Kingdom of Saudi Arabia
National Commission for
Academic Accreditation & Assessment

المملكـة العربيـة السعوديـة
الهيئـــة الوطنيـــة للتقويـم
والاعـتـمـــاد الأكـاديـمـــي

كلية العلوم التطبيقية
Faculty of Applied Sciences

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

T6. Course Specifications (CS)

Course title: General Physics 1

Course code: 23064462-3

Course Specifications

Institution: **Umm AL – Qura University**	Date : **12/3/1439**
College/Department : **Jamoum University College – Physics Department**	

A. Course Identification and General Information

1. Course title and code: **Radiation physics (code: 23064462-3)**
2. Credit hours: **3 Hrs**
3. Program(s) in which the course is offered. **BSc Physics.**
(If general elective available in many programs indicate this rather than list programs)
4. Name of faculty member responsible for the course
One of the staff members
5. Level/year at which this course is offered : **4st Year / Level 8**
6. Pre-requisites for this course (if any) : **Nuclear Physics (23064361-4)**
7. Co-requisites for this course (if any) : ---
8. Location if not on main campus: **Al-Jamoum**
9. Mode of Instruction (mark all that apply)

a. traditional classroom	✓	What percentage?	100%
b. blended (traditional and online)		What percentage?	
c. e-learning		What percentage?	
d. correspondence		What percentage?	
f. other		What percentage?	

Comments:

B Objectives

1-Acquire basics of information about interaction of radiation with matter. 2-Acquire the basic of the radiation dosimetry. 3-Describe types of radiation Detectors. 4- Acquire information about biological effects of radiation. 5- Acquire information about units of radiation dosimetry. 6-Acquire the basic of external radiation protection. 7- List the natural and the artificial sources of radiation. 8- Acquire procedure of radiation dosimetry. 9- Describe the methods for radiation dosimetry.
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) 1- Outlines of the physical laws, principles and the associated proofs. 2. Highlighting the day life applications whenever exist. 3. Encourage the students to see more details in the international web sites and reference books in the library. 4- Encourage the student to build an example of different experiments related to course 5- Frequently check for the latest discovery in science

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

Course Description:
The course will cover the principle of physics, such as measurements, work and energy, Newton's laws, heat, fluid mechanics, and light. This course will provide a conceptual and experimental background in physics sufficient to enable students to take courses that are more advanced in related fields.
The course will cover the principle of radiation physics, such as Interaction with matter, dosimetry, detectors, biological effects, measurements and protection sources of radiation. Units procedure and methods of radiation dosimetry.This course will provide a conceptual and experimental background in radiation physics sufficient to enable students to take courses that are more advanced in related fields.

1 Topics to be Covered

Topics	No of Weeks	Contact hours
❖ **Interaction of Radiation with Matter** 1- The energy transfer. 2- Range of heavy charged particles (alpha particles). 3- The specific ionization and the stopping power.	1	3
❖ **Interaction of Radiation with Matter** 1. The energy transfer from electron to the matter.	2	6

2. Energy loss by inelastic collision and by radiation. 3. Absorption of electrons, the half-thickness. 4. Range determination from the absorption curve.		
❖ Interaction of Radiation with Matter 1. The energy transfer from electron to the matter. 2. Energy loss by inelastic collision and by radiation. 3. Classification of neutrons, the neutrons sources. 4. The neutron elastic and inelastic scattering. 5. The neutron capture, Transmutation. 6. The total neutron cross-section and its determination.	**1**	**3**
❖ **Units of Radiation Dosimetry** 1- Radiation flux density 2- The exposure. 3- Roentgen. 4- The radiation absorbed dose. 5- Relative biological effectiveness.	**1**	**3**
❖ **Units of Radiation Dosimetry** 1- -The radiation-weighting factor. 2- -The tissue equivalent dose. 3- -The tissue-weighting factor. 4- -The effective dose. 5- The collective effective dose, the dose rate.	**2**	**6**
❖ **Biological Effects of Radiation** 1- Interaction of the ionizing radiation with the cell (the physical stage, the - physico-chemical stage, the chemical stage and the biological stage). 2- The deterministic and stochastic effects. 3- The late effects. 4- The risk factor. 5- The hereditary effects of radiation.	**1**	**3**
❖ **Radiation detectors** 1. motion of electrons and ions in gases - The drift motion. - The attachment - The recombination 2. -The electron and ion currents in gases 3. The gas detectors :the ionization chamber, 4. The proportional counters, Geiger-Muller counters. 5. The scintillation detectors. 6. -The semiconductor detectors. Cerenkov detectors.	**2**	**6**
❖ **Dosimeters** 1. Pocket Dosimeters. 2. Film Badges. 3. Thermo-luminescent Dosimeter. 4. Ion Current Chamber	**1**	**3**

❖ **External Radiation Protection** 1. The natural and non-made sources of radiation and their sources (cosmic rays, the terrestrial radiation, the radon gas), 2. The artificial sources of radiation (the diagnostic radiology, therapeutic radiology, the nuclear energy and industries, the radioactive waste, the radioactive dust), 3. Techniques of protection (time, distance, shields).	**1**	**6**
❖ **Fundamental Sciences** 1. -Quantities and units in science and engineering Background information 2. -Excitation and Ionization	**1**	**3**
❖ **Reflection and refraction of light at plane surface** 1. Spherical mirrors 2. Spherical refracting surfaces. 3. Thin lenses 4. Compound optical systems 5. Optical instruments	**1**	**3**
❖ **Exercises and Solved problems**	**1**	**3**
	15 weeks	**45hrs**

Practical part:

1. Safety and Security at the lab.
1. Introduction to the Lab.
2. Precise measurements.
3. Vectors.
4. Verification of lens formula.
5. Determination of Viscosity
6. Determination of Sound speed.

