

## T6. Course Specification (CS)

Institution: Najran University	Date: Second semester 1/5/2018
College/Department: Science & Arts Faculty / Physics	

### A. Course Identification and General Information:

1. Course title and code : Nuclear physics-1 (481 phys-3)			
2. Credit hours :3			
3. Program(s) in which the course is offered. (If general elective available in many programs indicate this rather than list programs)			
Physics Program.			
4. Name of faculty member responsible for the course : <b>Dr /Heba Mohamed &amp; Aymen Abdallah</b>			
5. Level/year at which this course is offered : 7 <sup>th</sup> level / fourth year			
6. Pre-requisites for this course (if any) : Quantum Physics 352Phys -3			
7. Co-requisites for this course (if any) :None			
8. Location if not on main campus : <b>Males and females division in New campus</b>			
9. Mode of Instruction (mark all that apply)			
a. Traditional classroom	<input type="checkbox"/>	What percentage?	<input type="checkbox"/>
b. Blended (traditional and online)	<input checked="" type="checkbox"/>	What percentage?	<b>100</b>
c. e-learning	<input type="checkbox"/>	What percentage?	<input type="checkbox"/>
d. Correspondence	<input type="checkbox"/>	What percentage?	<input type="checkbox"/>
f. Other طرق أخرى	<input type="checkbox"/>	What percentage?	<input type="checkbox"/>
Comments :NO Comments			

## B. Objectives

1. What is the main purpose for this course? Nuclear physics is considered as one of the pillars of physics. It concentrates on the study of the nucleus of the atom (protons and neutrons and their interaction with each other). Also the study of the properties of the nucleus. This course is designed to teach students the basic concepts and principles of nuclear physics, highlighting the importance of this branch of physics in the practical aspects .
2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field) <ul style="list-style-type: none"> <li>Update the content of the course on the basis of recent developments.</li> </ul>

## C. Course Description (Note: General description in the form used in the Bulletin or handbook should be attached)

### Course Description :

**Nuclear physics is considered as one of the pillars of physics. It concentrates on the study of the nucleus of the atom (protons and neutrons and their interaction with each other). Also the study of the properties of the nucleus. This course is designed to teach students the basic concepts and principles of nuclear physics, highlighting the importance of this branch of physics in the practical aspects .**

1. Topics to be Covered:		
List of Topics	No. of Weeks	Contact Hours
<b>Nuclear properties:</b> Nuclear radius – components of nucleus - angular momentum and parity- magnetic momentum - mass and abundance of nuclei - nuclear binding energy - nuclear stability . Nuclear force: Characteristics of nuclear force - Duetron- mutual force.	3	9
<b>Radioactive decay:</b> Radioactive decay - Radioactive decay law - activity of daughter nucleus- Successive radioactive decay - radioactive equilibrium - measuring units- Applications.	3	9
<b>Natural radioactivity :</b> Natural radioactive series - Conversion processes (Alfa particles emission - Beta particles emission- Gamma ray emission- Electron capture- Internal conversion).	3	9
<b>Nuclear models:</b> Shell model –Liquid drop model - Fermi gas model- Total model- Rotational and vibrational motion .	2	6

<b>Nuclear Reactions :</b> Types of nuclear reactions- conservation laws – reaction energy- threshold energy- cross section- compound nucleus - direct reactions- heavy ions reactions- nuclear resonance.	2	6
<b>Nuclear Fission :</b> Fission process- released energy- spontaneous and induced fission- activation energy- characteristics of fission- Successive fission reactions - fission reactor - Controlled successive fission reactions- Critical mass.	1	3
<b>Nuclear Fusion:</b> Characteristics – fusion reactions in Sun and stars- fusion reactor - Lawson criterion.	1	3

1.Course components (total contact hours and credits per semester):						
	Lecture	Tutorial	Laboratory or studio	Practical	Other:	Total
Contact Hours	45	----	-----	-----	-----	45
Credit	3	----	-----	-----	-----	3

3-Additional private study/learning hours expected for students per week 3h/week
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4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy.
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On the table below are the five NQF Learning Domains, numbered in the left column.

**First**, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table)

**Second**, insert supporting teaching strategies that fit and align with the assessment methods and intended learning outcomes.

**Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy ought to reasonably fit and flow together as an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain).

