رقم التحصص ٤٠٣٠١ الخطة الدراسية لبكالوريوس الفيزياء الطبية ١٤٣٧ هـ رقم التوحية ٣٧ ساعات الخطة ١٣٦	كلية العلوم التطبيقية / قسم الغيزياء
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	السنة الأولى												
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٣	٣		١	٣	الاحياء العامة General Biology	£•111•1-£	-	٤		-	٤	تفاضل و تکامل Calculus	£•£11•1-£
٣	٣		١	٣	الفيزياء العامة General Physics	£•~11•1-£	۲	٣		١	٣	الكيمياء العامة General Chemistry	5 • 7 1 1 • 1 - 5
-	٤	۷ ٤١.١_٤	-	٤	اللغة الانجليزية للعلوم التطبيقية English for science	V • • £ 1 • Y_£	-	٤		-	٤	اللغة الانجليزية English language	V • • £ 1 • 1_£
-	۲		-	۲	اللغة العربية Arabic Language	0.11.1_7	-	۲		-	۲	القرآن الكريم ١ (1) The Holy Qura'an	7.01.1_7
-	۲		-	۲	السيرة النبوية Biography of prophet Mohammed (PBUH)	1.71.1_7	-	۲		-	۲	الثقافة الاسلامية ١ Islamic Culture (1)	7 • 1 1 • 1-4
			ساعة	١٦	المجموع					ساعة	- 1 7	المجموع	

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-	£	£ • £ 7 • • 1_£	-	٤	طرق نظریة فی الفیزیاء (۱) Theoretical Methods in Physics (1)	£ • TY 1 £ 1_£	٣	٣	£ • T \ 1 • 1_£	١	٣	فیزیاء عامهٔ (۲) General Physics (2)	£ • T Y • Y-£
٣	٣	£•#71•7_£	١	٣	فيزياء حديثة Modern Physics	£ • T Y 1 0 • _ £	٣	٣	£ • T \ 1 • 1-£	١	٣	كهربية ومغناطيسية Electricity and Magnetism	£• TT171_£
۲	۲	£•17817_7	١	۲	فسيولوجيا حيوان Biology-Physiology	£•17771_7	-	٤	£ • £ \ \ • _£	-	٤	التفاضل والتكامل (٢) Differentiation and Integration (2)	£ . £ Y 0 . 1_£
-	۲	7.01.1_7	-	۲	القرآن الكريم (2) The Holy Qura'an (2)	7.07.1_7	۲	Y	£ • 1 1 1 • 1_£	۰ ۱		بيولوجيا الخلية Cell Biology	£•17717_7
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			١	٨	المجموع					جموع ١٨		المجموع	
عدد المقررات: تخصصية (٣ مقرر) + مقرر مساند (١ مقرر) + متطلب جامعة (٢ مقرر)							d 1	قرر مساند (۲ مقرر)	۲ مقرر) + ه	نخصصية (عدد المقررات: ت		

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	٣	٣	£ • TT 7 10_£	١	٣	فيزياء اشعاعية طبية (2) Radiation Medical Physics (2)	£ •	-	۲	£ • 4 4 4 4 • - E	-	۲	فيزياء الليزر الطبي Physics Of Medical Laser	£ • 377 1 - 1
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	٣	٣	£ • TT 1 £ 0_£	,	٣	فيزياء نووية Nuclear Physics	£ • ٣£ 1 7 • _£	-	۲	£ • 18881_8	-	۲	فيزياء الاغشية والجزيئات الكبيرة Physics of Cell Membrane And Macromolecules	£ • 3779A_1
	-	٤	2.77120_2	-	£	فيزياء الجوامد (١) Solid State Physics	£ • W £ 1 V • _ £	-	٤	2 • 37 1 2 1 - 2	-	٤	میکانیکا الکم (۱) Quantum Mechanics (1)	2.77120-2
								-	٣	3 . 1 7 . 1_7	-	٣	الثقافة الإسلامية (3) Islamic Culture (3)	3.18.1_8
				١,	٨	المجموع					١	۷	المجموع	
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	وافقة القسم	م	,	١	التدريب الميداني Hospital Training	£ • ₩ £ 9 9 A_ 1 1	١	Ŋ	£ • 77797_£	n	١	تطبيقات الحاسب في الفيزياء الطبية Computer Applications in Medical Physics	£ • ₩ £ Y 9 1_1
-	۲	۲ ۰۱۳۰۱ _۳	-	۲	الثقافة الإسلامية (4) Islamic Culture (4)	7 . 1 : . 1_7	-	٣	£ • WWY9Y_E	-	٣	فيزياء التصوير الطبي Physics of Medical Imaging	£ • T £ T \ 9_1
-	۲	3.07.1_7	-	۲	القرآن الكريم (4) The Holy Qura'an (4)	7.05.1_7	٣	۲	£ • WWY9Y_£	۲	۲	فيزياء العلاج بالإشعاع Physics Of Radiotherapy	£ • 7 £ 7 A 7 _ 5
				10	المجموع		٣	٣	£ • ٣ £ 1 7 • - £	,	٣	فيزياء الطب النووي Physics of Nuclear Medicine	٤ • ٣ ٤ ٢ ٩ ٥ _ ١
		-					-	٣	£ • ₩ £ 1 V • _ £	-	٣	فيزياء المواد الحيوية Physic of Bio-Materials	£ • ₩ £ Y 9 7_Y
							-	۲	2.07.1_7	-	۲	القرآن الكريم (3) The Holy Qura'an (3)	7.07.1_7
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	عدد المقررات: تدریب میدانی (۱ مقرر) + متطلب جامعة (۲ مقرر)								طلب جامعة (١ مقرر)	مقرر) + مت	فصصية (٥	عدد المقررات: تح	

سائمانهم الحطق ١٣٦	رفته التوحية ٣٧	🛋 121°V	الخطة الدراسية لبكالوريوس الغيزياء الطبية	رقه التهدص ٤٠٣٠١	كلية العلوم التطبيةية / محسم الميزياء
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Kingdom of Saudi Arabia

The National Commission for Academic Accreditation & Assessment

COURSE SPECIFICATION

7

Course title General Physics

Course code: 4031012-4

Revised 13 December 2015

رقو التخصى ٤٠٣٠١ لنطة الدراسية لبكالوريوس ا

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

Institution: UM AL – QURA UNIVERSITY

College/Department : Faculty of Applied Science – Department of Physics

A Course Identification and General Information

1. Course title General Physics
2. Course code: 4031012-4
2. Credit hours: 4hrs
3. Program(s) in which the course is offered. : BSc Physics
4. Name of faculty member responsible for the course:
One of the academic staff member
5. Level/year at which this course is offered: 1 st 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 Alzaher.
9. Mode of Instruction (mark all that apply)
a. traditional classroom What percentage?
b. blended (traditional and online) What percentage?
c. e-learning What percentage?

كلية العلوم التطبيقية / محسم الفيزياء

لتوحية ٣٧ سائمانه الخطة ١٣٦



١٤٣٧ کے رقم

وصية ٣٧ ما الحطة ١٣٦

B Objectives

After completing this course student should be able to: 1. Define the concepts of the measurements. 2. Define the concepts measuring length. 3. Define the concepts of measuring time. 4. Define the concepts of measuring weight. 5. Differentiate between the distance, the position, and the displacement. 6. Differentiate between the speed and the velocity. 7. Differentiate between the average velocity and the instantaneous velocity. 8. Define the concepts of the acceleration. 9. Differentiate between the average acceleration and the instantaneous acceleration. 10. Differentiate between the linear acceleration and the free fall acceleration. 11. Differentiate between the vectors and the scalars 12. Analyze the vectors into their components. 13. Calculate the multiplication of the vectors. 14. Define the concepts of the force. 15. Define the relation between the force and the acceleration. 16. Apply Newton's laws of motion. 17. Differentiate between the Work and the Energy. 18. Differentiate between the Energy and the power. 19. Define the Kinetic energy of the body. 20. Define the concept of the density of the body. 21. Define the concept of the pressure within the fluid. 22. Define the concept of Pascal principle. 23. Define the concept of Archimedes' principle. 24. Define the concept of Bernoulli's Equation. 25. Define the concept of the temperature 26. Differentiate between the Celsius Scale and Fahrenheit scale of temperature. 27. Define the laws of reflection through plane mirrors and spherical mirrors. 28. Define the laws of refraction through thin lenses. 29. Apply the laws of thin lenses. In addition to these items, the students should gain practical skills through performance some experimental class.

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

رقه	121°V	الخطة الدراسية لبكالوريوس الغيزياء الطبية	رقم التخصص ٤٠٣٠١	<u>قية / قسم الغيزياء</u>	كلية العلوم التطبيد
				ساعاته الخطة ١٣٦	التروصية ٣٧

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	Contact
		Weeks	hours
*	Measurement	1	3
	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.		
*	Vectors	2	6
	1- Vectors and Scalars.		
	2- Adding vectors : graphical methods		
	3- Components of vectors.		
	 Adding vector: component method. 		
	5- Multiplications of vectors.		
	6- Vector laws in physics.		
*	Motion in one dimension	1	3
	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.		

رەم		-4 1ETV	الخطة الدراسية لبكالوريوس الغيزياء الطبية	٤•٣•١	التحص	رقع	لغيزياء	لبية / مسم ا	لوم الت	كلية الع
							117 #1	عال معرادات	۳۷	التوصية
*	Mc	otion in two	and three dimensions		1	3				
	1-	Position, v	elocity, and acceleration.							
	2-	Motion wit	th constant acceleration							
	3-	Projectile r	notion							
	4-	Uniform ci	rcular motion							
	5-	Velocity ar	nd acceleration vectors in circular motion							
*	For	ce and moti	on		2	6				
	1-	Position. v	elocity, and accelerations		-	Ū				
	2-	Motion wit	th constant acceleration.							
	3-	Newtons fi	irst and second laws.							
	4-	Forces								
	5-	Newtons s	econd law							
	6-	Newton's t	hird law							
	7-	Units of fo	rce							
	, 8-	Weight an	d mass							
	9_	Measuring	forces							
	10-	- Annlying N	lewton's laws							
	10	, (pp)								
*	Wo	ork and Ener	gy		1	3				
	1.	Work done	e by constant force.							
	2.	Work done	e by a variable force: one dimensional case	e.						
	3.	Work done	e by a variable force: two dimensional case	e.						
	4.	Kinetic ene	ergy and work-energy theory.							
	5.	Power.								
*	Flui	ids Statics			1	3				
	1.	Fluids and	Solids							
	2.	Density an	d pressure.							
	3.	Variation of	of density in a fluid at rest.							
	4.	Pascal Prir	nciple.							
	5.	Archimede	es' Principle.							
	6.	Surface te	nsion.							
*	Flui	id dynamics			1	2				
•	1	General co	oncents of fluid flow		1	5				
	2	Streamline	as and the equation of continuity							
	∠. ⊋	Bernoulli's	Equation							
	ס. ⊿	Application	n of Bernoulli's Equation							
	4. F	Viscosity								
	5.	viscosity.								
1				1		1	1			

رقتم	الخطة الدراسية لبكالوريوس الغيزياء الطبية ١٤٣٧ هـ	التخصص ٤٠٣٠١	یاء رقع ۱۳٦
*	 Temperature, Heat and the first law of Thermodynamics. Heat: Energy in transit Heat capacity and specific heat. Heat capacity of solids Temperature. The Celsius and Fahrenheit Scales. Heat transfer. 	2	6
*	 Reflection and refraction of light at plane surface 1. Reflection and Refraction 2. Deriving the law of refrlection 3. Image formation by plane mirrors. 4. Deriving the law of refraction. 5. Total internal reflection. 	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

2 Course components (total contact hours per semester):								
Lecture : 45	Tutorial:	Practical: 42	Other:					

Practical part:

- 1. Safety and Security at the lab.
- 1. Introduction.
- 2. Precise measurements.
- 3. Vectors.
- Determination of specific gravity.
 Determination of Surface tension of a liquid.

كلية العلوم التطبيقية / مسم الهيزياء

هانحا يتحاذاه ية ٣٧ ۱٤۳۷ که رق

توحية ٣٧ ساغات الخطة ١٣٦

- 6. Determination of viscosity of a liquid.
- 7. Determination of refractive index of a Prism.
- 8. Determination of the melting point of wax.
- 9. Verification of lens formula.
- 10. Verification of mirrors formula.
- 11. Determination of specific heat.

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):6 Office hours to help students for solving assigned problems

4. Development of Learning Outcomes in Domains of Learning

For each of the domains of learning shown below indicate:

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

Upon successful completion of this course The student will be able to:

- 1- Understanding the principle and concepts of physics.
- 2- Applying the physics law to different environmental situation.
- 3- Improving logical thinking.
- 4- Using mathematical formulation to describe the physical principle or phenomena
- 5- Ability to explain how things are working.
- 6- Teaching strategies to be used to develop that knowledge
- 7- Demonstrating the basic information and principles through lectures and the achieved applications
- 8- Discussing phenomena with illustrating pictures and diagrams
- 9- Lecturing method:
 - a. Blackboard
 - b. Power point
 - c. e-learning

.<u>⊿</u> 121°V رقع

التروحية ٣٧

10-Tutorials	
11-Revisit concepts	
12-Discussions	
13-Brain storming sessions	
14-Start each chapter by general idea and the benefit of it;	
15-Learn the student background of the subject;	
16- Show the best ways to deal with problem;	
17-Keep the question "why" or "how" to explain always there	
Build a strategy to solve problem.	
(ii) Teaching strategies to be used to develop that knowledge	
 The methodology includes a combination of lectures by the lecturer, seminar presentation by the students and web-interactions. Students will be given opportunity to understand the role of important physics law in different applications. At the end of the programme, students will be divided into groups for seminar presentation on important areas of the course to assess their understanding and comprehension of the course. All students will be involved in on-line learning process and each student is required to create an E-mail address to facilitate student web interactions. Using images and movies Encouraging students to collect the new information about what the new in Physics. Enable the reference books and scientific sites concerning Physics in internet. 	
 (iii) Methods of assessment of knowledge acquired: Solve some example during the lecture. 	
• Exams:	
 Quizzes 	
 Short exams (mid term exams) 	
 Long exams (final) 	
 Homework. 	
 Activities. 	
Discussions with the students.	
Ask the student to clear the misunderstanding of some physical principle.	
• Ask quality question.	
b. Cognitive Skills	
(i) Cognitive skills to be developed	
Having successfully completed the course students should be able to:	
1- Define the physical phenomena.	
2- Apply the laws of physics.	

رقع	فيزياء رقو التخصص ٤٠٣٠١ الخطة الدراسية لوكالوريوس الفيزياء الطبية ٧٢٠٦ هـ ر		بيغية / مُسم الغيزياء	كلية العلوم التط	
				الاكم الحطة الالم	التوحية ٣٧
3-	Analys	e the physical phenomena.			
4-	Express	s the physical phenomena mathematically.			
5-	Doing	sman researches			
(ii) T	eaching	strategies to be used to develop these cogni	tive skills:		
1-	Prepari	ng main outlines for teaching			
2-	Follow	ing some proofs			
3-	Define	duties for each chapter			
4-	Home	vork assignments			
5-	Encour	age the student to look for the information in	different references		
6-	Ask the	student to attend lectures for practice solving	g problem		
(iii) N	Iethods	of assessment of students cognitive skills			
1-	Midter	n's exam. Exams, short quizzes			
2-	Asking	about physical laws previously taught			
3-	Writing	reports on selected parts of the course			
4-	Discuss	sions of how to simplify or analyze some phe	enomena		
c. Inte	erperson	al Skills and Responsibility			
		At the end of the co	urse, the student will be able to	b :	
•	Work in	dependently. Jonts learn independently and take up responsib	11:+		
	THE Stur		inty.		
(i)	Tea	ching strategies to be used to develop these	e skills and abilities		
	1- Sea	rch through the internet and use the library.			
	2- Lab	work.			
	3- Cas	e Study.			
	4- Sm	all group discussion.			
	5- Enł	ance educational skills.			
	6- Dev	velop their interest in Science through :(lab w	vork, field trips, visits to		
	scie	ntific and research.			
	7- Enc	ourage the student to attend lectures regularly	y		
	8- Give	e students tasks of duties			
(iii) N	lethods	for assessment of the students interperson	al skills and capacity to		
carry	respons	ibility	× v		
•	Evaluat	e the efforts of each student in preparing the r	eport.		

رقم		. <u>⊾</u> 1£1″V	الخطة الدراسية لبكالوريوس الغيزياء الطبية	رقم التخصص ٢٠٣٠١	بيغية / قسع الغيزياء	كلية العلوم التم
					الاسم عليما المعادات	التروحية ٣٧
	•	Evaluate the	e scientific values of reports.			
	•	Evaluate the	e work in team			
	•	Evaluation of	f the role of each student in Tab group assignmen f students presentations	t		
			F			
d.	Co	ommunicatio	on, Information Technology and Numeri	ical Skills		
	1.	Description course, the	n of the skills to be developed in this don student will be able to:	nain. At the end of the		
	1.	Enhancing t	the ability of students to use computers and	internet.		
	2.	Interpret Phy	ysical phenomena.			
	3.	Present Phys	sical phenomena orally.			
	4. 5.		n			
	6.	Problem sol	ving			
	7.	Data analysi	s and interpretation.			
	8.	Feeling phys	sical reality of results			
	2.	Teaching s	strategies to be used to develop these skill	ls		
	1.	Homework on web site	(preparing a report on some topics related as).	to the course depending		
	2.	Seminars p	resentation			
	3.	Field visits				
	(iii)) Methods (of assessment of students numerical and	communication skills		
	1.	Evaluation of	of presentations			
	2.	Evaluation of	of reports			
	3.	Practical exa	am			
	4.	Homework.				
	5.	Final exams.				
	6.	Research.				
e.]	Psy	chomotor S	skills (if applicable)			
			At the end of the cour	rse, the student will be able to		
	1. 2. 3.	Perform the Operate instr Draw the dat	experiments with high accuracy. ruments safely. ta and curves.			

التوحية ٣٧ ماغات الحطة ١٣٦

(ii) Teaching strategies to be used to develop these skills Follow up the students in lab and during carryout all experimental work. 4. Methods of assessment of students psychomotor skills

- Practical exam.
- Giving additional marks for the results with high and good accuracy

	5. Schedule of Assessment Tasks for Students During the Semester				
	Assessment task	Week Due	Proportion of Total		
	(e.g. essay, test, group project, examination, speech, oral		Assessment		
	presentation, etc.)				
1	Exercises & Home works	All weeks	10 %		
2	Participation in activities lectures and labs	All weeks	10 %		
3	Written Test (1)	6 th week	10%		
4	Written Test (2)	11 th week	10%		
5	Final Exam (Practical)	15 th week	20%		
6	Final Exam (theoretical)	16 th week	40%		

D. Student Support

1. Arrangements for availability of faculty for individual student consultations and

academic advice. (include amount of time faculty are available each week)

Each student will supervise by academic adviser in physics Department and the time table for academic advice were given to the student each semester.

