Kingdom of Saudi Arabia
Umm Al-Qura University
Faculty of Applied Science
Physics Department

المملكة العربية السعودية
جامعة أم القرى
كلية العلوم التطبيقية
قسم الفيزياء

Handbook of Physics Program

Study Plan 33

Program Specification – Course Specification

Plan 33


بسم الله الرحمن الرحيم


وقل اعملوا فسيرى الله عملكم ورسوله والمؤمنون

Content

Physics Program

Prepared by

All Staff Members

2017

معالي مدير الجامعة
الدكتور بكري بن معتوق عساس

سعادة عميد الكلية
د. وليد بن جميل ألطف

سعادة وكيل الكلية
د./ حاتم الطس

سعادة وكيلة الكلية لفرع الطالبات
د/ رجاء معتوق

سعادة وكيل الكلية للتطوير الجامعي
الدكتور/ فهد الهاشمي

سعادة وكيل الكلية للشئون الاكاديمية
الدكتور/ حسين ابو الريش

سعادة وكيل الكلية للدراسات العليا
أ.د./ باسم حسين اصغر

سعادة وكيلة الكلية لشئون التعليم والتطوير
د/ بدرية الجحدلي

سعادة رئيس قسم الفيزياء
الدكتور صالح بن مرزوق اللقماني

سعادة وكيلة القسم لفرع الطالبات
الدكتوره/ زينب مطر

مقدمة

الحمد لله رب العالمين والصلاة والسلام على سيدنا ونبينا محمد وعلى آله واصحابه والتابعين الى يوم الدين،

أنشئ قسم الفيزياء في عام ١٣٨٥/١٣٨٤ هـ الموافق ١٩٦٥/١٩٦٤م، كتوأم لقسم الرياضيات، وذلك عندما صدرت أول لائحة لكلية التربية بجامعة الملك عبد العزيز شطر مكة المكرمة، وقد تخرجت عدة دفعات على نظام التخصص المزدوج (فيزياء ورياضيات).

استمر العمل على هذا النظام لمدة عشر سنوات، حتى عام ١٣٩٥/١٣٩٤هـ حيث تم فصل قسم الفيزياء عن قسم الرياضيات، واصبح قسما قائما بذاته يمنح درجة البكالوريوس في الفيزياء والفيزياء الطبية.

و في عام ١٣٩٧/١٣٩٦هـ، ادخل نظام الساعات المعتمدة على جامعة الملك عبد العزيز شطر مكة المكرمة، وأصبح القسم يقدم مقرراته وفقا لنظام الساعات المعتمدة. ويمنح درجة البكالوريوس في الفيزياء. وفى عام ١٤٠١/١٤٠٠ هـ تأسست جامعة أم القرى بمكة المكرمة، ثم انشئت كلية العلوم التطبيقية واصبح القسم تابعا لها. وأصبح يمنح درجة البكالوريوس في الفيزياء و الفيزياء الطبية.

وهناك ثلاث خطط دراسية من أهم الخطط بالنسبة للقسم، وهى الخطة ١٩، والخطة ٣٣، والخطة ٣٧، والأخيرة هي الأحدث وهى قيد التنفيذ الأن، وفيما يلى نستعرض توزيع المقررات وتوصيف البرنامج وتوصيف المقررات لبرنامج الفيزياء الخطة ٣٣.

وفقنا الله وإياكم الى ما يحبه و يرضاه ،،،

لجنة المناهج الدراسية

قسـم الفيزياء

Study plan 33

(Credit hours 129)

Level 1 : Credit Hours 16					
Course		Hours		Prerequisite	
Code	Title	L	P	Code	Title
4800140-4	Calculus 1	4	-		
4800150-2	IT	2	-		
4800170-6	English Language	6	-		
4800130-4	General Physics (1)	4	-		

Level 2 : Credit Hours 14					
Course		Hours		Prerequisite	
Code	Title	L	P	Code	Title
4800141-4	Calculus 2	4	-	4800140-4	Calculus 1
4800104-3	Learning Skills	3	-		
4800171-4	English Language	4	-	7004101-4	English Language
4800153-3	IT skills	3	-	4800150-2	IT

Level 3 : Credit Hours 17					
Course		Hours		Prerequisite	
Code	Title	L	P	Code	Title
403243-2	Theoretical Methods in Physics (1)	2	-	4800141-4	Calculus 2
403210-2	Thermodynamics	2	-	4800141-4	Calculus 2
403200-4	Classical Physics	3	1	4031101-4	General Physics
402101-4	General chemistry	3	1	4031101-4	General Physics
404231-3	Statistics	3	-	4800141-4	Calculus 2
601101-2	Islamic Culture (1)	2	-		
605101-2	The Holy Qura'an (1)	2	-		

Level 4 : Credit Hours 15					
Course		Hours		Prerequisite	
Code	Title	L	P	Code	Title
403244-3	Theoretical Methods in Physics (2)	3	-	404243-2	Theoretical Methods in Physics (1)
403232-4	Optics	3	1	4800141-4	Calculus 2
403220-3	Classical Mechanics(1)	3	-	404243-2	Theoretical Methods in Physics (1)
403211-3	Statistical Thermodynamics	3	-	403210-2	Thermodynamics
605201-2	The Holy Qura'an (2)	2	-	605101-2	The Holy Qura'an (1)

Level 5 : Credit Hours 20					
Course		Hours		Prerequisite	
Code	Title	L	P	Code	Title
403343-3	Theoretical Methods in Physics (3)	3	-	403244-3	Theoretical Methods in Physics (2)
403321-3	Classical Mechanics(2)	3	-	403220-3	Classical Mechanics(1)
403344-3	Quantum Mechanics (1)	3	-	403244-3	Theoretical Methods in Physics (2)
403201-3	Electromagnetism (1)	3	-	403200-4	Classical Physics
403350-4	Modern Physics	3	1	4042141-4	Theoretical Methods in Physics (1)
605301-2	The Holy Qura'an (3)	2	-	605201-2	The Holy Qura'an (2)
501101-2	Arabic Language	2	-		

Level 6 : Credit Hours 16					
Course		Hours		Prerequisite	
Code	Title	L	P	Code	Title
403345-3	Quantum Mechanics (2)	3	-	403344-3	Quantum Mechanics (1)
403370-3	Solid State Physics (1)	3	-	403344-3	Quantum Mechanics (1)
403331-3	Electromagnetism (2)	3	-	403201-3	Electromagnetism (1)
403380-3	Computational Physics	3	-	403344-3	Quantum Mechanics (1)
102101-2	Biography of prophet Mohamed (PBUH)	2	-		
601201-2	Islamic Culture (2)	2	-	601101-2	Islamic Culture (1)

Level 7 : Credit Hours 21					
Course		**Hours**		**Prerequisite**	
Code	**Title**	**L**	**P**	**Code**	**Title**
403446-2	Quantum mechanics	2	-	403345-3	Quantum Mechanics (2)
403460-4	Nuclear Physics	3	1	403345-3	Quantum Mechanics (2)
403434-2	Advanced optics (1)	2	-	403232-4	Optics
403471-2	Semiconductors	2	-	403370-3	Solid State Physics (1)
403452-2	Atomic Physics	2	-	403345-3	Quantum Mechanics (2)
403473-4	Electronics	3	1	403370-3	Solid State Physics (1)
601301-3	Islamic Culture (3)	3	-	601201-2	Islamic Culture (2)
605401-2	The Holy Qura'an (4)	2	-	605301-2	The Holy Qura'an (3)

Level 8 : Credit Hours 10					
Course		**Hours**		**Prerequisite**	
Code	**Title**	**L**	**P**	**Code**	**Title**
403462-2	Radiation Physics	2	-	403460-4	Nuclear Physics
403472-2	Solid State Physics (2)	2	-	403370-3	Solid State Physics (1)
403465-2	Nuclear technology	2	-	4034170-4	Solid State Physics (1)
403499-2	Graduated Project	2	-		Agreement of Department
601401-2	Islamic Culture (4)	2	-	601301-3	Islamic Culture (3)

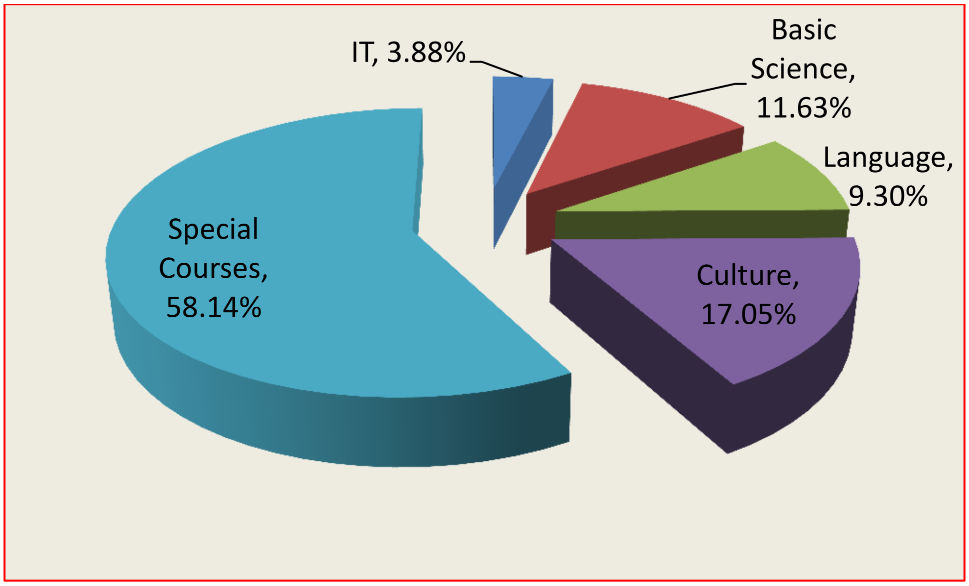

Figure 1: The Curriculum Structure of the program.

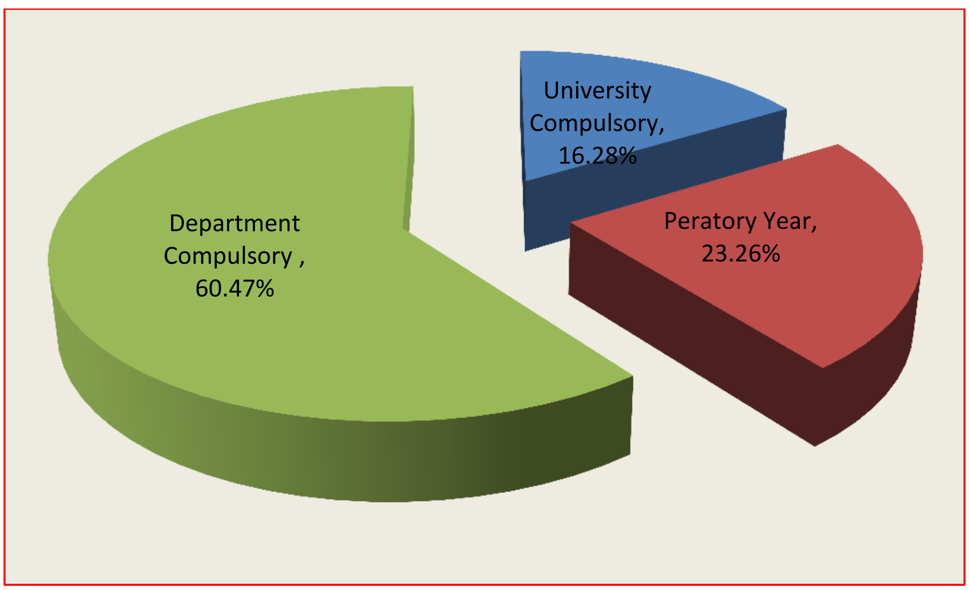

Figure 2: Curriculum Distribution.

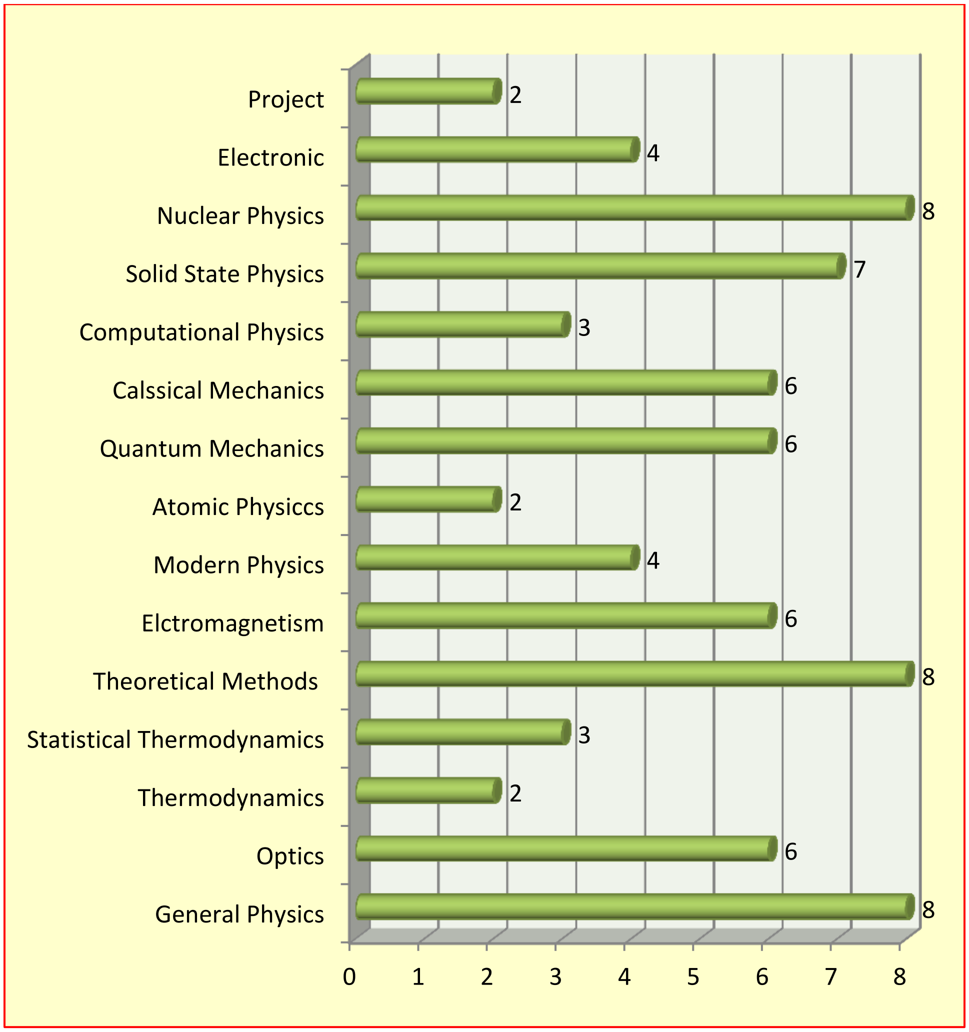

Figure 3: Credit hours distribution.

Program Specification
Plan 33

كلية العلوم التطبيقية
Faculty of Applied Sciences

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

T4. Program Specifications (PS)

Program : Physics

Course code: 40300

National Commission for Academic Accreditation & Assessment

Program Specifications

For guidance on the completion of this template, please refer to NCAAA guidebooks.

1. Institution **Umm AL-Qura University**	Date of Report: **April 2013**
2. College/Department: **Faculty of Applied Science / Department of Physics**	

A. Program Identification and General Information

1. Program title and code: **Physics (Phys)**

2. Total credit hours needed for completion of the program: **129 credit hours in 8 semesters (4 years).**

3. Award granted on completion of the program: **Bachelor of Science (B.Sc.) in Physics**

4. Major tracks/pathways or specializations within the program (eg. transportation or structural engineering within a civil engineering program or counselling or school psychology within a psychology program)

N/A

5. Intermediate Exit Points and Awards (if any) (eg. associate degree within a bachelor degree program)

N/A

6. Professional occupations (licensed occupations, if any) for which graduates are prepared. (If there is an early exit point from the program (eg. diploma or associate degree) include professions or occupations at each exit point)

- Work in research centers and universities.
- Work in public and private school as a teacher of physics
- Work as a machine operator and/or a data analyst in one of the following industrial regions: Quality control labs. Electric power stations. Water stations. Standards and measurements bureau Petroleum ministry. Manufactures of plastics, steel, textile, glass, ceramics, rubber, electronics, semiconductors and solar cells, ..etc.

7. (a) New Program ☐ Planned starting date ☐ (b) Continuing Program ✓ Year of most recent major program review: **2013** Organization involved in recent major review (eg. internal within the institution, Accreditation review by Submitted for accreditation by German organization ASIIN Other: Departmental curriculum committee The program was revised by external reviewers:
8. Name of program coordinator or chair. If a program coordinator or chair has been appointed for the female section as well as the male section, include names of both. **Dr Saleh Alluqmani (Program Chair)**
9. Location if not on main campus or locations if program is offered in more than one location.

B. Program Context

1. Explain why the program was established.

a. Summarize economic reasons, social or cultural reasons, technological developments, national policy developments or other reasons.

Program Aims: This program aims to introduce students to the vast world of Physics and its essentials applications which involves directly to the lives of humans. The program has strong practical emphasis, providing students with all basic laboratory skills required for career either in applied or research Physics.

The program will introduce students to the basic concepts of classical Physics (Classical physics, optics, electricity and magnetism, Thermodynamic, Mathematical physics, introduction to modern physics) in the first two years. Then the third and fourth year will introduce the concepts of modern physics and their applications (Quantum physics, Classical mechanical physics Statistical physics, Electromagnetism, Solid State physics, Nuclear physics, Radiation physics, finally carrying out a project in physics).

During their studies, students will be exposed to a variety of information sources and techniques and be trained in various skills, including those used in reasoning, argument and communication. Students will acquire a number of transferable skills, including: design and execution of experiments (including working in a team); accessing information; interpretation of data using statistics; computing; essay and report writing; and oral and poster presentation.

Career Prospect: Umm Al-Qura University Physics graduates are qualified to enter a variety of careers in academia, research centres, and industry. Many of our students continue in a research career or find employment in universities, or Schools, and in Research Institutes. Others have found positions in Industry (petrochemical companies, SABIC, Water companies, Oils and soap factories, etc.). As scientists with developed numeracy and communication skills, our graduates also have qualifications suited to a wide variety of occupations related to the field of Science especially Physics.

b. Explain the relevance of the program to the mission and goals of the institution.
Physics is concerned with the observation, understanding and prediction of natural phenomena and the behavior of manmade systems. It deals with profound questions about the nature of the universe and with some of the most important practical, environmental technology issues. Its scope is broad and involves mathematical theories, experiments and observation, computing technology, materials, nuclear energy and magnetism. Therefore the mission of the Department of Physics focus on preparing a well-qualified graduate who is able to serve the community and able to respond to the requirements of the labor market.
As described above, the program aims clearly shows relevance to the department’s mission statement.

2. Relationship (if any) to other programs offered by the institution/college/department.

a. Does this program offer courses that students in other programs are required to take? **Yes**

If yes, what has been done to make sure those courses meet the needs of students in the other programs?

Some of the courses of physics are introduced to other department. General physics (4800130-4 are introduced to the student of Mathematics, Biology, and chemistry.

b. Does the program require students to take courses taught by other departments? **Yes**

If yes, what has been done to make sure those courses in other departments meet the needs of students in this program?

By arranging yearly meeting to discuss the best course content to the program. The department of Physics Department will communicate its needs to other departments to ensure that the course coverage fulfills the need of Physics department students. The syllabi of the courses are reviewed by the Undergraduate Committee of the department to ensure compliance to the department's needs. The department must approve the syllabi of the courses offered by the other departments.

Some of these courses are university requirements (a total of 51 credit hours that include 21 hours for Holy Quran, Islamic Culture and Arabic language; Also there are 30 hours for IT, English language, Calculus, General physics and learning skills) . The department has no relevance to involve in the content of these courses.

However, this program include a course offered by the Department of Chemistry (General chemistry 402101-4), and the Department of Mathematics (Statistics 404231-3).

3. Do students who are likely to be enrolled in the program have any special needs or characteristics? (eg. Part time evening students, physical and academic disabilities, limited IT or language skills).

Yes:

- Adequate preparation and achievement in mathematics and sciences at the general education level.
- English language proficiency Knowledge of computer skills.

Students have to be prepared at the general education level and through a preparatory year or at the undergraduate level in English Language, mathematics, sciences, computer skills.

4. What modifications or services are you providing for special needs applicants?

N/A

C. Mission, Goals and Objectives

1. Program Mission Statement (insert)

The mission of the BSc Physics program is to provide basic education in core subjects of modern and advanced Physics and intensive training, with an emphasis on laboratory methodology, in basic and applied Physics, and related areas for students planning careers in applied Physics.

2. List goals and objectives of the program within to help achieve the mission. For each goal and objective describe the major strategies to be followed and list the indicators that are used to measure achievement.

Goals and Objectives	Major Strategies	Measurable Indicators
• Prepare highly qualified educators and technicians. • Develop a curriculum that is responsive to the needs of the employment market.	• Focus on providing intensive training programs for students during the university study. • Establish cooperative relationships with governmental and private sectors.	• Views that were obtained from academic staff members for their opinion in the mission, and the proportionality of this mission with the needs and aspirations of society.
To be well connected with the community to provide all possible educational programs that can solve problems and increase their awareness	• The participation of academic staff members in providing information and services and the establishment of lectures, symposia and meetings. • The contribution of academic staff members to work as part-time advisors for governmental and private sectors institutions	• Awareness and supporting by the academic staff members to the program and its mission
• Prepare Pure and applied research projects and publish them in well-known and respected international journals.	• Collaboration with research centers, local, regional and international, in Physics to conduct joint research - publishing the outcome of the research projects in reputable scientific journals - to support scientific research in the area.	• Keenness of academics staff members on the sophistication in scientific research and increase the number of publications and projects in collaboration with research institutions, national and international.

D. Program Structure and Organization

1. Program Description:

List the core and elective program courses offered each semester from Prep Year to graduation using the below Curriculum Study Plan Table (A separate table is required for each branch IF a given branch/location offers a different study plan).

A program or department manual should be available for students or other stakeholders and a copy of the information relating to this program should be attached to the program specification. This information should include required and elective courses, credit hour requirements and department/college and institution requirements, and details of courses to be taken in each year or semester.

Curriculum Study Plan Table

Year	Course Code	Course Title	Required or Elective	Credit Hours	College or Department
1st Year Semester 1	4800140-4	Calculus 1	R	4	Deanship of Preparatory year
	4800150-2	IT	R	2	Deanship of Preparatory year
	4800170-6	English Language	R	6	Deanship of Preparatory year
	4800130-4	General Physics (1)	R	4	Deanship of Preparatory year
1st Year Semester 2	4800141-4	Calculus 2	R	4	Deanship of Preparatory year
	4800104-3	Learning Skills	R	3	Deanship of Preparatory year
	4800171-4	English Language	R	4	Deanship of Preparatory year
	4800153-3	IT skills	R	3	Deanship of Preparatory year
2nd Year Semester 1	403243-2	Theoretical Methods in Physics (1)	R	2	Faculty of Applied Science / Dept. of Physics
	403210-2	Thermodynamics	R	2	Faculty of Applied Science / Dept. of Physics
	403200-4	Classical Physics	R	4	Faculty of Applied Science / Dept. of Physics

Year	Course Code	Course Title	Required or Elective	Credit Hours	College or Department
	402101-4	General chemistry	R	4	Faculty of Applied Science / Dept. of Chemistry
	404231-3	Statistics	R	3	Faculty of Applied Science / Dept. of Mathematics
	601101-2	Islamic Culture (1)	R	2	
	605101-2	The Holy Qura'an (1)	R	2	
2nd Year Semester 2	403244-3	Theoretical Methods in Physics (2)	R	3	Faculty of Applied Science / Dept. of Physics
	403232-4	Optics	R	4	Faculty of Applied Science / Dept. of Physics
	403220-3	Classical Mechanics(1)	R	3	Faculty of Applied Science / Dept. of Physics
	4033111-3	Statistical Thermodynamics	R	3	Faculty of Applied Science / Dept. of Physics
	605201-2	The Holy Qura'an (2)	R	2	
3rd Year Semester 1	403343-3	Theoretical Methods in Physics (3)	R	3	Faculty of Applied Science / Dept. of Physics
	403321-3	Classical Mechanics(2)	R	3	Faculty of Applied Science / Dept. of Physics
	403344-3	Quantum Mechanics (1)	R	3	Faculty of Applied Science / Dept. of Physics
	403201-3	Electromagnetism (1)	R	3	Faculty of Applied Science / Dept. of Physics
	403350-4	Modern Physics	R	4	Faculty of Applied Science / Dept. of Physics
	605301-2	The Holy Qura'an (3)	R	2	
	501101-2	Arabic Language	R	2	
3rd Year	403345-3	Quantum Mechanics	R	3	Faculty of Applied

Year	Course Code	Course Title	Required or Elective	Credit Hours	College or Department
Semester 2		(2)			Science / Dept. of Physics
	403370-3	Solid State Physics (1)	R	3	Faculty of Applied Science / Dept. of Physics
	403331-3	Electromagnetism (2)	R	3	Faculty of Applied Science / Dept. of Physics
	403380-3	Computational Physics	R	3	Faculty of Applied Science / Dept. of Physics
	102101-2	Biography of prophet Mohamed (PBUH)	R	2	
	601201-2	Islamic Culture (2)	R	2	
4th Year Semester 1	403446-2	Quantum mechanics	R	2	Faculty of Applied Science / Dept. of Physics
	403460-4	Nuclear Physics	R	4	Faculty of Applied Science / Dept. of Physics
	403434-2	Advanced optics (1)	R	2	Faculty of Applied Science / Dept. of Physics
	403471-2	Semiconductors	R	2	Faculty of Applied Science / Dept. of Physics
	403452-2	Atomic Physics	R	2	Faculty of Applied Science / Dept. of Physics
	403473-4	Electronics	R	4	Faculty of Applied Science / Dept. of Physics
	601301-3	Islamic Culture (3)	R	3	
	605401-2	The Holy Qura'an (4)	R	2	
4th Year Semester 2	403462-2	Radiation Physics	R	2	Faculty of Applied Science / Dept. of Physics
	403472-2	Solid State Physics (2)	R	2	Faculty of Applied Science / Dept. of Physics

Year	Course Code	Course Title	Required or Elective	Credit Hours	College or Department
	403465-2	Nuclear technology	R	2	Faculty of Applied Science / Dept. of Physics
	403499-2	Graduated Project	R	2	Faculty of Applied Science / Dept. of Physics
	601401-2	Islamic Culture (4)	R	2	

Total credit hours 130.