2. 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. 3

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

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
1.0	**Knowledge**		
1.1	Define the physical quantities, physical phenomena, and basic principles.	1- Demonstrating the basic principles through lectures. 2. Discussing phenomena with illustrating pictures and diagrams. 3. Lecturing method: Board, Power point. 4. Discussions 5. Brain storming 6. Start each chapter by general idea and the benefit of it.	Solve some example during the lecture. Discussions during the lectures Exams: a) Quizzes (E-learning) b) Short exams (mid- term exams) c) Long exams (final) d) Oral exams .
1.2	Describe the physical laws and quantities using mathematics		
2.0	**Cognitive Skills**		
2.1	Apply the laws of physics to calculate some quantities.	1. Preparing main outlines for teaching. 2. Following some proofs. 3. Define duties for each chapter	1. Exams (Midterm, final, quizzes) 2. Asking about physical laws previously taught
2.2	Solve problems in physics by using suitable mathematics.		
2.3	Analyse and interpret quantitative results.		

2.4	Apply physical principle on day life phenomena.	4. Encourage the student to look for the information in different references. 5. Ask the student to attend lectures for practice solving problem.	3. Writing reports on selected parts of the course. 4. Discussions of how to simplify or analyze some phenomena.
2.5	Derive the physical laws and formulas.		
3.0	**Interpersonal Skills & Responsibility**		
3.1	Show responsibility for self-learning to be aware with recent developments in physics	• Search through the internet and the library. • Small group discussion. • Enhance self-learning skills. • Develop their interest in Science through : (lab work, visits to scientific and research institutes).	• Evaluate the efforts of each student in preparing the report. • Evaluate the scientific reports. • Evaluate the team work in lab and small groups. • Evaluation of students presentations.
3.2	Work effectively in groups and exercise leadership when appropriate.		
4.0	**Communication, Information Technology, Numerical**		
4.1	Communicate effectively in oral and written form.	• Incorporating the use and utilization of computer, software, network and multimedia through courses • preparing a report on some topics related to the course depending on web sites	• Evaluating the scientific reports. • Evaluating activities and homework
4.2	Collect and classify the material for the course.		
4.3	Use basic physics terminology in English.		
4.4	Acquire the skills to use the internet communicates tools.		
5.0	**Psychomotor (NA)**		

5. Map course LOs with the program LOs. (Place course LO #s in the left column and program LO #s across the top.)																
Course LOs #	**Program Learning Outcomes (Use Program LO Code #s provided in the Program Specifications)**															
	1.1	**1.2**	**1.3**	**2.1**	**2.2**	**2.3**	**2.4**	**2.5**	**3.1**	**3.2**	**4.1**	**4.2**	**4.3**	**4.4**	**5.1**	**5.2**
1.1	✓															
1.2		✓														
1.3																
2.1				✓												
2.2					✓											
2.3						✓										
2.4							✓									
2.5								✓								
3.1									✓							
3.2										✓						
4.1											✓					
4.2												✓				
4.3													✓			
4.4														✓		
5.1																
5.2																

6. Schedule of Assessment Tasks for Students During the Semester			
	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Exercises & Home works (lectures)	All weeks	5%
2	Exercises & Home works (lab)	All weeks	5%
3	Participation in lectures activities	All weeks	5%
4	Participation in lab activities	All weeks	5%
5	Midterm Exam (theoretical)	8th week	20%
6	Lab. Reports (Practical)	11th week	5%
7	Final Exam (Practical)	14th week	15%
8	Final Exam (theoretical)	16th week	40%

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)
Each student will supervise by academic adviser in physics Department and the time table for academic advice were given to the student each semester. (4hrs per week)

E Learning Resources

1. List Required Textbooks
- ✓ "A Primer In Applied Radiation Physics", F.A.SMITH, Ed. World Scientific, 2000.
- ✓ "Radiation Physics for Medical Physicist", E. B. Podgorsak, Ed. Springer. 2006
- ✓ . Radiation physics for medical physicists Ervin B. Podgorsak Springer 2006.

Electronic Materials, Web Sites
(eg. Web Sites, Social Media, Blackboard, etc.)

- ✓ http://www.IAEA.com, http://ICRP.com, http://NCRP..com., http://ICRU.com,
- ✓ http://UNSCAR.com, http://ANSI.com, http://WHO.com

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

3. List Recommended Textbooks and Reference Material (Journals, Reports, etc)

4. List Electronic Materials, Web Sites, Facebook, Twitter, etc.
www.uqu.sa/eemohamad

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

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.)

There are enough classrooms provided with a good accommodation, including good air condition, good Data show, suitable white board. There are enough laboratories for experimental physics, provided with air conditions, good data show, and experimental equipment.
2. Computing resources (AV, data show, Smart Board, software, etc.) In each class room and laboratories, there is a data show, and board.
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) Each Class room and laboratories require a TV screen at least 65 inch-and smart, and double layer white board.

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching • Course reports • Course evaluation.
2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department • Revision of student answer paper by another staff member. • Analysis the grades of students.
3 Processes for Improvement of Teaching • Preparing the course as PPT. • Using scientific flash and movies. • Coupling the theoretical part with laboratory part • Periodical revision of course content.
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) • The instructors of the course are checking together and put a unique process of evaluation. • Check marking of a sample of papers by others in the department. • Feedback evaluation of teaching from independent organization. • Independent evaluation by another instructor that give the same course in another faculty. • Evaluation by the accreditation committee in the university.
5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement. 1- The following points may help to get the course effectiveness • Student evaluation • Course report • Program report • Program Self study 2- According to point 1 the plan of improvement should be given.