Form: Course Syllabus	Form Number	EXC-01-02-02A
	Issue Number and Date	2/3/24/2022/2963 05/12/2022
	Number and Date of Revision or Modification	
	Deans Council Approval Decision Number	2/3/24/2023
	The Date of the Deans Council Approval Decision	23/01/2023
	Number of Pages	06

1.	**Course Title**	Nuclear Physics-I
2.	**Course Number**	0302763
3.	**Credit Hours (Theory, Practical)**	3,0
	Contact Hours (Theory, Practical)	3,0
4.	**Prerequisites/ Corequisites**	
5.	**Program Title**	M.Sc. in Physics
6.	**Program Code**	
7.	**School/ Center**	Science
8.	**Department**	Physics
9.	**Course Level**	Master degree
10.	**Year of Study and Semester (s)**	2023, Spring
11.	**Other Department(s) Involved in Teaching the Course**	
12.	**Main Learning Language**	English
13.	**Learning Types**	☐Face to face learning ☐Blended ☐Fully online
14.	**Online Platforms(s)**	☐Moodle ☒Microsoft Teams
15.	**Issuing Date**	13/11/2024
16.	**Revision Date**	

17. Course Coordinator:

Name: Khalifeh AbuSaleem Contact hours: Sunday, Monday: 10.30-11.30

Office number: Phone number: 22023

Email: k.abusaleem@ju.edu.jo

18. Other Instructors:

Name:
Office number:
Phone number:
Email:
Contact hours:
Name:
Office number:
Phone number:
Email:
Contact hours:

19. Course Description:

This course is intended for the first year graduate students who have studied nuclear physics at the undergraduate senior level. In this course we build on the thorough acquaintance the students have with modern and nuclear physics to develop two alternative formulations of nuclear force, scattering problem, nuclear models, reactions, structure (including spins). The focus in the lectures is on the formalism (chapters: *2: 2.1-2.14; 3: 3.1, 3.2, 3.3, 3.4.1, 3.4.2, 3.4.3; 5: 5.1-5.9; 10; 11: 11.1-11.5* of the textbook)

20. Program Intended Learning Outcomes: (To be used in designing the matrix linking the intended learning outcomes of the course with the intended learning outcomes of the program)

1. To be able to identify, formulate, and solve broadly defined technical or scientific problems by applying knowledge of mathematics and science and/or technical topics to areas relevant to the discipline.
2. To be able to formulate or design a scientific system, process, procedure or program to contribute achieving scientific desired needs.
3. To be able to develop and conduct experiments or test hypotheses, analyze and interpret data and use scientific judgment to draw conclusions.
4. To be able to communicate his/her scientific contributions effectively with a range of audiences.
5. To be able to recognize and demonstrate social, ethical and professional responsibilities and the impact of technical and/or scientific solutions in global economic, environmental, and societal contexts.

6. To be able to function effectively independently and on teams for establishing goals, plan tasks, meet deadlines, and analyze risk and uncertainty.

21. Course Intended Learning Outcomes: (Upon completion of the course, the student will be able to achieve the following intended learning outcomes)

1.Derive, Analyze and Apply the *BASIC Nuclear Concepts & Nuclear Properties, Hadrons* Analyze the mechanics of a particle

2. Derive, Analyze and Apply Theory of the Deuteron

3. Derive, Analyze and Apply *Nuclear Force including the Nucleon –Nucleon Scattering Concept*

4. Derive, Analyze and Apply Various *Nuclear Models*

5. Derive, Analyze and Apply *Nuclear Decay and Radioactivity*

6. Nuclear Reactions: An Introductions

Course ILOs	**The learning levels to be achieved**					
	Remembering	**Understanding**	**Applying**	**Analysing**	**evaluating**	**Creating**
1		✓	✓	✓		
2		✓	✓	✓		
3		✓	✓	✓		
4		✓	✓	✓		
5		✓	✓	✓		
6		✓	✓	✓		

٢٢. The matrix linking the intended learning outcomes of the course with the intended learning outcomes of the program:

Program ILOs / Course ILOs	ILO (1)	ILO (2)	ILO (3)	ILO (4)	ILO (5)	ILO (6)
1	✓	✓		✓		
2	✓	✓		✓		

3	✓	✓		✓		
4	✓	✓		✓		
5	✓	✓		✓		
6	✓	✓		✓		

٢٣. Topic Outline and Schedule:

Week	Lecture	Topic
1-3	1.1 1.2 1.3	Derive, Analyze and Apply the *BASIC Nuclear Concepts & Nuclear Properties, Hadrons* Analyze the mechanics of a particle
4-6	2.1 2.2 2.3	Derive, Analyze and Apply the Theory of the Deuteron
7-10	3.1 3.2 3.3	Derive, Analyze and Apply *Nuclear Force including the Nucleon –Nucleon Scattering Concept*
11-13	4.1 4.2 4.3	Derive, Analyze and Apply various *Nuclear Models*
13	5.1 5.2 5.3	Derive, Analyze and Apply *Nuclear Decay and Radioactivity*
14-15	6.1 6.2 6.3	*Nuclear Reactions: Direct, Quasi and Compound Nuclear Models*

٢٤. Evaluation Methods:

Opportunities to demonstrate achievement of the ILOs are provided through the following assessment methods and requirements:

Evaluation Activity	Mark	Topic(s)	ILO/s Linked to the Evaluation activity	Period (Week)	Platform
Homework	30		1,2,3,4	6	On campus
Mid Exam	30		5,6,	11	Paper
Final Exam	40		1-6	15	On campus

٢٥. Course Requirements:

(e.g.: students should have a computer, internet connection, webcam, account on a specific software/platform…etc.):

N/A

٢٦. Course Policies:

A- Attendance policies: According to JU by-laws.

B- Absences from exams and submitting assignments on time: According to JU by-laws.

C- Health and safety procedures: N/A

D- Honesty policy regarding cheating, plagiarism, misbehavior: According to JU by-laws.

E- Grading policy: According to JU by-laws.

F- Available university services that support achievement in the course: N/A

٢٧. References:

A- Required book(s), assigned reading and audio-visuals:

Carlos A. Bertulni, Nuclear Physics in a Nutshell, 2007
Recommended References:

B- Recommended books, materials, and media:

1. Krane, S., *"Introductory Nuclear Physics "*John Wiley (1987)

2. W.E. Meyerhof, "Elements of Nuclear physics"
3. B.L. Cohen, "Concepts of Nuclear physics"
4. P.E. Hodgson, E. Gadioli and E. Gadioli Erba, "Introductory Nuclear physics"
5. H. Enge, "Introduction to Nuclear Physics".

2٨. Additional information:

N/A

Name of the Instructor or the Course Coordinator: Mohammad Hussein	Signature:	Date: 2/12/2024
Name of the Head of Quality Assurance Committee/ Department	Signature:	Date:
…….	……..……	……..……
Name of the Head of Department	Signature:	Date:
…….	……..……	……..……
Name of the Head of Quality Assurance Committee/ School or Center	Signature:	Date:
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Name of the Dean or the Director	Signature:	Date:
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