2. Development of Special Student Characteristics or Attributes

List any special student characteristics or attributes beyond normal expectations that the institution, college or department is trying to develop in all of its students. (eg. Eg. Particularly good at creative problem solving, leadership capacity, commitment to public service, high level of skills in IT). For each special attribute indicate the teaching strategies and student activities to be used to develop it.

Special Attributes	Strategies or Student Activities to Develop these Special Attributes
Commitment to the environmental issues	Special emphasis on environmental awareness in the curriculum throughout the program.
Observing safety rule and regulations	Teaching the safety aspects in the lecture and laboratory courses.
Commitment to societal Needs	Involving senior students with faculty in conducting training programs and other public services.

3. Required Field Experience Component (if any, e.g. internship, cooperative program, work experience).

Summary of practical, clinical or internship component required in the program. Note: see Field Experience Specification
Note that a more detailed Field Experience Specification comparable to a course specification should also be prepared in a separate document for any field experience required as part of the program.

a. Brief description of field experience activity
The program will require a project program that enables the students to experience the real work environment in laboratories. It also provides an opportunity to participate in group work. The student will spend a time working in a physics Lab. Upon completion of Project, a student will be required to write a brief report on his work experience and present it orally

b. At what stage or stages in the program does the field experience occur? (eg. year, semester) At the fourth year (Level 8)
c. Time allocation and scheduling arrangement. (eg. 3 days per week for 4 weeks, full time for one semester): Full time summer work for 2 ½ months minimum.
d. Number of credit hours (if any) **2** Credit hours

4. Project or Research Requirements (if any)

Summary of any project or thesis requirements in the program. (Other than projects or assignments within individual courses) (A copy of the requirements for the project should be attached.)
a. Brief description At the end of this course student should be able to evaluate the different approaches used and suggest future experiments or alternative strategies for addressing the problem. The student should be able to conversant with writing a scientific report and presenting scientific data in a clear accessible manner. The skills learnt will be applicable to problem solving exercises encountered in all types of employment.
b. List the major intended learning outcomes of the project or research task. 1. Gain first-hand experience of work place environment in the field of scientific research. 2. Gain practical and theoretical knowledge to apply the concepts of basic sciences in a particular area of physics. 3. Gain the ability to perform analysis, design and evaluation of physics problem. 4. Work independently on the research project under the supervision of academic member or staff, and should be able to design experiments to answer the particular question posed, and critically analysed the results. There will be scope for initiative in this element of the project. 5. Be able to set the work in the context of work done by other experimentalists, and provide a concise summary of relevant literature. 6. Acquire all the necessary skills to work in relevant work field. 7. Apply all the knowledge gained from previous course in relevant work settings. 8. Develop interpersonal skills / work under pressure / solve work related problems. 9. Improve skills to work independently and in teamwork.

c. At what stage or stages in the program is the project or research undertaken? (e.g. year, semester) **4th Year / final semester**
d. Number of credit hours (if any) **2 credit hours**
e. Description of academic advising and support mechanisms for students. Each student will be assigned an academic advisor who will act as a mentor, providing academic and career advice, and general counseling. Each student will be required to meet his advisor at least twice a semester, one at the beginning of his registration and the other one towards the end of the semester. The department will provide support to the students in the form of hosting extracurricular activities, field trips, and seminars by inviting guest speakers, and providing an interactive learning environment. The chairman will be available to meet the students and listen to their academic problems and concerns. College club will be formed to help students undertake their activities

f. Description of assessment procedures (including mechanism for verification of standards) A self-assessment of the program will be carried out every two years to identify areas of weaknesses that require attention, using NCAAA guidelines wherever applicable. Since this is a new program and it will require four years to have the first batch of graduates, no employment and alumni data will be available for the first two years. Self-evaluation will be carried out using faculty input, course files, and students' evaluation of courses to objectively determine the course coverage, students' learning and satisfaction.

4. Learning Outcomes in Domains of Learning, Assessment Methods and Teaching Strategy

Program Learning Outcomes, Assessment Methods, and Teaching Strategy work together and are aligned. They are joined together as one, coherent, unity that collectively articulate a consistent agreement between student learning and teaching. The National Qualification Framework provides five learning domains. Learning outcomes are required in the first four domains and sometimes are also required in the Psychomotor Domain. On the table below are the five NQF Learning Domains, numbered in the left column. For Program Accreditation there are four learning outcomes required for knowledge and cognitive skills. The other three domains require at least two learning outcomes. Additional learning outcomes are suggested.

First, insert the suitable and measurable learning outcomes required in each of the 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 program learning outcomes, assessment method, and teaching strategy ought to reasonably fit and flow together as an integrated learning and teaching process.

	NQF Learning Domains and Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	**Knowledge**		
	Summary description of the knowledge to be acquired	**Teaching strategies to be used to develop that knowledge**	**Methods of assessment of knowledge acquired**
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		
1.3	Determine the physical quantities at the Lab.	1. Doing team research or team project. 2.Doing team work to perform some experiments 3. Perform the experiments correctly. 4. Demonstrate the results correctly. 5. Write the reports about the experiment. 6. Discussion with the student about the results	Writing scientific Reports. Lab assignments Exam.

	NQF Learning Domains and Learning Outcomes	Teaching Strategies	Assessment Methods
2.0	**Cognitive Skills**		
	Cognitive skills to be developed and level of performance expected	**Teaching strategies to be used to develop these cognitive skills**	**Methods of assessment of students cognitive skills**
	Physics graduates Students will have the ability to:	1. Preparing main outlines for teaching. 2. Following some proofs. 3. Define duties for each chapter 4. Encourage the student to look for the information in different references. 5. Ask the student to attend lectures for practice solving problem.	1. Exams (Midterm, final, quizzes) 2. Asking about physical laws previously taught 3. Writing reports on selected parts of the course. 4. Discussions of how to simplify or analyze some phenomena.
2.1	Apply the laws of physics to calculate some quantities.		
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.		
2.5	Derive the physical laws and formulas.		
3.0	**Interpersonal Skills & Responsibility**		
	Description of the level of interpersonal skills and capacity to carry responsibility to be developed	**Teaching strategies to be used to develop these skills and abilities**	**Methods of assessment of students interpersonal skills and capacity to carry 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**		
	Description of the communication, IT and numerical skills to be developed	**Teaching strategies to be used to develop these skills**	**Methods of assessment of students numerical and communication skills**
4.1	Communicate effectively in oral and written form.	• Incorporating the use and utilization of computer,	1- Evaluating the scientific reports.

	NQF Learning Domains and Learning Outcomes	Teaching Strategies	Assessment Methods
4.2	Collect and classify the material for the course.	software, network and multimedia through courses • preparing a report on some topics related to the course depending on web sites	2- Evaluating activities and homework.
4.3	Use basic physics terminology in English.		
4.4	Acquire the skills to use the internet communicates tools.		
5.0	**Psychomotor**		
	Psychomotor Skills (if applicable)	**Teaching strategies to be used to develop these skills**	**Methods of assessment of students psychomotor skills**
5.1	Use experimental tools safely and correctly.	Follow up the students in lab and during carryout all physical experiments.	Practical exam. Giving additional marks for the results with high and good accuracy
5.2	Determine the physical quantity correctly at the Lab.		

NQF Learning Outcome Verb, Assessment, and Teaching Strategies and Suggestions

NQF Learning Domains	Suggested Verbs
Knowledge	list, name, record, define, label, outline, state, describe, recall, memorize, reproduce, recognize, record, tell, write
Cognitive Skills	estimate, explain, summarize, write, compare, contrast, diagram, subdivide, differentiate, criticize, calculate, analyze, compose, develop, create, prepare, reconstruct, reorganize, summarize, explain, predict, justify, rate, evaluate, plan, design, measure, judge, justify, interpret, appraise
Interpersonal Skills & Responsibility	demonstrate, judge, choose, illustrate, modify, show, use, appraise, evaluate, justify, analyze, question, and write
Communication, Information Technology, Numerical	demonstrate, calculate, illustrate, interpret, research, question, operate, appraise, evaluate, assess, and criticize
Psychomotor	Perform , draw, operate, Examine, explore,

Suggested ***verbs not to use*** when writing measurable and assessable learning outcomes are as follows:

Consider	Maximize	Continue	Review	Ensure	Enlarge	Understand
Maintain	Reflect	Examine	Strengthen	Explore	Encourage	Deepen

Some of these verbs can be used if tied to specific actions or quantification.

Suggested assessment methods and teaching strategies are:

According to research and best practices, multiple and continuous assessment methods are required to verify student learning. Current trends incorporate a wide range of rubric assessment tools; including web-based student performance systems that apply rubrics, benchmarks, KPIs, and analysis. Rubrics are especially helpful for qualitative evaluation. Differentiated assessment strategies include: exams, portfolios, long and short essays, log books, analytical reports, individual and group presentations, posters, journals, case studies, lab manuals, video analysis, group reports, lab reports, debates, speeches, learning logs, peer evaluations, self-evaluations, videos, graphs, dramatic performances, tables, demonstrations, graphic organizers, discussion forums, interviews, learning contracts, antidotal notes, artwork, KWL charts, and concept mapping.

Differentiated teaching strategies should be selected to align with the curriculum taught, the needs of students, and the intended learning outcomes. Teaching methods include: lecture, debate, small group work, whole group and small group discussion, research activities, lab demonstrations, projects, debates, role playing, case studies, guest speakers, memorization, humor, individual presentation, brainstorming, and a wide variety of hands-on student learning activities.

Insert the program learning outcomes, according to the level of instruction, from the above table below and indicate the courses and levels that are required to teach each one; use your program's course numbers across the top and the following level scale. Levels: I = Introduction P = Proficient A = Advanced

	Course Offerings NQF Learning Domains and Learning Outcomes	I-4800130	I-403210	I-403200	P-403243	P-403244	P-403232	P-403220	P-403343	P-403321	P-403344	P-403201	P-403350	P-403345
1.0	**Knowledge**													
1.1	Define the physical quantities, physical phenomena, and basic principles.	I	I	I	P	P	P	P	P	P	P	P	P	P
1.2	Describe the physical laws and quantities using mathematics	I	I	I	P	P	P	P	P	P	P	P	P	P
1.3	Determine the physical quantities at the Lab.	I		I			P						P	
2.0	**Cognitive Skills**													
2.1	Apply the laws of physics to calculate some quantities.	I	I	I	P	P	P	P	P	P	P	P	P	P
2.2	Solve problems in physics by using suitable mathematics.	I	I	I	P	P	P	P	P	P	P	P	P	P
2.3	Analyse and interpret quantitative results.	I	I	I	P	P	P	P	P	P	P	P	P	P
2.4	Apply physical principle on day life phenomena.	I	I	I	P	P	P	P	P	P	P	P	P	P
2.5	Derive the physical laws and formulas.	I	I	I	P	P	P	P	P	P	P	P	P	P
3.0	**Interpersonal Skills & Responsibility**													
3.1	Show responsibility for self-learning to be aware with recent developments in physics	I	I	I	P	P	P	P	P	P	P	P	P	P
3.2	Work effectively in groups and exercise leadership when appropriate.	I	I	I	P	P	P	P	P	P	P	P	P	P
4.0	**Communication, Information Technology, Numerical**													

	Course Offerings NQF Learning Domains and Learning Outcomes	P-403320	P-403331	P-403380	A-403446	A-403460	A-403434	P-403471	A-403452	A-403473	A-403462	A-403472	A-403465	A-403499
1.0	**Knowledge**													
1.1	Define the physical quantities, physical phenomena, and basic principles.	P	P	P	A	A	A	A	A	A	A	A	A	A
1.2	Describe the physical laws and quantities using mathematics	P	P	P	A	A	A	A	A	A	A	A	A	A
1.3	Determine the physical quantities at the Lab.					A				A				
2.0	**Cognitive Skills**													
2.1	Apply the laws of physics to calculate some quantities.	P	P	P	A	A	A	A	A	A	A	A	A	A
2.2	Solve problems in physics by using suitable mathematics.	P	P	P	A	A	A	A	A	A	A	A	A	A
2.3	Analyse and interpret quantitative results.	P	P	P	A	A	A	A	A	A	A	A	A	A
2.4	Apply physical principle on day life phenomena.	P	P	P	A	A	A	A	A	A	A	A	A	A
2.5	Derive the physical laws and formulas.	P	P	P	A	A	A	A	A	A	A	A	A	A
3.0	**Interpersonal Skills & Responsibility**													
3.1	Show responsibility for self-learning to be aware with recent developments in physics	P	P	P	A	A	A	A	A	A	A	A	A	A
3.2	Work effectively in groups and exercise leadership when appropriate.	P	P	P	A	A	A	A	A	A	A	A	A	A
4.0	**Communication, Information Technology, Numerical**													

4.1	Communicate effectively in oral and written form.	I	I	I	P	P	P	P	P	P	P	P	P	P	P	P	P	A	A	A	A	A	A	A	A	A	A
4.2	Collect and classify the material for the course.	I	I	I	P	P	P	P	P	P	P	P	P	P	P	P	P	A	A	A	A	A	A	A	A	A	A
4.3	Use basic physics terminology in English.	I	I	I	P	P	P	P	P	P	P	P	P	P	P	P	P	A	A	A	A	A	A	A	A	A	A
4.4	Acquire the skills to use the internet communicates tools.	I	I	I	P	P	P	P	P	P	P	P	P	P	P	P	P	A	A	A	A	A	A	A	A	A	A
5.0	**Psychomotor**																										
5.1	Use experimental tools safely and correctly.	I		I			P						P						A				A				
5.2	Determine the physical quantity correctly at the Lab.	I		I			P						P						A				A				

5. Admission Requirements for the program

Attach handbook or bulletin description of admission requirements including any course or experience prerequisites**.**

6. Attendance and Completion Requirements

Attach handbook or bulletin description of requirements for:

a. Attendance.
b. Progression from year to year.
c. Program completion or graduation requirements.

E. Regulations for Student Assessment and Verification of Standards

What processes will be used for verifying standards of achievement (eg check marking of sample of tests or assignments? Independent assessment by faculty from another institution) (Processes may vary for different courses or domains of learning.)

- Samples of all kind of assessment are available in the departmental course of each course
- Group marking and group grading is conducted in some courses where the exam paper of each person is graded by more than one instructor.
- Conducting standardized exams.
- Conducting employers surveys exam paper of each person is graded by more than one instructor.

F Student Administration and Support

1. Student Academic Counselling

Describe the arrangements for academic counselling and advising for students, including both scheduling of faculty office hours and advising on program planning, subject selection and career planning (which might be available at college level).

- Each faculty member will be assigned a group of students for counselling and advising. A student will be required to meet his academic advisor at least twice a semester, the first visit being before the registration.
- Each faculty member will be asked to post his office hours during which a student can visit for receiving counselling and advising.

2. Student Appeals

Attach the regulations for student appeals on academic matters, including processes for consideration of those appeals.

G. Learning Resources, Facilities and Equipment

1a. What processes are followed by faculty and teaching staff for planning and acquisition of textbooks, reference and other resource material including electronic and web based resources? The requirements of text book and other materials for teaching are identified by the instructor teaching the course. The instructor's suggestions are reviewed by the Undergraduate Committee, who may seek the opinion of the other faculty members. The instructor, proposing the text book for a course, is asked to review at least two text books on the subject and submit justifications for the chosen text book. 1b. What processes are followed by faculty and teaching staff for planning and acquisition resources for library, laboratories, and classrooms. The department requests the Purchasing department to procure the text books selected by the department.
2. What processes are followed by faculty and teaching staff for evaluating the adequacy of textbooks, reference and other resource provisions? It is the responsibility of the undergraduate committee formed by the department to valuate the adequacy of text books, and reference materials for each course. The undergraduate committee ensures that the books are current and contents most of the topics covered in syllabuses.
3. What processes are followed by students for evaluating the adequacy of textbooks, reference and other resource provisions?
4. What processes are followed for textbook acquisition and approval?

H. Faculty and other Teaching Staff

1. Appointments

Summarize the process of employment of new faculty and teaching staff to ensure that they are appropriately qualified and experienced for their teaching responsibilities. The department has an established process for recruiting new faculty members in the areas needed. The positions are advertised with the specific requirements of qualification and experience. The department has the policy not to offer a professorial rank to instructors without a doctoral degree in the discipline. Qualifications are verified before appointments are made.

2. Participation in Program Planning, Monitoring and Review

a. Explain the process for consultation with and involvement of teaching staff in monitoring program quality, annual review and planning for improvement.

- The department conducts its affairs through a number of standing committees in the department, each committee is entrusted with some duties and responsibilities.
- The quality of program is reviewed by the Program Assessment Committee.
- The Undergraduate Committee looks after the undergraduate curriculum, and makes changes as and when necessary to main the currency of the program.
- All faculty members are distributed in the standing committees, so that all participate in the academic affairs of the department.
- All decisions of the department are discussed in the Department Council meeting for approval of the department.

b. Explain the process of the Advisory Committee (if applicable)

3. Professional; Development

What arrangements are made for professional development of faculty and teaching staff for:

a. Improvement of skills in teaching and student assessment?

The Academic Development Unit of the University holds periodically workshops on effective teaching, education technology, and better learning environment and on similar topic for the professional development of the faculty.

b. Other professional development including knowledge of research and developments in their field of teaching specialty?

Through seminars and lectures/talks delivered by the invited experts from the academia and universities.
Through conference attendance for which the University provides the support.
Through international collaboration with other universities and research centres

4. Preparation of New Faculty and Teaching Staff

Describe the process used for orientation and induction of new, visiting or part time teaching staff to ensure full understanding of the program and the role of the course(s) they teach as components within it.

A new faculty member will be given a copy of the Faculty Handbook that contains all information about the duties and responsibilities of the faculty, including the rights, privileges and code of conduct. For the first two semesters, he will be assigned multi-section courses which are co-ordinated and courses that are within his area of specialty. If necessary and desired, he will be assigned an experienced senior faculty member for receiving teaching help. His students evaluation will be closely monitored to see that there is no problem with his teaching. He will be asked to attend the workshops on effective teaching and professional development conducted by the Academic Development Unit of the University.

5. Part Time and Visiting Faculty and Teaching Staff

Provide a summary of Program/Department/College/institution policy on appointment of part time and visiting teaching staff. (ie. Approvals required, selection process, proportion to total teaching staff, etc.)

The department, for the time being, relies fully on the full time faculty member. There is no plan to hire part time faculty members, other than those who are invited from the other universities to deliver some lectures in some courses.

I. Program Evaluation and Improvement Processes

1. Effectiveness of Teaching

a. What processes are used to evaluate and improve the strategies for developing learning outcomes in the different domains of learning? (eg. assessment of learning achieved, advice on consistency with learning theory for different types of learning, assessment of understanding and skill of teaching staff in using different strategies)

(i) from current students and graduates of the program?

- graduating students surveys and interviews.
- Alumni surveys.
- Establishing an internet open forum to get student feedback.

(ii) from independent advisors and/or evaluator(s)?

- self-assessment report reviewed by external experts.
- professional chemical societies assessment.

b. What processes are used for evaluating the skills of faculty and teaching staff in using the

planned strategies? Faculty's skills will be evaluated through observation of their performance, expertise, student's evaluation and their own interests. When necessary, a faculty member is trained to perform a special function through seminars and workshops

2. Overall Program Evaluation

a. What strategies are used in the program for obtaining assessments of the overall quality of the program and achievement of its intended learning outcomes:
(i) From current students and graduates of the program? • The entry-level students will be administered a locally developed skill-testing test to measure the level of skill and knowledge. • The graduates will be tested through a locally developed exit exam to measure of the level of attainment of the learning outcomes. • An exit interview with the graduates will be carried out to receive feed back on the program and their learning experience. The department will note their concerns and suggestions for the improvement of the program and the method of teaching and learning. • During the course, students provide feedback to the lecturer via course questionnaires. Questionnaire summaries are discussed each term at the staff student consultative committee providing additional student feedback. At the end of each physics course the lecturer completes a pro-forma report, including a summary of student questionnaire responses.
(ii) From independent advisors and/or evaluator(s)? Peer review, appraising progress and identifying changes that need to be made. The reports are discussed at theme group meetings who monitor the quality of module delivery and syllabus related issues across groups of related modules forming subject themes Every three- year, a team of independent evaluators will be invited to evaluate the program on basis of an on-site visit for which the course files of all courses that will also contain the samples of best and worst student work will be made available. Such an assessment may require inspection of laboratories, equipment, class rooms and interviews with faculty, staff and students for a comprehensive evaluation of the program, facilities and the learning environment. The findings and recommendations of the evaluating team will be used for the improvement of the program.
(iii) From employers and/or other stakeholders. Beginning with the fifth year of the commencement of this new program, every two-year interval a comprehensive survey of the employers and alumni will be carried out to collect data and information on the attainment of the program's educational objectives and outcomes. Additionally, face-to-face exit interviews will be conducted with the graduating students to receive feedback on the program, delivery , learning experience and outcomes.

b. What key performance indicators will be used to monitor and report annually on the quality of the program?
• Average score on an overall program quality item on a student survey on completion of the program (50% response rate required) • Completion rate for students in first year of the program. • Proportion of students who complete the full program in minimum time. • Proportion of students (available for employment) who are employed within six months of graduation. • Proportion of full time faculty who completed training programs in teaching or attended conferences during the year. • Number of refereed journal, book or monograph publications during the year per full time faculty member.
c. What processes will be followed for reviewing these assessments and planning action to improve the program?
The department will form a standing committee known as Program Assessment Committee (PAC), which will be entrusted with the primary duty of administering every two-years a self-assessment of the program, and to evaluate the findings of this evaluation, the surveys of the employers, alumni, faculty, and the input of the exit interviews with the graduating students. Additionally, PAC will also review the assessment of the external evaluators to propose actions to be taken for the improvement of the program. PAC will propose the recommended actions to the department chair for the improvement of the program. It is departmental practice that lecturers on all but specialist courses should be changed regularly so that lecture courses are constantly refreshed, and the detailed content of lectures regularly reviewed and up-dated. Good practice is identified and shared via teaching and learning committee, the subject theme groups and at the annual courses review meeting. Teaching material.

Attachments.

1. Copies of regulations and other documents referred to in template preceded by a table of contents.

2. Course specifications for all courses.

Program KPI and Assessment Table

KPI #	List of Program KPIs Approved by the Institution	KPI Target Benchmark	KPI Actual Benchmark	KPI Internal Benchmarks	KPI External Benchmarks	KPI Analysis	KPI New Target Benchmark
1							
2							
3							
4							
5							
6							
Analysis of KPIs and Benchmarks: (list strengths and recommendations)							

NOTE The following definitions are provided to guide the completion of the above table for Program KPI and Assessment.

KPI refers to the key performance indicators the programs used in the SSRP and are approved by the institution (if applicable at this time). This includes both the NCAAA suggested KPIs chosen and all additional KPIs determined by the program (including 50% of the NCAAA suggested KPIs and all others).
Target Benchmark refers to the anticipated or desired outcome (goal or aim) for each KPI.
Actual Benchmark refers to the actual outcome determined when the KPI is measured or calculated.
Internal Benchmarks refer to comparable benchmarks (actual benchmarks) from inside the program (like data results from previous years or data results from other departments within the same college).
External Benchmarks refer to comparable benchmarks (actual benchmarks) from similar programs that are outside the program (like from similar programs that are national or international).
KPI Analysis refers to a comparison and contrast of the benchmarks to determine strengths and recommendations for improvement.
New Target Benchmark refers to the establishment of a new anticipated or desired outcome for the KPI that is based on the KPI analysis.

Program Action Plan Table

Directions: Based on your "*Analysis of KPIs and Benchmarks*" provided in the above Program KPI and Assessment Table, list the recommendations identified below.

No.	Recommendations	Action Points	Assessment Criteria	Responsible Person	Start Date	Completion Date
1						
2						
3						
4						
5						
6						
Action Plan Analysis (List the strengths and recommendations for improvement of the Program Action Plan).						