E. Learning Resources

Required Text(s):

رقع	<u></u> 1Σ۳ν	الخطة الحراسية لبكالوريوس الفيزياء الطبية	رقم التخصص ٤٠٣٠١	بيغية / قسم الغيزياء ساعات الحلة ١٣٦	كلية العلوم التط التوحية ٣٧
Physic	s, 4 th edition	n, By: Halliday, Resnick, and Krane, Wi	iley (1992)		
			Recommended Reading Lis	t	
	University	Physics with modern Physics, 13th edition, Free	by: Hugh D. Young and Roger A dman, Addison-Wesley, (2012)	 .	
		E	lectronic Materials, Web Sites		
			(eg. www.youtube.com.)	
	0	ther learning material such as computer-ba	sed programs/CD, professiona standards/regulation	ıl s	

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (ie number of seats in classrooms and laboratories, extent of computer access etc.)
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
Computer room
Scientific calculator.
3. Other resources (specifyeg. If specific laboratory equipment is required, list

• .

G Course Evaluation and Improvement Processes

التوصية ٣٧

	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.
•	Coupling the theoretical part with laboratory part
•	Periodical revision of course content.
	4. Processes for Verifying Standards of Student Achievement (eg. check marking by an independent faculty member of a sample of student work, periodic exchange and remarking of a sample of assignments with a faculty member in another institution)
•	After the agreement of Department and Faculty administrations
5 De	escribe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.
•	Periodical revision by Quality Assurance Units in the Department and institution

Head of the Physics Department

Dr. Hatem Alamri

Kingdom of Saudi Arabia National Commission for Academic Accreditation & Assessment



المملكة العربية السعودية الهيئية الوطنيية للتقويم والاعتماد الأكماديمسي

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

COURSE SPECIFICATION

Course title: Fundamentals of Medical Physics

Course code: 4032280-4

Revised 13 December 2015

١٤٣٧ کے رقم

الخطة الدراسية لبكالوريوس الغيزياء الطبية

رقو التخصص ٤٠٣٠١

التوحية ٣٧ ساعات الخطة ١٣٦

Kingdom of Saudi Arabia

National Commission for

Academic Accreditation & Assessment



المملكة العربية السعودية الهيئة الوطنية للتقويم والاعتماد الأكاديمي

COURSE SPECIFICATIONS MPH, 4032280-4

Institution	Date of Report
Umm AL-Qura University	Revised Safar 1431 H
College/Department : Science /Mathematics	
A. Course Identification and General Information	1
1. Course title and code: Fundamentals of Medical I	Physics, 4032280-4
2. Credit hours: <mark>4 Cr. (2 + 3 Lab)</mark>	
3. Program(s) in which the course is offered.	
(If general elective available in many programs indic	ate this rather than list programs)
Physics Department	
	4. Name of faculty member responsible for the course :
Prof. Saud Allyhani	
5. Level/year at which this course is offered :3 rd leve	el /Second year
6. Pre-requisites for this course (if any): General Phy	ysics 4031101-4
7. Co-requisites for this course (if any): No-Co-requi	site
8. Location if not on main campus <mark>: within the unive</mark>	rsity campus
9. Mode of Instruction (mark all that apply)	
a. Traditional classroom \checkmark	What percentage? 100%
b. Blended (traditional and online)	What percentage?
c. e-learning d. Correspondence	What percentage? What percentage?
	۴۱

۱٤۳۷ کے رقم

رقو التخصص ٤٠٣٠١

التوحية ٣٧ ماغامهم الخطة ١٣٦

f. Other

What percentage?

Comments:

B Objectives (hyper link of Medical physics plan)

1. What is the main purpose for this course?

- 1- study the motions of the living bodies as: static forces, friction, translational motion, angular motion.
- 2- define elasticity and strength of materials .

3- acquire basics of fluids, the motion of fluids and body fluid flow.

- 4- discuss the fundamentals of heat and life, kinetic theory and thermodynamics.
- 5- describe different types of waves, sound, electricity, electrical technology.

6- identify forces on bones and muscles, electrodynamics of nerve impulses, electrocardiograms, magnetocardiograms and magnetoencephalograms.

7- list different diffusion processes, membrane transport, kidney function. 8- describe different biological effects in magnetic resonance and ultra-low frequency electromagnetic radiation, radiation therapy, imaging. and laser applications.

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)

Add the following topics and reference

1-Cooperate with other educational institutions to find how they deal with the subject.

2- Re- new the course references frequently.

3-Frequently check the latest discovery in science to improve the course objectives.

4- The course needs the use of computers.

5- Posting some course material on the websites to help the students.

6- Focusing on generic skills.

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

1 Topics to be Covered :-					
Topics	No of	Contact			
	Weeks (Studying Week No.)	hours			
Topics					

التوحية ٣٧ مالاهمالحطة ١٣٦

1- PHYSICS OF HEAT AND BODY:		
- Body as a Heat Source		6 brs
- Conduction and Loss of Heat	2 WEEKS (Week 1& 2)	01113
- Thermography		
- Medical Applications		
Solved problems, Quizzes and homework exercises		
Electricity and the Body:		
Electricity of Cell Membrane		
- Diffusion Equations		
- Nernst Equation		
- Godlberg Equation	2 weeks	6 hrs
Conduction in nerve Cells	(Week 3 &4)	
- Velocity of Conduction		
Solved problems, Quizzes and homework exercises		
3-Electric Conduction in Heart:		
- Electrophysiology of the Heart	-	
- Charge Distribution and propagation		
- ECG – Machine	2 weeks	
- Electrocardiograph Pulse	(Week 5 & 6)	6 hrs
Solved problems, Quizzes and homework exercises		
First Periodic Exam	Week 7	
MIDDLE TERM VACATION	Week 8	
4-Electricity and Medicine:		
- Defibrillation	1	3 hrs
- High Frequency Electricity	т weeк (Week 9)	
- Electromagnetic Effects		

۱٤۳۷ <u>م</u> رقم

التوحية ٣٧ ماعات الخطة ١٣٦

Solved problems, Quizzes and homework exercises		
5- Light and Eye:		
- The Optics of the Eye	-	
- The Physiology of the Eye	1 week	3 hrs
- Diffraction in the Eye	(Week 10)	
- Light and Medicine		
Solved problems, Quizzes and homework exercises		
6- X-RAY IN MEDICINE:		
- physics of X-Ray	-	
- Methods of Production	– 2 weeks	6 hrs
- Medical Applications	(Week 11& 12)	
- Analysis of X-Ray Diffraction	-	
In Biological Molecules	-	
7- ESR		
- Theory and Applications	1 week	3 hrs
	(Week 13)	
8- NMR		
- Theory and Applications	1 week	3 nrs
	(Week 14)	
Second Periodic Exam	(Week 15)	2hrs
Final Practical Exam	(Week 16)	2hrs

2. Course components (total contact hours and credits per semester):								
Credit				C	ontact Hours	Self-Study	Other	Total
Х	NCCCA	Lecture	Tutorial	Laboratory	Practical			
	4 ch	24		36	0	72	18	150 hrs

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رقع	. <u>⊿</u> 1ΣľV	1

الخطة الدراسية لبكالوريوس الغيزياء الطبية

رقه التخصص ٤٠٣٠١

كلية العلوم التطبيقية / قسم الغيزياء

التروحية ٣٧ ساغات الخطة ١٣٦

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

7-8 h

7-8 11

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

	NQF Learning Domains	Course Teaching	Course Assessment
	And Course Learning Outcomes	Strategies	Methods
1.0	Knowledge	·	
1.1	knowledge that students should know and understand. At the end of the programme the student should be able to: - outline the fundamentals of medical physics.	 Brainstorming. Cooperative learning. Dialogue and discussion. Constructivist. Learning. Self-learning. 	 Conducting scientific research and follow-up of advances in the field. Quarterly tests. By 15 minute multiple choice test on content on completion of each topic with results carrying 20% of final assessment. Duties and discussions within the lecture Multiple choice knowledge item on final exam.
1.2	 state the basics of X-rays and its medical application, electrocardiograms, magnetocardiograms and magnetic resonance 		
2.0	Cognitive Skills		
2.1	 estimate mathematical and physical formulas to solve problems in medical physics and related fields of studies interpret the data obtained from testing diagnostic instruments such as MRI and X-rays 	 Problem-solving strategy Cooperative learning strategy Strategy group discussions Assigning students solve 	 Practical test Written test Individual and group activities Short cognitive tests.

رقع	دراسية لبكالوريوس الفيزياء الطبية لكالا 🛦	رقو التخصى ٤٠٣٠١ الخطة ال	كلية العلوم التطبيقية / قسم الفيزياء التوحية ٣٧ مامايم الخطة ١٣٦
2.2	 integrate information technology (IT) based solution into medical physics different fields effectively 	the exercises in each chapters	 Achievement tests
3.0 3.1	Interpersonal Skills & Responsibility -work in a group to conduct an experiment. -write a short report in specific subject related to the course materials by using advanced information and communication tools . - write a report individually or in a team using the library and the internet - appraise the correctness of their solution, interpret their results and connect it to related areas of medical physics.	Training students to build good relationships with their counterparts and collaborate with others and develop personal and professional performance through the following strategies: • cooperative learning • peer education • Enhance confidence in the same student and encourage dialogue and discussion	Students are assessed through: • evaluation of field activities • verbal tests • assessment assignments • style note • Request solutions from each group in front of students.
3.2	 justify the essential parts of a problem and formulate a strategy for solving the problem. evaluate the solution to a problem and apply appropriate techniques to arrive the solution. 	- Raise the spirit of cooperation among students.	- The final evaluation of the collective tasks and discusses their students.
4.0	 Communication, Information Technology illustrate numeracy and computational skills, including such aspects as error analysis, order-of-magnitude estimations, and correct use of units and modes of data presentation. operate with basic software, such as word processing, spread sheet use, and graphic programmes, data-logging and storage. 	 Numerical skills Cooperative learning(e.g:Creating working groups with peers to collectively prepare: solving problems and search the internet for some topics). Self-learning to the global of information networks Medical Physics labs. Simulation programs. Hospital Training. Readymade programs. Smart Board Power point 	Discussing a group work sheets. Discuses with them the results of computations analysis and problem solutions. Give homework's to know how the student understands the numerical skills. Give them comments on some resulting numbers.
4.2	- <mark>illustrate</mark> information and communications technology to act	Give the students tasks to measure	• Written tests

رقم	دراسية لبكالوريوس الغيزياء الطبية العلام المعا م	رقو التخصص ٤٠٣٠١ الخطة ال	كلية العلوم التطبيقية / قسم الفيزياء
			التودية ۳۷ ماغاند الحكة ۱۳٦
	 responsibly in personal and professional relationships. work independently and as a part of a team, and learn independently with open - mindedness and critical enquiry. demonstrate the ability to manage time, priorities workloads, and utilize long- and short-term planning skills. 	their: mathematical skills, computational analysis and problem solving.	 Laboratory tests Evaluate the information gathered by the students that are using information networks.
5.0	Psychomotor		
5.1	4. Perform the experiments with high accuracy.5. Operate instruments safely.6. Draw the data and curves.	- 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. Sc	5. Schedule of Assessment Tasks for Students During the Semester				
	Assessment task (e.g. essay, test, group project, examination, speech,	Week Due	Proportion of Total		
	oral presentation, etc.)		Assessment		
1	Midterm 1	7 th week	10 %		
2	Midterm 2	15 th week	10%		
3	assay	1^{st} - 15^{th} week	10%		
4	Homework + reports	During the	10%		
		semester			
5	Final exam	End of semester	60 %		

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- 5-office hours per week in the lecturer schedule.

2- The contact with students by e-mail and website

E. Learning Resources

1. List Required Textbooks

(1) H.A.Taha, Introduction Operations Research 6th edition, London, Macmilla Publishing Company, Inc.

(2)V. Chvatal: Linear Programming, San Francisco: McGill University, W.H. Freeman and Company,

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

1-Paul Davidovits "Physics in Biology and Medicine" 3rd edi. Elsevier 2008.

رقم	.∡ 1£1″V	الخطة الدراسبة لبكالوربوس الغبزياء الطيبة	ريتم التحصص ٤٠٣٠١	الغيزياء
,.,			\mathbf{v}	4/41

كلية العلوم التطبيقية / قسم الفيزياء

التوحية ٣٧ ماداه ١٢ الدحلة

 2-Russell K. Hobbie & Bradley J. Roth "Intermediate Physics for Medicine and Biology" Springer Science 2007. 3- Raymond A. Serway - John W. Jewett "Physics for Scientists and Engineers" Thomson Brooks 2004.
4-John R. Cameron & James G. Skofronick "Medical physics" Willy John 1988
3. List Recommended Textbooks and Reference Material (Journals, Reports, etc)
1-M.Bazara and Shetly: Linear programming, Theory and Algorithm, New York,John Wiley,1993.
2- B. Gottfried and J. Weisman:Introduction to Optimization Theory, Prentic-Hell,Inc.,Englewood Cliffs,New Jersey.
3-O.L. Mangasarian: Nonlinear programming ,McGraw-Hill,York,1969.
4-Donald M.Simmons: Nonlinear Programming for Operations Research
4. List Electronic Materials (eg. Web Sites, Social Media, Blackboard, etc.)
http://www.springer.com
- http:// www.sciencedirect.com
-http:// www.gigabedia .org
5. Other learning material such as computer-based programs/CD, professional standards or regulations and software.
None

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.)

-The size of the room should be proportional to the number of students

- Provide enough seats for students.

- The number of student not exceed on 30 in the classroom

- Library

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

-Hall is equipped with a computer.

- Provide overhead projectors and related items

-Smart board

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

None

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching

Student evaluation electronically organized by the University.

2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor

-Revision developmental internal and external.

- Student Assessment tests quarterly and final through questionnaires

- ٧٣٤ هـ رقو
- الخطة الدراسية لبكالوريوس الغيزياء الطبية

توحية ٣٧ ساغانه المحلة ١٣٦
-The colleagues who teach the same course discuss together to evaluate their teaching
3 Processes for Improvement of Teaching
-To ensure the teaching aids course.
- The new follow-up, which was linked to the course or effective ways of teaching.
- Create the right atmosphere for study.
- Material and moral incentives.
- Lecture developmental audit, or workshop lesson model
- Course report, Program report and Program self-study.
- A tutorial lecture must be added to this course.
4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff
of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another
institution)
-The instructors of the course are checking together and put a unique process of evaluation.
5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.
- Consulting the other professors scheduled.
- Hosting a visiting professor to evaluate the course.
- Workshops with professor's course.
- Reconsider the vocabulary scheduled every two years in order to cope with new developments
-Student evaluation.
Course report.
Program report

Date: 13 December 2015

Head of the Physics Department

Dr. Hatem Alamri

التوحية ۳۷ معادات العطة ۱۳۹

Kingdom of Saudi Arabia

The National Commission for Academic Accreditation & Assessment

COURSE SPECIFICATION

Course title General Physics (2)

Course code: 4032101-4

Revised 13 December 2015

Course Specification For Guidance on the completion of this template, please refer to of Handbook Institution: UM AL – QURA UNIVERSITY College/Department : Faculty of Applied Science – Department of Physics dentification and General Information urse title General Physics (2)

A Course Identification and General Information 3. Course title General Physics (2) 4. Course code: 4032101 2. Credit hours: 4hrs 3. Program(s) in which the course is offered. : BSc Physics 5. Name of faculty member responsible for the course: One of the academic staff member 5. Level/year at which this course is offered: 1st Year / Level 2 6. Pre-requisites for this course (if any): General physics 4031012-4 7. Co-requisites for this course (if any): ---8. Location if not on main campus: Main campus 9. Mode of Instruction (mark all that apply) 100% a. traditional classroom What percentage? b. blended (traditional and online) What percentage? c. e-learning What percentage?

الخطة الدراسية لبكالوريوس الغيزياء الطبية

۲۳۷ <u>هـ</u>

رەھ

of Handbook 2 Internal Quality Assurance

Arrangements

رقو التخصص ٤٠٣٠١

كلية العلوم التطبيقية / قسم الفيزياء التوحية ۳۷ ما**عات الدلة ۱۳**۲



۱٤۳۷ <u>م</u> رقم

التوحية ٣٧ ساعات الخطة ١٣٦

B Objectives

	After a secondation this second student should be able to
1-	Identify that a force is a vector quantity and thus has both magnitude and direction
2-	Given two or more forces acting on the same particle, add the forces as vectors to get
2_	the net force. Identify Newton's first and second laws of motion
4-	Identify inertial reference frames.
5-	Sketch a free-body diagram for an object, showing the object as a particle and drawing the forces acting on it as vectors with their tails anchored on the particle.
6-	Apply the relationship (Newton's second law) between the net force on an object, the mass of the object, and the acceleration produced by the net force.
7- 8-	Distinguish between friction in a static situation and a kinetic situation. Determine direction and magnitude of a frictional force for objects on horizontal, vertical, or inclined planes in situations involving friction, draw free-body diagrams
٩_	and apply Newton's second law.
10	- For a particle moving between two points, identify that the work done by a
	conservative force does not depend on which path the particle takes.
11	 Calculate the gravitational potential energy of a particle (or, more properly, a particle–Earth system).
12	- Calculate the elastic potential energy of a block-spring system.
13 14	 Locate the center of mass of an extended, symmetric object by using the symmetry. For a two-dimensional or three-dimensional extended object with a uniform
	distribution of mass, determine the center of mass.
15	- Identify that if all parts of a body rotate around a fixed axis locked together, the body is a rigid body. (This chapter is about the motion of such bodies.)
16	 Identify that the angular position of a rotating rigid body is the angle that an internal reference line makes with a fixed, external reference line.
17	 Identify that counterclockwise motion is in the positive direction and clockwise motion is in the negative direction.
18	- Identify instantaneous angular speed as the magnitude of the instantaneous angular velocity
19	- Identify that smooth rolling can be considered as a combination of pure translation
	and pure rotation.
20	- Apply the relationship between the center-of-mass speed and the angular speed of a body in smooth rolling.
21	- Distinguish between equilibrium and static equilibrium
22	- Identify that a uniform spherical shell of matter attracts a particle that is outside the shell as if all the shell's mass were concentrated as a particle at its center.
23	- Distinguish fluids from solids.
24	- Apply the relationship between hydrostatic pressure, force, and the surface area over which that force acts.

رقم	. <u>▲</u> 12.‴V	الخطة الدراسية لبكالوريوس الغيزياء الطبية	رقم التخصص ٤٠٣٠١	بيقية / قسم الفيزياء	كلية العلوم التط
				التا قلعال موادلم	التروحية ٣٧
25 26 27	 Distinguish Identify the particle in S Identify that always give 	simple harmonic motion from other types of p e phase constant f that corresponds to the start SHM is at an extreme point or passing through at for a simple harmonic oscillator the accelerat en by the product of a negative constant and the	periodic motion. ting time being set when a the center point. tion a at any instant is e displacement x just then.		
29 30 31 32 33	 Distinguish Describe th Distinguish Distinguish Explain wav Apply the r wave, and t 	between transverse waves and longitudinal wave effect on a transverse wave of changing phase between a longitudinal wave and a transverse ve fronts and rays. elationship between the speed of sound, the distance.	aves. se constant. wave. istance traveled by a sound		

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

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.

