



Course Specification (Bachelor)

Course Title: Nuclear Physics (2)
Course Code: PHYS 483
Program: Bachelor
Department: Physics and Astronomy
College: College of Science
Institution: King Saud University
Version: 2
Last Revision Date: October, 15th, 2023







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A. General information about the course:

1. Course Identification

1. Credit hours: (3+0+0)

2. Course type						
Α.	University	College	Depa	rtment	Track	□Others
В.	Required			Electi	ve	
3. Level/year at which this course is offered: (level 8/ fourth year)						
4. Course general Description:						

The course introduces the fundamental principles that underline nuclear science, as well as mathematical tools needed to grasp these concepts. Topics in nuclear physics include two nucleon systems, nuclear models and nuclear reactions. Topics in particle physics include Particle interactions and families, symmetries and Conservation laws, The Quark model.

5. Pre-requirements for this course (if any):

PHYS 481

6. Pre-requirements for this course (if any):

7. Course Main Objective(s):

- 1. Identify the main properties of the two nucleon systems.
- 2. Introduces the student to the main experimental and theoretical outcome of nuclear physics which contributed to explaining many phenomena related to the atomic nuclei.
- 3. Familiarize the student with the different nuclear models and interactions.
- 4. Give the student the tools to further continue his/her exploration in nuclear science.





2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	24	100%
2	E-learning		
3	Hybrid Traditional classroom E-learning 		
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
	Lectures	24
	Laboratory/Studio	
	Field	
	Tutorial	
	Others (specify)	
Total		24





B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and unders	standing		
1.1	Define the basics properties of atomic nucleus	К1	1- Lecture 2- Textbook3 3- Class notes	Quizzes Homework Examination
1.2	Identify the different models of the nuclear systems	К2	1- Lecture 2- Textbook3 3- Class notes	Quizzes Homework Examination
1.3	Describe the basis behind the different nuclear reactions	КЗ	1- Lecture 2- Textbook3 3- Class notes	Quizzes Homework Examination
2.0	Skills			
2.1	Solve problems related to nuclear physics	S1	1- Lecture 2- Textbook3 3- Class notes	Quizzes Homework Examination
2.2	Analyze critically the results of nuclear reactions	S2	1- Lecture 2- Textbook3 3- Class notes	Quizzes Homework Examination
3.0	Values, autonomy, and	l responsibility		
3.1	Conduct research independently	V1	Small projects	Presentation or small research submission
3.2				



C. Course Content

No	List of Topics	Chapter#	Section#	Contact Hours
1	The two nucleon system	2	1,2,3,5	4
2	Nucleon-Nucleon interaction	3	1,2,3	6
3	Nuclear models: Fermi gas model, nuclear vibrations, the rotational model.	5	3,6,9	6
4	Nuclear reactions: Reaction cross section, nuclear scattering, Coulomb scattering, Compound nucleus, Resonances, Photonuclear reactions	11 10, 11	4, 6, 7,10 10-5, 11-3	8
5	Introduction to particle physics (Particle interactions and families, symmetries and Conservation laws, The Quark model)	18	1,2,3,	8
	Total			32
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D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1	First midterm exam	week 6	20%
2	Second midterm exam	week 10	20%
3	Homeworks	weekly	10%
4	Research project	week 12	10%
5	Final exam	week 16-18	40%

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).





E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	 Introductory Nuclear Physics , Kenneth S. Krane, John Wiley & Sons, 2nd edition,1988. Nuclear Physics in a Nutshell, Carlos A. Bertulani, Princeton University Press, 2007.
Supportive References	Nuclear Physics, Irving Kaplan, Addison Wesley Publishing Company, 2nd edition, 1977.
Electronic Materials	Introduction to Nuclear Physics, by Enge, Publisher: Addison Wisley, 1975.
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms
Technology equipment (projector, smart board, software)	White board and Blackboard
Other equipment (depending on the nature of the specialty)	

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students/per reviewer	direct/ indirect
Effectiveness of Students assessment	Faculty	direct
Quality of learning resources	Students	indirect
The extent to which CLOs have been achieved	Faculty	indirect





Assessment Areas/Iss	sues	Assessor	Assessment Methods		
Other					
Assessors (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify) Assessment Methods (Direct, Indirect) G. Specification Approval					
COUNCIL /COMMITTEE	COUNCIL /COMMITTEE Physics Department's council				
REFERENCE NO.	7 th (1 st term/1445)				
DATE	15/05/1445				