Authorized Signatures

Dean / Program Chair	Name	Title	Signature	Date
Program Dean or Chair of Board of Trustees Main Campus	Dr. Wlid Jameel Altaf	Associate professor		
Vice Rector	Dr. Saleh M Aluqmai	Assistant professor		

Course Specification:
Plan 33

	Code	Course Title
1.	4800130-4	General Physics
2.	403210-2	Thermodynamics
3.	403200-4	Classical Physics
4.	403243-2	Theoretical Methods in Physics (1)
5.	403244-3	Theoretical Methods in Physics (2)
6.	403232-4	Optics
7.	403220-3	Classical Mechanics(1)
8.	403211-3	Statistical Thermodynamics
9.	403343-3	Theoretical Methods in Physics (3)
10.	403321-3	Classical Mechanics(2)
11.	403344-3	Quantum Mechanics (1)
12.	403201-3	Electromagnetism (1)
13.	403350-4	Modern Physics
14.	403345-3	Quantum Mechanics (2)
15.	403370-3	Solid State Physics (1)
16.	403331-3	Electromagnetism (2)
17.	403380-3	Computational Physics
18.	403446-2	Quantum mechanics
19.	403460-4	Nuclear Physics
20.	403434-2	Advanced optics (1)
21.	403471-2	Semiconductors
22.	403452-2	Atomic Physics
23.	403473-4	Electronics
24.	403462-2	Radiation Physics
25.	403472-2	Solid State Physics (2)
26.	403465-2	Nuclear technology
27.	403499-2	Graduated Project

Kingdom of Saudi Arabia
National Commission for
Academic Accreditation & Assessment

المملكة العربية السعودية
الهيئة الوطنية للتقويم
والاعتماد الأكاديمي

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: 4800130-4

Course Specifications

Institution: **Umm AL – Qura University**	Date : **18/1/1438**
College/Department : **College of Applied Science – Department of Physics**	

A. Course Identification and General Information

1. Course title and code: **General Physics 1 (code: 4800130)**
2. Credit hours: **4 Hrs**
3. Program(s) in which the course is offered. **For all student** (If general elective available in many programs indicate this rather than list programs)
4. Name of faculty member responsible for the course **One staff member**
5. Level/year at which this course is offered : **1st Year / Level 2**
6. Pre-requisites for this course (if any) : ---
7. Co-requisites for this course (if any) : ---
8. Location if not on main campus: **Main campus and Al-Shesha**
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. What is the main purpose for this course? This course is designed to demonstrate and consolidate the basic physics concepts in the branches of physics such as mechanics, properties of matter, heat and optics and also aims to link the mathematical equations to the applied physics.
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.

1 Topics to be Covered

Topics	No of Weeks	Contact hours
❖ **Measurement** 1- The physical quantities, standards, and Units. 2- The international system of units. 3- The Standard of time 4- The Standard of length 5- The Standard of Mass 6- Precision and significant figures. 7- Dimensional analysis.	2	6

❖ **Vectors** 1- Vectors and Scalars. 2- Adding vectors : graphical methods 3- Components of vectors. 4- Adding vector: component method. 5- Multiplications of vectors. 6- Vector laws in physics.	**2**	**6**
❖ **Motion in one dimension** 1- Particles kinematics. 2- Description of motion 3- Average velocity 4- Instantaneous velocity. 5- Accelerated motion. 6- Motion with Constant Acceleration 7- Freely falling Bodies. 8- Measuring free fall acceleration.	**2**	**6**
❖ **Motion in two and three dimensions** 1- Position, velocity, and acceleration. 2- Motion with constant acceleration 3- Projectile motion 4- Uniform circular motion 5- Velocity and acceleration vectors in circular motion	**1**	**3**
❖ **Force and motion** 1- Position, velocity, and accelerations 2- Motion with constant acceleration. . 3- Newton's first and second laws. 4- Forces. 5- Newton's second law 6- Newton's third law. 7- Units of force 8- Weight and mass 9- Measuring forces 10- Applying Newton's laws.	**2**	**6**
❖ **Work and Energy** 1. Work done by constant force. 2. Work done by a variable force: one dimensional case. 3. Work done by a variable force: two dimensional case. 4. Kinetic energy and work-energy theory. 5. Power.	**1**	**3**

❖ **Fluids Statics** 1. Fluids and Solids 2. Density and pressure. 3. Variation of density in a fluid at rest. 4. Pascal Principle. 5. Archimedes' Principle. 6. Surface tension.	**2**	**6**
❖ **Fluid dynamics** 1. General concepts of fluid flow 2. Streamlines and the equation of continuity. 3. Bernoulli's Equation 4. Application of Bernoulli's Equation 5. Viscosity.	**2**	**6**
❖ **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**		**42**			**87**
Credit	**3**		**1**			

3. Additional private study/learning hours expected for students per week.	4

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		
1.3	Determine the physical quantities at the Lab.	1. Doing team research or team project. 2.Doing team work to perform some experiments 3. Perform the experiments correctly. 4. Demonstrate the results correctly. 5. Write the reports about the experiment. 6. Discussion with the student about the results	Writing scientific Reports. Lab assignments Exam.

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 4. Encourage the student to look for the information in different references. 5. Ask the student to attend lectures for practice solving problem.	1. Exams (Midterm, final, quizzes) 2. Asking about physical laws previously taught 3. Writing reports on selected parts of the course. 4. Discussions of how to simplify or analyze some phenomena.
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.		
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**		
5.1	Use experimental tools safely and correctly.	Follow up the students in lab and during carryout all experimental work.	• Practical exam. • Giving additional marks for the results with high and good accuracy
5.2	Determine the physical quantity correctly at the Lab.		

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	All weeks	5 %
2	Participation in activities lectures and labs	All weeks	5 %
3	Midterm Exam (theoretical)	8^{th} week	30%
4	Lab. Reports (Practical)	11^{th} week	5%
5	Final Exam (Practical)	15^{th} week	15%
6	Final Exam (theoretical)	16^{th} 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

Physics, 4^{th} edition , By: Halliday, Resnick, and Krane, Wiley (1992)

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

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

Physics , 4^{th} edition, By: J. Walker (2010)

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

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.

Name of Instructor: _______One staff member____

Signature: ____________________________ Date Report Completed: _____________

Name of Field Experience Teaching Staff ____

Program Coordinator:____

Signature: ____________________________ Date Received: ____________________

Kingdom of Saudi Arabia
National Commission for
Academic Accreditation & Assessment

المملكة العربية السعودية
الهيئة الوطنية للتقويم
والاعتماد الأكاديمي

كلية العلوم التطبيقية
Faculty of Applied Sciences

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

T6. Course Specifications (CS)

Course title: Heat and Thermodynamics

Course code: 403210-2

Course Specifications

Institution: **Umm AL – Qura University**	Date : **18/1/1438**
College/Department : **College of Applied Science – Department of Physics**	

A. Course Identification and General Information

1. Course title and code: **Heat and Thermodynamics (403210-2)**
2. Credit hours: **2 Hrs**
3. Program(s) in which the course is offered. **B.Sc 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 academic staff member**
5. Level/year at which this course is offered : **2nd Year / Level 3**
6. Pre-requisites for this course (if any) : **Introduction in Mathematics (2): 4800141-4**
7. Co-requisites for this course (if any) : ---
8. Location if not on main campus: **Main campus and Alzaher**
9. Mode of Instruction (mark all that apply)

Mode			
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. What is the main purpose for this course?

This course provides the basic concepts in the heat and thermodynamics including basic definitions, laws relating to them and their applications.

After completing this course students should be able to:

-Know definitions, units and laws of heat –heat transfer-methods of measuring the temperature-thermal expansion, its types and its applications-gases' laws

-realize the first law of thermodynamics and the concepts of heat lead to understand it (internal energy-specific heat -latent heat- work).

-differentiate between the types of systems in thermodynamics (open, closed, adiabatic, isolated) and process (cyclic, adiabatic, isobaric, isochronic , isothermal, reversible and irreversible) based on it.

-define the second law of thermodynamics and its applications(heat engine-heat pump)

-measure thermal efficiency of engine and coefficient of performance of heat pump in cooling and heating mood.

-interpret concept of the entropy and calculate it for a variety of processes

-analyze and evaluate various thermodynamic cycles used for energy production work and heat.

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. Encourage the students to see more details in the international websites and reference books in the library.
3. Renew the course references frequently.
4. Frequently check for the latest discovery in science.

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

Course Description:

In this course, chapter1: presents the basic concepts of heat and consequences related to it. Chapter 2: introduces the Kinetic theory of gases and basic concepts related to that. Chapter3: shows the first law of thermodynamics, types of systems and thermodynamic processes. Chapter 4: introduce the second law of thermodynamics, heat engines and pumps. Chapter 5: explain the concept of entropy, the change in entropy in the reversible processes, the third law of thermodynamics. chapter 6: introduce thermodynamics potentials, internal energy U, enthalpy (H), free energy of Gibbs (G) and Helmholtz free energy (A), Maxwell relations and their the application, Tds equations, Clausiuos Claperyron equation.

1 Topics to be Covered

Topics	No of Weeks	Contact hours
❖ **Thermal properties of matter** Temperature and Heat, Temperature scales, Type of thermometer, Zero law of Thermodynamic, Thermal transfers, thermal expansion	2	4
Thermodynamics properties equation of ideal gas, kinetic theory, Vander Waal equation for real gas, deduction of the critical constant of a real gas of Van der Waal, Virial equation of state, Reduced equation of state, adiabatic compressibility, P-V-T relationship of real gases, Phase Diagram	3	6
❖ **First law of thermodynamics, Heat and Energy** The types of systems and the processing in thermodynamics, The definition of heat capacity -specific heat capacity, latent heat, apply the first law of thermodynamics to evaluate the temperature - work - The internal energy and energy conversion, explain the enthalpy, The relationship between specific heat for gas, The work done in adiabatic process.	3	6
❖ **Second law of thermodynamics** Heat engines, Refrigerators, and heat pumps, Reversible processes, Statements of Kelvin - Planck and Clausius, Carnot machine and its efficiency, the principles of the Carnot cycle- Efficiency of Otto cycle and diesel fuel and gasoline	2	4
Entropy and third law of thermodynamics Concept of entropy, Entropy in the reversible processes, The third law of thermodynamics	2	4
Thermodynamics potentials Thermodynamics potentials, Internal energy U, Enthalpy (H), Free energy of Gibbs (G) and Helmholtz free energy (A), Maxwell relations and their application, Tds equations, Clausiuos Claperyron equation.	2	4
❖ **Revision**	1	2
	15 weeks	**30hrs**

2. Course components (total contact hours and credits per semester):						
	Lecture	Tutorial	Laboratory or Studio	Practical	Other:	Total
Contact Hours	**30**		**-**		**28**	**58**
Credit	**2**		**-**			

3. Additional private study/learning hours expected for students per week.	2

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 4. Encourage the student to look for the	1. Exams (Midterm, final, quizzes) 2. Asking about physical laws previously taught 3. Writing reports on selected parts of the
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.	information in different references. 5. Ask the student to attend lectures for practice solving problem.	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	Home works for each section	All weeks	10 %
2	Participation and attendance	All weeks	5 %
3	activity	3th week	5%
4	Midterm 1	6th week	15%
5	Midterm 2	10th week	15%
6	Final Exam	16th week	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)

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
1. Daniel V. Shroeder, An Introduction to Thermal Physics, Addison-Wesley Publishing Company, San Francisco, CA, 1999, The ISBN is 0-201-38027-7.
2. Physics for Scientists and Engineers, 6th Edn. (R.A.Serway, J.W.Jewett, Thomson 2004, ISBN 053440
3. Giancoli- Physics (6th)

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

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

1. Physics for Scientists and Engineers, 6th Edn. (R.A.Serway, J.W.Jewett, Thomson 2004, ISBN

053440 2. Giancoli - Physics (6th).Physics , 4th edition, By: J. Walker (2010)
4. List Electronic Materials, Web Sites, Facebook, Twitter, etc. www.uqu.sa/smattia
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.
2. Computing resources (AV, data show, Smart Board, software, etc.) In each class room, 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.
- 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.

Name of Instructor: _______M.A. Mohaseb_______________________________________

Signature: ____________________________ Date Report Completed: _____________

Name of Field Experience Teaching Staff _______________________________________

Program Coordinator:____

Signature: ____________________________ Date Received: ____________________

كلية العلوم التطبيقية
Faculty of Applied Sciences

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

T6. Course Specifications (CS)

Course title: Classical Physics

Course code: 403200-4

Course Specifications

Institution: **Umm AL – Qura University**	Date : **15/3/1438**
College/Department : **College of Applied Science – Department of Physics**	

A. Course Identification and General Information

1. Course title and code: **Classical Physics (code: 4032٠٠-4)**
2. Credit hours: **4 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 academic staff member**
5. Level/year at which this course is offered : **2nd Year / Level 2**
6. Pre-requisites for this course (if any) : **General physics 4031101-4**
7. Co-requisites for this course (if any) : ---
8. Location if not on main campus: **Main campus and Al Zaher**
9. Mode of Instruction (mark all that apply)

Mode	Mark		Percentage
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. What is the main purpose for this course?

The main purpose of the course to covering some advanced physics principles in mechanics and electricity and magnetism, such as particle dynamics, system of particles, collisions, rotational kinematics, rotational dynamics, oscillations, electric field, electric potential, electric current, magnetic field, etc. 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.

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- From using the E-learning web based in the university web site, the students improve their IT skill
2- Outlines of the physical laws, principles and the associated proofs.
3- Highlighting the day life applications whenever exist.
4- Encourage the students to see more details in the international web sites and reference books in the library.
5- Encourage the student to build an example of different experiments related to course
6- 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 main purpose of the course to covering some advanced physics principles in mechanics and electricity and magnetism, such as particle dynamics, system of particles, collisions, rotational kinematics, rotational dynamics, oscillations, electric field, electric potential, electric current, magnetic field, etc. 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.

1 Topics to be Covered

Topics	No of Weeks	Contact hours
❖ ***Collisions*** 1- What is collisions? 2- Impulse and momentum. 3- Conservation of momentum during collision. 4- Collisions in one dimension. 5- Two dimensional collisions. 6- Center of mass reference frame.	**1**	**3**

7- Spontaneous decay process. .		
❖ ***Rotational Kinematics*** 1- Rotational motion. 2- Rotation variables. 3- Rotation with constant angular acceleration. 4- Rotational quantities as vectors. 5- Relationship between linear and angular variables: scalar form. 6- Relationship between linear and angular variables: vector form.	**1.33**	**4**
❖ ***Rotational dynamics*** 1. Rotational dynamics 2. Kinetic energy of rotation and rotational inertia. 3. Rotational inertia of solid bodies 4. Rotational dynamics of rigid body 5. Combined rotational and translational motion.	**1**	**3**
❖ ***Angular momentum*** 1- Angular momentum of a particle 2- System of particles 3- Angular momentum and angular velocity 4- Conservation of angular momentum 5- The spinning top. 6- Quantization of angular momentum.	**1**	**3**
❖ ***Equilibrium of Rigid bodies*** 1- Condition of equilibrium. 2- Center of Gravity. 3- Examples of equilibrium. 4- Stable, unstable, and Neutral equilibrium or rigid bodies in a gravitational field. 5- Elasticity.	**1**	**3**
❖ ***Oscillations.*** 1. Oscillating systems. 2. The simple harmonic oscillator. 3. Simple harmonic motion 4. Energy considerations in simple harmonic motion.	**1.33**	**4**

5. Applications of simple harmonic motion 6. Simple harmonic motion and uniform circular motion. 7. Combinations of harmonic motions 8. Damped harmonic motions 9. Forced harmonic motions. .		
❖ ***Electric Charge*** 10. Electric Charge 11. Conductors and Insulators 12. Coulomb' Law 13. Charge is Quantized	**1**	**3**
❖ ***Electric Field*** 14. Field 15. Electric Field E 16. The Electric Field of Point Charge 17. Lines of Force 18. The Electric Field of continuous Charge Distribution 19. (Ring of Charge) 20. A Point Charge in an Electric Field	**1**	**3**
❖ ***Gauss 'Law*** 21. The Flux of a Vector Field 22. The Flux of the Electric Field 23. Gauss' Law 24. A Charged Isolated Conductor 25. Application of Gauss's Law : Infinite Sheet of Charge		
❖ ***Electric potential*** 26. Electric Potential Energy 27. Electric Potential 28. Calculating the Potential from the Field 29. Potential Due to a Point Charge 30. Potential Due to a Collection of Point Charges 31. The Electric Potential of Continuous Charge Distribution 32. Equipotential Surfaces 33. Calculating the Field from the Potential		
❖ ***Capacitance And Dielectric***		

34. Capacitance 35. Calculating the Capacitance (of a Parallel-Plate Capacitor only) 36. Capacitor in Series and Parallel 37. Energy Stored in an Electric Field 38. Capacitor with a Dielectric		
❖ ***Current And Resistance*** 39. Electric current 40. Current Density 41. Resistance, Resistivity and Conductivity 42. Ohm's Law 43. Energy Transfers in an Electric Circuits		
❖ ***De Circuits*** 44. Electromotive Force 45. Calculating the Current in a Single Loop 46. Potential Differences 47. Resistance in Series and Parallel 48. Multiloop Circuits 49. RC Circuits		
❖ ***Magnetism*** 50. The Magnetic Field B 51. Magnetic Force on a Moving Charge 52. Circulating Charges 53. Magnetic Force on a Current 54. Magnetic field lines 55. The magnetic force on moving charges 56. Magnitude of the magnetic force, F 57. Magnitude of the magnetic field, B 58. Magnetic force Right-Hand Rule (RHR) 59. III- The motion of charged particles in a magnetic field 60. Electric versus Magnetic Forces 61. Constant-velocity, straight-line motion 62. Circular motion 63. IV- The magnetic force exerted on a current-carrying wire 64. V- Loops of current and magnetic		

torque 65. VI- Electric currents, magnetic fields and Ampere´s law		
❖ ***Solved problems***	**2**	**6**
	15 weeks	**45hrs**

Practical part:

1. Safety and Security at the lab.
2. Introduction.
3. Simple Pendulum.
4. Torque pendulum
5. Verification of Hook's law.
6. Moment of inertia of rigid body.
7. Projectiles
8. Determination of sound velocity in air.

2. Course components (total contact hours and credits per semester):						
	Lecture	Tutorial	Laboratory or Studio	Practical	Other:	Total
Contact Hours	**45**		**42**			**87**
Credit	**3**		**1**			

3. Additional private study/learning hours expected for students per week.	4

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		
1.3	Determine the physical quantities at the Lab.	1. Doing team research or team project. 2.Doing team work to perform some experiments 3. Perform the experiments correctly. 4. Demonstrate the results correctly. 5. Write the reports about the experiment. 6. Discussion with the student about the results	Writing scientific Reports. Lab assignments Exam.

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 4. Encourage the student to look for the information in different references. 5. Ask the student to attend lectures for practice solving problem.	1. Exams (Midterm, final, quizzes) 2. Asking about physical laws previously taught 3. Writing reports on selected parts of the course. 4. Discussions of how to simplify or analyze some phenomena.
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.		
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**		
5.1	Use experimental tools safely and correctly.	Follow up the students in lab and during carryout all experimental work.	• Practical exam. • Giving additional marks for the results with high and good accuracy
5.2	Determine the physical quantity correctly at the Lab.		

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	All weeks	5 %
2	Participation in activities lectures and labs	All weeks	5 %
3	Midterm Exam (theoretical)	8th week	30%
4	Lab. Reports (Practical)	11th week	5%
5	Final Exam (Practical)	15th week	15%
6	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

Physics, 4th edition , By: Halliday, Resnick, and Krane, Wiley (1992)

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

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

Physics, 4th edition , By: Halliday, Resnick, and Krane, Wiley (1992)
Physics , 4th edition, By: J. Walker (2010)

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

www.uqu.sa/baewiss

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.

Name of Instructor: _______B. A. Korany_______________________________________

Signature: ____________________________ Date Report Completed: _____________

Name of Field Experience Teaching Staff _______________________________________

Program Coordinator:____

Signature: ____________________________ Date Received: ____________________

Kingdom of Saudi Arabia
National Commission for
Academic Accreditation & Assessment

المملكة العربية السعودية
الهيئة الوطنية للتقويم
والاعتماد الأكاديمي

كلية العلوم التطبيقية
Faculty of Applied Sciences

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

T6. Course Specifications (CS)

Course title: Theoretical Methods in Physics (1)

Course code: 403243-2

Course Specifications

Institution: **Umm AL – Qura University**	Date : **18/2/1438**
College/Department : **College of Applied Science – Department of Physics**	

A. Course Identification and General Information

1. Course title and code: **Theoretical Methods in Physics (1) (code: 403243-2)**
2. Credit hours: **2 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 **Mohamed M.Sabry**
5. Level/year at which this course is offered : **2nd Year / Level 4**
6. Pre-requisites for this course (if any) : **Differentiation and Integration (2) (4042501-4)**
7. Co-requisites for this course (if any) : ---
8. Location if not on main campus: **Main campus and Alzaher**
9. Mode of Instruction (mark all that apply)

Mode			
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. What is the main purpose for this course? This course is designed to demonstrate and consolidate the different concepts of mathematics and algebra and ways of using them in the different branches of physics
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) Encourage students to practice in the basics of mathematics and algebra – like differentiation and integration, limits, related to the course

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

Course Description: The course provides a direct preparation for an advanced study in theoretical physics and is also an interesting element in the education of an experimental physicist. The physical principles behind the mathematical models are stressed so that insight and problem solving ability become primary. This course will cover the basic mathematical tools used in physical science and engineering: Vector analysis, partial differentiation, power and series, differential equations, special functions, integral transforms, and complex analysis. The course is designed to supply students for a variety of mathematical methods that need for advanced undergraduate and beginning graduate study in physical science and to develop a solid background for those who will continue into the mathematics of advanced theoretical physics

1 Topics to be Covered

Topics	No of Weeks	Contact hours
❖ **Vector Analysis** 1- Triple (Scalar-Vector) products- 2- Differentiation of vectors- 3- grad, Div, Curl and Laplace's operator, 4- Vector integral- 5- Green's, Gauss' and Stokes theorems, 6- General curvilinear coordinates- 7- vector operators in orthogonal curvilinear coordinates	4	8
❖ **Infinite series, Power series** **1-** Geometric series, **2-** testing series for convergence, **3-** Alternating series, **4-** interval of convergence- **5-** expanding functions in power series, **6-** Taylor and Maclaurin expansions,	3	6

7- Solving Problems about Series		
❖ **Partial Differentiation** 1- Total differentials- 2- Approximating using differentials, 3- chain rule 4- Implicit differentiation, A 5- Application to Maximum and Minimum problems, 6- Lagrange Multipliers, Change of Variables, 7- Differentiation of Integrals	**4**	**8**
❖ **Ordinary differential equations** 1- First order differential equations; 2- separable differential equations, 3- linear 1st order equations, 4- 2nt order differential equations; 5- Homogeneous differential equations, 6- Non-homogeneous differential equations.	**3**	**6**
	15 weeks	**30 hrs**

2. Course components (total contact hours and credits per semester):						
	Lecture	Tutorial	Laboratory or Studio	Practical	Other:	Total
Contact Hours	**30**		**0**		**10**	**40**
Credit	**4**		**0**			

3. Additional private study/learning hours expected for students per week.	4

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 4. Encourage the student to look for the	1. Exams (Midterm, final, quizzes) 2. Asking about physical laws previously taught 3. Writing reports on selected parts of the
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.	information in different references. 5. Ask the student to attend lectures for practice solving problem.	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	All weeks	10 %
2	Participation in activities lectures and labs	All weeks	10 %
3	1st Periodic Exam	8th week	15%
4	2nd Periodic Exam	11th week	15%
5	Final Exam	16th week	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)

Students are supervised by academic advisers 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
1- Mary L. Boas, Mathematical methods in the Physical sciences, second edition, John Wiley and Sons (1966) and (1983).
2- G. Dennis Zill, R. Michael Cullen, Advanced engineering mathematics, Jones and Bartlett Publisher (2006), ISBN 9780763745912.
3- Eugene Butkov, Mathematical Physics, World student series edition (1973)

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.

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.
2. Computing resources (AV, data show, Smart Board, software, etc.) In each class room, there is a data show, and board.
3. Other resources (specify, e.g. 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 • 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 of the grades of students.
3 Processes for Improvement of Teaching • Preparing the course as PPT. • Coupling the theoretical part with real physics problems • 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.

Name of Instructor: _______Mohamed M.Sabry______________________________________

Signature: ___________________________ Date Report Completed: ____________

Name of Field Experience Teaching Staff ______________________________________

Program Coordinator:____

Signature: ___________________________ Date Received: ___________________

كلية العلوم التطبيقية
Faculty of Applied Sciences

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

T6. Course Specifications (CS)

Course title: Theoretical Methods in Physics (2)

Course code: 403242-3

Course Specifications

Institution: **Umm AL – Qura University**	Date : **11/3/1439**
College/Department : **College of Applied Science –Department of Physics**	

A. Course Identification and General Information

1. Course title and code: **Theoretical Methods in Physics (2) (code: 403242-3)**
2. Credit hours: **3 Hrs**
3. Program(s) in which the course is offered. **BScPhysics.** (If general elective available in many programs indicate this rather than list programs)
4. Name of faculty member responsible for the course **Walid Belkacem Belhadj**
5. Level/year at which this course is offered : **2^{nd} Year / Level 4**
6. Pre-requisites for this course (if any) : **Theoretical Methods in Physics (1) 403241-3**
7. Co-requisites for this course (if any) : ---
8. Location if not on main campus: **Main campus and Alzaher**
9. Mode of Instruction (mark all that apply)

Mode	Mark		Percentage
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. What is the main purpose for this course?