التوحية ٣٧ مالاهمالحطة ١٣٦

	Topics to b	e Covered :
Topics	No of Weeks	Contact hours
 Particle dynamics Force laws. Frictional Forces. The Dynamics of uniform Circular motion Equation of motion: constant and non-constant forces. Time-dependent forces; analytical methods Time-dependent forces: numerical methods. Drag forces and the motion of projectiles. Limitation of newton's law. 	1	3
 Conservation of energy 9- Conservative force. 10- Potential energy. 11- One dimensional conservative systems. 12- Two-and three-dimensional conservative systems. 13- Conservation of energy of a system of particles. 14- Mass and energy. 15- Quantization of energy. 	1	3
 System of particles 7- Two particle system 8- Many particle system 9- Center of mass of solid objects 10- Linear momentum of system of particles. 11- Conservation of linear momentum 12- Work and energy in system of particles 13- Systems of variable mass. 	1	3
 Collisions What is collisions? Impulse and momentum. Conservation of momentum during collision. Collisions in one dimension. Two dimensional collisions. Center of mass reference frame. Spontaneous decay process. 	1	3

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					ساغانهم الخطة ١٣٦	التوحية ٣٧
*	Rotational Ki1-Rotational2-Rotation va3-Rotation wa4-Rotational5-Relationshi6-Relationshi	nematics motion. ariables. ith constant angular acceleration. quantities as vectors. p between linear and angular variables: scala p between linear and angular variables: vecto	ar form. or form.	4		
*	 Rotational dy 6. Rotational 7. Kinetic ener 8. Rotational 9. Rotational 10. Combined 	namics dynamics ergy of rotation and rotational inertia. inertia of solid bodies dynamics of rigid body rotational and translational motion.	1	3		
*	Angular mon 1- Angular mon 2- System of p 3- Angular mon 4- Conservation 5- The spinnin 6- Quantization	pentum omentum of a particle particles omentum and angular velocity on of angular momentum ng top. on of angular momentum.	1	3		
*	Equilibrium (1- Condition (2- Center of (3- Examples (4- Stable, uns gravitation 5- Elasticity.	of Rigid bodies of equilibrium. Gravity. of equilibrium. table, and Neutral equilibrium or rigid bodies al field.	s in a	3		
*	Gravitation 7. Gravitation 8. Newton an 9. The gravita 10. Gravity nea 11. Gravitation 12. Gravitation 13. The gravita 14. The motion 15. Universal g	n from the Ancients to Kepler. Ind the law of universal gravitation. Intion constant G ar the Earth's surface. Inal Effect of a spherical distribution of matter Inal potential energy Intional field and potentials Ins of planets and satellites Igravitation	1.33	4		
\$ \$		الخطة الدراسية لبكالوريوس الفيزياء الطبية	التخصص ٤٠٣٠١	د وقع	بيقية / قسم الغيزيا	كلية العلوم التطر
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				11	معلكما معاداه	التوحية ٣٧
*	Oscillations. 7. Oscillating e 8. The simple 9. Simple harr 10. Energy cons 11. Application 12. Simple harr 13. Combination 14. Damped har 15. Forced harr	systems. harmonic oscillator. nonic motion siderations in simple harmonic motion. s of simple harmonic motion nonic motion and uniform circular motion. ons of harmonic motions rmonic motions nonic motions	1.33	4		
*	Wave Motion 6. Mechanical 7. Types of wa 8. Traveling w 9. Wave speed 10. The wave e 11. Power and 12. The princip 13. Interference 14. Standing wa 15. Resonance.	waves. aves. aves. d quation intensity in wave motion le of superposition e of waves ave.	1	3		
*	Sound Wave 1. The speed of 2. Traveling lo 3. Power and 4. Standing lo 5. Vibrating sy 6. Beats 7. The Dopple	of sound. ngitudinal waves. intensity of sound waves. ngitudinal waves. rstems and sources of sound. r effect.	1	3		
*	Solved problem	ms	2 15 weeks	6 45hrs		

١٤٣٧ هـ رقه

الخطة الدراسية لبكالوريوس الغيزياء الطبية

ريتم التحص ٤٠٣٠١

كلية العلوم التطبيقية / متسم الميزياء

التروحية ٣٧ ساغات الخطة ١٣٦

2 Course components (total contact hours per semester):					
Lecture : 45	Tutorial:	Practical: 42	Other:		

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.

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): 6 Office hours to help students for solving assigned problems

4. Development of Learning Outcomes in Domains of Learning

For each of the domains of learning shown below indicate:

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

Upon successful completion of this course The student will be able to:

18- Understanding the principle and concepts of physics.

19- Applying the physics law to different environmental situation.

رەم	<u></u> 1Σ۳ν	الخطة الدراسية لبكالوريوس الفيزياء الطبية	رقم التخصص ٤٠٣٠١	مُلية العلوم التطبيقية / قسم الغيزياء		
				الاتم قلحا معاذله	التوصية ٣٧	
	20- Improving	g logical thinking.				
	21-Using mat	hematical formulation to describe the physical	sical principle or			
	phenomen	a				
	22- Ability to	explain how things are working.				
	23-Teaching	strategies to be used to develop that knowl	ledge			
	 24- Demonstractional achieved a achieved a 25- Discussing 26- Lecturing a. Black b. Pocc. e-1 27- Tutorials 28- Revisit coccentration 29- Discussion 30- Brain store 31- Start each 32- Learn the 33- Show the back 	rating the basic information and principles applications g phenomena with illustrating pictures and method: ackboard wer point earning ncepts ns ming sessions chapter by general idea and the benefit of student background of the subject; best ways to deal with problem:	through lectures and the I diagrams			
-	31 Keen the	best ways to dear with problem,	s thara			
	54- Keep uie (Ruild a strate	egy to solve problem			
		Duna di Strate				
(ii)	Teaching str	ategies to be used to develop that knowl	ledge			
•	 The metho presentatic opportunit application At the end presentatic compreher All student to create a Using imag Encouragin Microbiolo Enable the 	dology includes a combination of lectures by to on by the students and web-interactions. Stud y to understand the role of important microor is and human service. of the programme, students will be divided in on on important areas of the course to assess histor of the course. s will be involved in on-line learning process a n E-mail address to facilitate student web inter tes and movies og students to collect the new information abor gy reference books and scientific sites concernin	the lecturer, seminar dents will be given rganisms in different nto groups for seminar their understanding and and each student is required eractions. out what the new in ng bacteriology in internet.			
		(iii) Methods of assess	ment of knowledge acquired	l:		
•	 Solve some 	e example during the lecture.				
•	• Exams:	Ouizzee				

• Short exams (mid term exams)

.<u>⊿</u> 121°V رەم

التو

	ساعات الخطة ١٣٦	ىيە ٣٧
 Long exams (final) 		
 Homework. 		
 Activities. 		
Discussions with the students.		
• Ask the student to clear the misunderstanding of some physical principle.		
• Ask quality question.		
b. Cognitive Skills	_	
(i) Cognitive skills to be developed		
Having successfully completed the course students should be able to: 6- Define the physical phenomena.		
7- Apply the laws of physics.		
8- Analyse the physical phenomena.		
9- Express the physical phenomena mathematically.		
10- Doing small researches		
 (ii) Teaching strategies to be used to develop these cognitive skills: - Lectures - Brain storming 		
-Discussion		
(iii) Methods of assessment of students cognitive skills		
 Exam must contain questions that can measure these skills. Quiz and exams Discussions after the lecture 		
	-	
c. Interpersonal Skills and Responsibility		
 At the end of the course, the student will be able to Work independently. 	:	
• The students learn independently and take up responsibility.		
(ii) Teaching strategies to be used to develop these skills and abilities		
- Lah work		
- Case Study		
- Active learning		
- Small group discussion		
- Sman group discussion		

رقع		.∡ 121°V	الخطة الدراسية لبكالوريوس الغيزياء الطرية	رقم التخصص ٤٠٣٠١	بيقية / قسم الفيزياء	ية العلوم التط
					ساعاتهم الخطة ١٣٦	وحية ٣٧
(iii cai) M rry I	lethods fo responsib	r assessment of the students interpersonal ility	skills and capacity to		
	•	Evaluate Evaluate Evaluate Evaluation Evaluation	the efforts of each student in preparing the rep the scientific values of reports. the work in team of the role of each student in lab group assignmen of students presentations	port. t		
d.	Co	ommunica	tion, Information Technology and Numeri	cal Skills		
	3.	Descripti course, tl	ion of the skills to be developed in this don ne student will be able to:	nain. At the end of the		
	9. 10. 11	Enhancin Interpret F	g the ability of students to use computers and Physical phenomena.	internet.		
	11. 12. 13.	Know how Computat	to write a report.			
	14. 15.	Problem s Data analy	olving vsis and interpretation.			
	16.	Feeling ph	ysical reality of results			
	4.	Teaching	strategies to be used to develop these skil	ls		
	5.	Homewo on web si	rk (preparing a report on some topics related tes).	to the course depending		
	6.	Seminars	presentation			
	7.	Field visi	ts			
	(iii)	Method	s of assessment of students numerical and	communication skills		
	7.	Evaluation	n of presentations			
	8.	Evaluation	n of reports			
	9.	Practical e	exam			
e.	Psy	chomotor	Skills (if applicable)			
	7. 8. 9.	Perform th Operate in Draw the c	At the end of the cour te experiments with high accuracy. struments safely. lata and curves.	rse, the student will be able to):	

التوحية ٣٧ ما عامة الحطة ١٣٦

(ii) Teaching strategies to be used to develop these skills Follow up the students in lab and during carryout all experimental work. 8. Methods of assessment of students psychomotor skills

- Practical exam.
- Giving additional marks for the results with high and good accuracy

	5. Schedule of Assessment Tasks for Students During the Semester				
	Assessment task	Week Due	Proportion of Total		
	(e.g. essay, test, group project, examination, speech, oral presentation, etc.)		Assessment		
1	Exercises & Home works	All weeks	10 %		
2	Participation in activities lectures and labs	All weeks	10 %		
3	Written Test (1)	6 th week	10%		
4	Written Test (2)	11 th week	10%		
5	Final Exam (Practical)	15 th week	20%		
6	Final Exam (theoretical)	16 th week	40%		

D. Student Support

1. Arrangements for availability of faculty for individual student consultations and

academic advice. (include amount of time faculty are available each week)

Each student will supervise by academic adviser in physics Department and the time table for academic advice were given to the student each semester.

E. Learning Resources

Required Text(s):

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

رەھ	12TV	الخطة الدراسية لبكالوريوس الفيزياء الطبية	رقو التخصص ٤٠٣٠١	لبيغية / قسم الفيزياء	كلية العلوم الت
				الاتل المخطة ١٣٦	التوحية ٣٧
			Recommended Reading List		
•	University P Freedman, A	hysics with modern Physics, 13th edition, by Addison-Wesley, (2012).	r: Hugh D. Young and Roger A.		
	,	E	Electronic Materials, Web Sites		
			(eg. www.youtube.com.		
	0	ther learning material such as computer-ba	ased programs/CD, professiona		
			standards/regulations		

F. Facilities Required

Indicate re number of	quirements for the course including size of classrooms and laboratories (ie seats in classrooms and laboratories, extent of computer access etc.)
	1. Accommodation (Lecture rooms, laboratories, etc.)
 Cla The and Lib 	ss room is already provided with data show a area of class room is suitable concerning the number of enrolled students (68) d air conditioned. rary
• Lab	oratory for fundamental of physics
	2. Computing resources
• Cor	nputer room
• Scie	entific calculator.
• .	3.Other resources (specifyeg. If specific laboratory equipment is required, list requirements or attach list)

G Course Evaluation and Improvement Processes

رقه	.∡ 1£‴V	الخطة الدراسية لبكالوريوس الغيزياء الطبية	رقو التخصص ٤٠٣٠١	كلية العلوم التطبيقية / قسم الفيزياء
		1. Strategies for Obtaining Student Feedback	k on Effectiveness of Te	التوصية ٢٧ مالمانهم الخطفا ال
	Questiona			
	 Open disc 	ussion in the class room at the end of the lect	ures	
	2. Other St	trategies for Evaluation of Teaching by the Ins	structor or by the Depar	tment
	Revision oAnalysis tl	of student answer paper by another staff mem he grades of students.	ber.	
	,	3. Processes	for Improvement of Tea	aching
	PreparingUsing scie	the course as PPT. ntific movies.		
	CouplingPeriodical	the theoretical part with laboratory part revision of course content.		
	4. Processe indepe remarkin	s for Verifying Standards of Student Achieven Indent faculty member of a sample of student Ig of a sample of assignments with a faculty m	nent (eg. check marking t work, periodic exchan nember in another instit	; by an ge and :ution)
•	• After the a	agreement of Department and Faculty adminis	strations	
5	Describe the	planning arrangements for periodically review	wing course effectivene	ss and
			planning for improve	ement.
•	Periodical	revision by Quality Assurance Units in the Dep	partment and institution	

Date: 13 December 2015

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Head of the Physics Department

Dr. Hatem Alamri

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

COURSE SPECIFICATION

Course title Biomechanics

Course code: 4032293-3

Revised 13 December 2015

التوحية ۳۷ ساغاده الخطة ۱۳۶

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Course Specification

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

Institution: Umm AL-Qura University

College/Department :- College of Sciences / Physics Department

A Course Identification and General Information

1. Course title and code: Biomechanics 4032293-3
2. Credit hours; 3 Cr. Hrs
3. Program(s) in which the course is offered. (If general elective available in many programs indicate this rather than list programs)
B.Sc Degree in Medical Physics
4. Name of faculty member responsible for the course
5. Level/year at which this course is offered 4 th level/Second year
6. Pre-requisites for this course (if any) 4032280-4
7. Co-requisites for this course (if any) No
O Leasting if not an arrive service
8. Location if not on main campus
9. Mode of Instruction (mark all that apply)
a Traditional clas
a. Traditional clas $$
b. Blended (trad nd online) Wporeentage?

رقه	12TV	الخطة الدراسية لبكالوريوس الغيزياء الطبية	رقو التخصص ٤٠٣٠١	بيقية / قسم الفيزياء	كلية العلوم التط
				الاتل تحلق الحلة	التوصية ٣٧
		c. e-learning d. Correspondence f. Other	What percentage? W nat perce ntage? Wntage?		
			Comments:		

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توحية ٣٧ ماغات الخطة ١٣٦

B Objectives

1. Sum	1. Summary of the main learning outcomes for students enrolled in the course.				
т	he objectives of this course are to give the students the basic knowledge about the Bio- mechanics.				
	:For students undertaking this course, the aims are to study				
1) 2) 3) 4) 5) 6) 7)	Static Forces Friction For The Human Body Translational Motion For The Human Body Angular Motion For The Human Body Elasticity And Strength Of Materials. Insect Flight. Fluids				
8)	The Motion Of Fluids In Human Body				
2. Brief increase the field	It describe any plans for developing and improving the course that are being implemented. (eg d use of IT or web based reference material, changes in content as a result of new research in				
1. 2. 3. 4. 5. 6. 7.	 Explain strategy of the course in the beginning of the semester Outlines of the physical laws, principles and the associated proofs. Highlighting the day life applications whenever exist. Encourage the students to see more details in the international web sites and reference books in the library. Discussing some selected problems in each chapter. Cooperate with different institution to find how they deal with the subject Renew the course references frequently 				
	Frequently check for the latest discovery in science				

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

1 Topics to be covered		
Торіс	No of	Contact
	Weeks	hours
Static Forces-Equilibrium and Stability- Equilibrium	1	1 hr
Considerations for the Human Body.		
Stability of the Human Body under the Action of an External		2 hrs
Force- Skeletal Muscles- Levers- The Elbow- The Hip-		

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Limping Standing		
Tip-Toe on One Foot- Dynamic Aspects of Posture.	1	1 hrs
Friction- Standing at an Incline-Friction at the Hip Joint-		2 hrs
Spine Fin of a Catfish- EXERCISES.		
Translational Motion- Vertical Jump- Effect of Gravity on the		1 hr
Vertical Jump-	1	
Running High Jump- Range of a Projectile- Standing Broad		2 hrs
Jump- Running Broad Jump (Long Jump)- Motion through		
Air- Energy Consumed in Physical Activity- EXERCISES		
Angular Motion- Forces on a Curved Path- A Runner on a	1	1 hr
Curved Track- Pendulum		
Walking- Physical Pendulum- Speed of Walking and		2 hrs
Running- Energy Expended in Running- Alternate		
Perspectives on Walking and Running- Carrying Loads-		
EXERCISES		
Elasticity and Strength of Materials-Longitudinal Stretch and	1	1 hr
Compression-A Spring.		
Bone Fracture: Energy Considerations-Impulsive Forces-		2 hrs
Fracture Due to a Fall: Impulsive Force Considerations-		
Airbags: Inflating Collision Protection Devices.		
Whiplash Injury- Falling from Great Height- Osteoarthritis	1	1 hr
and Exercise.		
Fluids-Force and Pressure in a Fluid-Pascal's Principle	1	1 hr
Hydrostatic Skeleton-Archimedes' Principle-Power Required		2 hrs
to Remain Afloat-Buoyancy of Fish-Surface Tension-Soil		
Water		
The Motion of Fluids-Bernoulli's Equation-Viscosity and	1	3 hrs
Poiseuille's Law-Turbulent Flow-Circulation of the Blood-		

كلية العلوم التطبيقية / قسم الفيزياء

التوحية ٣٧ ماعاده الحطة ١٣٦

Blood Pressure-Control of Blood Flow.			OW.		
Energetics of Blood Flow-Turbulence in the Blood- Arteriosclerosis and Blood Flow			od- 1 low	1 hr	
Power Produced by the Heart-Measurement of Blood Pressure-EXERCISES					
2 Course components (total	contact hours per semester	r):			
Lecture:30	Tutorial: 15	Practical/Fieldwork/Inte rnship:	Other: 75 hrs (study Hrs)	ther: 75 hr s (self- udy Hrs)	

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)

4. Development of Learning Outcomes in Domains of Learning

For each of the domains of learning shown below indicate:

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

a. Knowledge

(i) Description of the knowledge to be acquired

- (i) Learning fundamentals in dielectric theory, fundamental information about the dielectric theory its laws, susceptibility, conductivity.
- (ii) Understanding the physics of dielectric theory and their applications mentioned in the text.
- (iii) Improving logical thinking.
- (iv) To use mathematical formulation to describe the physical principle or phenomena

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التوحية ٣٧ ماغايم الخطة ١٣٦

(v) Ability to explain how things work.	
(ii) Teaching strategies to be used to develop that knowledge	
1 Demonstrating the basic information and principles through lectures and	d the
achieved applications	a the
2. Discussing phenomena with illustrating pictures and diagrams	
3. Lecturing method:	
a. Blackboard	
b. Power point	
4 Tutorials	
5. Revisit concepts	
6. Discussions	
7. Brain storming sessions	
8. Start each chapter by general idea and the benefit of it;	
9. Learn the student background of the subject;	
10. Show the best ways to deal with problem;	
11. Keep the question "why" or "how" to explain always there;	
Build a strategy to solve problem.	
(iii) Methods of assessment of knowledge acquired	
1 Solve some example during the lecture	
2. Exams:	
a) Quizzes	
b) Short exams (mid term exams)	
c) Long exams (final)	
d) Oral exams	
3. Discussions with the students.	
4. Ask the student to clear the misunderstanding of some physical principle.	
5. Ask quality question	
b. Cognitive Skills	
(i) Cognitive skills to be developed	
1. How to use physical laws and principles to understand the subject	
2. How to simplify problems and analyze phenomena	
3. Analyse and explain natural phenomena.	
4. Ability to explain the idea with the student own words.	
5. Represent the problems mathematically	
(ii) Teaching strategies to be used to develop these cognitive skills	
1. Preparing main outlines for teaching	
2. Following some proofs	

الخطة الدراسية لبكالوريوس الغيزياء الطبية كلية العلوم التطبيقية / قسم الغيزياء سائما بداخطة الخطة 3. Define duties for each chapter 4. Home work assignments 5. Encourage the student to look for the information in different references 6. Ask the student to attend lectures for practice solving problem Ask the student to do small research. (iii) Methods of assessment of students cognitive skills 1. Midterm's exam. Exams, short guizzes 2. Asking about physical laws previously taught 3. Writing reports on selected parts of the course Discussions of how to simplify or analyze some phenomena c. Interpersonal Skills and Responsibility (i) Description of the interpersonal skills and capacity to carry responsibility to be developed Work independently. The students learn independently and take up responsibility. (ii) Teaching strategies to be used to develop these skills and abilities 1. Learn how to search the internet and use the library. 2. Learn how to cover missed lectures. 3. Learn how to summarize lectures or to collect materials of the course. 4. Learn how to solve difficulties in learning: solving problems – enhance educational skills. 5. Develop her interest in Science through :(lab work, field trips, visits to scientific and research. **u** Encourage the student to attend lectures regularly by: Giving bonus marks for attendance Assigning marks for attendance. give students tasks of duties (iii) Methods of assessment of students interpersonal skills and capacity to carry responsibility 1. Quizzes on the previous lecture 2. Checking report on internet use and trips 3. Discussion 4. The accuracy of the result gained by each group will indicate good group work Presenting the required research on time and the degree of the quality will show the sense of responsibility.

