

**Kingdom of Saudi Arabia**  
**The National Commission for Academic Accreditation &  
Assessment**

**COURSE SPECIFICATION**

Faculty of Science- Department of Physics and Astronomy

Nuclear Physics

Phys 481

**Revised March 2009**

# Course Specification

*For Guidance on the completion of this template, please refer to of Handbook 2 Internal Quality Assurance Arrangements*

Institution; <b>King Saud University</b>
College/Department; <b>College of Science / Physics and Astronomy Department</b>

## A Course Identification and General Information

1. Course title and code: <b>Nuclear Physics (Phys.481)</b>
2. Credit hours; <b>(3.0)</b>
3. Program(s) in which the course is offered. (If general elective available in many programs indicate this rather than list programs)  <b>B.Sc physics program</b>
4. Name of faculty member responsible for the course  <b>Dr. Mohammad Al-Garawi Dr. S. Al-Ghamdi – Prof. Mirza Rehbmat Baig – Dr. Khalid Kezzar, Dr. Faroug Eksouh</b>
5. Level/year at which this course is offered: <b>Level 8</b>
6. Pre-requisites for this course (if any): <b>Modern physics (Phys.352)</b>
7. Co-requisites for this course (if any): <b>Nuclear Laboratory (Phys.492)</b>
8. Location if not on main campus:

## B Objectives

1. Summary of the main learning outcomes for students enrolled in the course.  <b>Introduction to basic nuclear physics</b> <b>Develop the student ability to use physical laws and principles</b> <b>Work independently and within a group</b> <b>Use of the internet</b>
2. Briefly describe any plans for developing and improving the course that are being implemented. (eg increased use of IT or web based reference material, changes in content as a result of new research in the field)  <b>1- The course content has been revised and a new syllabus is written.</b> <b>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.</b>

**C. Course Description,** (Note: General description in the form to be used for the Bulletin or Handbook should be attached)

1 Topics to be Covered		
Topic	No of Weeks	Contact hours
<b>Nuclear Masses and Stability</b>	<b>3</b>	<b>9</b>
<b>Radioactive Decay Alpha and Beta</b>	<b>3</b>	<b>9</b>
<b>Energy in Nuclear Reactions and Radioactive Decay</b>	<b>3</b>	<b>9</b>
<b>Interaction of Radiation with Matter and Radiation Detection</b>	<b>2</b>	<b>6</b>
<b>Nuclear Models: Liquid Drop Model and The Shell Model</b>	<b>4</b>	<b>12</b>

2 Course components (total contact hours per semester):			
Lecture: <b>45</b>	Tutorial:	Practical/Fieldwork/Internship:	Other:

3. Additional private study/learning hours expected for students per week. (This should be an average :for the semester not a specific requirement in each week)

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

#### 4. Development of Learning Outcomes in Domains of Learning

For each of the domains of learning shown below indicate:

- A brief summary of the knowledge or skill the course is intended to develop;
- A description of the teaching strategies to be used in the course to develop that knowledge or skill;
- The methods of student assessment to be used in the course to evaluate learning outcomes in the domain concerned.

##### **a. Knowledge**

(i) Description of the knowledge to be acquired

**This is an introductory course which gives the student a wide and general look at the different aspects of nuclear physics specially that related to general properties of the atomic nucleus, nuclear reactions and nuclear decay.**

(ii) Teaching strategies to be used to develop that knowledge

- 1- Give lectures to demonstrate the basic information and principles of the course**
- 2- Discussing phenomena with illustrating diagrams**
- 3- Revisit concepts**
- 4- Ask questions during lectures**

(iii) Methods of assessment of knowledge acquired

<b>1- Formal homework</b> <b>2- Spontaneous questions</b> <b>3- Major and Final exams</b>
<b>b. Cognitive Skills</b>
(i) Cognitive skills to be developed <b>1- Know the content of the subject</b> <b>2- Develop the students ability to solve and analyse problems related to the course</b> <b>3- Develop the students ability to use physical laws and principles to understand the subject</b>
(ii) Teaching strategies to be used to develop these cognitive skills <b>1- Preparing main outlines for teaching</b> <b>2- Following some proofs</b> <b>3- Spontaneous questions during lectures</b> <b>4- Discussions</b>
(iii) Methods of assessment of students cognitive skills <b>1- Spontaneous questions to connect different parts of the course to each other</b> <b>2- Revisiting concepts</b> <b>3- Quizzes and homework</b> <b>4- Major and final exams</b>