This course together with Phys 403241 and Phys 403343 are designed to provide a variety of mathematical techniques for the Physical Sciences.

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. Use Fourier series for expansion of periodic functions in terms of an infinite sum of sines and cosines.
2. Use Laplace transform and calculate solution of differential equations by Laplace transform.
3. Deal with Fourier transform, Dirac-Delta, and Green's functions and their applications in physics.
4. Deal with special functions (factorial, gamma, beta and error functions) that are used extensively in physics problems.
5. Develop an intuitive feeling for the precise mathematical formulation of physical problems and for the physical interpretation of the mathematical solutions.
6. Be familiar with the mathematical formulae of this course that frequently appear in physics problems.
7. Use computer to verify the solution of some physical problems.
8. Use computer to construct graphs of some functions.

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

Course Description:

The course provides a direct preparation for an advanced study in theoretical physics and is also an interesting element in the education of an experimental physicist. The physical principles behind the mathematical models are stressed so that insight and problem solving ability become primary. This course together with Phys 403241 and phys 403343 will cover the basic mathematical tools used in physical science and engineering: Vector analysis, partial differentiation, power and series, differential equations, special functions, integral transforms, and complex analysis. The course is designed to supply students for a variety of mathematical methods that need for advanced undergraduate and beginning graduate study in physical science and to develop a solid background for those who will continue into the mathematics of advanced theoretical physics.

1 Topics to be Covered

Topics	No of Weeks	Contact hours
❖ **Fourier series and transforms:** Simple Harmonic Motion and Wave Motion; Periodic Functions, Average Value of a Function, Fourier Coefficients, Complex Form of Fourier Series, Even and Odd Functions, Applications of Fourier Series, Fourier Transforms, Laplace Transforms.	4	12
❖ **Special functions:** Factorial Function, Gamma Function; Recursion Relation, Some Important Formulas Involving Gamma Functions, Beta Functions, Beta Functions in Terms of Gamma Functions, The Error Function, Asymptotic Series, Stirling's Formula, Elliptic Integrals and Functions.	3	9
❖ **Legendre's functions:** Leibniz' Rule, Rodrigues' Formula, Generating Function, Orthogonality of the Legendre Polynomials, Normalization of the Legendre Polynomials, Legendre Series, Associated Legendre Functions, Generalized Power Series.	3	9
❖ **Bessel's functions:** First and Second Solution of Bessel's Equation, Graphs and Zeros of Bessel Functions, Recursion Relations, Other Kinds of Bessel Functions, Orthogonality of Bessel Functions.	3	9
❖ **Hermite - Laguerre Functions:** Ladder operators, Hermite functions, Hermite polynomials, Laguerre functions, Laguerre polynomials, Associated Laguerre polynomials.	2	6
	15 weeks	45 hrs

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

	Lecture	Tutorial	Laboratory or Studio	Practical	Other:	Total
Contact Hours	45		--			45
Credit	4		--			

3. Additional private study/learning hours expected for students per week.	4

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 4. Encourage the student to look for the	1. Exams (Midterm, final, quizzes) 2. Asking about physical laws previously taught 3. Writing reports on selected parts of the
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.	information in different references. 5. Ask the student to attend lectures for practice solving problem.	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	Online quizzes	All weeks	10%
2	Exercises & Home works	All weeks	10 %
3	Participation in activities lectures and labs	All weeks	10 %
4	Midterm Exam (1)	8^{th} week	15%
5	Midterm Exam (2)	11^{th} week	15%
6	Final Exam	16^{th} 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

1. Mary L. Boas, Mathematical methods in the Physical sciences, third edition, John Wiley and Sons (2006), ISBN-13 978-0-471-19826-0.

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

1. G. Dennis Zill, R. Michael Cullen, Advanced engineering mathematics, Jones and Bartlett Publisher (2006), ISBN 9780763745912.
2. Eugene Butkov, Mathematical Physics, World student series edition (1973).

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

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

1. www.mpipks-dresden.mpg.de/~jochen/methoden/outline.html
2. People.uncw.edu/hermanr/phy311/mathphysbook/index.html

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.)

- Class room is already provided with data show.
- The area of class room is suitable concerning the number of enrolled students (68) and air conditioned.
- Library.
- Laboratory for fundamental of physics.

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

- Computer room.
- MATLAB software.

3. Other resources (specify, e.g. 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

- 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.

Name of Instructor: _______**Walid Belkacem Belhadj**______________________

Signature:___________________________Date Report Completed:____________

Name of Field Experience Teaching Staff ______________________________________

Program Coordinator:____

Signature: ___________________________ Date Received:___________________

كلية العلوم التطبيقية
Faculty of Applied Sciences

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

T6. Course Specifications (CS)

Course title: Optics

Course code: 403232-4

Course Specifications

Institution: **Umm AL – Qura University**	Date : **18/1/1438**
College/Department : **College of Applied Science – Department of Physics**	

A. Course Identification and General Information

1. Course title and code: **Optics (code: 403232)**
2. Credit hours: **4 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 academic staff member**
5. Level/year at which this course is offered : **2st Year / Level 5**
6. Pre-requisites for this course (if any) : 403232
7. Co-requisites for this course (if any) : ---
8. Location if not on main campus: **Main campus and Alzaher**
9. Mode of Instruction (mark all that apply)

Mode			
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. What is the main purpose for this course?

The objectives of this course are to through light on nature of light. And also through light on different phenomena like interference, diffraction, polarization and their application in life.

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- Cooperate with different institution to find how they deal with the subject.
6- Renew the course references frequently.
7- Frequently check for the latest discovery in science.
8- Encourage the students to see more details in the international web sites and reference books in the library.

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

Course Description:
The course will cover the principle of physics, reflection and refraction, harmonic wave motion, interference, diffraction , applied interferometry, Diffraction gratings and polarization of 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.

1 Topics to be Covered

Topics	No of Weeks	Contact hours
❖ **Introduction: Reflection and Refraction** 1- Reflection, Fermat's principle, refraction. 2- Mirrors	**2**	**6**

3- Thin Lenses 4- Prisms and dispersion		
❖ **Wave Optics: Harmonic Wave motion**	**1**	**3**
❖ **Interference** 1- Young's double slit experiment 2- General conditions of interference, superposition of waves	**3**	**9**
❖ **Diffraction** 1- General description of diffraction, Fraunhofer Diffraction at a single slit, Fraunhofer diffraction at a circular aperture, 2- Fresnel diffraction 3- Fresnel integrals, Cornu spiral, obliquity factor).	**3**	**9**
❖ **Applied interferometry** 1. the Michelson interferometer 2. Mach – Zehnder interferometer. 3. Coherence	**2**	**6**
❖ **Diffraction gratings** 1. (one dimensional Gratings, two-dimensional Gratings, x-ray Diffraction, Moire' Fringes). 2. Multiple Reflection Interference (plane parallel plates, The Fabry – Perot interferometer, Newton's rings,	**3**	**9**
❖ **Exercises and Solved problems**	**1**	**3**
	15 weeks	**45hrs**

Practical part:

1. Safety and Security in the lab.
2. Introduction.
3. Interference of Light and eye resolving power.
4. Diffraction of Light.
5. Newton's Rings.
6. Polarization of Light and Brewster's angle.
7. Diffraction Grating .
8. Study of prism properties using Spectrometers Thermobiles.
9. Abbe refractometer.

10. Malus law Experiment.

2. Course components (total contact hours and credits per semester):						
	Lecture	Tutorial	Laboratory or Studio	Practical	Other:	Total
Contact Hours	**45**		**42**			**87**
Credit	**3**		**1**			

3. Additional private study/learning hours expected for students per week.	4

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		
1.3	Determine the physical quantities at the Lab.	1. Doing team research or team project. 2.Doing team work to perform some experiments 3. Perform the experiments correctly. 4. Demonstrate the results correctly. 5. Write the reports about the experiment. 6. Discussion with the student about the results	Writing scientific Reports. Lab assignments Exam.
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 4. Encourage the student to look for the information in different references. 5. Ask the student to attend lectures for practice solving problem.	1. Exams (Midterm, final, quizzes) 2. Asking about physical laws previously taught 3. Writing reports on selected parts of the course. 4. Discussions of how to simplify or analyze some phenomena.
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.		
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**		
5.1	Use experimental tools safely and correctly.	Follow up the students in lab and during carryout all experimental work.	• Practical exam. • Giving additional marks for the results with high and good accuracy
5.2	Determine the physical quantity correctly at the Lab.		

5. Map course LOs with the program LOs. (Place course LO #s in the left column and program LO #s across the top.)

Kingdom of Saudi Arabia
National Commission for
Academic Accreditation & Assessment

المملكة العربيــة السعودية
الهيئــة الوطنيــة للتقويــم
والاعــتــمــاد الأكــاديــمــي

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	All weeks	5 %
2	Participation in activities lectures and labs	All weeks	5 %
3	Midterm Exam (theoretical)	8th week	30%
4	Lab. Reports (Practical)	11th week	5%
5	Final Exam (Practical)	15th week	15%
6	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. (6hrs per week)

E Learning Resources

1. List Required Textbooks

1.Physical optics Notebook: Tutorials in Fourier Optics, eds. Reynolds, George, John

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

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

*Introduction to Classical and Modern Optics, by Jurgen R. Meyer-Arendt, Prentic – Hall international , (1995).
*Fundamentals of optics , by Francis Jenkins and Harvey White, Mc Graw Education, (2001)

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

http://www.physicsclassroom.com

http://www.learnerstv.com/ http://www.lightandmatter.com/lm/ http://optics.byu.edu/BYUOpticsBook_2011c.pdf
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 • Evaluating the instructor by the student using questionnaires • Following up the progress of student in the course • Evaluating the progress of student by the projects and reports • Evaluating the course by specialized committees
2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department • Self-evaluation

- Student evaluation
- Evaluation by other instructor in the same department or outside it.

3 Processes for Improvement of Teaching

- Course report
- Program report
- Program self study
- Handling the weakness point.
- By the Accreditation committee in the department

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
2- According to point 1 the plan of improvement should be given.
3- Contact the college to evaluate the course
4- Reviewing the course and updating it.

Name of Instructor: _______Mongi Ben Moussa

Signature: ____________________________ Date Report Completed: ____________

Name of Field Experience Teaching Staff ____

Program Coordinator:____

Signature: ____________________________ Date Received: ____________________

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

T6. Course Specifications (CS)

Course title: Classical Mechanics 1

Course code: 403220-3

Course Specifications

Institution: **Umm AL – Qura University**	Date : **11/3/1439**
College/Department : **College of Applied Science – Department of Physics**	

A. Course Identification and General Information

1. Course title and code: **Classical Mechanics 1 (code: 403220-3)**
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 **Dr. Fatma Elsayed Mahrous**
5. Level/year at which this course is offered: **2nd Year / Level 4**
6. Pre-requisites for this course (if any): **Classical Physics (403200-4)**
7. Co-requisites for this course (if any) : ---
8. Location, if not on the main campus: **Main campus and Al-Zaher**

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. What is the main purpose for this course? This course is designed to demonstrate and consolidate the basic physics concepts in classical mechanics, the general motion of the particles in three dimensions, the noninertial reference systems, the gravitation, and central forces.
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 websites and reference books in the library. 4- Encourage the student to build an example of different experiments related to the 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: Chapter 1: A brief preparation in vector algebra and vector differentiation. Chapter 2: Newton's laws of motion and the rectilinear motion of a single particle. Chapter 3: Harmonic motion, damped and forced harmonic oscillator. Chapter 4: The general motion of a particle in three dimensions. Chapter 5: Noninertial reference systems. Chapter 6: The central forces and celestial mechanics.

1 Topics to be Covered

Topics	No of Weeks	Contact hours
❖ **Fundamental Concepts Vectors** 1- Physical quantities and units. 2- Scalar and vector quantities. 3- Formal definition and rules. 4- The Scalar and Vector Products. 5- Triple products 6- Derivative of a vector. 7- Position vector of a particle velocity and Acceleration in Rectangular Coordinates. 8- Velocity and Acceleration in Polar Coordinates. 9- Velocity and Acceleration in Cylindrical and Spherical Coordinates.	2	6

❖ **Newtonian Mechanics, Rectilinear Motion of a Particle** 1- Newton's Law of Motion. 2- Rectilinear Motion: Uniform Acceleration Under a Constant Force. 3- Forces that Depend on Position: The Concepts of Kinetic and Potential Energy. 4- Velocity-Dependent Forces: Fluid Resistance and Terminal Velocity.	**3**	**9**
❖ **Oscillations** 1- Linear Resoring Force: Harmonic Motion. 2- Energy Considerations in Harmonic Motion. 3- Damped Harmonic Motion. 4- Forced Harmonic Motion: Resonance.	**2**	**6**
❖ **General Motion of a Particle in Three Dimensions** 1- Introduction. 2- The Potential Energy Function in Three-Dimensional Motion: The Del Operator. 3- Forces of the Separable Type. 4- The Harmonic Oscillator in Two and Three Dimensions. 5- Constrained Motion of a particle.	**2**	**6**
❖ **Noninertial Reference Systems** 1- Accelerated Coordinate Systems and Interial Forces. 2- Rotating Coordinate Systems. 3- Dynamics of a Particle in a Rotating Coordinate System. 4- Effects of Earth's Rotation. 5- The Foucault Pendulum.	**2**	**6**
❖ **Gravitation and Central Forces** 1- Introduction. 2- Gravitational Force between a Uniform Sphere and a Particle. 3- Kepler's Laws of Planetary Motion. 4- Kepler's Second Law: Equal Areas. 5- Kepler's Firs Law: The Law of Ellipses. 6- Kepler's Third Law: The Harmonic Law. 7- Potential Energy in a Gravitational Field: Gravitational Potential. 8- Potential Energy in a General Central Field. 9- Energy Equation of an Orbit in a Central Field. 10- Orbital Energies in an Inverse-Square Field.	**3**	**9**
	14 weeks	**42 hours**

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

	Lecture	Tutorial	Laboratory or Studio	Practical	Other:	Total
Contact Hours	**42**		**--**		**14**	**56**
Credit	**3**					

3. Additional private study/learning hours expected for students per week. 4

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 4. Encourage the student to look for the	1. Exams (Midterm, final, quizzes) 2. Asking about physical laws previously taught 3. Writing reports on selected parts of the
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.	information in different references. 5. Ask the student to attend lectures for practice solving problem.	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	All weeks	5 %
2	Participation in activities, lectures	All weeks	5 %
3	In-Class Problem solving	All weeks	10 %
4	Midterm Exam1 (theoretical)	6th week	15%
5	Midterm Exam2 (theoretical)	11th week	15%
6	Final Exam (theoretical)	16th week	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)

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

E Learning Resources

1. List Required Textbooks

G. R. Fowles and G. L. Cassiday, “Analytical Mechanics”, 7th edition, Brooks Cole (2005).
G. R. Fowles, “Analytical Mechanics”, 3rd edition, Holt, Rinehart and Winston (1977).

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

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

S. T. Thornton, and J. B. Marion, “Classical Dynamics of Particles and Systems”, 5th edition, Brooks Cole (2003).

4. List Electronic Materials, Web Sites, Facebook, Twitter, etc.
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.) Classroom for 40 students with data show Library
2. Computing resources (AV, data show, Smart Board, software, etc.) Computer room Data show
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) Each Classroom data show, and double layer white board.

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching • Evaluating the instructor by the student using questionnaires. • Following up the progress of students in the course. • Evaluating the progress of student by projects.
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 Strategies are modified each term according to the student feedback.
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.

Name of Instructor: _______Fatma El-Sayed Mahrous Othman____________________

Signature: _____Fatma El-Sayed______ Date Report Completed: ___11/3/1439__

Name of Field Experience Teaching Staff ____________________________________

Program Coordinator:____

Signature: __________________________ Date Received: ___________________

كلية العلوم التطبيقية
Faculty of Applied Sciences

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

T6. Course Specifications (CS)

Course title: Statistical thermodynamics

Course code: 4033111-3

Course Specifications

Institution: **Umm AL – Qura University**	Date : **18/1/1438**
College/Department : **College of Applied Science – Department of Physics**	

A. Course Identification and General Information

1. Course title and code: **Statistical thermodynamic (code: 403211-3)**
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 **Dr. Ahmed Mohamed El-Hadi**
5. Level/year at which this course is offered : **3st Year / Level 6**
6. Pre-requisites for this course (if any) : **Heat and thermodynamics (4033110-3)**
7. Co-requisites for this course (if any) : ---
8. Location if not on main campus: **Main campus and Alzaher**
9. Mode of Instruction (mark all that apply)

Mode			
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. What is the main purpose for this course? 1. Realize the difference between the energy levels and energy states. 2. Define the concept of the thermodynamic probability and how to deal with some physical applications through this concept. 3. Differentiate between distinguishable and indistinguishable particles. 4. Compare between the different distribution functions and the different cases in use every one. 5. Define the concept of the partition function and redefine the thermodynamic quantities in terms of the partition function. 6. apply some statistics and some quantum statistics to the systems.
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 give the new mathematical treatment in the concept of probability for some physical quantities for a system consists of a large number of particles such as a monatomic or diatomic ideal gas or steam of electrons or quantity of photons radiated from black body radiation. These quantities are given according to classical or quantum treatment. .

1 Topics to be Covered

Topic	No of Weeks	Contact hours
❖ **Introduction:** **-Energy states and energy levels, macro states and microstates, thermodynamic probability.**	**2**	**6**
The three statistics and its distribution functions: **-The Bose-Einstein statistics, the Fermi-Dirac statistics , the Maxwell-Boltzmann statistics, The statistical interpretation of entropy, The Bose-Einstein distribution function, the Fermi-Dirac distribution functions, the classical distribution function, comparison of distribution functions for indistinguishable particles, the Maxwell-Boltzmann distribution function.**	**3**	**9**
❖ **The partition function:** **Thermodynamic properties of a system.**	**1**	**3**
❖ **Applications of statistics to gases:** **- The monatomic ideal gas, the distribution of molecular velocities, The principle of equipartition of energy, the quantized linear oscillator and specific heat capacity of a diatomic ideal gas.**	**4**	**12**
❖ **Applications of quantum statistics to other systems :** **The Einstein and Debye theories of the specific heat capacity of a solid, Black body radiation, Para magnetism and the electron gas.**	**4**	**12**
	14 weeks	**42hrs**

2 Course components (total contact hours per semester):			
Lecture : 42	**Tutorial: 12**	**Practical: 0**	**Other:** Office hours 12

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): 12h (reports & essay)

3. Additional private study/learning hours expected for students per week.	4

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	Understand and apply the principles of statistical mechanics on ensembles of molecules. Understand and apply the principles of statistical mechanics on ensembles of molecules. Recognize the association between statistical mechanics and thermodynamics. Understanding of how intermolecular interaction affects the properties of matter.	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. Exams: a) Quizzes (E-learning) b) Short exams (mid- term exams) c) Long exams (final) d) Oral exams Discussions during the lectures.
1.2	Use statistical mechanical computer programmers to calculate the properties of macroscopic systems.	1. Demonstrating the basic principle of the experiment. 2. Show the best ways to perform the	Home work. Writing scientific Reports. Doing team research or team project.

		experiments 3. Show the best ways to demonstrate the results. 4. Show the best way to write the reports about the experiment. 5. Discussion with the student about the results.	Doing team work to perform some experiments Discussions during the class.
2.0	**Cognitive Skills**		
2.1	Apply the laws of physics.	1. Preparing main outlines for teaching 2.Following some proofs 3.Define duties for each chapter 4.Encourage the student to look for the information in different references 5.Ask the student to attend lectures for practice solving problem	Midterm theoretical exams (2) 30% Homework and Activities 10% quizzes 10% Final exam 50% Discussions of how to simplify or analyze some phenomena
2.2	Solve problems in Physics by using suitable mathematical principles		
2.3	Analyse and interpret quantitative results		
2.4	Express the physical phenomena mathematically.		
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 use the library. • Small group discussion. • Enhance educational skills. • Develop their interest in Science through :(lab work, field trips, visits to scientific and research. • Encourage the student to attend lectures regularly • Give students tasks of duties	• Evaluate the efforts of each student in preparing the report. • Evaluate the scientific values of reports. • Evaluate the work in team • Evaluation of the role of each student in lab group assignment • 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	• Homework	• Evaluation of presentations

4.2	Collect and classify the material for a course	• preparing a report on some topics related to the course depending on web sites.	• Evaluation of reports • Practical exam • Homework. • Final exams.
4.3	Use basic physics terminology in English		
4.4	Acquire the skills to use the internet communicates tools.		
5.0	**Psychomotor**		
5.1	• Evaluate the work in team. • Evaluation of student's presentations. • The ability to search through the library and internet to give information on the course. • The ability to understand and the think of problems by solving the exercises and questions in solving problems.	We will apply the principles of statistics to develop (1) The concepts of ensembles and distribution functions. (2) Statistical mechanical expressions for thermodynamic functions. (3) Models of polyatomic gases, monatomic crystals, polymers.	Asking questions during lectures. Midterm exams and quizzes. Doing homework. Discussion same physical method, check the problems solution.

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**	**3.3**	**3.4**	**4.1**	**4.2**	**4.3**	**4.4**	**5.1**	**5.2**
1.1		✓																
1.2			✓															

2.1				✓														
2.2						✓												
2.3							✓											
2.4						✓												
3.1									✓									
3.2										✓								
4.1													✓					
4.2														✓				
4.3															✓			
4.4																✓		
5.1																	✓	

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	All weeks	15 %
2	Participation in activities lectures and labs	All weeks	5 %
3	Midterm Exam (theoretical)	8^{th} week	30%
6	Final Exam (theoretical)	16^{th} week	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)

1- 12-office hours per week in the lecturer schedule.

2- The contact with students by e-mail.

E Learning Resources

1. List Required Textbooks

1. Thermodynamics, Kinetic theory, and statistical thermodynamics, 3rd edition, Francis W. Sears and Gerhard L. Salinger.
2. An introduction to thermodynamics and statistical mechanics second edition(2007).
3. Fundamentals of Statistical and Thermal Physics, by R. Reif, (2008).
4. Concepts in thermal physics, Stephen J.Blundell and Katherine M.Blundell,2006

.

Recommended Reading List

1. M.D. Sturge, Statistical and Thermal Physics, Fundamentals and Applications (A.K. Peters, Natick, Massachusetts, 2003) ISBN 1-56881-196-9..

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

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

www.uqu.sa/Ahmed El-hadi

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.
Lecture room and a board to write on
The area of class room is suitable concerning the number of enrolled students (30) and air conditioned.

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 has smart, and double layer white board.
Questionaries
Open discussion in the class room at the end of the lectures

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.

Name of Instructor: _______Assoc. Dr. El-hadi, Ahmed

Signature: ____________________________ Date Report Completed: ____________

Name of Field Experience Teaching Staff _______________________________________

Program Coordinator:____

Signature: ____________________________ Date Received:
____12/3/1438_______________

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

T6. Course Specifications (CS)

Course title: Theoretical Methods in Physics (3)

Course code: 403343-3

Course Specifications

Institution: **Umm AL – Qura University**	Date : **18/2/1438**
College/Department : **College of Applied Science – Department of Physics**	

A. Course Identification and General Information

1. Course title and code: **Theoretical Methods in Physics (3) (code: 403343-3)**
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 **Atif Ismail**
5. Level/year at which this course is offered : **3nd Year / Level 5**
6. Pre-requisites for this course (if any) : Methods in theoretical physics (2) (code: 403243)
7. Co-requisites for this course (if any) : ---
8. Location if not on main campus: **Main campus and Alzaher**
9. Mode of Instruction (mark all that apply)

Mode	Mark		Percentage
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. What is the main purpose for this course? This course is designed to demonstrate and consolidate the different concepts of mathematics and algebra and ways of using them in the different branches of physics
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) Encourage students to practice in the basics of mathematics and algebra – like differentiation and integration, limits, function of complex variables and series, differential equations, partial differential equations, and integral transforms related to the course. Develop an intuitive feeling for the precise mathematical formulation of physical problems and for the physical interpretation of the mathematical solutions. Be familiar with the mathematical formulae of this course that frequently appear in physics problems. Use computer to verify the solution of some physical problems. Use computer to construct graphs of some functions.