رقه التخصص ٤٠٣٠١

d. Communication, Information Technology and Numerical Skills

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٧ "اعا کھ الخطة الدراسية لبكالوريوس الغيزياء الطبية رقه التخصص ٤٠٣٠١ كلية العلوم التطبيقية / قسم الغيزياء رەم ساغاته الخلة ١٣٦ (i) Description of the skills to be developed in this domain. 1. Computation 2. Problem solving 3. Data analysis and interpretation. Feeling physical reality of results (ii) Teaching strategies to be used to develop these skills 1. Know the basic mathematical principles. 2. Use the web for research. 3. Discuss with the student. 4. Exams to measure the mathematical skill. 5. Clear the weakness point that should be eliminated. 6. Encourage the student to ask for help if needed. 7. Computational analysis. 8. Data representation. 9. Focusing on some real results and its physical meaning. 10. Lectures for problem solution. 11. Encourage the student to ask good question to help solve the problem. Display the lecture note and homework assignment at the web. (iii) Methods of assessment of students numerical and communication skills 1. Their interaction with the lectures and discussions. 2. The reports of different asked tasks. 3. Homework, Problem solutions assignment and exam should focus on the understanding. 4. Results of computations and analysis. 5. Comments on some resulting numbers. **Research.** e. Psychomotor Skills (if applicable NA (Not Applicable) (i) Description of the psychomotor skills to be developed and the level of performance required NA (Not Applicable)

(ii) Teaching strategies to be used to develop these skills

التوحية ٣٧ ماماد الخطة ١٣٦

NA (Not Applicable)

(iii) Methods of assessment of students psychomotor skills

	5. Schedule of Assessment Tasks for	Students During	; the Semester
Assess ment	Assessment task (eg. essay, test, group project, examination etc.)	Week due	Proportion of Final Assessment
1	Midterm 1	5 th week	10
2	Midterm 2	10 th week	10
3	In-Class Problem Solving	weekly	10
4	project	12 th week	10
5	Homework	Every week	10
6	Final exam	End of semester	50
7	Midterm 1	5 th week	10
8	Midterm 2	10 th week	10

D. Student Support

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

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التوحية ٣٧ ماغاده الخطة ١٣٦

4 office hours per week

E Learning Resources

1. Required Text(s)
2. Essential References
[1] Physics in Biology and Medicine, Paul Davidovits, 3rd edition, Academic Press is an imprint of Elsevier 2007.
[2] Handbook of physics in medicine and biology, Robert Splinter, CRC Press Taylor & Francis Group, 2010.
[3] Biophysics, Roland Glaser, spring-Verlag Berlin Heidelberg, New York, 5 th , 2001.
Electronic Materials, Web Sites etc
http://www.youtube.com/watch?v=IP57gEWcisY&feature=related
Ehttp://www.youtube.com/watch?v=HuZLh_mS6i
3- Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)
4Electronic Materials, Web Sites etc
http://www.youtube.com/watch?v=PTaSfpBJgCE&feature=related
http://www.youtube.com/watch?v=Fjy_hVpWgWs&feature=related
5- Other learning material such as computer-based programs/CD, professional standards/regulations
Wikipedia

F. Facilities Required

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

1. Accommodation (Lecture rooms, laboratories, etc.)

4 Lecture room for 30 students

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				الاع الخطة ١٣٦	التروحية ٣٧
4	Laborator Biomecha	ry for electricity (there is a special course : anics course)	for laboratory related to		
			2. Computing resource	25	
Ι.	Committee				
	Computer	room			
4	Scientific o	calculator.		<u> </u>	
3. Oth	er resources (specifyeg. If specific laboratory equipment is rec	quired, list requirements or attac	ch .	
			list	t)	

G Course Evaluation and Improvement Processes

	1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching
4	Midterm and final exam.
4	Quiz.
	2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department
	3 Processes for Improvement of Teaching
(a) (b) (c)) Course report) Program report) Program self study
4	Fortification of the student learning.
4	Handling the weakness point.
4. P	rocesses for Verifying Standards of Student Achievement (eg. check marking by an independent faculty member of a sample of student work, periodic exchange and remarking of a sample of assignments with a faculty member in another institution)
4	The instructors of the course are checking together and put a unique process of evaluation
4	Check marking of a sample of papers by others in the department.
4	Feedback evaluation of teaching from independent organization.

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				الاكم قلمغال متهاذله	التوصية ٣٧
5 Des	scribe the pla	nning arrangements for periodically reviewing cour	rse effectiveness and planning for improvement.		
1	 The follow Stude Cours Progr Progr 	ring points may help to get the course effective nt evaluation se report am report am Self study	eness		
2.	- According	to point 1 the plan of improvement should be	given.		
3.	- Contact th Add s	e college to evaluate the course and the bene ome subject and cut off others depending on t	fit it add to other courses. the new discoveries in physics.		

Date: 13 December 2015

Head of the Physics Department

Dr. Hatem Alamri

Kingdom of Saudi Arabia

The National Commission for Academic Accreditation & Assessment

التوحية ٣٧ ماعامه الخطة ١٣٦

COURSE SPECIFICATION

Course title Electricity and Magnetism

Course code: 4-4032121

Revised 13 December 2015

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كلية العلوم التطبيقية / قسم الغيزياء رقم التخصص ٤٠٣٠١

09

لتوحية ٣٧ سائات الخطة ١٣٦

رەم

Course Specification

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

Institution: UMM AL – QURA UNIVERSITY

College/Department : Faculty of Applied Science – Department of Physics

A Course Identification and General Information

1. Course title Electricity and Magnetism
2. Course code: 4-4032121
2. Credit hours: 4hrs
3. Program(s) in which the course is offered. : BSc Physics
6. Name of faculty member responsible for the course:
One of the academic staff member
5. Level/year at which this course is offered: 2 nd Year / Level 3
6. Pre-requisites for this course (if any): General physics 4031012-4
7. Co-requisites for this course (if any):
8. Location if not on main campus: Main campus
9. Mode of Instruction (mark all that apply)
a. traditional classroom What percentage?
b. blended (traditional and online) What percentage?
c. e-learning What percentage?

رقع	. <u>▲</u> 12.1°V	الخطة الدراسية لبكالوريوس الفيزياء الطبية	رقع التخصص ٤٠٣٠١	كلية العلوم التطبيقية / قسم الفيزياء التوحية ۳۷ ساعات المحلة ۱۳٦
		d. correspondence	What percentage?	
		f. other	What percentage?	,
			Comments	:

التروحية ٣٧

ساغاته الخطة ١٣٦

رقم التخصص ٤٠٣٠١

B Objectives

Upon completion of this course the student will be able to:
 Provide and define the fundamental properties of the electric charge, solve technical problems associated with the electrostatic force (Coulomb force), Identify that at every point in the space surrounding a charged particle, the particle
sets up an electric field, which is a vector quantity and thus has both magnitude
and direction. 3. Identify how an electric field can be used to explain how a charged particle can exert
an electrostatic force on a second charged particle even though there is no contact
between the particles.
4. Explain how a small positive test charge is used (in principle) to measure the electric
field at any given point.
 5. Define electric capacitance and solve technical problems associated with capacitors of various symmetries, capacitors in series and parallel combination, the microscopic effect of dielectric materials on capacitance and stored energy. 6. Define electric current, current density, and solve technical problems involving DC networks of resistors, batteries, and capacitors, Ohm's Law, Kirchhoff's laws, and RC charging and decay circuits. 7. Calculate the potential difference between any two points in a circuit. 8. Distinguish a real battery from an ideal battery and, in a circuit diagram, replace a real battery with an ideal battery and an explicitly shown resistance. 9. Calculate the net rate of energy transfer in a real battery for current in the direction of the emf and in the opposite direction. 10. Define the magnetic field and magnetic flux, solve technical problems associated with the effect of static, non-uniform and uniform magnetic fields on moving charges and current-carrying wires, loops and the magnetic dipole.
 11. Calculate the magnitude and direction of the magnetic field for symmetric current distributions using the Law of Biot-Savart and Ampere's Law, and state the limitations of Ampere's Law. 12. State Faraday's Law of Induction with Lenz's Law and use these equations to solve technical problems associated with induction. 13. Calculate inductance according to the fundamental definition, solve technical problems associated with LR circuits and coils, and calculate the stored energy in magnetic fields.
In addition to these items, the students should gain practical skills through performance some

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رقم

توحية ٣٧ ساغات الخطة ١٣٦

experimental class.

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

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	Contact hours
	Weeks	
Electric charge and Coulomb's law	1	3
1- Introduction.		
2- Electric Charge		
3- Conductors and Insulators		
4- Coulomb's law		
5- Charge is Quantized		
6- Charge is Conserved		
The Electric Field	1	3
1- Fields.		
2- The Electric Field E		
3- The Electric Field of a Point Charge Satu Lines of Force		
4- The Electric Field of Continuous Charge Distributions		
6 A Dipolo in an Electric Field		
Second Se	1	3
1- IntroductionThe flux of a Vector Field	-	5
2- The Flux of the Electric Field		
3- Gauss law		
4- A Charged Insolated Conductor		
5- Applications of Gauss law		
6- Experimental Tests of Gauss law and Coulomb law		

رقم	12TV	الخطة الدراسية لبكالوريوس الغيزياء الطيية	٤٠٣٠١	تطبيقية / قسم الفيزياء رقم التخصى ٢٠ مالحات ١٣٦			كلية العلوم التد التوحية ٣٧		
* 1- 2- 3- 4- 5- 6- 7- 8- 9- 10-	Electric Pote Electrostatic Electrical Po Electric Pote Calculating t Potential du Potential du The Electric Equipotentia Calculating t - An Insulated	ential and Gravitational Forces tential Energy ntial he Potential from the Field e to Point Charge e to a Collection of Point Charges Potential of Continuous Charge distribution al Surfaces he Field from the Potential Conductor	1	2	6				
1- 2- 3- 4- 5- 6- 7-	Capacitance Calculating t Capacitors ir Energy Stora Capacitor wi Dielectrics: a Dielectrics a	Capacitors and on the Capacitance Series and Parallel age in an Electric Field th Dielectric an Atomic View and Gauss law	dielectrics	1.5	5				
	 Electric (Current Resistan Ohm's la Ohm's la Energy T 	Current Current Denstiy ce, Resistivity, and Conductivity w w: A Microscopic View transfers in an Electric Circuit	Resistance	1.5	5				
	 Electrom Calculati Potentia Resistors Multiloo RC Circu 	D notive Force ng the Current in a Single Loop I Differences in Series and Parallel p Circuits its	C Circuits	1.5	5				
	 The Mag The Mag Circulati The Hall The Mag The Mag Torque The Mag 	The Magne gnetic Field B gnetic Force on a Moving Charge ng Charges Effect. gnetic Force on a Current on a Current LoopThe Magnetic Force on a gnetic Dipole	etic Field Current	2	6				
						7 1"			

رقع	ا ک	1287	الخطة الدراسية لبكالوريوس الغيزياء الطبية		_ر, ٤٠٣٠١	فحم التحص	<i></i> ,	بيقية / قسم الغيزياء	لوم التط	لحاية العا
								سائما بعم الحطة ١٣٦	۳۷	لتوصية
				Ampere's Law	2		6			
	1. 2. 3. 4. 5. 6.	The I Appli Lines Two Amp Soler	Biot-Savart Law. ications of the Biot-Savart Law s of Magnetic Field Parallel Conductors ere's Law noids and Toroids.							
					14 wee	4 eks	42hrs			

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

Practical part:

- 1. Safety and Security at the lab.
- 2. Introduction.
- 3. Determining the capacitance of a capacitor / connecting capacitors in series and in parallel
- 4. Studying Ohm's Law / connecting two resistors in series and in parallel
- 5. Determining the time constant of an RC circuit
- 6. Kirchhoff's Rules (The Junction Rule and The Loop Rule)

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): 6 Office hours to help students for solving assigned problems

توحية ٣٧ ماعات الخطة ١٣٦

4. Development of Learning Outcomes in Domains of Learning
For each of the domains of learning shown below indicate:
A brief summary of the knowledge or skill the course is intended to develop;
A description of the teaching strategies to be used in the course to develop that knowledge or skill;
The methods of student assessment to be used in the course to evaluate learning outcomes in the domain concerned.
a. Knowledge : Description of the knowledge to be acquired
Upon successful completion of this course The student will be able to:
Understanding the principle and concepts of physics.
Applying the physics law to different environmental situation.
Improving logical thinking.
Using mathematical formulation to describe the physical principle or phenomena
Ability to explain how things are working.
Teaching strategies to be used to develop that knowledge
1- Demonstrating the basic information and principles through lectures and the achieved applications
2- Discussing phenomena with illustrating pictures and diagrams
a. Blackboard
b. Power point
c. e-learning
4- Tutorials
5- Revisit concepts
o- Discussions 7- Brain storming sessions
Start each chapter by general idea and the benefit of it:
Learn the student background of the subject:
Show the best ways to deal with problem:
Keep the question "why" or "how" to explain always there
Build a strategy to solve problem.
(ii) Teaching strategies to be used to develop that knowledge
(ii) i caching strategies to be used to develop that knowledge
 The methodology includes a combination of lectures by the lecturer, seminar presentation by the students and web-interactions. Students will be given opportunity to understand the role of important physics law in different applications.

• At the end of the programme, students will be divided into groups for seminar

رقم	. <u>⊿</u> 12.‴V	الخطة الدراسية لبكالوريوس الفيزياء الطبية	رقو التخصي ٤٠٣٠١	ياء	/ محسم الغيز	وم التطبيقية	كلية العا
				١٣٦	غارتم الحطق	L <u> </u>	التوصية
•	presentation comprehens All students create an E-I Using image Encouraging Enable the r	n on important areas of the course to assess t sion of the course. will be involved in on-line learning process an mail address to facilitate student web interac s and movies s students to collect the new information abo eference books and scientific sites concerning	their understanding and nd each student is required to ctions. ut what the new in Physics. g Physics in internet.				
• Ask qu	Solve some of Exams: Discussions Ask the stud uality questio	 (iii) Methods of assess example during the lecture. Quizzes Short exams (mid term exams) Long exams (final) Homework. Activities. with the students. ent to clear the misunderstanding of some p on. 	ment of knowledge acquired	:			
b. Coş	gnitive Skills	5					
(i) Co Define Apply Analy Expres Doing	e the physical the laws of p se the physical ss the physical ss the physical	s to be developed ving successfully completed the course stude l phenomena. physics. al phenomena. al phenomena mathematically. ches	nts should be able to:				
(ii) T	eaching stra	tegies to be used to develop these cognit	tive skills:				
	Prep	paring main outlines for teaching					
	Foll	owing some proofs					
3-	Define duti	es for each chapter					
Home Encou Ask th	work assign arage the stud are student to	ments lent to look for the information in differen attend lectures for practice solving proble	t references m				
(III) N	Aletnods of a	ssessment of students cognitive skills					
1-	ivitaterm's e	exam. Exams, snort quizzes					

رقع	. <u>⊿</u> 121″V		رقه التخصص ٤٠٣٠١	بيقية / قسم الغيزياء	كلية العلوم التط
				الاتا يقلعا الحلة الاتراس	التوحية ٣٧
2- 3- Discus	Asking ab Writing re ssions of he	pout physical laws previously taught ports on selected parts of the course ow to simplify or analyze some phenomena	1		
c. Inte	erpersonal	Skills and Responsibility			
		At the end of the co	ourse, the student will be able t	:0:	
•	work inde	pendentiy.	111		
•	The studer	nts learn independently and take up responsib	ility.		
Teach	ning strateg	jies to be used to develop these skills and	abilities		
	 Search Lab w Case S Small Enhan Develor scienti Encour Give st 	through the internet and use the library. ork. Study. group discussion. ce educational skills. op their interest in Science through :(lab w fic and research. rage the student to attend lectures regularly udents tasks of duties	v ork, field trips, visits to		
(iii) N	Methods for carr Evaluate th Evaluate th Evaluate th	r assessment of the students interpersona ry responsibility he efforts of each student in preparing the ro he scientific values of reports. he work in team	al skills and capacity to eport.		
•	Evaluation Evaluation	of the role of each student in lab group assignme of students presentations	ent		
d. Co Descr	ommunicat iption of th tudent will	tion, Information Technology and Nume ne skills to be developed in this domain. A be able to:	rical Skills At the end of the course, the	5	
1. 2. 3.	Enhancing Interpret Pl Present Phy	g the ability of students to use computers an hysical phenomena. Asical phenomena orally.	d internet.		
4.	Know how	to write a report.			
5.	Computatio	on			
6. 7	Problem sc	Diving			
7. 8.	Feeling phy	/sical reality of results			
Teach	ning strateg	ies to be used to develop these skills			
Home	work (prepa	aring a report on some topics related to the	course depending on web		

	الحصار درامية بنصاد ريوس المتدرية الصحد	رقم التخصص ٤٠٣٠١	بيقية / قسم الغيزياء	كلية العلوم التط
			ساعاته الخطة ١٣٦	التوصية ٣٧
ars presentat	ion			
isits				
Methods	of assessment of students numerical and	l communication skills		
luation of p	resentations			
tion of repor	ts			
al exam				
Homework.				
Final exams.				
Research.				
Perform the Operate inst Draw the dat	At the end of the co experiments with high accuracy. ruments safely. ta and curves.	urse, the student will be able	to:	
aching stra	tegies to be used to develop these skills			
- Follow up	the students in lab and during carryout all ex	xperimental work.		
Methods o	f assessment of students psychomotor sl	kills		
Practical exa	m. tional marks for the results with high and g	ood accuracy		
	rs presentat isits Methods of luation of prion of repor al exam Homework. Final exams. Research. Chomotor S Perform the Operate instr Draw the dat aching stra - Follow up Methods o Practical exa	rs presentation isits Methods of assessment of students numerical and luation of presentations ion of reports il exam Homework. Final exams. Research. Chomotor Skills (if applicable) At the end of the co Perform the experiments with high accuracy. Operate instruments safely. Draw the data and curves. aching strategies to be used to develop these skills - Follow up the students in lab and during carryout all el Methods of assessment of students psychomotor sl Practical exam.	rs presentation isits Methods of assessment of students numerical and communication skills luation of presentations ion of reports il exam Homework. Final exams. Research. Chomotor Skills (if applicable) At the end of the course, the student will be able Perform the experiments with high accuracy. Operate instruments safely. Draw the data and curves. aching strategies to be used to develop these skills - Follow up the students in lab and during carryout all experimental work. Methods of assessment of students psychomotor skills Practical exam.	rs presentation isits Methods of assessment of students numerical and communication skills luation of presentations ion of reports il exam Homework. Final exams. Research. Chomotor Skills (if applicable) At the end of the course, the student will be able to: Perform the experiments with high accuracy. Operate instruments safely. Draw the data and curves. aching strategies to be used to develop these skills - Follow up the students in lab and during carryout all experimental work. Methods of assessment of students psychomotor skills Practical exam.

