

مختصر توصيف المقرر

:(Course Information)

معلومات المقرر *

اسم المقرر:	فيزياء نووية 1
رقم المقرر:	PHYS 3812
اسم ورقم المتطلب السابق:	PHYS 2512
اسم ورقم المتطلب المرافق:	--
مستوى المقرر:	السادس
الساعات المعتمدة:	3 (0+0+3)
Module Title:	Nuclear Physics I
Module ID:	PHYS 3812
Prerequisite (Co-requisite) :	PHYS 2512
Co-requisite :	--
Course Level:	Sixth
Credit Hours:	3 (3+0+0)

Module Description

وصف المقرر :

Nuclear properties: Constituents, nuclear radius, nuclear and atomic masses, nuclear binding energy, nucleon separation energy, semi-empirical mass formula, nuclear angular momentum and parity. **Radioactivity:** Types of radioactive decay, radioactive decay law, natural radioactivity, nuclear stability, radioactivity and theory of transformation, Artificial radioactivity, transuranium elements, Interaction of radiation with matter. **Alpha Decay:** Basic alpha decay processes, theory of alpha emission, angular momentum and parity in alpha decay. **Beta Decay:** Energy release in beta decay, Fermi theory of beta decay, angular momentum and parity selection rules. **Gamma Decay:** energetics of gamma decay, angular momentum and parity selection rules. **Nuclear reactions:** Types of reactions and conservation laws, energetics of nuclear reactions, reaction threshold energy. **Nuclear Fission:** Why nuclei fission, characteristics of fission, energy in fission. **Nuclear Fusion:** basic fusion processes, characteristics of fusion.

Module Aims

أهداف المقرر :

1	Develop a clear understanding of the basic concepts in nuclear physics.	1
2	Explain the physical principles underlying the liquid drop model of the nucleus and use it to explain nuclear masses and binding energies.	2
3	Acquire knowledge of natural radioactivity and various decay modes.	3
4	Be familiar with the different types of nuclear reactions and conservation laws	4

Learning Outcomes:

مخرجات التعليم:

1	Recognize the constituents of the nucleus.	1
2	Identify basic nuclear properties such the nuclear charge, nuclear radius, nuclear mass, nuclear magnetic moments, nuclear spin and parity.	2
3	Identify the nuclear binding energy and semi-empirical mass formula.	3
4	Describe natural radioactivity and the differences between various decay modes.	4
5	Recognize the different types of nuclear reactions.	5

Course Contents:

محتوى المقرر:

ساعات التدريس (Hours)	عدد الأسابيع (Weeks)	قائمة الموضوعات (Subjects)
6	2	<i>Nuclear properties:</i> constituents of the nucleus, nuclear radius and mass
6	2	Binding energy and semi-empirical mass formula
6	2	<i>Natural Radioactivity:</i> Decay law-Nuclear stability
3	1	<i>Artificial Radioactivity:</i> Discovery of artificial radionuclides – Interaction of radiation with matter
3	1	Alpha Decay: Basic alpha decay processes, theory of alpha emission, angular momentum and parity in alpha decay
3	1	Beta Decay: Energy release in beta decay, Fermi theory of beta decay, angular momentum and parity selection rules
3	1	Gamma Decay: energetics of gamma decay, angular momentum and parity selection rules
6	2	Nuclear reactions: Types of reactions and conservation laws, energetics of nuclear reactions, reaction threshold energy.
3	1	Nuclear Fission: Why nuclei fission, characteristics of fission, energy in fission.
3	1	Nuclear Fusion: basic fusion processes, characteristics of fusion.

Textbook and

الكتاب المقرر والمراجع المساندة:

References:

سنة النشر Publishing Year	اسم الناشر Publisher	اسم المؤلف (رئيسي) Author's Name	اسم الكتاب المقرر Textbook title
1988	John Wiley and Sons	Kenneth S. Krane	Introductory Nuclear Physics
سنة النشر Publishing Year	اسم الناشر Publisher	اسم المؤلف (رئيسي) Author's Name	اسم المرجع Reference
2017	Taylor and Francis Group	J. Kenneth Shultis and Richard E. Faw	Fundamentals of Nuclear Science and Engineering
2002	McGraw Hill	Beiser	Concepts of Modern Physics