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

Course Description:

The course provides a direct preparation for an advanced study in theoretical physics and is also an interesting element in the education of an experimental physicist. The physical principles behind the mathematical models are stressed so that insight and problem solving ability become primary. This course will cover the basic mathematical tools used in physical science and engineering: functions of complex variables, series, residue theorem, contour integral, integral transforms, and ordinary differential equations and partial differential equations. The course is designed to supply students for a variety of mathematical methods that need for advanced undergraduate and beginning graduate study in physical science and to develop a solid background for those who will continue into the mathematics of advanced theoretical physics

1 Topics to be Covered

Topics	No of Weeks	Contact hours
❖ **Partial differential equations:** Laplace's equation, The diffusion equation, The wave equation, Application of Laplace's equation, Steady state temperature distribution in a plate, Steady state temperature distribution in a Cylinder, Steady state temperature distribution in a Sphere.	**5**	**15**
❖ **Laplace transforms:** Solution of differential equations by Laplace transforms.	**2**	**6**

❖ **Green's functions:** A brief introduction to Green's function.	**2**	**6**
❖ **Functions of a complex variable:** Analytic functions, Cauchy-Riemann, conditions, Contour integrals, Laurent series, the residue theorem.	**4**	**12**
❖ **Introduction to tensor analysis:**	**2**	**6**
	15 weeks	**45 hrs**

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.	4

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 4. Encourage the student to look for the	1. Exams (Midterm, final, quizzes) 2. Asking about physical laws previously taught 3. Writing reports on selected parts of the
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.	information in different references. 5. Ask the student to attend lectures for practice solving problem.	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	All weeks	10 %
2	Participation in activities lectures and labs	All weeks	10 %
3	1st Periodic Exam	8th week	15%
4	2nd Periodic Exam	11th week	15%
5	Final Exam	16th week	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)

Students are supervised by academic advisers 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

1- Mary L. Boas, Mathematical methods in the Physical sciences, second edition, John Wiley and Sons (1966) and (1983).
2- G. Dennis Zill, R. Michael Cullen, Advanced engineering mathematics, Jones and Bartlett Publisher (2006), ISBN 9780763745912.
3- Eugene Butkov, Mathematical Physics, World student series edition (1973)

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.

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.
2. Computing resources (AV, data show, Smart Board, software, etc.) In each class room, there is a data show, and board.
3. Other resources (specify, e.g. 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 • 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 of the grades of students.
3 Processes for Improvement of Teaching • Preparing the course as PPT. • Coupling the theoretical part with real physics problems • 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.

Name of Instructor: _______Atif Ismail____

Signature: ___________________________ Date Report Completed: ____________

Name of Field Experience Teaching Staff ______________________________________

Program Coordinator:____

Signature: ___________________________ Date Received: ___________________

كلية العلوم التطبيقية
Faculty of Applied Sciences

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

T6. Course Specifications (CS)

Course Title: Classical Mechanics (2)

Course Code: 403321 -3

Course Specifications

Institution: **Umm AL – Qura University**	Date : **18/1/1438**
College/Department : **College of Applied Science – Department of Physics**	

A. Course Identification and General Information

1. Course title and code: **Classical Mechanics (2) (code: 403321)**
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 academic staff member**
5. Level/year at which this course is offered : **3rd Year / Level 5**
6. Pre-requisites for this course (if any) : **Classical Mechanics (1) (403220-3)**
7. Co-requisites for this course (if any) : **Theoretical Methods in Physics (2)**
8. Location if not on main campus: **Main campus and Alzaher**

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. What is the main purpose for this course?

- Discuss the fundamental concepts in classical mechanics.
- Understand the physical basis of mechanics and dynamics of rigid body.
- Aanalyse the center of mass and moment of inertia of a rigid body.
- Describe the theorems of static equilibrium of rigid body.
- Use of matrices in rigid body dynamics.
- Build the link between Physics theories and ideas with applications in the students daily life.
- Discuss the Euler's equation of motion of a rigid body.
- Realize that the Lagrangian and the Hamiltonian formalism derived from the "least action principle" though they are alternative formulation of Newton's second law they are more general and allow to derive the relation between symmetries and conservation laws
- Use Lagrangian and the Hamiltonian formalisms to solve mechanical problems.
- Use the scientific method to understand the enormous variety of classical mechanics in terms of a few relatively simple laws as an overall goal.

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. Frequently check for the latest discovery in science

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

Course Description:
This course concern to by study the mechanics of rigid bodies in plan motion and motion of rigid bodies in three dimensions and their applications. Moreover, extensions of Newton's equations due to Lagrange and Hamilton, which allow for simplified treatments of many, interesting problems and which provide the foundation for the modern understanding of dynamics. This course provides students a sufficient background on the basics of classical mechanics enabling students to take more courses that are advanced in physics.

1 Topics to be Covered

Topic	No of Weeks	Contact hours
❖ **Dynamics of Systems of Many Particles** - Center of Mass and Linear Momentum. - Angular Momentum of a System. - Kinetic energy of a system of particles. - Motion of two interacting bodies. The reduced mass. - Collisions. - Oblique collisions and Scattering. Comparison of A laboratory and center-of-mass coordinates. - Impulse in collisions. - Motion of a body with variable mass. Rocket motion.	4	12
❖ **Mechanics of Rigid Bodies , Planar Motion:** - Center of mass of a rigid body. - Some theorems of static equilibrium of rigid body. - Rotation of a rigid body about a fixed axis (Moment of inertia). - Calculation of the moment of inertia. - The physical pendulum. - General theorem concerning angular momentum. - Laminar motion of rigid body. - Body rolling down in inclined plane. - Motion of a rigid body under an impulsive force. - Collisions of rigid bodies.	**5**	**15**
❖ **Motion of Rigid Bodies in Three Dimensions:** - Angular momentum of a rigid body, Products of inertia. - Use of matrices in rigid body dynamics (the inertia tensor). - Determination of principle axes. - Rotational kinetic energy of a rigid body. - Moment of inertia of a rigid body about an arbitrary axis, the momental ellipsoid. - Euler’s equation of motion of a rigid body. - Free rotation of a rigid body under no forces. Geometric description of the motion. - Free rotation of a rigid body with an axis of symmetry. Analytical treatment. - Gyroscopic precession. Motion of a top.	**3**	**9**

❖ **Lagrangian Mechanics:** - Generalized coordinates. - Generalized forces. - Lagrange's equations. - Some Applications of Lagrange's equations. - Generalized moments ignorable coordinate. - Lagrange's equations for impulsive forces. - Hamilton's variational principle. - The Hamiltonian function (Hamiltonian equation). - Lagrange's equations of motion with constrain, Examples.	**3**	**9**
	15 weeks	**45 hrs**

2. Course components (total contact hours and credits per semester):						
	Lecture	Tutorial	Laboratory or Studio	Practical	Other:	Total
Contact Hours	45				Office hours : 14 hr	59
Credit	**3**					

3. Additional private study/learning hours expected for students per week.	2

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 4. Encourage the student to look for the	1. Exams (Midterm, final, quizzes) 2. Asking about physical laws previously taught 3. Writing reports on selected parts of the
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.	information in different references. 5. Ask the student to attend lectures for practice solving problem.	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	Midterm 1	6th week	15 %
2	Midterm 2	11th week	15 %
3	Participation	All weeks	5 %
4	Presence and absence	All weeks	5 %
5	Exercises & Homework	All weeks	10%
6	Final Exam	End of the semester	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)

Each student will supervise by academic adviser in physics department and timetable for academic advice were given to the student each semester. (2hrs per week)

E Learning Resources

1. List Required Textbooks

1. G.R. Fowles, and G.L.Cassiday, "Analytical Mechanics" (7th Ed.), Brooks Cole. (2005).
2. G.R. Fowles, "Analytical Mechanics" (3th Ed.), Holt, Rinehart and Winston (1977).

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

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

1. Thornton, Stephen T.; Marion, Jerry B. Classical Dynamics of Particles and Systems (5th ed.). Brooks Cole. (2003).
2. Kibble, Tom W. B.; Berkshire, Frank H. Classical Mechanics (5th ed.). Imperial College Press. (2004).

4. List Electronic Materials, Web Sites, Facebook, Twitter, etc. http://academicearth.org/lectures/modern-physics-classical-mechanics-2
5. Other learning material such as computer-based programs/CD, professional standards or regulations and software. Wikipedia

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.) • Lecture room for 30 students, Black (white) boards • Class room is already provided with data show
2. Computing resources (AV, data show, Smart Board, software, etc.) Providing class rooms with computers , data show, Smart Board, software, etc.)
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) NA

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching • Open discussion in the class room at the end of the lectures • Quiz. • Midterm and final exam. • Questionaries • Meeting with students • Open door policy
2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department • At the end of term, Students fill an evaluation Sheet (without names). • Analysis the grades of students.
3 Processes for Improvement of Teaching • Handling the weakness point is done each term according to the results of the questionnaires of course evaluation

• Periodical revision of course content. • Report writing of the course and determine goals. • Fortification of the student learning.
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) • In the case of taking more than one group this course, the faculty members (giving this course) cooperate to give unified Exams and use the same marks distribution for the questions in the exams. Students can see their corrected sheets and compare them with the model answers' sheets.
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. 3- Contact the college to evaluate the course and the benefit it add to other courses. 4- Add some subject and cut off others depending on the new discoveries in physics.

Name of Instructor: _______ Doaa Abdallah Said ____

Signature: ___________________________ Date Report Completed: ____________

Name of Field Experience Teaching Staff ______________________________________

Program Coordinator:____

Signature: ___________________________ Date Received: ___________________

Kingdom of Saudi Arabia
National Commission for
Academic Accreditation & Assessment

المملكة العربية السعودية
الهيئة الوطنية للتقويم
والاعتماد الأكاديمي

كلية العلوم التطبيقية
Faculty of Applied Sciences

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

T6. Course Specifications (CS)

Course title: Principles of Quantum Mechanics

Course code: 403344-3

Course Specifications

Institution: **Umm AL – Qura University**	Date : **18/1/1438**
College/Department : **College of Applied Science – Department of Physics**	

A. Course Identification and General Information

1. Course title and code: **Quantum Mechanics 1 (code: 403344)**
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 academic staff member**
5. Level/year at which this course is offered : **3rd Year / 5th Level**
6. Pre-requisites for this course (if any) : **Theoretical Methods in Physics (1) (403241-2)**
7. Co-requisites for this course (if any) : ---
8. Location if not on main campus: **Main campus and Alzaher**
9. Mode of Instruction (mark all that apply)

Mode	Mark		Percentage
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. What is the main purpose for this course? Explain that, the quantum mechanics is a more general theory which contains classical mechanics as a limiting case and in fact historically quantum mechanics was developed by analogy with classical theory. Demonstrate theoretical knowledge and have practical skills and personal attributes that will be required for quantum mechanics. Demonstrate an ability to initiate and sustain in-depth research relevant to quantum mechanics.
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:

1- **Wave-Particle Duality and Uncertainty**: Probability interpretation for wave-functions; wave packets, momentum representation; group velocity and phase velocity for a free particle, dispersion and time evolution; uncertainty principle for position and momentum.

2- The Schrödinger Equation: Introduction to operators and conjugate variables; eigenfunctions and eigenvalues, time-dependent and -independent wave equations; probability density and current; stationary states.

3- **Unbound Particles:** solutions for a free particle, beams, one-dimensional potentials; boundary conditions; reflection and transmission for a square potential step and barrier; tunnelling.

4- **Bound Particles**: Particle in an infinite potential well; zero-point energy; orthogonality and parity of eigenfunctions, normalization; eigenfunction expansions. Finite potential well. Harmonic oscillator. 3D box; separation of variables; degeneracy.

5- **Operator Methods:** Observables and operators; Hermitian operators. Dirac notation, eigenstates and eigenvalues. Correspondence of observables with operators; orthogonality and completeness of eigenstates. Postulates of quantum mechanics. Probability of outcomes of measurements; expectation values. Compatible and incompatible observables; commuting operators and simultaneous eigenstates; non-commuting operators; generalised uncertainty relations; minimum uncertainty states. The harmonic oscillator; ladder operators, eigenstates, equipartition. Time dependence; evolution of expectation values. Ehrenfest's theorem. Time-energy uncertainty relation. Symmetry operators and conserved quantities.

6- **Quantum Mechanics in Three Dimensions:** General formulation. Spherically symmetric systems; orbital angular momentum; angular momentum operators; eigenvalues and eigenstates; orbital magnetic moment. Eigenfunctions; spherical harmonics; parity. Rotational invariance and angular momentum conservation. The three-dimensional harmonic oscillator; quantum numbers and degeneracies. Central potentials and conservation of angular momentum. Separation of variables; the radial equation. The hydrogen atom; quantum numbers; overall wavefunctions. Non-central potentials.

7- **Spin:** Stern-Gerlach experiment and spin; spin eigenstates. Matrix methods applied to angular momentum; Pauli matrices; spinors. Combining spin and orbital angular momentum; combining spins; singlet and triplet states.

1 Topics to be Covered

Topics	No of Weeks	Contact hours
❖ **Wave Particle Duality, Probability, and the Schrodinger Equation** • Radiation as Particles, Electrons as Waves. • Plane Waves and Wavepackets. • The Probability Interpretation of the Wavefunction. • The Schrodinger Equation. • The Heisenberg Uncertainty Relations. • The Probability Current. • Expectation Values and the Momentum in Wave Mechanics; The Momentum in Wave Mechanics, Wavefunction in Momentum Space.	2	8
❖ **Eigenvalues, Eigenfunctions, and the Expansion Postulate** • The Time-Independent Schrodinger Equation. • Eigenvalue Equations. • The Eigenvalue Problem for a Particle in a Box. • The Expansion Postulate and Its Physical Interpretation. • Momentum Eigenfunctions and the Free Particle; Normalization of the Free Particle Wave Function, Degeneracy. • Parity.	2	8
❖ **One-Dimensional Potentials** • The Potential Step. • The Potential Well. • The Potential Barrier. • An Example of Tunneling. • Bound States in a Potential Well. • The Harmonic Oscillator.	2	8

❖ **The General Structure of Wave Mechanics** • Eigenfunctions and Eigenvalues; The Hamiltonian Operator. • Other Observables. • Vector Spaces and Operators. • Degeneracy and Simultaneous Observables. • Time Dependence and the Classical Limit.	**2**	**8**
❖ **Angular Momentum** • The Angular Momentum Commutation Relations. • Raising and Lowering Operators for Angular Momentum. • Representation of $\left\|\ell, \mathbf{m}\right\rangle$ States in Spherical Coordinates.	**1**	**4**
❖ **The Schrodinger Equation in Three Dimensions and the Hydrogen Atom** • The Central Potential. • The Hydrogen Atom. • The Energy Spectrum. • The Free Particle.	**2**	**8**
❖ **Spin** • Eigenstates of Spin 1/2. • The Intrinstic Magnetic Moment of Spin 1/2 Particles. • Addition of Two Spins. • The Addition of Spin 1/2 and Orbital Angular Momentum. • General Rules for Addition of Angular Momenta.	**1.5**	**6**
❖ **Matrix Representation of Operators** • Matrices in Quantum Mechanics. • Matrix Representation of Angular Momentum Operators. • General Relations in Marix Mechanics. • Matrix Representation of Spin 1/2.	**1.5**	**6**
	14 weeks	**56 hrs**

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

	Lecture	Tutorial	Laboratory or Studio	Practical	Other:	Total
Contact Hours	**56**				**14**	**70**
Credit	**4**					

3. Additional private study/learning hours expected for students per week. 14

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 4. Encourage the student to look for the	1. Exams (Midterm, final, quizzes) 2. Asking about physical laws previously taught 3. Writing reports on selected parts of the
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.	information in different references. 5. Ask the student to attend lectures for practice solving problem.	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	All weeks	5 %
2	Participation	All weeks	5 %
3	In-Class Problem Solving	13th,7th week	10%
4	Midterm 1	6^{th} week	15%
5	Midterm 2	10^{th} week	15%
6	Final Exam	16^{th} week	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)

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

1- Griffiths, David J. *Introduction to Quantum Mechanics*. 2nd ed. Upper Saddle River, NJ: Pearson Prentice Hall, 2004.

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

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

1- Sakurai, J. J. *Modern Quantum Mechanics*. Revised Edition. Reading, MA: Addison-Wesley; 1994.
2- Quantum Physics, Gasiorowicz S. 3rd ed. Hoboken, NJ: Wiley, 2003.
3- Cohen-Tannoudji, Claude. *Quantum Mechanics*. 2 vols. New York, NY: Wiley, 1977. ISBN: 9780471164326.

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

- http://en.wikipedia.org/wiki/Quantum Mechanics/
- http://www.dmoz.org/Science/Physics/Quantum Mechanics/

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

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.
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.

- 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.

Name of Instructor: _______Abdelrahman Lashin____

Signature: ___________________________ Date Report Completed: ____________

Name of Field Experience Teaching Staff ______________________________________

Program Coordinator:____

Signature: ___________________________ Date Received: ___________________

كلية العلوم التطبيقية
Faculty of Applied Sciences

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

T6. Course Specifications (CS)

Course title: Electromagnetism 1

Course code: 403201-3

Course Specifications

Institution: **Umm AL – Qura University**	Date : **18/1/1438**
College/Department : **College of Applied Science – Department of Physics**	

A. Course Identification and General Information

1. Course title and code: **Electromagnetism 1 (code: 403201-3)**
2. Credit hours: **3 Hrs**
3. Program(s) in which the course is offered. **B.Sc. Pure 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 academic staff member**
5. Level/year at which this course is offered : **3nd Year / Level 6**
6. Pre-requisites for this course (if any) : **Classical Physics (403200-4)**
7. Co-requisites for this course (if any) :
8. Location if not on main campus: **Main campus and Alzaher**

9. Mode of Instruction (mark all that apply)

Mode			
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. What is the main purpose for this course? Describe, in words, the ways in which various concepts in electromagnetism come into play in particular situations; to represent these electromagnetic phenomena and fields mathematically in those situations; and to predict outcomes in other similar situations.
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. Use the mathematics to express the phenomena in electromagnetism. 2. Define the electric field, the electric potential, and electric dipole 3. Calculate the electrostatic field, electrostatic potential of the charge, dipole and multipoles 4. Apply Gauss's law to solve some problems. 5. Apply Poisson's equation to solve some problems 6. Apply Laplace's equation to solve some problems. 7. Define the electric displacement, polarization of the materials, dielectric constant, and electric susceptibility. 8. Calculate the electric field outside a dielectric materials. 9. Calculate the electrostatic electric and potential fields in dielectric materials, microscopic theory of dielectric and electrostatic energy 10. Define the Ferroelectricity phenomena. 11. Calculate the energy density of the electrostatic field. 12. Calculate the energy of a System of Charged Conductors

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

Course Description: This course deals primarily with a vector calculus based description of static electric field in case of fixed charges, volume and surface charge distribution, dipole, multipole, conductor and dielectric beside the calculation of the electrostatic potentials in each case. The calculation of the electric field by applying Gauss's law for fixed charges and dielectric materials. Also, it concerns the study of the polarization, dielectric constant and the boundary conditions at the interface at the two different dielectric media. The calculation of molecular fields, electrostatic energy and the description of moving charges and steady electric currents are also presented.

1 Topics to be Covered

Topics	No of Weeks	Contact hours
❖ **Electrostatics:** 1-Electric Charge 2-Coulomb's law 3-The Electric Field 4-Electrostatic Potential 5-Conductors & Insulators 6-Gauss's Law 7-The Electric Dipole 8-Multipole Expansion	2	6
❖ **Solution of electrostatic problems:** 1-Poisson's Equation 2-Laplace's Equation 3-Laplaces's Equation in one independent Variable 4-Laplace's Equation in Spherical Coordinates 5-Conducting Sphere in Uniform 6-Cylindrical Harmonics 7-Electrostatic Images 8-Point charge & Conducting Sphere 9-Line charges & Line Images 10-System of Conductors 11-Poisson's Equation.	4	12
❖ **The Electrostatic Field in Dielectric Media** 1-Polarization 2-Field Outside of a Dielectric Medium 3-The Electric Field inside a Dielectric 4-The Electric Displacement 5-Electric Susceptibility and Dielectric Constant 6-Point Charge in a Dielectric Field 7-Boundary Conditions on the Field Vector 8-Boundary Value Problem Involving Dielectrics 9-Dielectric Sphere in a Uniform Electric Field.	3	9
❖ **Microscopic Theory of Dielectrics** 1-Molecular Field in Dielectric 2-Induced Dipoles	2	6

3-Polar Molecules 4-Ferroelectricity		
❖ **Electrostatic Energy** 1-Potential Energy of a Group of Point Charges 2-Energy Density of an Electrostatic Field 3-Energy of a System of Charged Conductors 4-Capacitors.	**1.5**	**4.5**
❖ **Electric Current** 1-Current Density & Equation of Continuity 2-Ohm's Law 3-Steady Currents in continuous Media 4-Microscopic Theory of Conduction.	**1.5**	**4.5**
	15 weeks	**42hrs**

2. Course components (total contact hours and credits per semester):						
	Lecture	Tutorial	Laboratory or Studio	Practical	Other:	Total
Contact Hours	**42**					**42**
Credit	**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 4. Encourage the student to look for the	1. Exams (Midterm, final, quizzes) 2. Asking about physical laws previously taught 3. Writing reports on selected parts of the
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.	information in different references. 5. Ask the student to attend lectures for practice solving problem.	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	All weeks	10 %
2	Participation in activities lectures	All weeks	10 %
3	Midterm Exam (theoretical)	8^{th} week	30%
6	Final Exam (theoretical)	16^{th} 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. (3 hrs per week)

E Learning Resources

1. List Required Textbooks

Introduction to Electrodynamics by David J. Griffiths, [Prentice-Hall, Inc., 1999], 3^{rd} Edition.

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

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

- Foundations of Electromagnetic Theory by Reitz, John R., Milford, Frederick J., Christy, Robert W. [Addison-Wesley, 2008] 4^{th} Edition
- Electromagnetic Fields and Waves by Paul Lorrain, Dale R. Corson, Francois Lorrain [W. H. Freeman and Company, 1988] 3^{rd} Edition

4. List Electronic Materials, Web Sites, Facebook, Twitter, etc.
https://www.khanacademy.org/science/physics

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.

Name of Instructor: _______ M. BOUSTIMI____

Signature: __________________________ Date Report Completed: ____________

Name of Field Experience Teaching Staff _____________________________________

Program Coordinator:____

Signature: __________________________ Date Received: ___________________

Kingdom of Saudi Arabia
National Commission for
Academic Accreditation & Assessment

المملكة العربية السعودية
الهيئة الوطنية للتقويم
والاعتماد الأكاديمي

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

T6. Course Specifications (CS)

Course title: Modern Physics

Course code: 4032150-4

Course Specifications

Institution: **Umm AL – Qura University**	Date : **18/2/1438**
College/Department : **College of Applied Science – Department of Physics**	

A. Course Identification and General Information

1. Course title and code: **Modern Physics (code: 4032150)**
2. Credit hours: **4 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 academic staff member**
5. Level/year at which this course is offered : **5th Level**
6. Pre-requisites for this course (if any) : ---
7. Co-requisites for this course (if any) : ---
8. Location if not on main campus: **Main campus and Alzaher**
9. Mode of Instruction (mark all that apply)

Mode	Mark		Percentage
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. What is the main purpose for this course?
This course is designed to study and consolidate the modern physics concepts in the branches of physics such as The relativity, the black body radiation, the particles properties of waves, wave properties of particles and the atomic structure.

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 modern physics 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:
This course will cover the principle of the modern physics concepts in the branches of physics such as The relativity, the black body radiation, the particles properties of waves, wave properties of particles and the atomic structure.

1 Topics to be Covered

Topics	No of Weeks	Contact hours
❖ **THE SPATIAL THEORY OF THE RELATIVITY** 1- Introduction, 2- Reference frame, 3- Inertial reference frame, 4- Galilean relativity. 5- Einstein's postulate of relativity, 6- Relativity of the simultaneity, 7- Time dilatation, length contraction, 8- Lorentz transformations, 9- Relativistic velocity transformations. 10- Relativistic mechanics, 11- Mass, 12- Energy,	**3**	**3**

13- transformation of energy, 14- Momentum and force, 15- Doppler effect, 16- Relativistic collisions.		
❖ **BLACK BODY RADIATION** 1- radiation of heated objects, 2- thermal radiation, 3- cavity radiation treated with classical physics, 4- UV catastrophe, 5- Planck's solution, 6- quantum of energy.	**3**	**3**
❖ **PARTICLE PROPERTIES OF WAVES** 1- The photoelectric effect, 2- The quantum theory of light, 3- X rays X-ray diffraction, 4- The Compton effect, 5- Pair production, 6- Gravitational red shift.	**3**	**3**
❖ **WAVE PROPERTIES OF PARTICLES** 1- De Broglie waves, 2- Wave function, 3- De Broglie wave velocity, 4- Phase and group velocities, 5- The diffraction of particles. 6- The uncertainty principle, 7- Applications of the uncertainty principle, 8- The wave-particle duality.	**2**	**3**
❖ **ATOMIC STRUCTRUE** 1- Atomic models, 2- Alpha-particle scattering, 3- The Rutherford scattering formula. 4- Nuclear dimensions, 5- Electron orbits, 6- Atomic spectra, 7- Energy levels and spectra, 8- Nuclear Motion, 9- Atomic excitation, 10- The correspondence Principle.	**3**	**3**
❖ **Exercises and Solved problems**	**1**	**3**
	15 weeks	**45hrs**

Practical part:

1. Safety and Security at the lab.
2. Introduction to the Lab.
3. Determination of e/m for electron
4. Determination of Planck's constant
5. Determination of ionization Potential
6. Study of Palmer series of Hydrogen lamp
7. Electron Diffraction: Thomson Experiment
8. Transmission & Absorption of X-ray
9. Franck Hertz experiments
10. Zeeman effect
11. Verification of Bragg law
12. Millikan's Experiment
13. Stefan-Boltzmann's law

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

	Lecture	Tutorial	Laboratory or Studio	Practical	Other:	Total
Contact Hours	**45**		**42**			**87**
Credit	**3**		**1**			

3. Additional private study/learning hours expected for students per week.	4

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		
1.3	Determine the physical quantities at the Lab.	1. Doing team research or team project. 2.Doing team work to perform some experiments 3. Perform the experiments correctly. 4. Demonstrate the results correctly. 5. Write the reports about the experiment. 6. Discussion with the student about the results	Writing scientific Reports. Lab assignments Exam.