	5. Schedule of Assessment Tasks for Students During the Semester						
	Assessment task	Week Due	Proportion of Total				
(€	e.g. essay, test, group project, examination, speech, oral presentation, etc.)		Assessment				
1	Exercises & Home works	All weeks	10 %				
2	Participation in activities lectures and labs	All weeks	10 %				
3	Written Test (1)	6 th week	10%				
4	Written Test (2)	11 th week	10%				
5	Final Exam (Practical)	15 th week	20%				

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	 			الاكم الحطة ١٣٦	التومية ٣٧
5	Final Exam (theoretical)	16 th week	40%		

D. Student Support

 Arrangements for availability of faculty for individual student consultations and academic advice. (include amount of time faculty are 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.

E. Learning Resources

Required Text(s):
Physics, 4 th edition, By: Halliday, Resnick, and Krane, Wiley (1992)
Recommended Reading List
University Physics with modern Physics, 13th edition, by: Hugh D. Young and Roger A. Freedman, Addison-Wesley, (2012).
Electronic Materials, Web Sites
(eg. www.youtube.com.)
Other learning material such as computer-based programs/CD, professional standards/regulations

F. Facilities Required

رقه	. <u>⊿</u> 12.‴V	الخطة الدراسية لبكالوريوس الغيزياء الطبية	رقم التحصص ٤٠٣٠١	لبيقية / قسم الفيزياء	كلية العلوم التر
				الاتل يقلعها المحلقة الاتلام	التوصية ٣٧
Indi	cate requirem num etc.) Class room The area o air conditio Library Laboratory	nents for the course including size of class ober of seats in classrooms and laboratorie () 1. Accommodation (Lee a is already provided with data show f class room is suitable concerning the number oned.	rooms and laboratories (ie es, extent of computer access cture rooms, laboratories, etc. er of enrolled students (68) and)	
			2. Computing resource	S	
	ComputerScientific c	room alculator.			
	3.Ot	her resources (specifyeg. If specific laborat	tory equipment is required, lis requirements or attach list	t	

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.	
•	Coupling the theoretical part with laboratory part	
•	Periodical revision of course content.	

لتوحية ٣٧ ماغامهم المحطة ١٣٦

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

Date: 13 December 2015

Head of the Physics Department

Dr. Hatem Alamri

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

كلية العلوم التطبيقية / قسم الفيزياء

التوحية ٣٧ ماغام المحطة ١٣٦

COURSE SPECIFICATION

Course title: Ultrasound in Medicine

Course code: **4033290-2**

Revised 13 December 2015

Kingdom of Saudi Arabia

National Commission for Academic Accreditation & Assessment



المملكة العربية السعودية الهيئة الوطنية للتقويم والاعتماد الأكاديمي

COURSE SPECIFICATIONS MPH, 4033290-2

Institution

Date of Report

Umm AL-Qura University

Revised Safar 1431 H

College/Department : Science /Physics

A. Course Identification and General Information
رقو التخصص ٤٠٣٠١ الخطة الدراسية لبكالوريوس الفيزياء الطبية 2٠٣٠ م رقو	كلية العلوم التطبيقية / قسم الفيزياء التوحية ٣٧ ماغات الخطة ١٣٩
1. Course title and code: Ultrasound in Medicine, 4033290-2	
2. Credit hours:- 2 Cr. (2 hrs lecture)	R Objectives (hyper link
3. Program(s) in which the course is offered.	of Medical physics plan)
(If general elective available in many programs indicate this rather than list programs)	
Medical Physics	
4. Name of faculty member responsible for the course	
Dr/ Taha Elfwal	
5. Level/year at which this course is offered 5 th Level / 3 rd year	
6. Pre-requisites for this course (if any) 4032280-4	
7. Co-requisites for this course (if any): No-Co-requisite	
8. Location if not on main campus :- within the university campus	
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:	
 Summary of the main learning outcomes for students enrolled in the course. The course aims to give the students the chance to: 	
1- Understand basic Fundamentals of ultrasound waves: Physics of wave motion, ultrasound intensity, and attenuation of ultrasound.	,
2- Describe, in words, the ways in which various concepts in ultrasound come into play in particular situations.	
3- Rrepresent ultrasound generation and principles of different medical applications.	
4- Analyse ultrasound systems using a required basics	
5- Differentiate between the behaviours of different modes of ultrasound imaging.	

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				ساغاته النطق ١٣٦	التوحية ٣٧
2. B incre the fi	Briefly describe a eased use of IT of ield)	any plans for developing and improving the course the course to or web based reference material, changes in content	hat are being implemented. (eg t as a result of new research in	r 5	
	 Image J p performar Cooperate 	program is applied on some ultrasound imagence of the calculations as in the hospital e with different institution to find how they	ges to simulate the deal with the subject		

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

Topics to be achieved		
Topics	No. Of	Contact
Topics	Weeks	hours
Ultrasound Wayes:		
1- Wave Motion		
2- Wave Characteristics		
3- Velocity of Ultrasound	2 weeks	
4- Ultrasound Intensity	(2 & 3)	4 hrs
5- Acoustic Impedance		
6-Ultrasound Wavefront		
7- Attenuation of Ultrasound		
Ultrasound Transducers:		
1- Pizoelectric Effect		
2- Transducer Design	2 weeks	1 hra
3- Frequency response of a transducer	(4&5)	4 111 5
4- Focused Transducer		
5- Ophthalmic and Doppler Probes		
Ultrasound Display System:		
1- A-Mode Presentation		
2- Echoencephalography	5 weeks	
3- B-Mode Presentation	(6,8,9,	10 hrs
4- Two-dimensional Display of Internal Organs	10,11)	
5- M-Mode Presentation		
6- Detection of Heart Movement and Fetus Health State		
First Midterm Exam	Week 7	2 hrs
The Doppler Effect:		
1- Measurement of the frequency shift	2 weeks	1 hra
2- Measurement of Reflection from Media of Different Acoustic	(12&13)	4 111 8
Impedances		
Second Midterm Exam	Week 14	2 hrs

رقم	الخطة الدراسية لبكالوريوس الغيزياء الطبية ٧٣٧ هـ رقم			٤٠٣٠	رقو التخصص ا	رياء	بِقِية / قِسم الغيز	علوه التطبي	ال تحلية ال	
							137	هاعارهم الخطة	۳۷ ،	التوصية
Ultrasound Imaging: 1- Basic system of imaging 2- Different types of images and modes 3- artifacts of images						1 weeks (15)	4 hrs			
2. Course	2. Course components (total contact hours and credits per semester):									
Cred	lit	Cont	act Hours			Self-Study	Otl	ner	Total	
X	NCCCA	Lecture	Tutorial	Laboratory						
•••••	2 Cr.	26	•••••			104	(<u> </u>	136 hrs	5

3. Additional private study/learning hours expected for stu	dents per w	veek.
Self study (web search, library, reports, homework, etc)	8 hrs	

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

	NQF Learning Domains	Course Teaching	Course Assessment
	And Course Learning Outcomes	Strategies	Methods
1.0		Knowledge	
	 knowledge that students should know and understand. <i>At the end of the</i> <i>coursee the student should be able to:</i> Understand the fundamentals of ultrasound wave physics. List the types of transducers and their applications. Define Pizoelectric effect Use mathematical formulation to describe the physical principle of different imaging modes 	 Brainstorming. Cooperative learning. Dialogue and discussion. Constructivist. Self-learning. 	 Quizzes Electronic exams Homeworks Discussion in the lecture Short exams (midterm exam) Long exam (final exam)
2.0		Cognitive Skills	

رقع	.∡ 12.‴V	لدراسية لبكالوريوس الغيزياء الطبية	رقم التخصص ٤٠٣٠١ الخطة ا	كلية العلوم التطبيقية / قسم الفيزياء
				التوحية ٣٧ سامات المحلق ٣٧
	 Interpret the usage in the solve problem behaviour of (absorption transmissio) Compare be different ult medical app Analyse di ultrasound to the solution transmission 	e piezoelectric effect and its e design of the trasducer. lems related to the of ultrasound in the matter , attenuation reflection, n, etc) etween the properties of trasound modes and their plications fferent artefacts of images.	 Problem-solving strategy Cooperative learning strategy Strategy group discussions Assigning students solve the exercises in each chapters Using ImageJ program to analyze some imaging modes 	 Written test Individual and group activities Short cognitive tests. Achievement tests Seminar Electronic exam Some application using software
3.0		Interp	ersonal Skills & Responsibility	
	 Summarized ultrasound if a sound formulated problem. 	e the different modes of imaging. e artefacts of the images. ssential parts of a problem te a strategy for solving the	Training students to build good relationships with their counterparts and collaborate with others and develop personal and professional performance through the following strategies: - cooperative learning - flipped classroom	Students are assessed through: - evaluation of field activities - Report - Short quiz in class - Discussion in class
4.0		Communication,	Information Technology, Numeric	al skills
	 Use softwa different me Work in de represent a to the study Use interne writing report 	are to analyse the images of odalities ependently and in group to seminar about topic related c. et to search for topics and orts standards for writing a good	 Group seminar discussion Reports about different tasks 	 Report assignment Class activities assignment Electronic exams
5.0			Psychomotor	1
	No	ot applicable (NA)	Not applicable	Not applicable

رقم	.4	1217V
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الخطة الدراسية لبكالوريوس الغيزياء الطبية

التوحية ٣٧ مامانه الخطة ١٣٦

5. Schedule of Assessment Tasks for Students During the Semester

0.50	neure of Histosisticit Fusiks for Students During the Semester		
	Assessment task (e.g. essay, test, group project, examination, speech,	Week Due	Proportion of Total
	oral presentation, etc.)		Assessment
1	Midterm 1	7 th week	10 %
2	Midterm 2	14 th week	10%
3	Project + Electronic exams	$5^{\text{th}} - 12^{\text{th}} \text{ week}$	10%
4	Homework	During the	10%
		semester	
5	Reports (5 reports/semester)	During the	10 %
		semester	
5	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)

- 1- 5-office hours per week in the lecturer schedule.
- 2- The contact with students by e-mail and website

E. Learning Resources

1. List Required Textbooks
[1] Physics and principles of ultrasound by R. A. Sofferman, Springer, 2012
[2] Basic Physics and Technology of Medical Diagnostic Ultrasound by M. Hussey, elsevier ,2008
2. List Essential References Materials (Journals, Reports, etc.)
3. List Recommended Textbooks and Reference Material (Journals, Reports, etc)
Diagnostic Ultrasound: physics and equipment by P. Hoskins, K. Martin and A. Thrush, Cambridge press, 2011.
4. List Electronic Materials (eg. Web Sites, Social Media, Blackboard, etc.)
http://www.physicsclassroom.com/
http://www.echopedia.org/index.php/The_principle_of_ultrasound
http://www.brooksidepress.org/Products/Military_OBGYN/Ultrasound/basic_ultrasound.htm
http://ozradonc.wikidot.com/principles-of-ultrasound
5. Other learning material such as computer-based programs/CD, professional standards or regulations and software

Application of ImageJ program on some selected images of different imaging modes

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and

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التوحية ٣٧ ماغامهم الحطة ١٣٦

laboratories, extent of computer access etc.)

Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)
 The size of the room should be proportional to the number of students
 Provide enough seats for students.
 The number of student not exceed on 30 in the classroom
 Library
 Computing resources (AV, data show, Smart Board, software, etc.)
 Hall is equipped with a computer.
 Provide overhead projectors and related items
 Smart board
 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

- Quizzes, midterm and final exams
- Electronic student evaluation is organized by the university measurement and evaluation unit
- 2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor
 - - Electronic exams
 - Evaluation of course by another colleagues

3 Processes for Improvement of Teaching

- - Electronic exams
- Evaluation of course by another colleagues

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.

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

- 4- The following points may help to get the course effectiveness
 - Student evaluation
 - Course report
 - Program report
 - Program Self study
- 5- According to point 1 the plan of improvement should be given.
- 6- Contact the college to evaluate the course and the benefit it add to other courses.

رقم	. <u>⊸</u> 12.‴V	الخطة الدراسية لبكالوريوس الغيزياء الطبية	رقم التخصص ٤٠٣٠١	كماية العلوم التطبيقية / قسم الفيزياء	
				الاسم للخطة ١٣٦	التوحية ٣٧

Date: 13 December 2015

Head of the Physics Department

Dr. Hatem Alamri

Kingdom of Saudi Arabia

The National Commission for Academic Accreditation & Assessment

رقم التخصص ٤٠٣٠١

التوصية ٣٧ **COURSE SPECIFICATION**

Course title Theoretical Methods in Physics (1)

Course code: 4032141-4

Revised 13 December 2015

رقم التخصص ٤٠٣٠١ الخطة الدراسية لبكالوريوس الغيزياء الطبية

Course Specification

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

Institution: UM AL – QURA UNIVERSITY

College/Department : Faculty of Applied Science – Department of Physics

A Course Identification and General Information

5. Course title Theoretical Methods in Physics (1)
6. Course code: 4032141-4
2. Credit hours: 4hrs
3. Program(s) in which the course is offered. : BSc Physics
7. Name of faculty member responsible for the course:
One of the academic staff member
5. Level/year at which this course is offered: 2 nd Year / Level 4
6. Pre-requisites for this course (if any): Differentiation and Integration (2) (4042002-4)
7. Co-requisites for this course (if any):
8. Location if not on main campus: Main campus
9. Mode of Instruction (mark all that apply)
a. traditional classroom What percentage?
b. blended (traditional and online) What percentage?
c. e-learning What percentage?

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توحية ٣٧ مالاه الحطة ١٣٦



١٤٣٧ ه. رقه

توحية ٣٧ سائماته الخطة ١٣٦

B Objectives

After completing this course student should be able to:

- 1. Manipulate vectors and perform algebraic operators on them.
- 2. Deal with infinite series and test convergence.
- **3.** Use Fourier series for expansion of periodic functions in terms of an infinite sum of sines and cosines.
- **4.** Perform partial differentiation and use ordinary differential equations in physics problems.
- 5. Solve homogeneous and nonhomogeneous second order differential equations.
- **6.** Use Laplace transform and calculate solution of differential equations by Laplace transform.
- **7.** Deal with Fourier transform, Dirac-Delta, and Green's functions and their applications in physics.
- **8.** Develop an intuitive feeling for the precise mathematical formulation of physical problems and for the physical interpretation of the mathematical solutions.
- **9.** Be familiar with the mathematical formulae of this course that frequently appear in physics problems.
- **10.** Use computer to verify the solution of some physical problems.
- **11.** Use computer to construct graphs of some functions.

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

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 403342-4 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.

Theoretical Methods in Physics (1)		
Торіс	No of	Contact
	Weeks	hours

الوريوس الفيزياء الطبية ١٤٣٧ ه . رقو	المنطة الدراسية لبك	عص ٤٠٣٠١	رقه التخد	يقية / قسم الغيزياء	كلية العلوم التطر
				الاسم قلعال متنادله	التوحية ٣٧
		2.	5 10		
Vector Analysis & Curvilinear Coc	ordinates:				
Triple (Scalar-Vector) products- Different	iation of vectors- grad,				
Div, Curl and Laplace's operator, Vector i	ntegral- Green's, Gauss'				
operators in orthogonal	curvilinear coordinates.				
		2	. 8		
Infinite series, Power series:					
Geometric series, testing series for co	onvergence, Alternating				
series, Interval of convergence- expand	Solving Problems about				
	Series				
Fist periodic e	xam				
		2.	5 10		
 Partial Differentiation: 					
Total differentials- Approximating using	g differentials, chain rule				
Implicit differentiation, Application to I	Maximum and Minimum				
problems, Lagrange Multiplie	ers, Change of Variables,				
Dif	ferentiation of Integrals.				
		2	8		
Equation contract and transforms:					
Simple Harmonic Motion and Wave Mo	tion: Periodic Functions				
Average Value of a Function Fourier Cos	officients Complex Form				
of Fourier Series Even and Odd Fu	Inctions Applications of				
Fourier Several Fourier Fourier Fourier Several Fourier Fo	ries. Fourier Transforms.				
Second periodic	: exam				
Ordinary differential equations:		3	12		
First order differential equation	ns; separable differential				
equations, linear 1st order equations: Homogeneous diff	erential equations Non-				
homogeneou	is differential equations.				
Solution of Differential Equations	by Laplace Transforms:	2	8		
	tion to Groop Functions				
Brief Introduc	tion to Green Functions.				
Final periodic e	exam				
		14	4 56		

لتوحية ٣٧ ماغامه الخطة ١٣٦

Т

2 Course components (total contact hours per semester):				
Lecture : 56	Tutorial:	Practical:	Other:	

3. Additional private study/learning hours expected for students per week. (This should be an average: for the semester not a specific requirement in each week): 12h (reports & essay)

This actually depends on the student's level, study skills and habits, but in general four hours per week are sufficient.

	4. Development of Learning Outcomes in Domains of Learning
	······································
For ea	ch of the domains of learning shown below indicate:
•	A brief summary of the knowledge or skill the course is intended to develop;
•	A description of the teaching strategies to be used in the course to develop that knowledge or skill;
•	The methods of student assessment to be used in the course to evaluate learning outcomes in the domain concerned;
c. Kr	nowledge : Description of the knowledge to be acquired
1.	Learning fundamentals of Mathematical Physics.
2.	Understand how to use mathematics as a tool for physics.
3.	Understand how to translate a physical problem in mathematical form.
4.	Ability to solve Physical problems analytically in an efficient way.
5.	Improving the logical thinking.
6.	tool, problem solving and demonstration.
	······
(ii) Te	eaching strategies to be used to develop that knowledge
•	The methodology includes a combination of lectures by the lecturer, seminar presentation by the students and web-interactions
•	Starting each Chanter by general idea and the benefit of the Mathematical tool

• Solving examples during the lecture time.

