



Course Specifications

Institution:	College of Education
Academic Department:	Physics
Programme:	Physics
Course:	Nuclear Physics (II)
Course Coordinator:	Dr. Mohsen Challan
Programme Coordinator:	Dr. Fatma Mohamed
Course Specification Approved Date:	01/01/1438 H



A. Course Identification and General Information

1 - Course title:	Nuclear Physics (II)	Course Code:	Phys423
2. Credit hours:	(3+1)		
3 - Program(s) in which the course is offered:	B.	of Education	
4 – Course Language:	Arabic		
5 - Name of faculty member responsible for the course:	Dr. Mohsen Challan		
6 - Level/year at which this course is offered :	8		
7 - Pre-requisites for this course (if any):	Phys415		
8 - Co-requisites for this course (if any):	Laboratory of Nuclear Physics (II)		
9 - Location if not on main campus:	(Girls Campus)		
10 - Mode of Instruction (mark all that apply)			
A - Traditional classroom	<input checked="" type="checkbox"/>	What percentage?	100 %
B - Blended (traditional and online)	<input type="checkbox"/>	What percentage?	%
D - e-learning	<input type="checkbox"/>	What percentage?	%
E – Correspondence	<input type="checkbox"/>	What percentage?	%
F - Other	<input type="checkbox"/>	What percentage?	%
Comments:		

B Objectives

<p>What is the main purpose for this course?</p> <ul style="list-style-type: none"> - Give the student a clear picture about the sources of radiation - How to identify radiations, intensity and their interactions, risks, and hazards How to shield radioactive sources and radiation protection principles through an introduction of basic nuclear physics. - Developing of student ability to use the laws of the physical principles in both theoretical and experimental aspects, and illustrate the importance of its in respects to the applied fields. - Practicing students to work independently, and within the group, using the Internet.
<p>Briefly describe any plans for developing and improving the course that are being implemented:</p> <p>1- The course content has been revised and a new syllabus is written.</p> <p>2- Students are encouraged to communicate through the email and the lecturer site which has many links to important sources of knowledge in the field of nuclear physics.</p>





C. Course Description:

1. Topics to be covered:

List of Topics	No. of Weeks	Contact Hours
Nuclear reactors (the basic structure of the reactors, classification, criticality of reactors, fission products).	1	3
Damage inside the reactors, Protection systems, most popular types of reactors	2	3
Nuclear accelerators (the theoretical principles of acceleration), types of accelerators.	3	3
Resonance accelerators, Betatron accelerator, Synchrotron, Synchro-cyclotron accelerators, Isochronous Cyclotrons.	4	3
Radiation sources (fast electrons sources - sources of heavy charged particles - sources of electromagnetic radiation - neutron sources).	5	3
Interaction of radiation with matter: interaction of the heavy ions, electrons, alphas, neutrons and gamma-rays with matters.	6	3
Interaction of radiation with matter: interaction of the alphas with matters.	7	3
Interaction of radiation with matter: interaction of the electrons with matters.	8	3
Interaction of radiation with matter: interaction of the gamma-rays with matters.	9	3
Interaction of radiation with matter: interaction of the neutrons with matters.	10	3
Biological effects of ionizing radiation: entry of radioactive materials into the human body, what is a living cell, the interaction of radiation with the cell and physical stages and physicochemical, chemical stage, biological stage, early and late effects of radiation, genetic effects.	11	3
Units of radiation dose and its borders measure (flux intensity, exposure, absorbed dose, equivalence between Roentgen and radio.	12	3
Biological effect in the body and the relative biological effect	13	3
Quality factor - equivalent dose rate - dose - dose endurance	14	3
The maximum allowable dose limits - equivalent dose, Risk factor, Multiply model, NIH Model.	15	3

2. Course components (total contact hours and credits per semester):

	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	48		32			
Credit	48		16			

3. Additional private study/learning hours expected for students per week.

7h





7 hours weekly for reading, translating (text books are usually in English) and solving the home work problems.