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 4. Encourage the student to look for the information in different references. 5. Ask the student to attend lectures for practice solving problem.	1. Exams (Midterm, final, quizzes) 2. Asking about physical laws previously taught 3. Writing reports on selected parts of the course. 4. Discussions of how to simplify or analyze some phenomena.
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.		
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**		
5.1	Use experimental tools safely and correctly.	Follow up the students in lab and during carryout all experimental work.	• Practical exam. • Giving additional marks for the results with high and good accuracy
5.2	Determine the physical quantity correctly at the Lab.		

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	All weeks	5 %
2	Participation in activities lectures and labs	All weeks	5 %
3	Midterm Exam (theoretical)	8th week	30%
4	Lab. Reports (Practical)	11th week	5%
5	Final Exam (Practical)	15th week	15%
6	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

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

3. List Recommended Textbooks and Reference Material (Journals, Reports, etc)
1- Jeremy Bernstein, Paul Fishbane and Stephen Gasiorowicz , Modern Physics, 2-Hardback (2000).
2- Randy Harris, Modern Physics (2nd Edition), International Edition
3- A. Beiser (2003). Concepts of Modern Physics (6th ed.). McGraw-Hill

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

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.

Name of Instructor: _______A. TIMOUMI_______________________________________

Signature: ____________________________ Date Report Completed: _____________

Name of Field Experience Teaching Staff ____

Program Coordinator:____

Signature: ____________________________ Date Received: ____________________

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

T6. Course Specifications (CS)

Course title: Quantum Mechanics 2

Course code: 403345-3

Course Specifications

Institution: **Umm AL – Qura University**	Date : **10/3/1439**
College/Department : **College of Applied Science – Department of Physics**	

A. Course Identification and General Information

1. Course title and code: **Quantum Mechanics 2 (code: 403345)**
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 **Fatma El-Sayed Mahrous Othman**
5. Level/year at which this course is offered: **3rd Year / Level 6**
6. Pre-requisites for this course (if any) : **Quantum Mechanics (1) (403344-4)**
7. Co-requisites for this course (if any) : ---
8. Location if not on main campus: **Main campus and Alzaher**
9. Mode of Instruction (mark all that apply)

Mode			
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. What is the main purpose for this course?

By the end of the course, students should understand each major concept of the following and be able to demonstrate their understanding in problems resolving as well as in applications in modern physics and in this field:

- Method of operators (lowering and rising operators, ...).
- Addition of angular momenta and spin.
- Matrix representation.
- Approximation methods to solve Schrödinger Equation.
- Emission and Absorption of Radiation.
- Scattering theory.

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 websites and reference books in the library.
4- Encourage the student to build an example of different experiments related to the 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:

1 Topics to be Covered

Topics	No of Weeks	Contact hours
❖ **Review of Quantum Mechanics 1** • Postulates. • Wave Mechanics and Schrodinger's Equation. • Operator Methods. • Bound and Unbound states in one-dimension. • Quantum Mechanics in more than one-dimension. • Matrix Mechanics. • Angular Momentum, Commutation Relations. • Spin; Spin Representation and Pauli matrices. • Addition of angular Momenta and spin.	2	6

❖ **Time –Independent Perturbation Theory** • Perturbation Series; First and Second Order Expansion. • Degenerate Perturbation Theory. • The Fine Structure of Hydrogen. • The Stark Effect. • The Zeeman Effect.	**3**	**9**
❖ **Variational Principle** • Theory • The Ground State of Helium.	**2**	**6**
❖ **The WKB Approximation** • The Classical Region. • Tunneling.	**1**	**3**
❖ **Time-Dependent Perturbation Theory** • Two- Level Systems: The Perturbed System, Time-Dependent Perturbation Theory, Sinusoidal Perturbations. • Emission and Absorption of Radiation, Absorption, Stimulated Emission, and Spontaneous Emission, Incoheret Perturbations. • Spontaneous Emission: Einstein's A and B coefficients, The Lifetime of an Excited State, Selection Rules.	**4**	**12**
❖ **Scattering** • Introduction. • Partial Wave Analysis. The Born Approximation.	**2**	**6**
	14 weeks	**42 hrs**

2. Course components (total contact hours and credits per semester):						
	Lecture	Tutorial	Laboratory or Studio	Practical	Other:	Total
Contact Hours	**42**				**28**	**70**
Credit	**3**					

3. Additional private study/learning hours expected for students per week.	4

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 4. Encourage the student to look for the	1. Exams (Midterm, final, quizzes) 2. Asking about physical laws previously taught 3. Writing reports on selected parts of the
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.	information in different references. 5. Ask the student to attend lectures for practice solving problem.	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	All weeks	5 %
2	Participation	All weeks	5 %
3	In-Class Problem Solving	13th,7th week	10%
4	Midterm 1 (theoretical)	6th week	15%
5	Midterm 2 (theoretical)	10th week	15%
6	Final Exam (theoretical)	16th week	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)

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

David J. Griffiths ”Introduction to Quantum Mechanics”, Pearson Prentice Hall, New York, (2005).
S. Gasiorowicz, "Quantum Mechanics", John Wiley & Sons, Inc., 3rd Ed. (2003).

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

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

Nouredine Zettili, "Quantum Mechanics: Concepts and Applications", John Wiley & Sons, Inc. (2001).

4. List Electronic Materials, Web Sites, Facebook, Twitter, etc. www.uqu.sa/feothman
5. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

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.) Classroom for 40 students Library
2. Computing resources (AV, data show, Smart Board, software, etc.) Computer room Data show
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) Each Classroom requires a data show, and double layer white board.

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching • Evaluating the instructor by the student using questionnaires. • Following up the progress of students in the course. • Evaluating the progress of student by projects.
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 • Strategies are modified each term according to the student feedback.

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.

Name of Instructor: _______Fatma El-Sayed Mahrous Othman___________________

Signature: _____Fatma El-Sayed______ Date Report Completed: ___10/3/1439___

Name of Field Experience Teaching Staff _____________________________________

Program Coordinator:____

Signature: __________________________ Date Received: ___________________

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

T6. Course Specifications (CS)

Course title: Solid State Physics 1

Course code: 403370-3

Course Specifications

Institution: **Umm AL – Qura University**	Date : **18/1/1438**
College/Department : **College of Applied Science – Department of Physics**	

A. Course Identification and General Information

1. Course title and code: **Solid State Physics 1 (code: 403370-3)**
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 academic staff member**
5. Level/year at which this course is offered : **4st Year / Level 6**
6. Pre-requisites for this course (if any) : **Quantum Mechanics 1 (code : 403344)**
7. Co-requisites for this course (if any) : ---
8. Location if not on main campus: **Main campus and Alzaher**
9. Mode of Instruction (mark all that apply)

Mode			
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. What is the main purpose for this course?

At the end of the course, the student must be able to :

- Gain knowledge and to be ready to study Solid State Physics 2.
- Be familiar with the basic physics knowledge on Solid State Physics.
- Understand and compare the origin of bonding in materials.
- Discuss and classify the different crystal structures and symmetry operations.
- List and understand the different types of defects in crystals: Point Defects, Thermal Consideration in Formation Energy, Dislocations, Types of Dislocations, Planar Defects.
- Understand how X-Rays Diffraction can be used in studying the solid structure, Experimental Methods for Diffraction..
- Describe the free electrons in metals: The Electrical and Thermal Conductivities, The Resistivity, the Quantum Theory of Free Electrons, Ground State Property of the Free Electron Gas, Electronic Specific Heat of Metals, Hall Effect in Metals, Some Problems (Drawbacks) with the Free Electron Model.
- Understand and appreciate of the Band Theory in Solids: Origin of Bands in Solids, Periodic Potential, Bloch Function, Crystal Structure in a One-Dimensional Atomic Chain, Brillouin Zone, Bands Theory in the Free Electron Model, Density of States, The Effective Mass, The Concept of Hole, Fermi Surface.

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- Explain the strategy of the course in the beginning of the semester
2- Outlines of the physical laws, principles and the associated proofs.
3- Encourage the students to see more details in the international web sites and reference books in the library.
4- Discussing some selected problems in each chapter.
5- Renew the course references frequently
6- 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 solid-state physics, such as Crystal Structure, Crystal Binding, Crystal Diffraction, Defects in Crystals, Lattice Vibrations, Some Thermal Properties, Free Electrons in Metals and Band Theory in Solids. At the end of the course, the student must be able to study the course solid-state physics 2.

1 Topics to be Covered

Topics	No of Weeks	Contact hours
❖ **Crystal Structure** 1- Classification of Solids 2- The Crystalline State 3- Some Basics Definitions 4- Symmetry Operations 5- Two-Dimensional and Three Dimensional Lattice Types 6- Positions and Directions of Planes in the Crystal 7- Some Simple Crystal Structures 8- Non-Crystalline Solids.	**2**	**6**
❖ **Crystal Binding** 1- Binding Energy in Solids 2- Types of Binding.	**1**	**3**
❖ **Crystal Diffraction** 1- X-ray Diffraction and Bragg's Law, 2- Laue Formulation for x-ray diffraction 3- Diffraction Directions 4- Experimental Methods for Diffraction.	**2**	**6**
❖ **Defects in Crystals** 1- Point Defects 2- Thermal Consideration in Formation Energy 3- Dislocations 4- Types of Dislocations 5- Planar Defects	**2**	**6**
❖ **Lattice Vibrations and Some Thermal Properties** 1- Vibrations of a One-Dimensional Mono-atomic and Diatomic Chains 2- Phonons 3- Lattice Specific Heat, the Classical Model 4- Einstein Model 5- Debye Model 6- The Thermal Conductivity.	**2**	**6**
❖ **Free Electrons in Metals** 1. The Electrical and Thermal Conductivities 2. The Resistivity 3. the Quantum Theory of Free Electrons 4. Ground State Property of the Free Electron Gas 5. Electronic Specific Heat of Metals 6. Hall Effect in Metals 7. Some Problems (Drawbacks) with the Free Electron Model.	**3**	**9**

❖ **Band Theory in Solids** 1. Origin of Bands in Solids 2. Periodic Potential 3. Bloch Function 4. Crystal Structure in a One-Dimensional Atomic Chain 5. Brillouin Zone 6. Bands Theory in the Free Electron Model 7. Density of States 8. The Effective Mass 9. The Concept of Hole 10. Fermi Surface.	**3**	**9**
	15 weeks	**45hrs**

2. Course components (total contact hours and credits per semester):						
	Lecture	Tutorial	Laboratory or Studio	Practical	Other:	Total
Contact Hours	**45**	**15**				**60**
Credit						

3. Additional private study/learning hours expected for students per week.	4

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 4. Encourage the student to look for the	1. Exams (Midterm, final, quizzes) 2. Asking about physical laws previously taught 3. Writing reports on selected parts of the
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.	information in different references. 5. Ask the student to attend lectures for practice solving problem.	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	All weeks	10 %
2	Participation in activities lectures	All weeks	10 %
3	Written Test (1)	6th week	15%
4	Written Test (2)	11th week	15%
5	Final Exam (theoretical)	16th week	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)

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
   1- Charles Kittel, Introduction to Solid State Physics 8th Ed, 2005, John Wiley & sons.
   2- H.P. Myers, Introduction to Solid State Physics, 2nd Ed, 2009 Taylor & Francis

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

3. List Recommended Textbooks and Reference Material (Journals, Reports, etc)
   1- Charles Kittel, Introduction to Solid State Physics 8th Ed, 2005, John Wiley & sons.
   2- H.P. Myers, Introduction to Solid State Physics, 2nd Ed, 2009 Taylor & Francis

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

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.
2. Computing resources (AV, data show, Smart Board, software, etc.) In each class room 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 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. • 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.

Name of Instructor: _______Loulou Mehrez

Signature: ___________________________ Date Report Completed: ____________

Name of Field Experience Teaching Staff ______________________________________

Program Coordinator:____

Signature: ___________________________ Date Received: ___________________

كلية العلوم التطبيقية
Faculty of Applied Sciences

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

T6. Course Specifications (CS)

Course Title: Electromagnetism (2)

Course Code: 403331-3

Course Specifications

Institution: **Umm AL – Qura University**	Date : **18/1/1438**
College/Department : **College of Applied Science – Department of Physics**	

A. Course Identification and General Information

1. Course title and code: **Electromagnetism (2) (code: 403331-3)**
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 academic staff member**
5. Level/year at which this course is offered : **3st Year / Level 6**
6. Pre-requisites for this course (if any) : **Electromagnetism 1 (403201-3)**
7. Co-requisites for this course (if any) : **Traditional Physics (403200-4)**
8. Location if not on main campus: **Main campus and Alzaher**

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. What is the main purpose for this course?

- Define the fundamentals of electromagnetic field and radiations.
- Define the magnetic field, magnetic flux, magnetic scalar potential, magnetic vector potential.
- Apply Biot-Savart law to calculate the magnetic field due to electric current.
- Apply Lorentz law to calculate the force acting on a wire carrying electric current placed in a magnetic field.
- Calculate the magnetic field using Ampere's law.
- Define the Faraday law of electromagnetic induction.
- Calculate the self-inductance and mutual inductance.
- Calculate the magnetic field due to a magnetized object.
- Define the magnetization, magnetic intensity, the magnetic permeability, magnetic susceptibility.
- Define the hysteresis loop.
- Define the diamagnetism, Paramagnetism, and ferromagnetism.
- Calculate the magnetic energy stored within the electric circuits.
- Calculate the density of the magnetic energy.
- List the Maxwell's equations in vacuum and in the materials.
- Define the displacement current.
- Explain the electromagnetism in bulk materials (permittivity and permeability, D and H fields) and investigating the concepts of field potential and energy was spent.
- Discuss the Maxwell's equations and resulted in the triumphal prediction of electromagnetic radiation, but it's surprisingly hard to derive the specific equations for the radiation from an antenna.
- Describe, in words, the ways in which various concepts in electromagnetism come into play in particular situations; to represent these electromagnetic phenomena and fields mathematically in those situations; and to predict outcomes in other similar situations.

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. Frequently check for the latest discovery and application of magnetism 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 electromagnetism, such as calculating the magnetic field due to steady current, calculating the magnetic induction, Calculating the magnetic energy, the magnetic materials and their fields, Maxwell's equations and their applications, Electromagnetic waves, propagation of electromagnetic wave in different media. This course will provide a conceptual background in electromagnetism 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**
❖ **The Magnetic Field of Steady Current** 1. Induction to magnetic field, 2. Lorentz force law and its applications. 3. Biot-Savart Law and its applications. 4. Ampere's Law (differential and integral shape) 5. Application of Ampere's law. 6. Divergence and curl of magnetic field. 7. The Magnetic Vector Potential, 8. The Magnetic Scalar Potential 9. The Magnetic Flux	**4**	**12**
❖ **The Electromagnetic Induction** 1- Self Induction 2- Mutual Induction 3- The Neumann Formula	**1.33**	**4**

❖ **Magnetic Properties of Matter** 1. The origin of magnetism in the matter. 2. Magnetic moment of the atom. 3. Magnetization. 4. Magnetic current density. 5. Surface current density. 6. Magnetic Intensity. 7. Calculation of magnetic Field of a Magnetized Object. 8. Magnetic susceptibility, 9. Magnetic Permeability, 10. Hysteresis loop. 11. Classification of magnetic materials. 12. Diamagnetic materials 13. Paramagnetic materials. 14. Ferromagnetic materials. 15. Boundary condition of magnetic field. 16. Electric circuits containing magnetic media. 17. Magnetic circuits. 18. Examples.	**4**	**12**
❖ **Magnetic Energy** 1- Magnetic energy of a solid circuit. 2- Magnetic Energy of Coupled Circuits, 3- Energy Density in Magnetic Field, 4- Force and Torques on Rigid Circuits	**1.33**	**4**

❖ **Maxwell's Equation's and Electromagnetic Waves** 1- Displacement Current, 2- Maxwell's Equation's 3- Wave Equation for Electric and Magnetic Field 4- Plane Wave 5- Plane Waves in Isotropic Insulating Media 6- Transfer of Plane Waves in Conductor 7- Resistance of conductors at ultra high frequencies. 8- Applications of Maxwell's Equations a. Boundary Conditions. b. Refraction and Reflection at the boundary of two non-conducting media. 9- Electromagnetic waves Energy 10- The Wave Equation with Sources	**3.33**	**10**
	14 weeks	**42hrs**

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

	Lecture	Tutorial	Laboratory or Studio	Practical	Other:	Total
Contact Hours	42	28	42		22	134
Credit	**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 4. Encourage the student to look for the	1. Exams (Midterm, final, quizzes) 2. Asking about physical laws previously taught 3. Writing reports on selected parts of the
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.	information in different references. 5. Ask the student to attend lectures for practice solving problem.	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	Midterm 1	5th week	15%
2	Midterm 2	10th week	15%
3	Quizzes and In-Class Problem Solving	Each 2 weeks w	5%
4	Presence of students	All lectures	5%
5	Small project	12th week	5%
6	Homework	Every week	5%

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 timetable for academic advice were given to the student each semester. (4hrs per week).

E Learning Resources

1. List Required Textbooks

   1. Foundations of Electromagnetic Theory by Reitz, John R., Milford, Frederick J., Christy, Robert W. [Addison-Wesley, 2008] 4th Edition
   2. Electromagnetic Fields and Waves by Paul Lorrain, Dale R. Corson, Francois Lorrain [W. H. Freeman and Company, 1988] 3rd Edition
   3. Introduction to Electrodynamics by David J. Griffiths, [Prentice-Hall, Inc., 1999], 3rd Edition.

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

3. List Recommended Textbooks and Reference Material (Journals, Reports, etc)
   1. I.S. Grant and W.R. Phillips, Electromagnetism, Second Edition, John Wiley & Sons, New York, 2008.

2. Elements of Electromagnetics : M. N. O. sadiku [Oxford University Press, 2001] 3rd Edition
4. List Electronic Materials, Web Sites, Facebook, Twitter, etc. 1. Web Sites, Social Media, Blackboard, Facebook, Twitter, etc.) 2. Consult courses in website of the certified universities,. 3. www.youtube.com.) 4. http://en.wikipedia.org/wiki/Electromagnetism
5. Other learning material such as computer-based programs/CD, professional standards or regulations and software. Wikipedia

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.) 1- Lecture room for 30 students, Black (white) boards 2- Class room is already provided with data show
2. Computing resources (AV, data show, Smart Board, software, etc.) Providing classrooms with computers, data show, Smart Board, software, etc.)
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) NA

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching 3- Questionaries 4- Open discussion in the class room at the end of the lectures 5- Meeting with students 6- Open door policy
2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department 7- Revision of student answer paper by another staff member. 8- Analysis the grades of students. 9- E-Learning Suggestions - e-Learning Documentation
3 Processes for Improvement of Teaching 1. Preparing the course as PPT. 2. Using scientific movies. 3. Coupling the theoretical part with laboratory part 4. Periodical revision of course content.

5. Report writing of the course and determine goals. 6. Fortification of the student learning. 7. Handling the weakness point
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) 1. After the agreement of Department and Faculty administrations 2. The instructors of the course are checking together and put a unique process of evaluation. 3. Feedback evaluation of teaching from independent organization.
5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement. • Periodical revision by Quality Assurance Units in the Department and institution for (Student evaluation, Course report, Program report, Program Self-study, Plan of improvement should be given. • Collect all reports and evaluations at the end of the year for a reviewing purpose. • Conduct a workshop to presents finding of reports and evaluation to share knowledge.

Name of Instructor: _______ Roshdi Seoudi ____

Signature: ____________________________ Date Report Completed: _____________

Name of Field Experience Teaching Staff _______________________________________

Program Coordinator:____

Signature: ____________________________ Date Received: ____________________

Kingdom of Saudi Arabia
National Commission for
Academic Accreditation & Assessment

المملكة العربية السعودية
الهيئة الوطنية للتقويم
والاعتماد الأكاديمي

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

T6. Course Specifications (CS)

Course title: Introduction to computing physics

Course code: 403380-3

Course Specifications

Institution: **Umm AL – Qura University**	Date : **18/1/1438**
College/Department : **College of Applied Science – Department of Physics**	

A. Course Identification and General Information

1. Course title and code: **Introduction to computing physics (code: 403380-3)**
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 academic staff member**
5. Level/year at which this course is offered : **3rd Year / Level 6**
6. Pre-requisites for this course (if any) : --- Quantum Mechanics (1) (code: 403344)
7. Co-requisites for this course (if any) : ---
8. Location if not on main campus: **Main campus and Alzaher**
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. What is the main purpose for this course? This course is designed to demonstrate and consolidate the basic structure of Fortran, control structure of Fortran design, arrays and structural programming, types of Fortran libraries, how to using Fortran libraries. Using computer to do least square fit and solving differential equations and Integration. An introduction to Monte Carlo Simulation Methods
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 basic structure of Fortran, Control structure of Fortran design. 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 write Fortran programs related to course 5- Encourage the student to do Monte Carlo simulation with computer software. 6- Use computer to verify the solution of some physical problems. 7- Use computer to construct graphs of some functions.

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

Course Description: The course will cover the basic structure of Fortran, control structure of Fortran design, arrays and structural programming. Using computer to do least square fit and solving differential equations and Integration. Types of Fortran libraries, Using Fortran libraries and Examples. Monte Carlo Simulation Methods: Like the inverse transform method, the rejection method, algorithm of random number generators (e.g., Gauss and Poission distribution), Histogramming and Applications to physical problems.

1 Topics to be Covered

Topics	No of Weeks	Contact hours
❖ **Introduction to Fortran 90/95:** - Basic structure of Fortran, Control structure of Fortran design, arrays and Structural programming,...	**7**	**21**
❖ **Numerical Analysis:** - Least square fit, Differential equations and Integration.	**2**	**6**
❖ **Fortran Libraries:** - Types of Fortran libraries, Using Fortran libraries and Examples.	**3**	**9**

❖ **Monte Carlo Simulation Methods:** - The inverse transform method, the rejection method, Algorithm of random number generators (e.g., Gauss and Poission distribution), Histogramming and applications to physical problems.	**3**	**9**
	15 weeks	**45hrs**

2. Course components (total contact hours and credits per semester):						
	Lecture	Tutorial	Laboratory or Studio	Practical	Other:	Total
Contact Hours	**45**				**15**	**60**
Credit	**3**					3

3. Additional private study/learning hours expected for students per week.	4

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 4. Encourage the student to look for the	1. Exams (Midterm, final, quizzes) 2. Asking about physical laws previously taught 3. Writing reports on selected parts of the
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.	information in different references. 5. Ask the student to attend lectures for practice solving problem.	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 and Research	All weeks	15 %
2	Participation in activities lectures	All weeks	5 %
3	1st periodic exam	8th week	15%
4	2nd periodic exam	11th week	15%
6	Final Exam	16th week	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)

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

Stephen J. Chapman, Fortran 90/95 for scientists and engineering, First edition, MacGraw-Hill Companies, Inc. (1998), ISBN 0-07-011938-4
Harvey Gould and Jan Tobochnik, An introduction to computer simulation methods, Applications to Physical Systems, Part1 and Part2, Addison-Wesley Publishing company (1988), ISBN 1-201-16503-1 (v.1) and 1-201-16504-X (v.2).

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/smattia

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.
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.

Name of Instructor: _______Atif Ismail_______________________________________

Signature: ____________________________ Date Report Completed: _____________

Name of Field Experience Teaching Staff _______________________________________

Program Coordinator:____

Signature: ____________________________ Date Received: ____________________

كلية العلوم التطبيقية
Faculty of Applied Sciences

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

T6. Course Specifications (CS)

Course title: Quantum Mechanics(3)

Course code: 403446-2

Course Specifications

Institution: **Umm AL – Qura University**	Date : **18/1/1438**
College/Department : **College of Applied Science – Department of Physics**	

A. Course Identification and General Information

1. Course title and code: **Quantum Mechanics (code: 403446)**
2. Credit hours: **2 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 **Atif Ismail**
5. Level/year at which this course is offered : **4th Year / Level 7**
6. Pre-requisites for this course (if any) : Quantum Mechanics(2) (code: 403345)
7. Co-requisites for this course (if any) : ---
8. Location if not on main campus: **Alzaher**
9. Mode of Instruction (mark all that apply)

Mode	Mark		Percentage
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. What is the main purpose for this course?

This course is designed to demonstrate and consolidate the basic quantum mechanics concepts such as identical particles, symmetries in quantum mechanics, scattering theory, adiabatic approximation, and relativistic quantum mechanics.

