

مختصر توصيف المقرر

:(Course Information)

معلومات المقرر \*

مختبر الفيزياء النووية	اسم المقرر:
فيز 4962	رقم المقرر:
فيز 3812	اسم ورقم المتطلب السابق:
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السابع	مستوى المقرر:
(0+4+0) 2	الساعات المعتمدة:
<b>Module Title:</b>	Nuclear Physics Lab
<b>Module ID:</b>	PHYS 4962
<b>Prerequisite :</b>	PHYS 3812
<b>Co-requisite :</b>	--
<b>Course Level:</b>	Seventh
<b>Credit Hours:</b>	2 (0+4+0)

Module Description

وصف المقرر :

Compton Scattering, Counting statistics (Bose statistics)/ Poisson Distribution, Half-life time measurements of a  $^{137}\text{Ba}$  using digital counter and PC,  $\beta$  absorption using NaI detector / Recording beta spectrum with a scintillation counter, Gamma ray Spectroscopy using scintillation detector/ Detecting  $\gamma$  radiation with a scintillation counter,  $\gamma$  absorption using NaI Detector, Law of distance and absorption of gamma or beta using Geiger counter, Inverse square law for  $\gamma$  rays, Alpha particle spectroscopy, Determining the energy loss of alpha particles in Al and Au, Rutherford Scattering, Nuclear magnetic resonance

Module Aims

أهداف المقرر :

1	To study the basic laws of nuclear physics, Compton scattering, Rutherford scattering, Half-life determination experimentally, Alpha & Gamma spectroscopy etc.	1
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Learning Outcomes:

مخرجات التعليم:

1	Describe nuclear radiations and half-life.	1
2	Describe Compton scattering, Rutherford scattering, and Poisson distribution.	2
3	Apply CASSY Lab 2 to data analysis.	3
4	Apply the gained mathematical and experimental knowledge in any physical phenomena to understand its behavior.	4
5	Work in a group and learn time management.	5
6	Present a short report in a written form and orally using appropriate scientific methods.	6
7	Students should be able to use computer tools in the laboratory.	7
8	Apply MS office to write lab reports and excel to plot graphs.	8

**Course Contents:**

محتوى المقرر:

ساعات التدريس (Hours)	عدد الأسابيع (Weeks)	قائمة الموضوعات (Subjects)
4	1	Introduction and instructions about the laboratory
4	1	Compton Scattering/ Quantitative observation of the Compton effect
4	1	Counting statistics (Bose statistics)/ Poisson Distribution/ Statistical variations in determining counting rates
4	1	Half-life measurements of Ba-137m using digital counter and PC
4	1	$\beta$ absorption using NaI detector / Recording beta spectrum with a scintillation counter
4	1	Gamma ray Spectroscopy using scintillation detector / Detecting $\gamma$ radiation with a scintillation counter
4	1	$\gamma$ absorption using NaI Detector/ Absorption of $\gamma$ radiation
4	1	Law of distance and absorption of gamma or beta using Geiger counter
4	1	Inverse square law for $\gamma$ rays
4	1	Alpha particle spectroscopy
4	1	Determining the energy loss of alpha particles in Al and Au
4	1	Rutherford Scattering
4	1	Nuclear magnetic resonance/
4	1	Seminar/ Presentation
2	1	Final Exam

الكتاب المقرر والمراجع المساندة:

Textbook and References:

سنة النشر Publishing Year	اسم الناشر Publisher	اسم المؤلف (رئيسي) Author's Name	اسم الكتاب المقرر Textbook title
1988	John Wiley and Sons	K.S. Krane	Introductory Nuclear Physics
سنة النشر Publishing Year	اسم الناشر Publisher	اسم المؤلف (رئيسي) Author's Name	اسم المرجع Reference
2010	John Wiley and Sons	G.F. Knoll	Radiation Detection and Measurement