<b>c. Interpersonal Skills and Responsibility</b>
<p>(i) Description of the interpersonal skills and capacity to carry responsibility to be developed</p> <ol style="list-style-type: none"> <li><b>1- Work independently</b></li> <li><b>2- Work within a group</b></li> <li><b>3- Share research ideas and findings with others</b></li> <li><b>4- Leadership development (managing time, resources and people)</b></li> </ol>
<p>(ii) Teaching strategies to be used to develop these skills and abilities</p> <ol style="list-style-type: none"> <li><b>1- Encouraging students to solve problems independently and through communication and discussion with other members of the group</b></li> <li><b>2- Set group assignments involving internet search.</b></li> <li><b>3- learn how to cover missed lectures</b></li> <li><b>4- Learn how to summarize lectures and collect the material of the course</b></li> </ol>
<p>(iii) Methods of assessment of students interpersonal skills and capacity to carry responsibility</p> <ol style="list-style-type: none"> <li><b>1- Grading homework</b></li> <li><b>2- Grading group assignments on the internet</b></li> <li><b>3- Quizzes on previous lectures</b></li> </ol>
<b>d. Communication, Information Technology and Numerical Skills</b>
<p>(i) Description of the skills to be developed in this domain.</p> <p><b>communicating with peers, lecturers and community, use of the computer and the internet, problem solving</b></p>
<p>(ii) Teaching strategies to be used to develop these skills</p> <ol style="list-style-type: none"> <li><b>1- Set and receive homework through the lecturers electronic site</b></li> <li><b>2- students to use the internet to seek course related information</b></li> <li><b>3- Set homework based on search through the internet with the help of key links provided by the</b></li> </ol>

<b>lecturer through his electronic site</b> <b>4- set group assignment (essay)</b> <b>5- plan visits to scientific institutes</b>
(iii) Methods of assessment of students numerical and communication skills  <b>1- Discussions</b>  <b>2- Grading the student homework</b>  <b>3- Grading essays</b>
<b>e. Psychomotor Skills (if applicable)</b>
(i) Description of the psychomotor skills to be developed and the level of performance required  <b>Not applicable</b>
(ii) Teaching strategies to be used to develop these skills  <b>Not applicable</b>
(iii) Methods of assessment of students psychomotor skills  <b>Not applicable</b>

5. Schedule of Assessment Tasks for Students During the Semester			
Assess ment	Assessment task (eg. essay, test, group project, examination etc.)	Week due	Proportion of Final Assessment
1	<b>Class activities (Attendance, questions, discussion, and homework)</b>	<b>continuous</b>	<b>10%</b>
2	<b>Major exams I</b>	<b>6</b>	<b>20%</b>
3	<b>Major exams II</b>	<b>12</b>	<b>20%</b>

4	<b>Final exam</b>	<b>16</b>	<b>50%</b>
5	<b>Essays on some topics related to the subject</b>		
6			
7			
8			

#### **D. Student Support**

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

**Office hours 6 hr/week**

#### **E Learning Resources**

1. Required Text(s)  <b>1- Kenneth S. Krane, Introductory Nuclear Physics, 1988, John Wiley &amp; Sons</b>
2. Essential References  <b>1- Nuclear Physics by Irving Kaplan, 1979</b>  <b>2- Introduction to Nuclear Physics, by Enge, Publisher: Addison Wesley</b>
3- Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)
4- Electronic Materials, Web Sites etc  <b>Websites on the internet that are relevant to the topics of the course</b>
5- Other learning material such as computer-based programs/CD, professional standards/regulations



## F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (ie number of seats in classrooms and laboratories, extent of computer access etc.)
1. Accommodation (Lecture rooms, laboratories, etc.)  <b>Lecture room with at least 30-40 seats</b>
2. Computing resources  <b>Scientific calculator for each student</b> <b>Data show facility</b>
3. Other resources (specify --eg. If specific laboratory equipment is required, list requirements or attach list)

## G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching  <b>Examination results and type of questions answered</b> <b>Course evaluation by student</b> <b>Students- faculty meetings</b>
2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department <b>1- Peer consultation on teaching</b> <b>2- Departmental council discussions</b> <b>3- Discussions within the group of faculty teaching the course</b>
3 Processes for Improvement of Teaching  <b>Workshops on teaching and learning methods</b>

4. Processes for Verifying Standards of Student Achievement (eg. check marking by an independent faculty member of a sample of student work, periodic exchange and remarking of a sample of assignments with a faculty member in another institution)

**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.

**1- The course material is periodically reviewed and the changes to be taken are approved in the departmental and higher councils.**

**2- The head of department and faculty take the responsibility of implementing the proposed changes.**