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 principles, laws, theories 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- 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 quantum mechanics, such as identical particles of two particle systems, exchange force, scattering amplitude, partial wave analysis, Lippmann-Schwinger equation, the Born approximation, Klein-Gordon equation, Dirac equation, adiabatic approximation theory, and translational and rotation symmetries and time reversal invariance. This course will provide a conceptual background in 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
❖ **Symmetry** - Translation of coordinates, coordinate rotations, coordinate reflections, charge conjugation. Displacement in time, time reversal invariance.	3	6
❖ **Identical Particles** - Two particle systems, Bosons and Fermions, Exchange forces, Applications: Atoms(Hydrogen and Helium).	3	6
❖ The Adiabatic Approximation - **The Adiabatic theory-Berry's phase.**	2	4

❖ **Scattering Theory** - Introduction, Scattering amplitude, The Lipmann-Schwinger equation, Born approximation, optical theorem, methods of partial waves, resonance scattering, time dependent formulation of scattering, coulomb scattering.	**4**	**8**
❖ **Elements of Relativistic Quantum Mechanics** - Notation-various conventions and definitions; klein-Gordon equation; Dirac equation.	**3**	**6**
	15 weeks	**30hrs**

2. Course components (total contact hours and credits per semester):						
	Lecture	Tutorial	Laboratory or Studio	Practical	Other:	Total
Contact Hours	**30**				**10**	**40**
Credit	**2**		0			2

3. Additional private study/learning hours expected for students per week.	4

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 4. Encourage the student to look for the	1. Exams (Midterm, final, quizzes) 2. Asking about physical laws previously taught 3. Writing reports on selected parts of the
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.	information in different references. 5. Ask the student to attend lectures for practice solving problem.	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 & Research	All weeks	15 %
2	Participation in activities lectures	All weeks	5 %
3	1st Periodic Exam	8th week	15%
	2nd Periodic Exam	11th week	15%
6	Final Exam (theoretical)	16th week	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)

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

D. J. Griffiths, Introduction to Quantum Mechanics, 2 nd ed. (Upper Saddle River, Pearson Prentice Hall, NJ, 2005).
A. Massiah, Quantum Mechanics, 6th prn. (John Wiley & Sons, Inc., NY, London, Sydney, 1966). Physics , 4th edition, By: J. Walker (2010)
N. Zettili, Quantum Mechanics: Concepts and Applications, 2 nd ed. (John Wiley & Sons Ltd, Jacksonville State University, Jacksonville, USA, 2009).

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/smattia

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, 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.

Name of Instructor: _______Atif Ismail_______________________________________

Signature: ____________________________ Date Report Completed: _____________

Name of Field Experience Teaching Staff _______________________________________

Program Coordinator:____

Signature: ____________________________ Date Received: ____________________

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

T6. Course Specifications (CS)

Course title: Nuclear Physics

Course code: 403460-4

Course Specifications

Institution: **Umm AL – Qura University**	Date : **18/1/1438**
College/Department : **College of Applied Science – Department of Physics**	

A. Course Identification and General Information

1. Course title and code: **Nuclear Physics (code: 403460-4)**
2. Credit hours: **4hrs (three hours lecture and one hour Lab.)**
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 **Dr. Adel MADANI (ammadani@uqu.edu.sa)**
5. Level/year at which this course is offered : **4th Year / Level 7**
6. Pre-requisites for this course (if any) : **Quantum mechanics (1) (403345-4)**
7. Co-requisites for this course (if any) : ---
8. Location if not on main campus: **Main campus and Al-Zaher**
9. Mode of Instruction (mark all that apply)

Mode	Mark		Percentage
a. traditional classroom	✓	What percentage?	**80%**
b. blended (traditional and online)		What percentage?	
c. e-learning		What percentage?	
d. correspondence		What percentage?	
f. other	✓	What percentage?	**20%**

Comments: Labs **20%**

B Objectives

1. What is the main purpose for this course? The objectives of this course are to establish the meaning of the concepts of nuclear physics and elementary particles, and to ease out the theoretical models to describe the nuclear properties. We want to be able: The benchmark statement of the main learning outcomes are as follows: *1. To understand basic fundamentals of nuclear properties.* *2. The students should be trained on physical and generic skills (knowledge – cognitive – interpersonal – communication – problem solving – IT)* 3. To understand the liquid drop model. 4. To understand the nuclear drop model. 5. To understand the origin of alpha transition within the nucleus. *6. To understand the origin of Gamma transition within the nucleus.* 7. To understand the origin of Beta transition within the nucleus. 8. To understand the elementary particles. The overall goal is to understand the fundamentals of nuclear physics.
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. Explain strategy of the course in the beginning of the semester 2. Outlines of the Nuclear concepts, theories and the associated proofs. 3. Highlighting the day life applications whenever exist. 4. Encourage the students to see more details in the international web sites and reference books in the library. 5. Discussing some selected problems in each chapter. 6. Cooperate with different institution to find how they deal with the subject 7. Renew the course references frequently 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 Nuclear physics, such as Nuclear Properties of the matter , Liquid Drop and shell Model , radiation… . 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.

1 Topics to be Covered :-		
Topics	No of Weeks	Contact hours
1- Nuclear Properties		
1- Definitions & Nuclear radii	1	1
2- Nuclear Mass-Binding Energy		1
3- Nuclear Radiation, Energy levels.		1
4- Nuclear Isomers.	1	1
5- Angular Momentum, Parity and Symmetry		1
6- Dipole moment, qudropole moment		1
2- Liquid Drop Model		
1- Finding Energy	1	1
2- Sem-emperical Formula		2
3- Mass Spectrometer	1	1
4- Nuclear Reactions and Q-value		2
3- Nuclear Shell Model		
1- Single Particle model with square well and Harmocia Oscillator	1	1
2- Magic Numbers		1
3- Spin for Different nuclei		1
4- Excited rootes nuclear magnetic moments	1	1
5- Parity		2
6- Isotopic spin		1
4- Gamma Transitions		
1- Multiple Moments	1	1
2- Decay Constants		1
3- Selection Nucles		1
4- Angular Correlation	1	2
5- Internal Conversion		1
5- Alpha Transitions		
1- Heavy Ions-Stalitlity	1	2
2- Decay Constants		1
3- Tunnel Effect	1	2

4- Energy Levels		1
6- Beta Transitions		
1- Theorgy of B-decay	1	2
2- Allowed and Forbiddin transitions		1
3- Selection Nucles	1	2
4- Non Conservation of Parity		1
7- Elementary Particles		
1- Nucler Force and Meson Theory	1	2
2- Pions & Mions		1
3- Kaons & Hyperons	1	2
4- Classi Fiction of demeray Pancles		1
Total	14	42

2. Course components (total contact hours and credits per semester):						
	Lecture	Tutorial	Laboratory or Studio	Practical	Other:	Total
Contact Hours	**42**		**10**			**52**
Credit	**3**		**1**			

3. Additional private study/learning hours expected for students per week.	4

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		
1.3	Determine the physical quantities at the Lab.	1. Doing team research or team project. 2.Doing team work to perform some experiments 3. Perform the experiments correctly. 4. Demonstrate the results correctly. 5. Write the reports about the experiment. 6. Discussion with the student about the results	Writing scientific Reports. Lab assignments Exam.

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 4. Encourage the student to look for the information in different references. 5. Ask the student to attend lectures for practice solving problem.	1. Exams (Midterm, final, quizzes) 2. Asking about physical laws previously taught 3. Writing reports on selected parts of the course. 4. Discussions of how to simplify or analyze some phenomena.
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.		
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**		
5.1	Use experimental tools safely and correctly.	Follow up the students in lab and during carryout all experimental work.	• Practical exam. • Giving additional marks for the results with high and good accuracy
5.2	Determine the physical quantity correctly at the Lab.		

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	Midterm 1	5th week	20 %
2	Midterm 2	10th week	20 %
3	Online quizzes	every week	10 %
4	Homework	Every week	10 %
5	Interactive discussions	Every week	10 %
6	Final exam	End of semester	30 %

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 timetable for academic advice were given to the student each semester. (4hrs per week)

E Learning Resources

1. List Required Textbooks

- K. Heyde, Basic ideas and concepts in nuclear Physics, An introductory approach, second edition, Institute of physics publishing, Bristol and Philadelphia (1999) ISBN 0 7503-0534 7 hbk, 07503 0535 pbk.
- Irving Kaplan, Nuclear Physics, Second Edition, Addison-Wesley Publishing Company (1977).
- Kenneth S. Krane , Introductory nuclear Physics, , first edition, Jone Wily & Sons Inc. (1988) ISBN 0 - 471-80553-X .

* Burcham, Nuclear and Particle Physics, 2 Edition, Longman Publisher (1995),ISBN-10 : 0582 450888 , -13: 978 - 0582 4508882

2. List Essential References Materials (Journals, Reports, etc.)
3. List Recommended Textbooks and Reference Material (Journals, Reports, etc) Introductory Nuclear Physics, Krene, 1987
4. List Electronic Materials, Web Sites, Facebook, Twitter, etc. www.uqu.sa/ammadani
5. Other learning material such as computer-based programs/CD, professional standards or regulations and software. • **Power points (use e-learning gate of Umm Al-Qura university)** • **Youtube videos(use e-learning gate of Umm Al-Qura university)**

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, and 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 classroom 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 Classroom 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.

Name of Instructor: _______A.M.MADANI_______________________________________

Signature: ___________________________ Date Report Completed: ____________

Name of Field Experience Teaching Staff ______________________________________

Program Coordinator:____

Signature: ___________________________ Date Received: ___________________

كلية العلوم التطبيقية
Faculty of Applied Sciences

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

T6. Course Specifications (CS)

Course title: Advanced optics

Course code: 403434-2

Course Specifications

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

A. Course Identification and General Information

1. Course title and code: **Advanced optics(1)** **(code: 403434)**
2. Credit hours: **2 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 **Dr/ Afaf Maweed Abdelmageed**
5. Level/year at which this course is offered : **4th Year / Level 7**
6. Pre-requisites for this course (if any) : **PH 232**
7. Co-requisites for this course (if any) : ---
8. Location if not on main campus: **Main campus and Alzaher**
9. Mode of Instruction (mark all that apply)

Mode	Mark		Percentage
a. traditional classroom	✓	What percentage?	**50%**
b. blended (traditional and online)	✓	What percentage?	**20%**
c. e-learning	✓	What percentage?	**20%**
d. correspondence	✓	What percentage?	**10%**
f. other		What percentage?	

Comments:

B Objectives

1. What is the main purpose for this course?
This course deals with the applied application of advanced optics in life. This course is designed to reveal the revolutionary changes have taken place in the field of optics. This course will prepare physics students to pursue the graduate courses in more advanced optics. Since the need to train physicists in applied areas is widely recognized, this course will meet this need by considering the application of optics in engineering departments.
The main goal of this course: is to use the scientific methods to understand the individual points of the course and its relation with the applied technology surrounding him.

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- Explain strategy of the course in the beginning of the semester
2. Outlines of the physical laws, principles and the associated proofs.
3. Highlighting the day life applications whenever exist.
4. Encourage the students to see more details in the international web sites and reference books in the library.
5- Encourage the student to build an example of different experiments related to course
6- Cooperate with different institution to find how they deal with the subject.
7- Renew the course references frequently.
8- 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 optic physics. This course will provide a conceptual and experimental background in advanced optics Lab which students to be able to understand the more advanced records.

1 Topics to be Covered

Topics	No of Weeks	Contact hours
Optical Boundaries 1- Maxwell theory 2- Fresnel`s equations 3- Reflectivity as a function of polarization 4- Metallic reflection 5- Reflectivity and surface roughness	**2**	**4**
Fourier transform spectroscopy 1- Interferometry and visibility curves 2- Michelson interferometer spectroscopy	**3**	**6**

3- Data reduction 4- Fourier transformation 5- Processing the interferogram 6- Advantage of Fourier transform spectroscopy.		
Transfer function 1- Spread functions 2- Point spread function 3- Line spread function 4- Composite spread function 5- Contrast 6-Contrast transfer.	**2**	**4**
Two dimension transforms 1- Two dimensional Fourier transforms 2- Diffraction theory of images formation in the microscope 3- Optical data processing 4- Spatial filtering	**2**	**4**
Holography 1- Wave front reconstruction 2- Reconstruction of Laue diagrams 3- Coherent background or reference beam requirements 4- Producing the hologram 5- Theory of holography 6- Fraunhofer and Fresnel holograms 7- Photographic requirements 8- Special types of holograms 9- Application of holography	**3**	**6**
Schileren optics 1- Theory of Schileren optics 2- Experimental Schileren optics 3- Self-plotting Schileren systems 4- Two dimension Schileren optics 5- Color Schileren optics	**2**	**4**
	14 weeks	**28hrs**

Practical part:

2. Course components (total contact hours and credits per semester):						
	Lecture	Tutorial	Laboratory or Studio	Practical	Other:	Total
Contact Hours	**28**					**28**
Credit	**2**					

3. Additional private study/learning hours expected for students per week.	2

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 4. Encourage the student to look for the	1. Exams (Midterm, final, quizzes) 2. Asking about physical laws previously taught 3. Writing reports on selected parts of the
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.	information in different references. 5. Ask the student to attend lectures for practice solving problem.	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	First exam*	6 week	15 %
2	Second exam*	12 week	15 %
3	Presentation, Homework, Discussions, quizzes	Every week	20%
4	Final exam		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)

Each student will supervise by academic adviser in physics Department and the time table for academic advice were given to the student each semester. (2 hrs per week)

E Learning Resources

1. List Required Textbooks

Jurgen R, . Meyer-Arendt, Introduction to Classical and Modern Optics, Prentic – Hall international , (1995).

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

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

Allen Nussbaum and Richard A. Phillips, Contemporary Optics for Scientists and Engineers, Prentice –Hall.

Francis A. Jenkins and Harvey E. White, Foundation of Optics, 4th Edt.,McGraw-Hill, 1976.

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

http://www.physicsclassroom.com
http://www.learnerstv.com/

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.) * Lecture room organized for face to face learning * Library *Laboratory for optics * Boards * Suitable lightening system * Air condition units * Fiber optic networks and wireless * Computers and data show
2. Computing resources (AV, data show, Smart Board, software, etc.) * computers with data show * Available numbers of computers for students * Updating the computer each year.
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) Checked later if needed

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching Evaluating the instructor by the student using questionnaires Following up the progress of student in the course Evaluating the progress of student by the projects and reports Evaluating the course by specialized committees.
2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department Self-evaluation

Student evaluation
Evaluation by other instructor in the same department or outside it

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.

Name of Instructor: _______Afaf maweed Abdelmageed

Signature: ____________________________ Date Report Completed: _____________

Name of Field Experience Teaching Staff ________optic physic___________________________

Program Coordinator:____

Signature: ____________________________ Date Received: ____________________

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

T6. Course Specifications (CS)

Course Title: Semiconductor

Course Code: 403471-2

Course Specifications

Institution: **Umm AL – Qura University**	Date : **18/1/1438**
College/Department : **College of Applied Science – Department of Physics**	

A. Course Identification and General Information

1. Course title and code: **Semiconductor (code: 403471-2)**
2. Credit hours: **2 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 academic staff member**
5. Level/year at which this course is offered : **4st Year / Level 7**
6. Pre-requisites for this course (if any) : **Solid State 1 (403370-3)**
7. Co-requisites for this course (if any) : **Quantum Mechanics 1 (403344-3)**
8. Location if not on main campus: **Main campus and Alzaher**
9. Mode of Instruction (mark all that apply)

Mode		What percentage?	
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. What is the main purpose for this course?

Outcomes of this course are to introduce the basic physical principles and fundamentals of semiconductors and their usage and application. It also discusses the effect of different physical parameters on semiconductors.

At the end of this course the student should be able to

- Understand how semiconductor devices work
- Understand the different physical parameters on semiconductors

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. Explain strategy of the course in the beginning of the semester
2. Outlines of the physical laws, principles and the associated proofs.
3. Highlighting the day life applications whenever exist.
4. Encourage the students to see more details in the international web sites and reference books in the library.
5. Discussing some selected problems in each chapter.
6. Cooperate with different institution to find how they deal with the subject
7. Renew the course references frequently
8. 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 semiconductor, such as the elementary properties of semiconductors, energy levels in crystalline solids, impurities and imperfections in crystals, carrier concentrations in thermal equilibrium, electron transport phenomena, thermal effects in semiconductors, and diffusion of electrons and positive holes. This course will provide a conceptual background in semiconductor 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
❖ **The Elementary Properties of Semiconductors** 1. Early work on semiconductors 2. Applications of semiconductors 3. Elementary theory for semiconductors 4. Control of carrier density	**1.5**	**3**
❖ **Energy Levels in Crystalline Solids** 1. Wave mechanics of free electrons 2. Motion in a periodic potential 3. Forms of the energy bands 4. Positive holes 5. Motion of electrons and holes in a crystal under the influence of an external field of force 6. Energy-level diagrams 7. Resistance to motion of electrons and holes in a crystal	**3**	**6**
❖ **Impurities and Imperfections in Crystals** 1. Types of imperfection 2. Chemical binding in semiconductors 3. Alternative approach to semiconductor designation 4. Substitutional impurities in semiconductors 5. Excitons	**1.5**	**3**
❖ **Carrier Concentrations in Thermal Equilibrium** 1- Distribution of electrons between the various energy levels 2- Intrinsic semiconductors 3- Semiconductors with impurity levels	**1.5**	**3**

❖ **Electron Transport Phenomena** 1- Collisions with crystalline imperfections- Relaxation time 2- Constant relaxation time 3- Relaxation time as a function of E 4- Electrical conduction at very law temperatures	**1.5**	**3**
❖ **Thermal Effects in Semiconductors** 1. Thermal conductivity 2. Thermoelectric power 3. Thermoelectric effects 4. Condition of degeneracy 5. Strong magnetic fields 6. Relative magnitudes of the magnetic effects	**2**	**4**
❖ **Diffusion of Electrons and Positive Holes** 7. Inhomogeneous semiconductors 8. Einstein's relationship 9. Departure from thermal equilibrium 10. Electron-hole recombination 11. Diffusion and conduction in extrinsic materials (n>>p or p>>n) 12. Drift of a pulse of minority carriers in an electric field 13. Near-intrinsic materials 14. Comparison of contact phenomena 15. The p-n junction 16. The n-n and p-p junctions 17. Surface effects 18. Metal-semiconductor contacts 19. Drift mobility of electrons and holes 20. Hetero junctions	**3**	**6**
	14 weeks	**28 hrs**

2. Course components (total contact hours and credits per semester):						
	Lecture	Tutorial	Laboratory or Studio	Practical	Other:	Total
Contact Hours	28	14			14	56
Credit	**2**					

3. Additional private study/learning hours expected for students per week. 2

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 4. Encourage the student to look for the	1. Exams (Midterm, final, quizzes) 2. Asking about physical laws previously taught 3. Writing reports on selected parts of the
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.	information in different references. 5. Ask the student to attend lectures for practice solving problem.	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	Midterm 1	5th week	10
2	Midterm 2	10th week	10
3	In-Class Problem Solving	13th,7th week	10
4	project	12th week	10
5	Homework	Every week	10
6	Final exam	End of semester	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)

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

E Learning Resources

1. List Required Textbooks

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

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

[1] Semiconductors by Smith

[2] Physics of Semiconductors by Sze

4. List Electronic Materials, Web Sites, Facebook, Twitter, etc.
   1. http://www.physicsclassroom.com
   2. http://www.electronicstheory.com/
   3. http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/

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

Wikipedia

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.) 1- Lecture room for 30 students, Black (white) boards 2- Class room is already provided with data show
2. Computing resources (AV, data show, Smart Board, software, etc.) Providing classrooms with computers, data show, Smart Board, software, etc.)
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) NA

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching 3- Questionnaires 4- Open discussion in the class room at the end of the lectures 5- Meeting with students 6- Open door policy
2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department 7- Revision of student answer paper by another staff member. 8- Analysis the grades of students. 9- E-Learning Suggestions - e-Learning Documentation
3 Processes for Improvement of Teaching 1. Preparing the course as PPT. 2. Using scientific movies. 3. Coupling the theoretical part with laboratory part 4. Periodical revision of course content. 5. Report writing of the course and determine goals. 6. Fortification of the student learning. 7. Handling the weakness point
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) 1. After the agreement of Department and Faculty administrations 2. The instructors of the course are checking together and put a unique process of evaluation.

3. Feedback evaluation of teaching from independent organization.
5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement. • Periodical revision by Quality Assurance Units in the Department and institution for (Student evaluation, Course report, Program report, Program Self-study, Plan of improvement should be given. • Collect all reports and evaluations at the end of the year for a reviewing purpose. • Conduct a workshop to presents finding of reports and evaluation to share knowledge.

Name of Instructor: _______ Roshdi Seoudi _______________________________________

Signature: ___________________________ Date Report Completed: ____________

Name of Field Experience Teaching Staff ______________________________________

Program Coordinator:____

Signature: ___________________________ Date Received: ___________________

كلية العلوم التطبيقية
Faculty of Applied Sciences

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

T6. Course Specifications (CS)

Course title: Atomic Physics

Course code: 403452-2

Course Specifications

Institution: **Umm AL – Qura University**	Date : **20/1/1438**
College/Department : **College of Applied Science – Department of Physics**	

A. Course Identification and General Information

1. Course title and code: **Atomic Physics (code: 403452)**
2. Credit hours: **2 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 academic staff member**
5. Level/year at which this course is offered : **7th Level**
6. Pre-requisites for this course (if any) : ---
7. Co-requisites for this course (if any) : ---
8. Location if not on main campus: **Main campus and Alzaher**
9. Mode of Instruction (mark all that apply)

Mode	Mark		Percentage
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. What is the main purpose for this course?

This course is designed to study and consolidate the atomic physics concepts in the branches of physics such as The quantum theory of the Hydrogen atom, the many-electron atom, the molecules H_2, the interaction of atoms with radiation, the lasers and masers and the atomic interferometer.

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 atomic physics theory, 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 atomic physics, such as quantum theory, many electron atom, molecules H_2, the interaction of atoms with radiation, lasers and masers, and atom interferometry. This course will provide a conceptual background in atomic 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
❖ **QUANTUM THEORY OF THE HYDROGEN ATOM** 1- Schrodinger equation for the Hydrogen atom, 2- Separation of variables, 3- Quantum numbers, 4- Principal quantum number, 5- Magnetic quantum number, 6- The normal Zeeman effect, 7- Electron probability density, 8- Radiative transition, 9- Selection rules.	2	4

❖ **MANY-ELECTRON ATOM** 1- Electron spin, 2- Spin orbit coupling, 3- The exclusion Pauli, 4- Electrons configurations, 5- The periodic Table, 6- Hand's rule, 7- Total angular momentum, 8- LS coupling, 9- Jj coupling, 10- One electron spectra, 11- Two electron spectra, 12- X-Ray spectra.	**3**	**6**
❖ **MOLECULES H2** 1- Molecular formation, 2- Electron sharing, 3- The H2+ molecular ion, 4- The H2 molecule, 5- Molecular orbitals, 6- Hybrid orbitals, 7- Carbon-carbon bonds, 8- Rotational; energy levels, 9- Vibrational energy levels, 10- Electronic spectra of molecules.	**2**	**4**
❖ **THE INTERACTION OF ATOMS WITH RADIATION** 1- Setting up the equations, 2- The Einstein beta coefficients, 3- Interactions with monochromatic radiation, 4- Ramsey fringes, 5- Radiative damping, 6- The optical absorption cross-section, 7- The a. c. Stark effect or light shift.	**3**	**6**
❖ **LASERS AND MASERS** 1- Light amplification, 2- Inversion method, 3- Resonant cavity, 4- Oscillator laser.	**2**	**4**

❖ **ATOM INTERFEROMETRY** 1- Young`s double slit experiment, 2- A diffraction grating for atoms, 3- The three grating interferometer, 4- Measurement of rotation, 5- The diffraction of atoms by light, 6- Interferometry with Raman transitions.	**2**	**4**
❖ **Exercises and Solved problems**	**1**	**2**
	15 weeks	**30hrs**

Practical part:

1. No practical part.

2. Course components (total contact hours and credits per semester):						
	Lecture	Tutorial	Laboratory or Studio	Practical	Other:	Total
Contact Hours	**30**		**00**			**30**
Credit	**2**		**0**			

3. Additional private study/learning hours expected for students per week.	2

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 4. Encourage the student to look for the	1. Exams (Midterm, final, quizzes) 2. Asking about physical laws previously taught 3. Writing reports on selected parts of the
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.	information in different references. 5. Ask the student to attend lectures for practice solving problem.	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	All weeks	10 %
2	Participation in activities lectures and labs	All weeks	10 %
3	Midterm Exam (theoretical)	8th week	30%
5	Final Exam (theoretical)	16th week	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)

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

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

3. List Recommended Textbooks and Reference Material (Journals, Reports, etc)
1- Jeremy Bernstein, Paul Fishbane and Stephen Gasiorowicz , Modern Physics, 2-Hardback (2000).
2- Randy Harris, Modern Physics (2nd Edition), International Edition
3- A. Beiser (2003). Concepts of Modern Physics (6th ed.). McGraw-Hill.
4-Robert B. Leighton, Principles of Modern Physics, McGraw-Hill Book company.

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

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.

