear." After logging in look for a link to Nuclear Training.net

Course Materials

Required Textbooks

There are no required textbooks.

Required Hardware & Software

A computer capable of displaying You Tube videos and a copy of Adobe Acrobat Reader are required. It goes without saying that internet access is also required.

Assignment Policy and Grading Scale

Assignment Information

The course consists of five modules. Assignments will be posted in Moodle. As this is a self-paced course, there are no hard and fast due dates, however, it is recommended that each module take no more than two weeks. Participant information will be reset after 15 weeks from the start of the course.

Assignment Description	Points
Favorite Physicist Article	5 Point Bonus
Introduction to Class	2.5 Points
Module 2 Quiz	20 Points
Module 2 Discussion Assignment	2.5 Points
Table of Nuclides Decoding Exercise	10 Points
Module 3 Discussion Assignment	2.5 Points
Module 4 Quiz	20 Points
Module 4 Discussion	2.5 Points
Neutron Life Cycle Map and Discussion	10 Points
Final Exam	30 Points
Total Points	100 Points

Grading

Final Grades are based on the following

Total Points	Grade	Total Points	Grade
94 to 100	A	77 to 79	C+
90 to 93	A-	74 to 76	C
87 to 89	B+	70 to 73	C-
84 to 86	B	60 to 69	D
80 to 84	B-	<59	F

Course Schedule

Module Number	To Do Activities
Introduction	View the Introduction Video
	If desired, complete Greatest Physicist Assignment
Module 1	View the Module 1 Video
	Read the Module 1 Material
	Take the "Which Superhero are You?" Quiz
	Participate in the Class Introductions Forum
Module 2	View the Module 2 Video
	Read the Module 2 Material
	Take the Module 2 Quiz
	Participate in the Most Important Element Forum
Module 3	View the Module 3 Video
	Read the Module 3 Material
	Decode the Table of Nuclides Message
	Participate in the Future of Nuclear Power Forum
Module 4	View the Module 4 Video
	Read the Module 4 Material
	Take the Module 4 Quiz
	Participate in the World Energy Policy Forum
Module 5	View the Module 5 Video
	Read the Module 5 Material
	Create and Share your Neutron Road Map
Final	Final Exam

Class Rubrics

Class Discussion Rubric

Points	2.0-2.5	1.0-2.0	0.5-1.0	0.0
Quality of Response	Thoughtful, well-presented comments. Less than two grammatical or spelling errors.	Appropriate comments. Between 2 and 4 grammatical or spelling errors.	Comments with minimal effort >5 grammatical or spelling errors.	No Response
Relevance of Response	Comments address the topic. Opinions about the topic are justified.	Comments are related to the topic at hand	Comments do not directly relate to topic discussion.	No Response
Contribution to the Learning Environment	Writes thoughtful responses which enhance group discussion	Provides minimal feedback to classmates	Barely responds to class responses	Does not respond to classmates

Decode the Table of Nuclides Rubric

Points	10 to 9	7 to 8	5 to 7	0.0
Quality of Response	No more than one mistake made within the decay chain. All work shown	2 to 4 errors made within the decay chain. All work shown	Greater than 4 errors made in the decay chain. All work shown.	No Response / No work shown

Neutron Road Map Rubric

Points	10 to 9	7 to 8	5 to 7	0.0
Six Factor Formula	None of the six factors omitted. All titles and symbols are correct.	No more than four mistakes on factors, symbols or titles.	Greater than four mistakes on factors, symbols or titles.	No Response
Neutron State Throughout the Formula	All neutron descriptions are accurate.	No more than two errors made with neutron descriptions.	Greater than two errors made with neutron descriptions.	No Response