4. Course learning outcomes in NQF domains of learning and alignment with assessment methods and teaching strategy:

	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	Knowledge		
1.1	This is an introductory course which gives the student a wide and general look at the different aspects of nuclear physics.	Give lectures to demonstrate the basic information and principles of the course	Formal homework
1.2	Recognize the importance of nuclear reactors in nuclear physics with respect to structures.	Discussing phenomena with illustrating diagrams	Spontaneous questions
1.3	Identify some of the important characteristics of the active nuclei aspects such as radiation types and analysis, the interaction of radiation with the matter.	Revisit concepts	Major and Final exams
1.4	To identify the theoretical and scientific fundamentals of the nuclear accelerators, Identify some of the important aspects for the detection of nuclear radiation, sources, protection, and biological effects and to follow-up applied research in this area.	Ask questions during lectures	Scientific reports
2.0	Cognitive Skills		
2.1	Know the content of the subject	Preparing main outlines for teaching	Spontaneous questions to connect different parts of the course to each other



	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
2.2	Develop the students ability to solve and analyze problems related to the course.	Following some proofs	Revisiting concepts
2.3	Develop the students ability to use physical laws.	Spontaneous questions during lectures	Quizzes and homework
2.4	principles to understand the subject	Discussions	Major and final exams
3.0	Interpersonal Skills & Responsibility		
3.1	Work independently	Encouraging students to solve problems independently and through communication and discussion with other members of the group	Grading homework
3.2	Work within a group	Set group assignments involving internet search.	Grading group assignments on the internet
3.3	Share research ideas and findings with others	learn how to cover missed lectures	Quizzes on previous lectures
3.4	Leadership development (managing time, resources and people)	Learn how to summarize lectures and collect the material of the course	Revisiting concepts
4.0	Communication, Information Technology, Numerical		



	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
4.1	communicating with peers, lecturers and community, use of the computer and the internet, problem solving	Set and receive homework through the lecturers electronic site	Discussions
4.2	communicating with lecturers	students to use the internet to seek course related information	Grading the student homework
4.3	communicating with community	Set homework based on search through the internet with the help of key links provided by the lecturer through his electronic site	Grading essays
4.4	Use of the computer and the internet.	set group assignment (essay)	Revisiting concepts
4.5	Problems solving.	plan visits to scientific institutes	Quizzes on previous lectures
5.0	Psychomotor		
5.1	Not applicable	Not applicable	Not applicable





5. Schedule of assessment tasks for students during the semester:

	Assessment task	Week Due	Proportion of Total Assessment
1	Quiz I	5	10
2	Mid-term Examination	7.	20
3	Quiz II	9	10
4	Laboratory Exam.	13	20
5	Final (term) Exam.	14	40

D. Student Academic Counseling and Support

- Office hours 6 hr/week

E. Learning Resources

1. List Required Textbooks:

- Kenneth S. Krane, *Introductory Nuclear Physics*, 1988, John Wiley & Sons

2. List Essential References Materials:

- *Nuclear Physics* by Irving Kaplan, 1979.
- Irving Kaplan *Nuclear Physics*, Addison, Wesley Publ. Comp., 1963.
- H.A. Enge, "Introduction to Nuclear Physics" Addison, Wesley Publ. Comp., 1981.
- *The principles of nuclear physics and its technology*, Salem Mohammed Dakhel, Ahmed Aoudi and Ahmed Elqadi, Scientific Publishing Center, King Abdulaziz University, 1996.
- *Nuclear physics and nuclear reactors*, A. N. Clément, translated by Magdi Mustafa Imam, Dar Meer for Printing and Publishing, 1980.
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3. List Recommended Textbooks and Reference Material :

- (Attach List)

4. List Electronic Materials:

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5. Other learning material:

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F. Facilities Required

1. Accommodation

- Lecture room with at least 30-40 seats

2. Computing resources

- Scientific calculator for each student
- Data show facility

3. Other resources

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G. Course Evaluation and Improvement Processes

1. Strategies for Obtaining Student Feedback on Effectiveness of Teaching:

- Examination results and type of questions answered
- Course evaluation by student
- Students- faculty meetings

2. Other Strategies for Evaluation of Teaching by the Program/Department Instructor :

- Peer consultation on teaching
- Departmental council discussions
- Discussions within the group of faculty teaching the course

3. Processes for Improvement of Teaching:

- Workshops on teaching and learning methods

4. Processes for Verifying Standards of Student Achievement

- Exchanging the course with other lecturers and comparing results
- Providing statistical information based on examination results

5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement:

- The course material is periodically reviewed and the changes to be taken are approved in the departmental and higher councils.
- The head of department and faculty take the responsibility of implementing the proposed changes.





Course Specification Approved
Department Official Meeting No (2) Date 01 /01/1438 H

Course's Coordinator

Name: Dr. Mohsen Challan

Signature:

Date: 01/01/1438 H

Department Head

Name: Dr. Fatma Mohamed

Signature:

Date: 01/01/1438 H

