Jordan University of Science and Technology

Faculty of Engineering

Nuclear Engineering Department

NE203 Fundamentals Of Nuclear Science
First Semester 2019-2020

Course Catalog
3 Credit Hours. Atomic and nuclear physics, atomic models, relativity, dual properties of matter, quantum numbers and mechanics, atomic and nuclear structure, hydrogen atom and many-electrons atoms, nuclear transformations (alpha, beta and gamma decay), and chart of nuclides, nuclear structure and nuclear models. Other topics related to nuclear sciences and technology

Text Book	
Title	Nuclear Principles in Engineering
Author(s)	T. Jevremovic
Edition	2nd Edition
Short Name	Ref #1
Other Information	

Course References

Short name	Book name	Author(s)	Edition	Other Information
Ref #2	Introduction to Nuclear Engineering	John R. Lamarsh, Anthony J. Baratta	3rd Edition	

Instructor	
Name	**Prof. Ziad Kodah**
Office Location	M5L2

Office Hours	Sun : 10:30 - 11:30 Sun : 12:30 - 13:30 Tue : 10:00 - 11:30 Tue : 12:30 - 13:30 Wed : 15:30 - 16:00 Thu : 10:30 - 11:30 Thu : 12:30 - 13:30
Email	kodah@just.edu.jo

Class Schedule & Room
Section 1: Lecture Time: Sun, Tue, Thu : 13:30 - 14:30 Room: E2117

Prerequisites		
Line Number	**Course Name**	**Prerequisite Type**
921020	PHY102 General Physics (2)	Prerequisite / Pass

Tentative List of Topics Covered		
Weeks	**Topic**	**References**
Weeks 1, 2, 3, 4	Atomic Theory	**Ch 2** From **Ref #1**
Weeks 5, 6, 7, 8	Nuclear Theory	**Ch 3** From **Ref #1**, **Ch 2** From **Ref #2**
Week 9	Nuclear Models	**Ch 3** From **Ref #1**, **Ch 2** From **Ref #2**
Weeks 10, 11	Wave-Particle Duality and Uncertainty Principle	**Ch 4** From **Ref #1**
Weeks 12, 13, 14, 15	Mechanism & Kinetics of Radioactive Decay	**Ch 5** From **Ref #1**

Mapping of Course Outcomes to Program Student Outcomes	Course Outcome Weight (Out of 100%)	Assessment method
Describe atomic models evolution with more focus on the quantum atomic model including the quantum leap, absorption & emission atomic spectra, ionization & excitation, quantum numbers and Pauli exclusion principle, and atomic radius.	30%	First exam, Second Exam, Final Exam
Demonstrate a good understanding of nuclear models and structure (size, shape, and density) and relate the mass & energy equivalence with nuclear stability, and binding energy.	28%	First exam, Second Exam, Final Exam

Recognize Planck's theory of quanta, the particle-wave property of matter, and uncertainty principle by solving simple problems.	12%	First exam, Second Exam, Final Exam
Understand radioactive decay, including mechanism, decay constant & half live, activity, radioactive decay equilibrium, and mechanisms & kinetics of alpha, beta, and gamma decay in addition to kinetics of orbital electron capture and kinetics of internal conversion.	30%	First exam, Second Exam, Final Exam

Relationship to Program Student Outcomes (Out of 100%)						
1	2	3	4	5	6	7

Evaluation	
Assessment Tool	**Weight**
First exam	30%
Second Exam	30%
Final Exam	40%

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