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التوصية

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	Show the best ways to deal wBuild a problem solving strate	rith the problem. Pgy.	
	 All students will be involved in to create an E-mail address to 	n on-line learning process and each student is required facilitate student web interactions.	
	 Using computer simulations. Enable reference books and s 	cientific websites concerning Theoretical Methods in	
	Physics.		
		(iii) Methods of assessment of knowledge acquired:	-
	Online Quizzes Homework	10%	
	 Interactive discussions 	10%	
	 Mid term exam 1: 	20%	
	• Mid term exam 2:	20%	
	• Final exam:	30%	
b.	Cognitive Skills		
(i)	Cognitive skills to be develop	ed	
	Having succe	essfully completed the course students should be able to:	
1. 2	Develop analytic skills.		
2. 3	Develop ability to think creativ	elv	
4 .	Improve memory skills.	ciy.	
5.	Improve mathematical skills.		
6.	Analyse and explain natural ph	ysical problem.	
(ii)	Teaching strategies to be use	d to develop these cognitive skills:	
7.	Develop ability to synthesize a	nd integrate information.	
8.	Encourage the students to use of	lifferent learning resources.	
9. 10	Writing the final answer in con	cise form when possible.	
10 11	Writing an equation/physical la	iw in wards.	
11 12.	Using appropriate symbols that	can be easily memorized	
13.	Discussions of how to simplify	or analyse physical problem.	
(ii i) Methods of assessment of stu	udents cognitive skills	
4 .	Oral questions.		
5. 6	Presentations.		
о. 7	Online Ouizzes		
7. 8.	Problem solving		
	rioblem solving.		
c.]	nterpersonal Skills and Respo	onsibility	
	· · · · · · · · · · · · · · · · · · ·	At the end of the course, the student will be able to:	
	1. Develop ability to work ind	lependently.	
	2. Develop donity to work inc		

رقع	- <u></u>	الخطة الدراسية لبكالوريوس الفيزياء الطبية	رقم التخصص ٤٠٣٠١	بيغية / قسم الغيزياء	كلية العلوم التط
				ساعاته الخطة ١٣٦	التوحية ٣٧
2. 3. 4.	Develop a Improve s Develop le	ability to work productively with others. self-esteem. eadership skills.			
(iii)	Teaching	strategies to be used to develop these sk	ills and abilities		
6. 7. 8. 9. 10. 11.	Homeworl Homeworl Cooperativ Microteac Search thr Develop th research.	k assignment for each group of the students. k assignments that should be worked out inde ve learning. hing. ough the internet and use the library. heir interest in Science through :(lab work, fiel	pendently. Id trips, visits to scientific and		
carry	responsibi	lity	ar skins and capacity to		
1. 2. 3. 4. 5. 6. 7.	Marking th Working cl Evaluate t Evaluate t Evaluate t Evaluation Evaluation	he home works. losely with the different groups. the efforts of each student in preparing the r the scientific values of reports. the work in team of the role of each student in lab group assignme of students presentations	eport. ent		
d. Co (i)	ommunica Descripti	tion, Information Technology and Nume ion of the skills to be developed in this do	erical Skills omain At the end of the		
	course, tl	he student will be able to:			
1.	Enhancing	g the ability of students to use computers an	d internet.		
2. 3.	Know how	vsical phenomena orally. to write a report.			
4.	Feeling ph	ysical reality of results.			
5.	Perform e	ffective communication with colleagues and fa	oculty members.		
6. 7	Ability to ι	use programs designed for numerical computa	tion.		
7.	Problem so	olving and ability to interpret the results.			
(ii)	Teaching	g strategies to be used to develop these sk	kills		
10	. Homewor on web si	rk (preparing a report on some topics relate tes).	d to the course depending		
11	. Seminars	presentation.			
12	. Field visi	ts to factories.			
13	. Additiona	al lectures on numerical techniques.			
14	. Exposing	the students to problems that can only be s	olved numerically.		
				AV	

رقه	.∡ 1£1″V	الخطة الدراسية لبكالوريوس الغيزياء الطبية	رقة التخصص ٤٠٣٠١	لبيقية / قسم الغيزياء	كلية العلوم التم
				الاسم عليما مهادله	التوحية ٣٧
(iii)	Methods o	of assessment of students numerical and	communication skills		
1	• Give the s numerical	students homework assignments on proble lly.	ems that can be solved		
2	Ask the s	students to search the internet for the solut	tion of a specific problem.		
3	Using the Evaluation	computer to construct three dimensional gra of presentations and reports.	phs.		
e. P	sychomotor	Skills (if applicable)			
(i) T	Ceaching str	ategies to be used to develop these skills	5		
(iv)	Methods	of assessment of students psychomotor	skills		

	5. Schedule of Assessment Tasks for Students During the Semester				
	Assessment task	Week Due	Proportion of Total		
(e.g	essay, test, group project, examination, speech, oral presentation,		Assessment		
	etc.)				
1	Online quizzes	All weeks	10%		
1	Exercises & Home works	All weeks	10 %		
2	Participation in activities lectures and labs	All weeks	10 %		
3	Written Test (1)	6 th week	20%		
4	Written Test (2)	11 th week	20%		
5	Final Exam (theoretical)	16 th week	30%		

D. Student Support

1. Arrangements for availability of faculty for individual student consultations and

لتوحية ٣٧ ما المحطة ١٣٦

academic advice. (include amount of time faculty are available each week).

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

E. Learning Resources

	Required Text(s):
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.	George B. Arfken, Hans J. Weber and Frank E. Harris, Mathematical Methods for Physicists (Seventh Edition), Elsevier (2012), ISBN: 978-0-12-384654-9.
3.	G. Dennis Zill, R. Michael Cullen, Advanced engineering mathematics, Jones and Bartlett Publisher (2006), ISBN 9780763745912.
4. 5.	Eugene Butkov, Mathematical Physics, World student series edition (1973). S. Grossman, Elementary Linear Algebra, 6 th edition, Wadsworth (2006).
	Recommended Reading List
	Electronic Materials, Web Sites
	(E-learning gate of Umm Al-Qura university, etc.)
	Other learning material such as computer-based programs/CD, professional standards/regulations

رقع	. <u>⊿</u> 12.‴V	الخطة الدراسية لبكالوريوس الفيزياء الطبية	رقم التخصص ٤٠٣٠١	لية العلوم التطبيقية / قسم الفيزياء	
				الاكم الحطة ١٣٦	التروحية ٣٧

F. Facilities Required

ndicate requirements for the course including size of classrooms and laboratories (ie umber of seats in classrooms and laboratories, extent of computer access etc.)				
1. Accommodation (Lecture rooms, laboratories, etc.)				
9- Class room is already provided with data show				
$10 ext{-}$ The area of class room is suitable concerning the number of enrolled students (68)				
and air conditioned.				
11-Library				
12- Laboratory for fundamental of physics.				
2. Computing resources				
7. Computer room				
8. MATLAB software.				
3.Other resources (specifyeg. If specific laboratory equipment is required, list requirements or attach list)				

G Course Evaluation and Improvement Processes



توحية ٣٧ ساغات الخطة ١٣٦

3. Processes for Improvement of Teaching

- Preparing the course as PPT.
- Using scientific movies.
- Coupling the theoretical part with laboratory part
- Periodical revision of course content.

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

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

Date: 13 December 2015

Head of the Physics Department

Dr. Hatem Alamri

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

COURSE SPECIFICATION

Course title: Physics of Laser in medicine

Course code: 4033281- 2

Revised 13 December 2015

Kingdom of Saudi Arabia

National Commission for Academic Accreditation & Assessment



المملكة العربية السعودية

الهيئة الوطنية للتقويم

والاعتماد الأكاديمي

COURSE SPECIFICATIONS MPH, 4033281-2

ية العلوم التحليبيةية / قسم الفيزياء رقم التخصى ٤٠٣٠١ له الخطة الدراسية لبكالوريوس الفيزياء الحليبة ١٤٣٧ هـ رقم	ةي لك
عية ٣٧ ماغارهم الخطق ١٣٦	التو
Institution Date of Report	
Umm AL-Qura University Revised Safar 1437 H	
College/Department : Science /Physics	
A. Course Identification and General Information	
1. Course title and code: Physics of Laser in medicine. 4033281	
2. Credit hours: 2 Cr.	
3. Program(s) in which the course is offered.	
(If general elective available in many programs indicate this rather than list programs)	
Physics Department	
4. Name of faculty member responsible for the cours	se :
5. Level/year at which this course is offered : ^{5th} level / Third year	
6. Pre-requisites for this course (if any Fundamentals of medical Physics / Code: 4032280-4	
7. Co-requisites for this course (if any): No-Co-requisite	
8. Location if not on main campus <mark>: On campus</mark>	
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 (hyper link of Medical physics plan)

What is the main purpose for this course?
 Study of Laser formation from 2, 3 and 4-level laser
 Study of the optical cavity conditions for Laser formation
 Study of some real Laser system like CO₂, He-Ne, Semiconductor, Ruby Lasers
 Laser Safety and Laser transportation
 Applications of Laser on Ophthalmological surgery.
 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)

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التوحية ٣٧ ساغات الخطة ١٣٦

1-Cooperate with other educational institutions to find how they deal with the subject.

2- Re new the course references frequently.

3-Frequently check the latest discovery in science to improve the course objectives.

4- The course needs the use of computers.

5- Posting some course material on the websites to help the students.

6- Focusing on generic skills.

C. Course Description (Note: General description in the form to be used for the Bulletin or handbook should be

attached)

1 Topics to be Covered :-		
Topics	No of Weeks	Contact
	(Studying Week No.)	hours
1- General Introduction	2 weeks	4 hrs
2- Introduction to Laser	۲ weeks	۴ hrs
First Periodic Exam		
3- Types of lasers	2 weeks	4 hrs
Mid Term Vacation		
4- Laser Safety, Damage and Transmission	2 weeks	4 hrs
5- Optical and Thermal Response of Tissue to Laser Radiation	2 weeks	4 hrs
Second Periodic Exam	•	
6- Lasers in Ophthalmology	2 weeks	4 hrs
Final Practical Exam	•	

2. Course components (total contact hours and credits per semester):								
	Credit			C	Contact Hours	Self-Study	Other	Total
Х	NCCCA	Lecture	Tutorial	Laboratory	Office			
	2 Cr. Hr.	۲ ٤		0	۲ ٤	٤٨	٦	۱.۸

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

	NQF Learning Domains	Course Teaching	Course Assessment
	And Course Learning Outcomes	Strategies	Methods
1.0	Knowledge		

رقم	لة الدراسية لبكالوريوس الفيزياء الطبية الدراسية لبكالوريوس الفيزياء الطبية	قوالتخصي ٤٠٣٠١ الخد	كلية العلوم التطبيقية / قسم الفيزياء ر
	 At the end of the program the student should be able to: fundamentals of Laser physics. Distinguishing between the different Lasers for the point of view of their importance, danger, and power. Gain some knowledge about the uses of Laser in Medicine in surgeries. 	 Brainstorming. Cooperative learning. discussion Self-learning. 	 Conducting scientific research and follow-up of advances in the field. Two tests per semsters. Discussions in the lecture
2.0	Cognitive Skills	I	I
	 estimate mathematical and physical formulas to interpreting the formation and stability of Laser integrate phys. information with that of medical and biological into medical physics 	 Problem-solving Cooperative learning group discussions solve the exercises in each chapters 	 Practical test Written test Individual and group activities Short cognitive tests. Achievement tests
3.0	Interpersonal Skills & Responsibility		
	 work in a group. write a short report in specific subject related to the course materials by using advanced information tools. write a report individually or in a team using the library and the internet appraise the correctness of their solution, interpret their results and connect it to related areas of medical physics. justify the essential parts of a problem and formulate a strategy for solving the problem. 	 Training students to build good relationships with their counterparts and collaborate with through: cooperative learning peer education Enhance confidence and encourage discussion. Raise the spirit of cooperation among students. 	 Students are assessed through: evaluation of field activities verbal tests assessment assignments style note Request solutions from each group in front of students. The final evaluation of the collective tasks and discusses their students.
4.0	Communication, Information Technology, N	umerical skills	1

رقم	<u></u> 1επν	طة الدراسية لبكالوريوس الفيزياء الطبية	قِمَ التِخصي ٤٠٣٠١ الذ	كلية العلوم التطبيقية / قسم الفيزياء ر
				التوحية ۳۷ ماغانه الحطة ۱۳۶
	 illustrate skills, inc analysis, o and correc data preser operate v word proc graphic pr storage. illustrate communic responsibly relationshi work inde team, and - mindedne demonstra priorities and short-t 	numeracy and computational huding such aspects as error rder-of-magnitude estimations, et use of units and modes of ntation. with basic software, such as ressing, spread sheet use, and rogrammes, data-logging and information and ations technology to act y in personal and professional ps. ependently and as a part of a learn independently with open ress and critical enquiry. te the ability to manage time, workloads, and utilize long- rerm planning skills.	 Cooperative learning working groups with peers solving problems and search the internet for some topics. Self-learning Medical Physics labs. Simulation programs. Readymade programs. Smart Board Power point Give the students tasks to measure mathematical and computational analysis and problem solving. 	 Discussing a group work sheets. Discuses with them the results of computations analysis and problem solutions. Give homework's to know how the student understands the numerical skills. Give them comments on some resulting numbers. Written tests Laboratory tests.
5.0	Psychomoto	r		
5.1	Not applicable	e (NA)	Not applicable	Not applicable

5. Schedule of Assessment Tasks for Students During the Semester					
	Assessment task (e.g. essay, test, group project, examination, speech,	Week Due	Proportion of Total		
	oral presentation, etc.)		Assessment		
1	1 st periodic exam	7 th week	15 %		
2	2 nd periodic exam	14 th week	15%		
3	Attendance	During the	10%		
		semester			
4	Homework + reports	During the	10%		
		semester			
5	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)

1- office hours per week in the lecturer schedule.

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التوحية ٣٧ ساغانه الخطة ١٣٦

2- The contact with students by e-mail and website

E. Learning Resources

1. List Required Textbooks

Laser Physics and Applications

Subvolume A: Laser Fundamentals - Part 1
Editors: H. Weber, G. Herziger, R. Poprawe
Authors:
H.J. Eichler, B. Eppich, J. Fischer, R. Güther, G.G. Gurzadyan,
A. Hermerschmidt, A. Laubereau, V.A. Lopota, O. Mehl, C.R. Vidal,
H. Weber, B. Wende
2. List Essential References Materials (Journals, Reports, etc.).

LASERS IN MEDICINE

Edited by Ronald W. Waynant CRC PRESS Boca Raton London New York Washington, D.C. 3. List Recommended Textbooks and Reference Material (Journals, Reports, etc) 4. List Electronic Materials (eg. Web Sites, Social Media, Blackboard, etc.) • http:// www.springer.com • http:// www.sciencedirect.com

• http:// www.gigabedia .org

5. Other learning material such as computer-based programs/CD, professional standards or regulations and software. None

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.)

-The size of the room is proportional to the number of students

Labs are adequately prepared

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

-Hall is equipped with a computer. overhead projectors and related items

-Smart board should be supplied

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

None

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching

Student evaluation electronically organized by the University.

2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor

١٤٣٧ هـ رقم	النطة الدراسية لبكالوريوس الغيزياء الطبية	رقم التخصص ٤٠٣٠١	كلية العلوم التطبيقية / قسم الفيزياء
			التوحية ٣٧ ماماته الحطة ١٣٦
-Revision development	ntal internal and external.		
- Student Assessment	tests quarterly and final through questionn	aires	
-The colleagues who	teach the same course discuss together to ev	aluate their teaching	
3 Processes for Impr	ovement of Teaching		
- Create the right atn	nosphere for study.		
- Material and moral	incentives.		
- Lecture developmer	ıtal audit, or workshop lesson model		
- Course report, Prog	ram report and Program self-study.		
- A tutorial lecture n	nust be added to this course.		
4. Processes for Verif	ying Standards of Student Achievement (e.g	. check marking by an indep	endent member teaching staff
of a sample of studen	t work, periodic exchange and remarking of	tests or a sample of assignme	ents with staff at another
institution)			
-The instructors of th	ne course are checking together and put a un	ique process of evaluation.	
5 Describe the planni	ng arrangements for periodically reviewing	course effectiveness and plar	nning for improvement.
- Consulting the othe	r professors scheduled.		
- Hosting a visiting p	rofessor to evaluate the course.		
- Workshops with pr	ofessor's course.		
- Reconsider the voca	bulary scheduled every two years in order to	o cope with new developmen	nts
-Student evaluation.			
Course report.			
Program report			

Date: 13 December 2015

Head of the Physics Department

Dr. Hatem Alamri

Kingdom of Saudi Arabia National Commission for Academic Accreditation & Assessment



المملكة العربية السعودية الهيئة الوطنية للتقويم والاعتماد الأكاديمس Kingdom of Saudi Arabia The National Commission for Academic Accreditation & Assessment

COURSE SPECIFICATION

Course title: Medical radiation physics (1)

Course code: 4033285 - 4

Revised 13 December 2015

	الخطة الدراسية لبكالوريوس الغي	رقم التخصص ٤٠٣٠١	بقية / قسم الفيزياء	كلية العلوم التطب
Kingdom of Saudi Arabia		مىغودىيەة	ساماللماللكلة القلابية ال	التوحية ٣٧
National Commission for		للتقويهم	الهيئة الوطنية	
Academic Accreditation &		دينميني	والاعبت مباد الأكبا	
Assessment		ي		
	COURSE SPECIF	ICATIONS <mark>Medical ra</mark>	diation physics(1)	4033285-4
Institution	Date of I	Report		
Umm AL-Qura Ur	niversity Revised S	afar 1437 H		
College/Department : Science	/Physics			
A. Course Identification and	General Information			
1. Course title and code: Medica	al radiation physics1 4-4033285			
2. Credit hours: 4. (3 lecturer	FI practical of lab.			
3. Frogram(s) in which the cou	rse is offered. many programs indicate this rath	er than list programs)		
Physics Department	many programs maleate this ratio	er enan nise programs)		
		4. Name of faculty m	ember responsible fo	r the course :
5. Level/year at which this cou	rse is offered : <mark>5ʰ level / third year</mark>	•		
6. Pre-requisites for this course	e (if any): Fundamental of medical	physics/ Code- <mark>4032280-</mark>	<mark>4</mark>	
7. Co-requisites for this course	(if any): <mark>No-Co-requisite</mark>			
8. Location if not on main camp	ous <mark>: within the university campus</mark>	5		
9. Mode of Instruction (mark a	ll that apply)			
a. Traditional classroom	What percen	tage?		
b Blended (traditional and o	nline) What percen	fare		
	what percent			
c. e-learning	What percer	ntage?		
d. Correspondence	What percer	ntage?		
Comments:				

١٤٣٧ ک. رقم

لتوحية ٣٧ ساغات الخطة ١٣٦

B Objectives (hyper link of Medical physics plan)

For students undertaking this course, the aims are to:

1.Study Production of X Rays : Accelerated Charged Particle, Synchrotron Radiation, Linear Accelerator 2-Acquire the interaction of radiation with matter , natural background radiation and general Aspects of Radioactive Decay Processes

3-Study the Activity; Naturally Occurring Radiation, Serial Transformation.

