



Jordan University of Science and Technology
Faculty of Engineering
Nuclear Engineering Department

NE311 Ionizing Radiation & Measurement

First Semester 2018-2019

Course Catalog

3 Credit Hours. Radiation Sources and their characteristics, review on interaction of radiation with matter, Statistical fluctuation and error propagation, Characteristics of various nuclear radiation detectors. Gas filled detectors, scintillation detectors, semiconductor diode detectors, neutron detection techniques

Text Book

Title	Radiation Detection and Measurement
Author(s)	Knoll, G. F.
Edition	3rd Edition
Short Name	Ref #1
Other Information	

Course References

Short name	Book name	Author(s)	Edition	Other Information
Ref #2	Atoms, Radiation, and Radiation Protection	Turner, J. E.	2nd Edition	

Instructor

Name	Dr. GHADEER AL-MALKAWI
Office Location	-
Office Hours	Sun : 10:30 - 11:30 Sun : 12:30 - 14:00 Mon : 08:30 - 09:30 Tue : 10:30 - 11:30 Tue : 12:30 - 14:00 Thu : 10:30 - 11:30 Thu : 12:30 - 14:00
Email	ghmalkawi@just.edu.jo

Class Schedule & Room
Section 1: Lecture Time: Sun, Tue, Thu : 11:30 - 12:30 Room: E2113

Prerequisites		
Line Number	Course Name	Prerequisite Type
2002040	NE204 Applied Engineering Statistics	Prerequisite / Study
2002030	NE203 Fundamentals Of Nuclear Science	Prerequisite / Pass

Tentative List of Topics Covered		
Weeks	Topic	References
Weeks 1, 2	Radiation sources	
Weeks 3, 4	Interaction of radiation with matter	
Weeks 5, 6	General properties of radiation detectors	
Week 7	Modes of operation of detectors	
Week 8	Energy resolution, detection efficiency, dead time	
Weeks 9, 10, 11	General properties of gas filled detectors (ionization chambers, proportional counters and G-M counters)	
Week 12	General properties of scintillation detectors and applications	
Week 13	Semiconductor detectors	
Week 14	Neutron detection	
Week 15	Gamma spectroscopy	

Mapping of Course Outcomes to Program Student Outcomes	Course Outcome Weight (Out of 100%)	Assessment method
An understanding of the mechanisms of radiation-material interaction with different types of radiation types and parameters. [11]	24%	First Exam, Homeworks, Final Exam
Ability to calculate the stopping power, ion range, exposure and absorbed dose. [11]	15%	First Exam, Second Exam, Homeworks, Final Exam
Ability to describe how gas filled detector functions & the counter functions. [11, 12]	21%	Second Exam, Homeworks, Final Exam
Ability to describe how scintillation detector functions. [11, 12]	12%	Second Exam, Homeworks, Final Exam

Ability to describe how solid state semi-conductor detector functions. [11, 12]	16%	Homeworks, Final Exam
Ability to describe how the neutrons can be detected. [11, 12]	12%	Final Exam

Relationship to Program Student Outcomes (Out of 100%)						
1	2	3	4	5	6	7
69.50	30.50					

Evaluation	
Assessment Tool	Weight
First Exam	25%
Second Exam	25%
Homeworks	10%
Final Exam	40%

Policy	
Attendance	Since class discussion is a major course ingredient, regular attendance is mandatory. Attendance record will be taken into consideration in any borderline grade decisions.
Exam policy	There will be no make-up exams except in extreme circumstances at the discretion of the instructor. The instructor has to be informed in advance (by email, phone, personal ...). You will be asked to provide proper documentation.
Disabled Students	Students with any sort of limitation or disability should discuss its consequences with instructor prior to the start of the course.
Emergency Provisions	In the event of a major campus emergency, course requirements, deadlines and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances beyond the instructor's control. Here are ways to get information about changes in this course: - E-learning announcements - Instructor email (ghmalkawi@just.edu.jo)

Date Printed: 2020-01-14