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
<b>1.0</b>	<b>Knowledge</b>		
1.1	Student should be able to Define all definitions contained in chapters: characteristics of nuclei- binding energy –radioactivity -nuclear models- nuclear reactions- fission and fusion.	Lecture dialogue and discussion	midterm and final exams
1.2	Student should be able to State the basic principles and theories contained in chapter: characteristics of nuclei- binding energy –radioactivity -nuclear models- nuclear reactions- fission and fusion.	Lecture dialogue and discussion	midterm and final exams
<b>2.0</b>	<b>Cognitive Skills المهارات الإدراكية</b>		
2.1	Student should be able to Calculate problems related to: the characteristics of nuclei- binding energy –radioactivity - nuclear models- nuclear reactions-cross section- fission and fusion.	Lecture dialogue and discussion	midterm and final exams + assignment
<b>3.0</b>	<b>Interpersonal Skills &amp; Responsibility</b>		
3.1	Student should be able to Commitment and cooperative in the teamwork.	Active learning Cooperative learning	Observation card
3.2	Student should be able to Bear responsibility and participate effectively as a team member	Active learning Cooperative learning	Observation card
<b>4.0</b>	<b>Communication, Information Technology, Numerical</b>		
4.1	Student should be able to Demonstrate effective Communicate with the others.	Active learning Cooperative learning	Observation card
4.2	Student should be able to Research by using Information Technology and analyze numerical values to get information behind them	Active learning Cooperative learning	Observation card
<b>5.0</b>	<b>Psychomotor</b>		
5.1	Not applicable		

#### 5. Schedule of Assessment Tasks for Students During the Semester

Assessment task (e.g. essay, test, Quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
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1	First semester exam	5-6	20%
2	Second semester exam	11-12	20%
3	assignment	During semester	10
4	Final exam	16-18	50%

#### D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)

- Two office hours per a week
- The instructor will generally be available after lectures times during official working hours for extra help.
- The instructor will generally be available at Blackboard forum for extra help.

#### E. Learning Resources

1. List Required Textbooks :

- **Das and Ferbel , Introduction to Nuclear and particle Physics World Scientific, 2 nd Edition 2003.**
- **JOHN WILEY & SONS, Introductory Nuclear Physics by Kenneth Krane, published New York 1988.**

2. List Essential References Materials (Journals, Reports, etc.)

- Introduction to Nuclear and particle Physics by Walter E. Meyerhof, Publisher: Mcgraw-Hill , 1967
- Arabic reference (الفيزياء النووية – د أحمد الناجي- الطبعة الاولى- دار الفكر العربي- 2001 – جمهورية مصر العربية)
- Arabic reference (الفيزياء النووية: محمد شحاتة الدغمة وآخرون- الجزء الاول والثاني – 1990- مكتبة الفلاح للنشر والتوزيع- العراق)

3. List Electronic Materials Web Sites, Facebook, Twitter, etc.

<http://sciencebooksonline.info/physics.html>

4. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

**Not exist**

#### F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)

-Class room can accommodate up to 50 students equipped with all IT equipments - connected to the Internet.

2. Computing resources (AV, data show, Smart Board, software, etc.)

- Number of computers connected to the Internet to help the students in self-learning .
- Data show
- Class room equipped with smart board and tabs .

3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

- Not exist

**G. Course Evaluation and Improvement Processes:**

1. Strategies for Obtaining Student Feedback on Effectiveness of Teaching

- University online questionnaire evaluation of course by students.

2. Other Strategies for Evaluation of Teaching by the Instructor or by the department.

- Course report at the end of semester.
- Evaluate the course portfolio

3. Processes for Improvement of Teaching:

- Use of modern strategies in teaching.
- Improve teaching through feedback from student's questionnaire (on the university Web site )
- Attending workshops and training courses for the development of teaching skills and strategies used in modern education
- Keeping up to date with refereed articles and books related to the topics of the course.

4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution)

- Use the system of measure learning outcomes to verify students' familiarity with targeted learning outcomes(KPI)
- Annual course report.

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

- Study and compare the results of the students in course
- Guided by the students feedback about the effectiveness of the course material through student's questionnaires
- Continues development of teaching methods and student participation
- Review and update the course to fulfill the needs of the labor market
- Study of the proposals submitted by professors have experience in teaching the course
- Using feedback from rotating Evaluation of course and performance of a faculty member in Development plans
- Update learning resources for the course regularly using the Internet
- Consult with other faculty member who is teaching the same course
- Update the content of the course in line with recent developments in the field

Name of instructor :

**Dr /Heba Mohamed & Aymen Abdallah**

Signature : \_\_\_\_\_ Date Report Completed: Second semester 1/5/2018

Name of field experience teaching staff: \_\_\_\_\_

Program coordinator : \_\_\_\_\_

Signature: \_\_\_\_\_ Date received: 1/5/2018