4- **List** a scientific method to come to understand the enormous variety of radiation physics phenomena in terms of a few relatively simple laws

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)

- 8. Explain strategy of the course in the beginning of the semester
- 9. Outlines of the introduction for radiation physical laws, principles and the associated proofs.
- 10. Highlighting the radiation experiments corresponding to a theoretical subject.
- 11. Encourage the students to see more details in the international web sites and reference books in the library.
- 12. Discussing some selected problems in each chapter.
- 13. Cooperate with different institution to find how they deal with the subject
- 14. Renew the course references frequently
- 8- Development of radiation physics laboratory
- 9- Joining between the theoretical and industrial applications

Frequently check for the latest discovery in science

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

1 Topics to be Covered		
	No of	Contact
	Weeks	hours

التوحية ٣٧ ماعاتم الخطة ١٣٦

Production of X Rays :	2 weeks	6 hrs
Accelerated Charged Particle	(1 &2 weeks)	
Synchrotron Radiation Linear Accelerator		
Fundamental Sciences	(۲ Weeks)	
Quantities and units in science and engineering	(3&4	6 hrs
Background information	weeks)	
Excitation and Ionization		
Characteristic x-ray		
Binding Energy		
The chart of nuclides		
Interaction of radiation with matter	weeks۲	
Alpha particle interactions	(week 5 & 6)	
Beta particle interactions		6 hrs
Specific ionization		
Mass stopping power		
Linear energy transfer		
Bremsstrahlung		
Radioactive atoms- Nature and Behaviour		
Alpha emission		
Positron emission		
Orbital electron capture		
Beta emission		
First Periodic Exam	Week	
	(week 7)	
Med Term Vacation	Week	
	(week 8)	

ية ١٤٣٧ هـ رقو	الخطة الدراسية لبكالوريوس الغيزياء الطو	و التخصص ٤٠٣٠١	رت	العلوم التطبيقية / قسم الفيزياء		
				الاتم قلخاة الخلة	التوصية ٣٧	
Gamma ray emission		۲ (week)	6 hrs			
Internal Conversion El	ectrons	(week 9 and 10)				
Auger electron						
Transformation kinetic	S					
Average life						
Specific activity						
Time of maximum pro	geny activity					
Tracing radioactive dee	cay on the chart of the nuclides					
Radiation quantities a	and units	Week				
Fxposure		(week 11)				
Absorbed dose and equ	ivalent dose		3hrs			
Radioactivity						
Radioactivity						
Biological Effects of I	onizing Radiation	Week				
Non Stochastic Effects		(week 12 & 13				
Death from whole body	y exposure	(WCCK 12 G 13	6 hrs			
The Acute Radiation S	yndrome	,				
Damage to skin						
Stochastic effect						
Radiation Protection	in Medicine	Week				
Radiation protection gr	nals	(week 14)	3hrs			
Dediction protection ge						
Radiation protection in	medical imaging technology					
Radiation protection in	nuclear medicine					
Radiation protection in	radiotherapy					
				J		

١٤٣٧ هـ رقم

الخطة الدراسية لبكالوريوس الغيزياء الطبية

رقم التخصص ٤٠٣٠١

كلية العلوم التطبيقية / محسم الميزياء

التوحية ٣٧ ساعات الخطة ١٣٦

Second examination 1	Week	
	(week 15)	
Final examination	Week	
	(week 16)	

2. Course	2. Course components (total contact hours and credits per semester):							
	Credit			Co	ontact Hours	Self-Study	Other	Total
Х	NCCCA	Lecture	Tutorial	Laboratory	Practical	' 		
	4 ch	36		39	0	90	21	292

3. Additional private study/learning hours expected for students per week.	6 h	

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

	NQF Learning Domains	Course Teaching	Course Assessment
	And Course Learning Outcomes	Strategies	Methods
1.0	Knowledge		
1.1	 knowledge that students should know and understand. At the end of the programme the student should be able to: 1- outline fundamental Sciences, Quantities and units in science and engineering, Background information Excitation and Ionization , Characteristic X-ray, Binding Energy and the chart of nuclides. 2- list the differents instruments for production X Rays : Accelerated Charged Particle , Synchrotron Radiation and Linear Accelerator 	 Brainstorming. Cooperative learning. Dialogue and discussion. Constructivist. Learning. Self-learning. 	 Conducting scientific research and follow-up of advances in the field. Quarterly tests. By 15 minute multiple choice test on content on completion of each topic with results carrying 20% of final assessment. Duties and discussions within the lecture Multiple choice knowledge item on final exam.
	5-5 <mark>tate</mark> interaction of radiation with		

رقو	دراسية لبكالوريوس الغيزياء الطبية لكالا م	٤٠٣ الخطة ال	رقو التخصص ٢٠	لبيقية / قسم الفيزياء ساعات المحلة ١٣٦	كلية العلوم التر التوحية ٣٧
	matter,				
	Alpha particle interactions,				
	Beta particle interactions,				
	Specific ionization,				
	Mass stopping power,				
	Linear energy transfer,				
	Bremsstrahlung,				
	Radioactive atoms- Nature and Behaviour,				
	Alpha emission,				
	Positron emission,				
	Orbital electron capture				
	And Beta emission				
	4- describe the interaction of radiation with matter , natural background radiation and general Aspects of adioactive Decay Processes				
1.2	-				
2.0	Cognitive Skills				
2.1	 B1. Estimate use physical laws and principles to understand the subject and to simplify problems and analyze phenomena Represent the problems mathematically. B2. Estimate the external exposure with 				
	different distances for calibration of the TLD(s) dosimetry.				
	B3. justify the mathematical expressions in calculating the doses due the inverse square law .				
	B4. integrate information technology (IT) based solution into radiation dose measurements in environment and				

١٤٣٧ هـ رقو

	medicine		
	B5. <mark>Analyse</mark> and explain natural phenomena.		
	B6. Ability to explain the idea with the student own words.		
3.0	Interpersonal Skills & Responsibility		
3.1	-work in a group to conduct an experiment.	Training students to build good relationships with their counterparts	Students are assessed through:
	-w <mark>rite</mark> a short report in specific subject	and collaborate with others and	
	related to the course materials by using	develop personal and professional	evaluation of field activities
	communication tools .	performance through the following	• verbal tests
	with a second tool the state of a	strategies:	assessment assignments
	- write a report individually or in a team using the library and the internet	• cooperative learning	style note
		• peer education	Request solutions from each
	- appraise the correctness of their solution interpret their results and	 Enhance confidence in the same 	group in front of students.
	connect it to related areas of medical	student and encourage dialogue	
	physics.	and discussion.	
3.2	- justify the essential parts of a problem	- Raise the spirit of cooperation	- The final evaluation of the
	and formulate a strategy for solving the	among students.	collective tasks and discusses
	problem.		their students.
4.0	Communication, Information Technolog	y, Numerical skills	
4.1	- <mark>illustrate</mark> numeracy and	- Cooperative	Discussing a group work sheets.
	computational skills, including	<i>learning(e.g:</i> Creating working groups with peers to	Discuses with them the results
	dose software and modes of data	collectively prepare: solving	of computations analysis and
	presentation.	problems and search the internet for some topics)	problem solutions.
	- operate with basic software, such as word processing, spread sheet	- Self-learning to the global of	Give homework's to know how
	use, and graphic programmes,	information networks	the student understands the
	data-logging and storage.	- Simulation programs.	numerical skills.
		 Hospital Training. Readvmade programs. 	Give them comments on some
		- Smart Board	resulting numbers.
		- Power point	
4.2	- <mark>illustrate</mark> information and	Give the students tasks to measure	 Written tests

رقه	سية لبكالوريوس الفيزياء الطبية المعالم	رقع التخصص ٤٠٣٠١ الخطة الدرا	كلية العلوم التطبيقية / قسم الفيزياء
			التوحية ٣٧ مامارهم الخطة ١٣٦
5.0	communicationstechnologyactresponsiblyin personalanprofessional relationshipsworkindependentlyandaspartofateam,andlearindependentlywithopenmindednessandcriticalenquirydemonstratetheabilitytmanagetime,prioriticworkloads,andutilizelong-anshort-termplanningskills.Psychomotor	 their: mathematical skills, computational analysis and problem solving. o o d 	 Laboratory tests Evaluate the information gathered by the students that are using information networks.
5.1	 13. Perform the experiments with high accuracy. 14. Operate instruments safely. 15. Draw the data and curves. 	- 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. Scl	nedule of Assessment Tasks for Students During the Semester		
	Assessment task (e.g. essay, test, group project, examination, speech,	Week Due	Proportion of Total
	oral presentation, etc.)		Assessment
1	Midterm 1	7 th week	10 %
2	Midterm 2	15 th week	10%
3	assay + discussion	1 st - 15 th week	10%
4	Homework + quizzes	During the	10%
		semester	
	Laboratory	15 th week	20
5	Final exam	End of semester	40 %
DC	tu dant A and annia Commandin a and Suma ant	i I	

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)

E. Learning Resources

•

1. List Required Textbooks

1- Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)

Michael G. Stabin" Radiation Protection and Dosimetry" 2007.Ch5. p-p, 67-74

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			التم المحلة التما	التوصية ٣٧	
Herman Cember	"Introduction to Health Physics" 1983, 2	003, 2009.Ch6. p-p, 135-	142.,Ch.10-p. 529.		
6. List Ess	ential References Materials (Journals, Re	ports, etc.).			
http://www.IAEA.cor	n				
http://ICRP.com					
http://NCRPcom					
http://ICRU.com					
http://UNSCAR.com					
http://ANSI.com					
http://WHO.com					
3. List Recommended	l Textbooks and Reference Material (Journa	ls, Reports, etc)			
			1 1	1 6	

F. Facilities Required

None

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.)
-The size of the room should be proportional to the number of students
- Provide enough seats for students.
- The number of student not exceed on 30 in the classroom
- Library
2. Computing resources (AV, data show, Smart Board, software, etc.)
-Hall is equipped with a computer.
- Provide overhead projectors and related items
-Smart board
Scientific calculator.
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)
None

G Course Evaluation and Improvement Processes
رقه	. <u>⊸</u> 121″V	الخطة الدراسية لبكالوريوس الغيزياء الطبية	رقه التخصص ٤٠٣٠١	يغية / قسم الغيزياء	كلية العلوم التطر
				الاسم يقلعوا عواذام	التوحية ٣٧
1 Strat	tegies for Obt	taining Student Feedback on Effectiveness of T	Feaching		
Studer	nt evaluation	electronically organized by the University.			
2 Oth	er Strategies	for Evaluation of Teaching by the Program/I	Department Instructor		
-Revis - Stude -The c	ion developm ent Assessme olleagues wh	ental internal and external. nt tests quarterly and final through questionn o teach the same course discuss together to ev	aires aluate their teaching		
3 Pro	cesses for Imp	provement of Teaching			
-To en - The : - Creat - Mate - Lectu - Cour - A tu	isure the teac new follow-up te the right at crial and mora ire developm se report, Pro torial lecture	hing aids course. p, which was linked to the course or effective v tmosphere for study. al incentives. ental audit, or workshop lesson model ogram report and Program self-study. must be added to this course.	vays of teaching.		
4. Pro	cesses for Ver	ifying Standards of Student Achievement (e.g	. check marking by an inde	ependent member te	aching staff
of a sa	mple of stude	ent work, periodic exchange and remarking of	tests or a sample of assign	ments with staff at a	nother
institu	tion)				
-The i	nstructors of	the course are checking together and put a un	ique process of evaluation.		
5 Desc	ribe the plan	ning arrangements for periodically reviewing	course effectiveness and p	lanning for improver	nent.
- Cons - Host - Wor - Reco -Stude Cours	ulting the oth ing a visiting kshops with p nsider the vo nt evaluation e report.	her professors scheduled. professor to evaluate the course. professor's course. cabulary scheduled every two years in order to	o cope with new developm	ents	
Progra	am report				

Date: 13 December 2015

Head of the Physics Department

Dr. Hatem Alamri

Kingdom of Saudi Arabia

The National Commission for Academic Accreditation & Assessment

COURSE SPECIFICATION

Course title Modern physics

Course code: 4033150-4

Revised 13 December 2015

كلية العلوم التطبيقية / مسم الغيزياء

ساعات الخطة ١٣٦ ۳V

Course Specification

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

Institution: Umm AL – Qura University

رقم التخصص ٤٠٣٠١

College/Department : College of Applied Sciences – Department of Physics

A Course Identification and General Information

Course title : Modern physics
Course code: 4-4033150
2. Credit hours: 4. (3 lecturer + 1 practical or lab.)
3. Program(s) in which the course is offered. : B.Sc Physics
8. Name of faculty member responsible for the course:
One of the academic staff member
5. Level/year at which this course is offered: 5 th level
6. Pre-requisites for this course (if any): General physics (2) 4032101-4
7. Co-requisites for this course (if any):
8. Location if not on main campus: Main campus
9. Mode of Instruction (mark all that apply)
a. traditional classroom What percentage?
b. blended (traditional and online) What percentage?
c. e-learning What percentage?

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رەم



B Objectives

For students undertaking this course, the aims are to:

1-acquire basics of the spatial theory of the relativity.

2-Acquire the basic of the radiation of black body and objects.

3-Calculate the phase and group velocities.

5-Describe atom structure (Atomic models, Alpha-particle scattering, The Rutherford scattering formula, Nuclear dimensions, Electron orbits, Atomic spectra, The Bohr atom, Energy levels and spectra, Nuclear Motion, Atomic excitation, The correspondence Principle).

6- acquire information about particles proprieties of waves

7- **List** the différents physics phenomena (The photoelectric effect, The quantum theory of light, X rays X-ray diffraction, The Compton effect, Pair production)

8- **describe** the UV catastrophe.

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

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

No of	Contact
Weeks	hours
Week	
(week 1)	3hrs
	No of Weeks Week (week 1)

			ساعات الخطة ١٣٦	٣
THE SPATIAL THEORY OF THE RELATIVITY (Einstein's postulate of relativity, relativity of the simultaneity, time dilatation, length contraction, Lorentz transformations, relativistic velocity transformations,)	Week (week 2)	3hrs		
THE SPATIAL THEORY OF THE RELATIVITY (relativistic mechanics, mass, energy, transformation of energy, momentum and force, Doppler effect, Relativistic collisions)	Week (week 3)	3hrs		
BLACK BODY RADIATION (radiation of heated objects, thermal radiation, cavity radiation treated with classical physics,)	Week (week 4)	3hrs		
BLACK BODY RADIATION (UV catastrophe, Planck's solution, quantum of energy)	Week (week 5)	3hrs		
PARTICLE PROPERTIES OF WAVES (The photoelectric effect, The quantum theory of light,)	Week (week 6)	3hrs		
First Periodic Exam	Week (week 7)	3hrs		
PARTICLE PROPERTIES OF WAVES (X rays X-ray diffraction, The Compton effect, Pair production, Gravitational red shift)	Week (week 8)			
WAVE PROPERTIES OF PARTICLES (De Broglie waves, Wave function, De Broglie wave velocity, Phase and group velocities,)	Week (week 9)	3hrs		
WAVE PROPERTIES OF PARTICLES (The diffraction of particles,)	Week (week 10)			

رقع

.<u>⊿</u> 121″V

الخطة الدراسية لبكالوريوس الغيزياء الطبية

كلية العلوم التطبيقية / قسم الفيزياء

التوصية

رقم التخصص ٤٠٣٠١

١٤٣٧ هـ رقم

كلية العلوم التطبيقية / متسم الفيزياء

التوحية ٣٧ ماغادها الخطة ١٣٦

Second examination	1 Week	
	(week 11)	3hrs
WAVE PROPERTIES OF PARTICLES (The uncertainty principle,	Week	
Applications of the uncertainty principle, The wave-particle duality)	(week 12)	
ATOMIC STRUCTRUE (Atomic models, Alpha-particle scattering, The	Week	
Rutherford scattering formula,)	(week 13)	3hrs
ATOMIC STRUCTRUE (Nuclear dimensions Electron orbits Atomic	Week	3hrs
spectra,)	(week 14)	51115
	Mask	
ATOMIC STRUCTRUE (Energy levels and spectra, Nuclear Motion, Atomic excitation, The correspondence Principle)	week (week 15)	
Final examination	Week	
	(week 16)	

2 Course components (total contact hours per semester):				
Lecture 36 (Credit Hrs)	Tutorial:	Practical/Fieldwork/Inte rnship:	Other: 12 hrs	

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)

رقم	رقو التخصص ٤٠٣٠١ الخطة الدراسية لبكالوريوس الغيزياء الطبية 1287 هـ
	4. Development of Learning Outcomes in Domains of Learning
For e	ach of the domains of learning shown below indicate:
•	A brief summary of the knowledge or skill the course is intended to develop;
•	A description of the teaching strategies to be used in the course to develop that knowledge or skill;
•	The methods of student assessment to be used in the course to evaluate learnin outcomes in the domain concerned.
d. I	nowledge : Description of the knowledge to be acquired
	Upon successful completion of this course The student will be able to
	- outline the adventages of relativity
	2- list the types of relativities
	3- define the inertial reference frame, Galilean relativity
	4- acquire basics of Einstein's postulate of relativity, relativity of the simultaneity, tim dilatation, length contraction, Lorentz transformation
	5- describe black body and UV catastroph
	6- list different model of atomic structure
7-	describe De Broglie waves, Wave function, De Broglie wave velocity, The diffraction of particle The uncertainty principle, Applications of the uncertainty principle, The wave-particle duali
(ii) 7	eaching strategies to be used to develop that knowledge
•	The methodology includes a combination of lectures by the lecturer, seminar presentation by the students and web-interactions. Students will be given opportunity to understand the role of important medical physics in different medical applications and human service.
•	At the end of the program, students will be divided into groups for seminar presentation on important areas of the course to assess their understanding and comprehension of the course
•	All students will be involved in on-line learning process and each student is required to create an E-mail address to facilitate student web interactions.
•	All students will be involved in on-line learning process and each student is required to create an E-mail address to facilitate student web interactions. Using images and movies Encouraging students to collect the new information about what the new in compute in medicine.

كلية العلوم التطبيقية / قسم الفيزياء

التروصية ٣٧

ساعاته الخطة ١٣٦

(iii) Methods of assessment of knowledge acquired: The assessment of these skills is implicit in all forms of assessment, but is not explicitly measured. The overall degree of success achieved by each student reflects the extent to which these skills have been acquired. The project work and growing in complexity as the student progresses, are assessed to explicitly measure the acquisition of the ability to handle experimental equipment, plan measurements in a logical fashion, analyse the results produced and communicate them through printed and verbal media. **b.** Cognitive Skills b1. estimate The uncertainty principle b2. Apply different physics idea in experimental Laboratory. (ii) Teaching strategies to be used to develop these cognitive skills: - Lectures -Brain storming -Discussion (iii) Methods of assessment of students cognitive skills - Exam must contain questions that can measure these skills. - Ouiz and exams - Discussions after the lecture c. Interpersonal Skills and Responsibility At the end of the course, the student will be able to: - work effectively in a group to make a decision. -Analyse obtained data and how to manage it. -make a certain decision fast especially during data acquisition. Teaching strategies to be used to develop these skills and abilities **(v)** - Lab work - Case Study

الخطة الدراسية لبكالوريوس الغيزياء الطبية

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رەم

- Active learning

رقه التخصص ٤٠٣٠١

كلية العلوم التطبيقية / قسم الغيزياء

الاسم الحطة الاسم

- Small group discussion

(iii) Methods for assessment of the students interpersonal skills and capacity to

رقع	- <u>-</u> 128V	الخطة الدراسية لبكالوريوس الغيزياء الطبية	رقم التهنصص ٤٠٣٠١	بيغية / قسم الغيزياء	كلية العلوم التط
				الاح قلخا منادله	التوحية ٣٧
carr	y responsibil	ity			
•	Evaluate th Evaluate th Evaluate th Evaluate th Evaluation o Evaluation o	ne efforts of each student in preparing the m ne scientific values of reports. ne work in team of the role of each student in lab group assignm of students presentations	report. Ient		
d. (Communicati	on, Information Technology and Num	erical Skills		
(iii) Descri course	ption of the skills to be developed in th , the student will be able to:	is domain. At the end of the		
5 6 7 8	 Enhancing Interpret im Use effective Know how to 	the ability of students to use computers ar age pre-processing data ely image processing package to enhance the ol o write a report.	nd internet. btained image.		
9). Teaching	strategies to be used to develop these sl	cills		
1 1 1	 Homework on web site Seminars p Field visits 	c (preparing a report on some topics relate es). presentation a to factories	ed to the course depending		
(i	ii) Methods	of assessment of students numerical an	d communication skills		
1 1 1	10. Evaluation11. Evaluation2. Practical ex	of presentations of reports :am			
e. P	sychomotor S	Skills (if applicable)			
1 1 1	 Perform the Operate inst Draw the da 	At the end of the co experiments with high accuracy. ruments safely. ta and curves.	ourse, the student will be able to		
(ii) '	Teaching stra	ategies to be used to develop these skills	S		
	- Follow up	the students in lab and during carryout all e	experimental work.		
1	8. Methods o	of assessment of students psychomotor	skills		
•	Practical exa Giving addi	am. itional marks for the results with high and	good accuracy		

كلية العلوم التطبيقية / محسم الهيزياء

التوحية ٣٧ مالاله الخطة ١٣٦

١٤٣٧ کے رقم

5. Schedule of Assessment Tasks for Students During the Semester

رقو التخصص ٤٠٣٠١

	Assessment task	Week Due	Proportion of Total
(e.g. essay, test, group project, examination, speech, oral presentation, etc.)			Assessment
1	Exercises & Home works+ quizzes	All weeks	5%
	Assay	15 th week	5%
2	Laboratory	All weeks	20 %
3	Written Test (1)	6 th week	10%
4	Written Test (2)	11 th week	10%
6	Final Exam (theoretical)	16 th week	50%

D. Student Support

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

Office hours: 10 hrs

E. Learning Resources

Required Text(s):
Recommended Reading List
Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)
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.). <u>McGraw-Hill</u>

التوحية ٣٧ ماغام الخطة ١٣٦

EI	ectronic Materials, Web Sites
(eg. Web Sites,	Social Media, Blackboard, etc.)
Other learning material such as computer-bas	ed programs/CD, professional
Other learning material such as computer-bas	ed programs/CD, professional standards/regulations
Other learning material such as computer-bas	ed programs/CD, professional standards/regulations

F. Facilities Required

Indica numbe	te requirements for the course including size of classrooms and laboratories (ie er of seats in classrooms and laboratories, extent of computer access etc.) 1. Accommodation (Lecture rooms, laboratories, 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.
	2. Computing resources
•	Providing class rooms with computers and labs with data show.
	3.Other resources (specifyeg. If specific laboratory equipment is required, list requirements or attach list)
•	Availability of some reference bacterial strains Availability different specific media and chemicals used for isolation.