Name of Instructor: _______A. TIMOUMI_______________________________________

Signature: ____________________________ Date Report Completed: _____________

Name of Field Experience Teaching Staff ______________________________________

Program Coordinator:____

Signature: ____________________________ Date Received: ____________________

كلية العلوم التطبيقية
Faculty of Applied Sciences

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

T6. Course Specifications (CS)

Course title: Electronics

Course code: 4034173-4

Course Specifications

Institution: **Umm AL – Qura University**	Date : **18/1/1438**
College/Department : **College of Applied Science – Department of Physics**	

A. Course Identification and General Information

1. Course title and code: **Electronics (code: 4034173-4)**
2. Credit hours: **4 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 academic staff member***
5. Level/year at which this course is offered : **4th Year / Level 8**
6. Pre-requisites for this course (if any) : **Solid state physics I (4034170-4)**
7. Co-requisites for this course (if any) : ---
8. Location if not on main campus: **Main campus & Girls section**
9. Mode of Instruction (mark all that apply)

Mode			
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. Summary of the main learning outcomes for students enrolled in the course.

Outcomes of this course are to introduce the basic physical principles and fundamentals of semiconductors and their usage and applications in electronic components like diodes and transistors.

This course introduces basic principles of linear and digital electronic circuits that are used in the everyday experience, like

- Semiconductor Diodes
- Circuit rectifiers.
- Special types of diodes
- Bipolar junction transistors
- Small signal amplifiers and biasing
- Field effect transistors
- Signal operational amplifiers,
- Digital circuits like logic gates
- Applications to memory chips and timers used in most of electronic devices

At the end of this course the student should be able to

1. Understand and analyze relatively simple electronic layouts and circuits

Design special purpose circuits that meet his requirements in his scientific life

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)

1. Explain strategy of the course in the beginning of the semester
2. Outlines of the physical laws, principles and the associated proofs.
3. Highlighting the day life applications whenever exist.
4. Encourage the students to see more details in the international web sites and reference books in the library.
5. Discussing some selected problems in each chapter.
6. Cooperate with different institution to find how they deal with the subject
7. Renew the course references frequently

Frequently check for the latest discovery in science

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

Course Description:

- Conduction mechanisms in semiconductors: Energy Bands of metals, semiconductors and insulators, Intrinsic semiconductors, Extrinsic (impurity) semiconductors (n-type semiconductors, p-type semiconductors), majority and minority carriers, generation and recombination rates.
- Junction diode physical electronics: The pn junction: Physical model, Current flow, carrier concentration at edge of space charge layer, Current voltage characteristics at direct and reverse bias - Temperature dependence of idealized diode equation- pn dynamic behavior, junction structures, contacts and metal-semiconductor junctions, Examples of diode circuit analysis.
- Bipolar junction transistors (BJT): BJT as control valves, Operation of BJT, Circuit models of low speed active region operation, Examples of transistor circuit analysis.
- Field effet transistors BJT: Electrical properties of semiconductor surfaces, Volt-Amper characteristics of MOSFET, Dynamics for MOSFET and circuit applications, Junction field effect transistors, Static drain characteristics, Comparison of MOSFET and JFET transistors.
- Operational amplifiers: Introduction, connecting the amplifier to the circuits, Ideal and real amplifiers, Linear amplification and negative feedback, Special application of amplification, Addition and subtraction of signal, Memory and timing applications using positive feedback (Multivibrators), Integration and differentiation.
- Digital electronics: Digital logic (binary numbers-logic levels,. Logic gates-truth. Tables logic. Families-Practical circuits, Main gates (AND-OR-NOT-NAND-NOT-AND-OR-NOT-NAND-NOR), Combinations of gates, Logic laws, XOR and XNOR gates, Adding of binary numbers, Memory elements (Multivibrators-Flip flops).

1 Topics to be Covered

Topics	No of Weeks	Contact hours
❖ Semiconductors and PN Junction Atoms Covalent bonds Conduction in Semiconducting Crystal PN Junction PN Junction Biasing	2	6
❖ Diode and its applications Diodes Calendar Half-wave rectifier Full -wave rectifier Full wave rectifier filters	2	6
❖ Special types of diode Diode "zener" Diode "zener" Applications Variable capacitance diode Optical diodes Other types of diode	2	6
❖ BIPOLAR JUNCTION TRANSISTORS	2	6

BJT as control valves Operation of BJT Circuit models of low speed active region operation An example of transistor circuit analysis ; Transistor operation at extremes of collector voltage		
❖ Bias transistor bipolar DC operating point Base Biasing Emitter Biasing Voltage divider Biasing Collector bias by feedback	**2**	**6**
❖ FIELD-EFFECT TRANSISTORS Electrical properties of semiconductors for surfaces Volt-Ampere characteristics of MOSFET A brief view of dynamics for MOSFET and circuit applications Junction Field-Effect Transistors static drain characteristics; Comparison of MOSFET and FET transistors	**1**	**3**
❖ Operational amplifiers Introduction Connecting the Amplifier to the circuit Ideal and real Amplifiers Linear Amplification and negative feedback Special applications of amplifications Addition and subtraction of signals Memory and timing applications; using positive feedback (Multivibrators) Integration and Differentiation	**1**	**3**
❖ DIGITAL ELECTRONICS Digital logic (Binary numbers, Logic levels, Logic gates; Truth tables; Logic families-practical circuits) Main gates (AND, OR, NOT, NAND, NOR) Combination of gates Logic laws XOR and XNOR gates Adding of binary numbers Memory elements (Multivibrators, Flip-Flops)	**2**	**6**
❖ **Exercises and Solved problems**	**1**	**3**
	15 weeks	**45hrs**

Practical part:

1. Laboratory Safty Guidelines
2. P-N Junction Diode Characteristic
3. Half and Full-wave rectifiers
4. Filters circuits
5. Zener diode

6. Light emitted diodes
7. Characteristic of bipolar junction transistors
8. Transistor Load line
9. Transistor Biasing
10. Small signal amplifiers
11. JEFT transistor
12. Logic circuits

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

	Lecture	Tutorial	Laboratory or Studio	Practical	Other:	Total
Contact Hours	**45**	**48**	**42**		**32**	**167**
Credit	**3**		**1**	**3**		

3. Additional private study/learning hours expected for students per week. 4

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		
1.3	Determine the physical quantities at the Lab.	1. Doing team research or team project. 2.Doing team work to perform some experiments 3. Perform the experiments correctly. 4. Demonstrate the results correctly. 5. Write the reports about the experiment. 6. Discussion with the student about the results	Writing scientific Reports. Lab assignments Exam.

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 4. Encourage the student to look for the information in different references. 5. Ask the student to attend lectures for practice solving problem.	1. Exams (Midterm, final, quizzes) 2. Asking about physical laws previously taught 3. Writing reports on selected parts of the course. 4. Discussions of how to simplify or analyze some phenomena.
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.		
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**		
5.1	Use experimental tools safely and correctly.	Follow up the students in lab and during carryout all experimental work.	• Practical exam. • Giving additional marks for the results with high and good accuracy
5.2	Determine the physical quantity correctly at the Lab.		

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	All weeks	10 %
2	In-Class Problem Solving	$5^{th,}13^{th}$ weeks	10 %
3	Midterm Exam 1 (theoretical)	5^{th} week	10%
	Midterm Exam 2 (theoretical)	10^{th} week	10%
4	Lab. Reports (Practical)	11^{th} week	10%
5	project	12^{th} week	10%
6	Final Exam (theoretical)	16^{th} week	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)

8 office hours per week

E Learning Resources

1. List Required Textbooks

Electronic Devices, 9^{th} Edition Thomas L.Floyd
Electronic Devices and Circuits by Jacob Millman and Christos C. Halkias

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

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

الأجهزة الالكترونية، طوماس فلويد، ترجمة دكتور يسرى مصطفى، جامعة السابع من ابريل، ٢٠٠٧.

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

• http://www.physicsclassroom.com • http://www.electronicstheory.com/ • http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/
5. Other learning material such as computer-based programs/CD, professional standards or regulations and software. Wikipedia

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.) • Lecture room for 30 students • Library • Laboratory for electronics there is a special course for laboratory related to electronics)
2. Computing resources (AV, data show, Smart Board, software, etc.) • Computer room • Scientific calculator.
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 • Questionaries • Open discussion in the class room at the end of the lectures
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 movies. • 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) • After the agreement of Department and Faculty administrations
5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement. • Periodical revision by Quality Assurance Units in the Department and institution

Name of Instructor: _______ J.A.OUERFELLI ________________________________

Signature: __________________________ Date Report Completed: -----------

Name of Field Experience Teaching Staff _____________________________________

Program Coordinator:____

Signature: __________________________ Date Received: ___________________

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: 4034162-3

Course Specifications

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

A. Course Identification and General Information

1. Course title and code: **Radiation physics (code: 403462)**
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 academic staff member**
5. Level/year at which this course is offered : **4st Year / Level 8**
6. Pre-requisites for this course (if any) : **Nuclear Physics (403460-4)**
7. Co-requisites for this course (if any) : ---
8. Location if not on main campus: **Main campus and Abdia**
9. Mode of Instruction (mark all that apply)

Mode			
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. Energy loss by inelastic collision and by radiation. 3. Absorption of electrons, the half-thickness. 4. Range determination from the absorption curve.	**2**	**6**
❖ 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.	**1**	**3**

3- The late effects. 4- The risk factor. 5- The hereditary effects of radiation.		
❖ **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. Cerencov 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 4. Encourage the student to look for the	1. Exams (Midterm, final, quizzes) 2. Asking about physical laws previously taught 3. Writing reports on selected parts of the
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.	information in different references. 5. Ask the student to attend lectures for practice solving problem.	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	All weeks	5 %
2	Participation in activities lectures and labs	All weeks	5 %
3	Midterm Exam (theoretical)	8th week	30%
4	Lab. Reports (Practical)	11th week	5%
5	Final Exam (Practical)	15th week	15%
6	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.

Name of Instructor: _______H. T. Mahdy ____

Signature: ___________________________ Date Report Completed: ____________

Name of Field Experience Teaching Staff ______________________________________

Program Coordinator:____

Signature: ___________________________ Date Received: ___________________

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

T6. Course Specifications (CS)

Course title: Solid State Physics 2

Course code: 403472-2

Course Specifications

Institution: **Umm AL – Qura University**	Date : **18/1/1439**
College/Department : **College of Applied Science – Department of Physics**	

A. Course Identification and General Information

1. Course title and code: **Solid State Physics 2 (code: 403472-2)**
2. Credit hours: **2 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 **Dr. S. M. Attia**
5. Level/year at which this course is offered : **4^{st} Year / Level 7**
6. Pre-requisites for this course (if any) : **Solid State Physics 1 (code : 403470-3)**
7. Co-requisites for this course (if any) : ---
8. Location if not on main campus: **Main campus and Alzaher**
9. Mode of Instruction (mark all that apply)

Mode	Mark		Percentage
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. What is the main purpose for this course?

After completing this course student should be able to:

1. Define the diamagnetics , paramagnetics, ferromagnetic and their properties.
2. Define the dielectrics, ferroelectrics, polarization and their properties,
3. Define the supperconductors and their properties.

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- Explain the strategy of the course in the beginning of the semester
2- Outlines of the physical laws, principles and the associated proofs.
3- Encourage the students to see more details in the international web sites and reference books in the library.
4- Discussing some selected problems in each chapter.
5- Renew the course references frequently
6- 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 An introduction to the physics governing the different types of materials , dielectric materials, magnetic material, and superconductors and semiconductors

1 Topics to be Covered

Topics	No of Weeks	Contact hours
❖ **Dielectrics** 1- Review of Dieletric materials 2- The polarization 3- The polarizability 4- Types of polarization 5- Ferroelctricity 6- The microscopic model of ferroelectic domain.	**3**	**9**
❖ **Magnetism and magnetic materials** 1- Review of Basic Formulas and Magnetic susceptibility, 2- The Atomic Origin of Magnetism	**5**	**15**

3- Diamagnetism and Langevin theory. 4- Paramagnetism : Classical and Quantum Theory of Paramagnetism. 5- Ferro-Magnetism: Properties, Curie law and Curie Wise law, 6- Rare Earth and Iron Group Ions and Magnetism in Metals. 7- Ferro-Magnetism in Insulators, the Molecular Field Theory, 8- Anti and Ferri-Magnetism and Ferro-Magnetization Process.		
❖ **Superconductivity:** Zero Resistance, Occurrence of Super Conductivity and the Meissner Effect. The Critical Field, Thermodynamics of the Super Conductivity Transition and the Two-Fluid Model. Superconductivity theory and Copper pair electron. Josephson Junction and SOQUED	**2**	**6**
	15 weeks	**30 hrs**

2. Course components (total contact hours and credits per semester):						
	Lecture	Tutorial	Laboratory or Studio	Practical	Other:	Total
Contact Hours	**30**	**15**				**45**
Credit						

3. Additional private study/learning hours expected for students per week.	4

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 4. Encourage the student to look for the	1. Exams (Midterm, final, quizzes) 2. Asking about physical laws previously taught 3. Writing reports on selected parts of the
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.	information in different references. 5. Ask the student to attend lectures for practice solving problem.	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	All weeks	10 %
2	Participation in activities lectures and labs	All weeks	10 %
3	1st Periodic Exam	8th week	15%
4	2nd Periodic Exam	11th week	15%
5	Final Exam	16th week	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)

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
   1- Charles Kittel, Introduction to Solid State Physics 7th Ed
   2- M. A. Omar "Elementary of Solid State Physics" Addison Wesley publishing company 1997.
   3- Walter A. Harrison, Solid State Theory , Dover edition 1979

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

3. List Recommended Textbooks and Reference Material (Journals, Reports, etc)
   1- H.P. Myers, Introduction to Solid State Physics, 2nd Ed, 2009 Taylor & Francis
   2- Walter A. Harrison, Solid State Theory , Dover edition 1979

4. List Electronic Materials, Web Sites, Facebook, Twitter, etc.
   - http://www.phys.lsu.edu/~jarrell/COURSES/SOLID_STATE_HTML/course_solid.html
   - http://www.encyclopedia.com/topic/solid-state_physics.aspx
   - http://www.physics.byu.edu/research/condensed
   - http://web.utk.edu/~tbarnes/website/cm/cm.html

• http://www.answers.com/topic/solid-state-physics • http://www.answers.com/topic/solid-state-physics
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.
2. Computing resources (AV, data show, Smart Board, software, etc.) In each class room 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 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 • Questionaries • Open discussion in the class room at the end of the lectures
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. • 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.

Name of Instructor: _______S. M. Attia

Signature: ____________________________ Date Report Completed: _____________

Name of Field Experience Teaching Staff ____

Program Coordinator:____

Signature: ____________________________ Date Received: ____________________

كلية العلوم التطبيقية
Faculty of Applied Sciences

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

T6. Course Specifications (CS)

Course title: Nuclear Technology

Course code: 403465-2

Course Specifications

Institution: **Umm AL – Qura University**	Date : **18/1/1438**
College/Department : **College of Applied Science – Department of Physics**	

A. Course Identification and General Information

1. Course title and code: **Nuclear Technology (code: 403465-2)**
2. Credit hours: **2Hrs**
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 academic staff member**
5. Level/year at which this course is offered : **Level 8**
6. Pre-requisites for this course (if any) : **Nuclear Physics (code : 403460)**
7. Co-requisites for this course (if any) : ---
8. Location if not on main campus: **Main campus and Alzaher**

9. Mode of Instruction (mark all that apply)

Mode	Mark		Percentage
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. What is the main purpose for this course?

At the end of the course, the student must be able to:

1- Describe the different types of accelerators :
- Electrostatic Van de Graaff accelerators
- Electrostatic Tandem Van de Graaff accelerators
- Linear accelerators of multiple electrodes
- Cyclotron resonance Frequency accelerators (Fixed Frequency-fixed magnetic field)
- Synchrocyclotron accelerators (Frequency- modulated Cyclotron)
- Synchrotron accelerators (Frequency- magnetic field -modulated Cyclotron)
- Betatron accelerators
- Heavy ion accelerators
- Colliding- beam accelerators

2- Describe the Mass Spectrometers (nuclear masses)
- Mass spectrograph (mass doublet method)
- Mass spectrometers (Nuclide abundances, isotopes separation)

3- List and understand the Fission Nuclear reactors
- Nuclear Fission (exothermic reaction)
- Neutron capture
- Critical mass, critical volume
- Neutron reproduction factor (four factor formula)
- Types of fuel
- Moderators and coolant
- Types of reactors
- A natural fission reactors
- Fission Explosives

4- List and understand the Fusion Nuclear reactors
- Requirements for fusion (Lawson criteria)
- Fusion reactions
- Fusion Fuel confinement (gravitational confinement, inertial confinement, magnetic confinement)
- Fusion Nuclear reactors

5- Know the Nuclear detectors

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- Explain the strategy of the course in the beginning of the semester
2- Outlines of the physical laws, principles and the associated proofs.
3- Encourage the students to see more details in the international web sites and reference books in the library.
4- Discussing some selected problems in each chapter.
5- Renew the course references frequently
6- 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 nuclear technology, such as different types of accelerators, the mass spectrometers (nuclear masses), the fission nuclear reactors, the fusion nuclear reactors and the nuclear detectors.

1 Topics to be Covered

Topics	No of Weeks	Contact hours
❖ **Accelerators** 1- Electrostatic Van de Graaff accelerators 2- Electrostatic Tandem Van de Graaff accelerators 3- Linear accelerators of multiple electrodes 4- Cyclotron resonance Frequency accelerators (Fixed Frequency- fixed magnetic field) 5- Synchrocyclotron accelerators (Frequency- modulated Cyclotron) 6- Synchrotron accelerators (Frequency- magnetic field -modulated Cyclotron) 7- Betatron accelerators 8- Heavy ion accelerators 9- Colliding- beam accelerators	**4**	**8**
❖ **Mass Spectrometers (nuclear masses)** 1- Mass spectrograph (mass doublet method) 2- Mass spectrometers (Nuclide abundances, isotopes separation)	**3**	**6**
❖ **Fission Nuclear reactors** 1- Nuclear Fission (exothermic reaction) 2- Neutron capture 3- Critical mass, critical volume 4- Neutron reproduction factor (four factor formula) 5- Types of fuel 6- Moderators and coolant 7- Types of reactors 8- A natural fission reactors 9- Fission Explosives	**3**	**6**
❖ **Fusion Nuclear reactors** 1- Requirements for fusion (Lawson criteria) 2- Fusion reactions 3- Fusion Fuel confinement (gravitational confinement, inertial confinement, magnetic confinement) 4- Fusion Nuclear reactors	**3**	**6**

❖ **Nuclear detectors**	**2**	**4**
	15 weeks	**30hrs**

2. Course components (total contact hours and credits per semester):						
	Lecture	Tutorial	Laboratory or Studio	Practical	Other:	Total
Contact Hours	**30**	**15**				**45**
Credit						

3. Additional private study/learning hours expected for students per week. 4

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 4. Encourage the student to look for the	1. Exams (Midterm, final, quizzes) 2. Asking about physical laws previously taught 3. Writing reports on selected parts of the
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.	information in different references. 5. Ask the student to attend lectures for practice solving problem.	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	All weeks	10 %
2	Participation in activities lectures	All weeks	10 %
3	Written Test (1)	6^{th} week	15%
4	Written Test (2)	11^{th} week	15%
5	Final Exam (theoretical)	16^{th} week	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)

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
   1- Klaus Wille, The Physics of particle accelerators, Oxford university press, 2000, ISBN: 19 850549
   2- Helmut Wiedemann, Particle accelerator physics I, springer, 2^{nd} edition, 1999.
   3- Kenneth S. Krane , Introductory nuclear Physics, , 1^{th} edition, Jone Wily & Sons Inc. (1988) ISBN 0 - 471-80553-X .
   4- Burcham, Nuclear and Particle Physics, 2nd edition, Longman Publisher (1995), ISBN-10 : 0582 450888 , -13: 978 - 0582 4508882
   5- Richard A. Dunlap , An Introduction to the physics of particles and nuclei, 1^{th} edition, Brooks Cole Publishing Company (2003), ISBN-10: 0534392946, -13: 978 – 0534392949

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.
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.
2. Computing resources (AV, data show, Smart Board, software, etc.) In each class room there is a data show, and board.
3. Other resources (specify, e.g. 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 • 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. • 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.

Name of Instructor: _______Loulou Mehrez

Signature: ___________________________ Date Report Completed: ____________

Name of Field Experience Teaching Staff ______________________________________

Program Coordinator:____

Signature: ___________________________ Date Received: ___________________

كلية العلوم التطبيقية
Faculty of Applied Sciences

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

T6. Course Specifications (CS)

Course title: Project

Course code: 403499-2

Course Specifications

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

A. Course Identification and General Information

1. Course title and code: **Project** **(code: 403499-2)**
2. Credit hours: **2 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 **Any member from the instructors of the departmrnt**
5. Level/year at which this course is offered : **4th Year / Level 8**
6. Pre-requisites for this course (if any) : **--------**
7. Co-requisites for this course (if any) : ---
8. Location if not on main campus: **Main campus and Alzaher**
9. Mode of Instruction (mark all that apply)

a. traditional classroom	✓	What percentage?	**20%**
b. blended (traditional and online)	✓	What percentage?	**10%**
c. e-learning		What percentage?	**10%**
d. correspondence	✓	What percentage?	**60%**
f. other		What percentage?	

Comments:

B Objectives

1. What is the main purpose for this course?
This course is dealing with a specific research point . this research point is carried by the student under the supervision of one of the academic stuff . the research point can be classified to two groups :
A- Theoretical research projects.
B- Experimental research project.

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.Explain strategy of the project in the beginning of the semester
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 and comparing it with experiments in the lab.
5- Highlighting the day life applications whenever exist.
6. Encourage the students to see more details in the international web sites and reference books in the library.
7- Encourage the student to build an example of different experiments related to course

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

Course Description:
The course mainly works on developing the different scientific skills of the student. Improving they way of scientific thinking .

1 Topics to be Covered

Topics	No of Weeks	Contact hours
This course is dealing with a specific research point . this research point is carried by the student under the supervision of one of the academic stuff . the research point can be classified to two groups : A- Theoretical research projects. B- Experimental research project. So the point of study will be varied according to the students and the instructor of the course		
	14 weeks	**28hrs**

Practical part:

The time of the practical depend on the selected point under study per each project.

2. Course components (total contact hours and credits per semester):						
	Lecture	Tutorial	Laboratory or Studio	Practical	Other:	Total
Contact Hours	**28**					**28**
Credit	**2**					

3. Additional private study/learning hours expected for students per week.	2

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	Understand relevant of knowledge and theory in other related disciplines and professional fields	• Brain storming • Discussions • Encourage the concept of team work • Active teaching • Co-operative learning • Self-learning • Solving problems	• Discussions during the lectures. • Ask the student to clear the misunderstanding of some physical principle and asking about quality question. • Writing scientific paper • Reports
1.2	Describe concepts, Procedures of matching the principles and the concepts to analyze problems within specific core areas and theories	• Discussions • Active teaching	• Discussions during the lectures.

		• Co-operative learning • Self-learning • Solving problems	• Ask the student to clear the misunderstanding of some physical principle and asking about quality question. • Writing scientific paper
2.0	**Cognitive Skills**		
2.1	Gain mental calculating skills by training them on it	• Brain storming • Encourage the student to look for the information in different references • Solving problems • Doing small research • Modeling and simulation	• Workshop • Feedback reports • Team work projects
2.2	Solve problems in Physics by using suitable mathematical principles		
2.3	Analyze and interpret quantitative results		
2.4	Gain the skills of solving scientific problems related to industrial problems		
3.0	**Interpersonal Skills & Responsibility**		
3.1	Show responsibility for self-learning to be aware with recent developments in physics	• Brain storming • Group discussion • Experimental training • Encourage the student to attend general lectures. • Seminars	• Discussion • Seminars • Home work • Reports
3.2	Act as professional and responsible person.		

4.0	**Communication, Information Technology, Numerical**		
4.1	Communicate effectively in oral and written form	• Use the web for research. • Computational analysis. • Data representation. • Focusing on some real results and its physical meaning. • Lectures for problem solution. • Experimental training	• Discussions in the lectures • The reports • Results of computations and analysis. • Doing research
4.2	Use basic physics terminology in English		
4.3	Acquire the skills to use the internet communicates tools.		
4.4	Use a perfect experimental tools to solve Physics problems in the Labs		
5.0	**Psychomotor**		
5.1	Employ software skills.	• Experimental training • Research projects	• Presentations

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			
2			
3			
4			

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. (2 hrs per week)

E Learning Resources

1. List Required Textbooks

Selected according to the research point under study.

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.

/

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.) * Lecture room organized for face to face learning * Library *Laboratory for optics * Boards * Suitable lightening system * Air condition units * Fiber optic networks and wireless * Computers and data show
2. Computing resources (AV, data show, Smart Board, software, etc.) * computers with data show * Available numbers of computers for students * Updating the computer each year.
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) Checked later if needed

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching Evaluating the instructor by the student using questionnaires Following up the progress of student in the course Evaluating the progress of student by the projects and reports Evaluating the course by specialized committees.
2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department Self-evaluation Student evaluation Evaluation by other instructor in the same department or outside it
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.
- 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.

Name of Instructor: _______Afaf maweed Abdelmageed

Signature: ____________________________ Date Report Completed: _____________

Name of Field Experience Teaching Staff ________optic physic___________________________

Program Coordinator:____

Signature: ____________________________ Date Received: ____________________