G Course Evaluation and Improvement Processes

1. Strategies for Obtaining Student Feedback on Effectiveness of Teaching

Questionaries

رقع	🛋 18.3V	الخطة الدراسية لبكالوريوس الغيزياء الطبية	رقم التخصص ٤٠٣٠١	بيغية / قسم الغيزياء	لوم التط	كلية الع
				ساعاته الخطة ١٣٦	۳۷	التومية
•	Open disc	cussion in the class room at the end of the lect	ures			
	2. Other St	trategies for Evaluation of Teaching by the Ins	structor or by the Departmen	t		
•	Revision c Analysis tl	of student answer paper by another staff mem he grades of students.	ber.			
		3. Processes	for Improvement of Teaching	3		
•	Preparing Using scie Coupling Periodical	the course as PPT. entific movies. the theoretical part with laboratory part revision of course content.				
	4. Processe indepe	es for Verifying Standards of Student Achiever endent faculty member of a sample of student	nent (eg. check marking by ar t work, periodic exchange and	1 1		
•	After the	agreement of Department and Faculty adminis	strations	1		
5 D	escribe the	planning arrangements for periodically revie	wing course effectiveness and planning for improvement			
•	Periodical	revision by Quality Assurance Units in the Dep	partment and institution			

Date: 13 December 2015

Head of the Physics Department

Dr. Hatem Alamri



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

COURSE SPECIFICATION

Course title: Physics of Membranes and Macromolecules

Course code: 4033298-2

Revised 13 December 2015

1 4 74

كلية العلوم التطبيقية / قسم الفيزياء رقم التخص ٤٠٣٠١

لترودية ٣٧ سائات الحطة ١٣٦

Course Specification

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

Arrangements

Institution:- Umm AL-Qura University

College/Department :- College of Sciences / Physics Department

A Course Identification and General Information

1. Course title and code: 4033298 Physics of Membranes and Macromolecules
2. Credit hours: - 2 Cr.
3. Program(s) in which the course is offered. (If general elective available in many programs indicate this rather than list programs)
Medical physics
4. Name of faculty member responsible for the course Prof. Saud Allehyani
5. Level/year at which this course is offered
5 th level/Third year
6. Pre-requisites for this course (if any) 4013331-3 (Biology-Physiology)
7. Co-requisites for this course (if any) no-Co-requisite
8. Location if not on main campus :- Within the university campus
9. Mode of Instruction (mark all that apply)
a. Traditional clas $$ What percentage?
b. Blended (tradnd online) Wntage?

رقع	.▲ 1ETV	الخطة الدراسية لبكالوريوس الغيزياء الطبية	رقم التخصص ٤٠٣٠١	بيقية / قسم الفيزياء	كلية العلوم التط
				الام الحطة الالم	التوحية ٣٧
		c. e-learning d. Correspondence f. Other	What percentage? W nat perce ntage? Wntage?		
			Comments:		

لحظه الكراسية لركالوريوس الهيرياء الطرية		الطرية	س الغيزياء	لبكالوريود	دراسية	لخطة ال
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رقم التخصص ٤٠٣٠١

B Objectives

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 Summary of the main learning outcomes for students enrolled in the course. at the end of this course student should know:
1-study the biological molecules forming the cell membrane such as proteins, lipids and cholesterol and their attachment to each other to form a cell unit.
2-Differentiate between types of cell membrane models.
3- acquire the basics physics laws of macromolecules.
4- define how to identify the structure of macromolecules by using x-ray diffraction, spectrophotometery analysis, diffusion and centrifugation method.
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-In the last year we have developed this course by introducing new references.
2- Using the library to search on some topics and writing reports.
3- Introducing new lab instruments as centrifuge, RLC bridge to study the electrical properties of living cells .

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

1 Tc	pics to be (Covered :-
Topics	No of	Contact hours
Topics	weeks	
Membranes:	3W	9
Wendrates.		

<u>⊿</u> 1£۳V	٤٠ الخطة الدراسية لبكالوريوس الفيزياء الطبية	٣
	- Basic membrane propertie	s
	- Analyzing Transpor	t
	- Electrodiffusion	I
	- Active transport in Red Blood Cell	s
	- Membrane Model	s
	- Artificial Membrane	s
	- Preparation and properties	;
	- Thickness Determination	า
	- Energy Transduction Processe	s

رەم

		- Active transport in Red Blood Cells
		- Membrane Models
		- Artificial Membranes
		- Preparation and properties
6	2W	- Thickness Determination
		- Energy Transduction Processes
		Macromolecules:
6	2144	Random Motion in Large Molecule
0	2 VV	Instantaneous Velocity-average
		Energy-r.m.s. Distance-Degree of Freedom-Temperature
		DIFFUSION:
		Fick's Equations-of Diffusion
		Coefficient and Temperature
q	3\\/	Viscosity and Friction-Solution of
	5	Diffusion Equation in Solids
		Liquids method of Determining the
		Diffusion Coefficient-Diaphragm
		Method-Radio Active Sectioning Technique.
		CENTRIFUGAL FORCE:
		Equation of Molion-Separation of
		Macromolecule-Thermal Effect-
9	3W	Molecular Weight-Sedimentation Constant
		OPTICAL METHOD :
		Molecular Weight of Unknown Molecules.
		Polarisation-Biological Polymer- Protiens-Amino Acids Virsus
L	1	

لتوصية ٣٧ ماغارهم الحطة ١٣٦

Enzymes.		
Molecular Weight of Unknown	2W	6
"Aspects if biophysics" By: William Hughes		

2 Course components (tot	al contact hours per semes	ter):	
Lecture: 30 hr	Tutorial: 15 hr	Practical/Fieldwork/Inte rnship:	Other: (self-study) Office hours : 75 hr

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)

1 hr

4. Development of Learning Outcomes in Domains of Learning

For each of the domains of learning shown below indicate:

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

a. Knowledge

- (vi) Knowledge that students should know and understand when they complete the course is as follow:
 - 1- Gaining how to present data measurement graphically
 - 2- delaying with physics lab equipments
 - 3- understanding the concept of fundamental physics
- (vii) Teaching strategies to be used to develop that knowledge

The strategies used to develop the above knowledge are as follows:-

1-Lectures

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توحية ٣٧ ماغانه الخطة ١٣٦

2-, tutorials

3-Independent study assignments.

4- Introductory lecture

5- Existing knowledge. Linking the particular content of the presentation to the general overview.

(iii) Methods of assessment of knowledge acquired

By 15 minute multiple choice tests on content on completion of each topic with results carrying 20% of final assessment. Multiple choice knowledge items on final exam.

b. Cognitive Skills

(i) Cognitive skills to be developed

List the thinking and problem solving skills the course is intended to develop. As a guide it may be useful to begin with the phrase "The ability to…." Which include both the use of analytic and predictive formulae and conceptual tools, and the ability to identify and use ones that are appropriate for new and unanticipated problems.

(ii) Teaching strategies to be used to develop these cognitive skills

By given Explanations and examples in lectures and practiced under supervision in tutorials and laboratory tasks. Transfer of learning encouraged by use of analytical tools in different applications and through discussion of potential application in other areas. Assignment tasks include some open ended tasks designed to apply predictive, analytical and problem solving skills (Eg. What would happen if......?, How could......?)

(iii) Methods of assessment of students cognitive skills

By Problem solving questions carrying 50% of mark on tests given at the end of each topic and on end of semester examination. Group and individual assignments require application of analytical tools in problem solving task

c. Interpersonal Skills and Responsibility

(i) Description of the interpersonal skills and capacity to carry responsibility to be developed

Through out the course the student well have the capacity for self directed learning, and personal and social responsibility.

(ii) Teaching strategies to be used to develop these skills and abilities

One group assignment in which 25% of assessment is based on individuals contribution to the group task. (Instructor meets with each group part way through project to discuss and advise on approach to the task) Two individual assignments requiring investigation using internet and library resources as a means of developing self study skills. Role play exercise on controversial issue relevant to the course based on a case study, with discussion in tutorial of appropriate responses and consequences to individuals involved.

(iii) Methods of assessment of students interpersonal skills and capacity to carry responsibility
Assessment of group assignment includes component for individual contribution. Capacity for independent study assessed in individual assignments.
d. Communication, Information Technology and Numerical Skills
(i) Description of the skills to be developed in this domain.
1- Using internet to search for topics and writing reports
2- using some math program for some calculation
(ii) Teaching strategies to be used to develop these skills
Student assignments require good standards of use of ICT. Where standards are inadequate the student is referred for special remedial instruction. Student essay assignments require proper style and referencing format as specified in college style manual
(iii) Methods of assessment of students numerical and communication skills
Test questions require interpretation of simple statistical information. Assessments of students assignment and project work include expectation of adequate use of numerical and communication skills. Five percent of marks allocated for standard of presentation using ICT.
e. Psychomotor Skills (if applicable)
(i) Description of the psychomotor skills to be developed and the level of performance required
NA (Not Applicable)
(ii) Teaching strategies to be used to develop these skills
NA (Not Applicable)
(iii) Methods of assessment of students psychomotor skills
NA (Not Applicable)
5. Schedule of Assessment Tasks for Students During the Semester

الخطة الدراسية لبكالوريوس الغيزياء الطبية

🔺 12 TV

رقم

كلية العلوم التطبيقية / محسم الغيزياء

التوحية ٣٧

ساعاته الخطة ١٣٦

رقم التخصص ٤٠٣٠١

١٤٣٧ کے رقم

التوحية ٣٧ ماغامه الحطة ١٣٦

2	Examination	7	30%
3	Homework	1/w	10%
4	Final exam	17	50%
5			
6			
7			
8			

D. Student Support

 Arrangements for availability of faculty for individual student consultations and academic advice. (include amount of time faculty are 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.

E Learning Resources

1. Required Text(s)

Chapters 3,4,5,6,7,8 from Introduction to Health Physics

2. Essential References;

Herman Cember and Thomas E. Johnson "Introduction to Health Physics" FOURTH EDITION McGraw-Hill 2009

رقع	-A 128V	الخطة الدراسية لبكالوريوس الغيزياء الطبية	رقو التخصص ٤٠٣٠١	لبيټية / ټسو الڼيزياء	كلية العلوم التر
				الاتم الحطة التراس	التروحية ٣٧
				7	
		3- Recon	nmended Books and Reference	_	
		1-O.Glasser, "Medical physics	J.R. Cameron & J.Shofronick	¢	
		4Ele	ctronic Materials, Web Sites etc		
			IAEA, AAPN	1	
5- Othe	er learning m	naterial such as computer-based programs/CD, pro	fessional standards/regulations	5	
			NA	A	

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (ie number of seats in classrooms and laboratories, extent of computer access etc.)
1. Accommodation (Lecture rooms, laboratories, etc.)
new lab instruments as centrifuge, RLC bridge to study the electrical properties of living cells .
2. Computing resources
PC at Lecture rooms
3. Other resources (specifyeg. If specific laboratory equipment is required, list requirements or attach list)

G Course Evaluation and Improvement Processes

التوحية ٣٧ ما المال ما لما معالم ٣٧ التوحية	رقم	. <u>⊿</u> 12.‴V	الخطة الدراسية لبكالوريوس الغيزياء الطبية	رقم التخصص ٤٠٣٠١	بيغية / قسم الغيزياء	كلية العلوم التط
					الاسم على المحاط المحاط	التوصية ٣٧

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching
2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department
3 Processes for Improvement of Teaching
4. Processes for Verifying Standards of Student Achievement (eg. check marking by an independent faculty member of a sample of student work, periodic exchange and remarking of a sample of assignments with a faculty member in another institution)
5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

Date: 13 December 2015

Head of the Physics Department

Dr. Hatem Alamri

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الخطة الدراسية لبكالوريوس الغيزياء الطبية

رقه التحص ٤٠٣٠١

التوحية ٣٧ ماغام الخطة ١٣٦

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

COURSE SPECIFICATION

Course title: **HEALTH PHYSICS**

Course code: **4033283-3**

Revised 13 December 2015

رقم	12TV	الخطة الدراسية لبكالوريوس الغيزياء الطبية	رقم التخصص ٤٠٣٠١	لبيغية / قسم الغيزياء	كلية العلوم الت
				سائمان الخطة ١٣٦	التوحية ٣٧
			السعوديسة	المملكة العربية	
	Kingdor	n of Saudi Arabia	ة للتقويم	الهيئة الوطني	
	National Academ assessme	l Commission for ic Accreditation & ent	ــاديــمـــي	والاعتمساد الأك	

COURSE SPECIFICATIONS HEALTH PHYSICS , 4033283-3

Institution	Date of Report	
Umm AL-Qura University	Revised Safar 143	<mark>7 H</mark>
College/Department : Science /Physics		
A. Course Identification and General Inf	ormation	
1. Course title and code: Medical radiation ph	1ysics2 4-4034292	
2. Credit hours: <mark>3 Cr. (3)</mark>		
3. Program(s) in which the course is offered	1.	
(If general elective available in many progra	ams indicate this rather than lis	st programs)
Physics Department		
	4. N	ame of faculty member responsible for the course :
5. Level/year at which this course is offered	d : <mark>6 level / third year</mark>	
6. Pre-requisites for this course (if any): Ra	diation Medical Physics(1)/ C	Code: 4033285-4
7. Co-requisites for this course (if any): No-	Co-requisite	
8. Location if not on main campus <mark>: within t</mark>	he university campus	
9. Mode of Instruction (mark all that apply)	
a. Traditional classroom	What percentage?	
_		
b. Blended (traditional and online)	What percentage?	
c. e-learning	What percentage?	

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التوحية ٣٧ ساغات الخطة ١٣٦

Comments:

B Objectives (hyper link of Medical physics plan)

1. What is the main purpose for this course?

For students undertaking this course, the aims are to:

- 1-acquire the concepts of medical instrumentation
- 2-Study Various types of sensors and measurement apparatus used for the calibration of medical imaging and therapy
- 3-Acquire the Physical and biological aspects of the use of ionizing radiation in industrial and academic institutions
- 4-Describes the way of waste disposal
- 5- acquire the physical principles underlying shielding instrumentation,
- 6- List the difference between Tests & Accident (Chernobyl Accident , The Goiania Radiation Incident).
- 7- describe the biological effects of low levels of ionizing radiation Nuclear

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)

Add the following topics and reference

1-Cooperate with other educational institutions to find how they deal with the subject.

2- Re- new the course references frequently.

3-Frequently check the latest discovery in science to improve the course objectives.

4- Posting some course material on the websites to help the students.

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

التوحية ٣٧ ساعات الخطة ١٣٦

1 Topics to be Covered		
List of Topics	No of	Contact
	Weeks	hours
Concepts of medical instrumentation	(Week 1,2 and 3)	9 nrs
Various types of sensors and measurement apparatus used for	Week	6 hrs
the calibration of medical imaging and therapy	(Week 4 and 5)	
Concepts of transducers, and medical electronics design	Week	6 hrs
	(Week 6)	
First Periodic Exam	Week	3 hrs
	(Week 7)	
Middle Term Vacation	Week	3 hrs
	(Week 8)	
Physical aspects of the use of ionizing radiation	Week	3 hrs
	(Week 9)	
Biological aspects of the use of ionizing radiation	Week	3 hrs
	(Week 10)	
biological effects of low levels of ionizing radiation	Week	3 hrs
	(Week 11)	
physical principles underlying shielding instrumentation	Week	3 hrs
	(Week 12)	
Nuclear Tests	Week	3 hrs
	(Week13)	
	,	
Accident and incident (Chernobyl Accident The Golania	Week	3 hrs
Radiation Incident).	(Week 14)	

١٤٣٧ هـ رقم

الخطة الدراسية لبكالوريوس الغيزياء الطبية

رقو التخصص ٤٠٣٠١

كلية العلوم التطبيقية / مّسم الفيزياء

التوحية ٣٧ ماغاده النطق ٣٧

Second Periodic Exam .	(week)
	(week 15)
Final Semester Exam.	(week)
	(week 16))

2. Course components (total contact hours and credits per semester):								
	Credit		Contact Hours Self-Study				Other	Total
X	NCCCA	Lecture	Tutorial	Laboratory	Practical			
	3 ch	36		0	0	96	12	129

3. Additional private study/learning hours expected for students per week.	7h	

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

	NQF Learning Domains	Course Teaching	Course Assessment
	And Course Learning Outcomes	Strategies	Methods
1.0	a.Knowledge		

رقع	لدراسية لبكالوريوس الفيزياء الطبية العالم الالالا	الخطة اا	رقو التخصص ٤٠٣٠١	كلية العلوم التطبيقية / قسم الفيزياء
1.1	knowledge that students should know and understand. At the end of the programme the student should be able to: a1-Outline concepts of medical instrumentation a2- Acquire the various type of sensors and measurement apparatus used for the calibration of medical imaging and therapy a3- state Physical and biological aspects of the use of ionizing radiation a4 Acquire knowledge about Accident and incident		Brainstorming. Cooperative learning. Dialogue and discussion. Constructivist. Learning. Self-learning.	 Conducting scientific research and follow-up of advances in the field. Quarterly tests. By 15 minute multiple choice test on content on completion of each topic with results carrying 20% of final assessment. Duties and discussions within the lecture Multiple choice knowledge item on final xam.
2.0	Cognitive Skills B1. estimate physical parameters to design Shielding for X-ray room. B3. integrate information technology (IT) based solution into radiation dose measurements in environment and medicine.			
3.0	Interpersonal Skills & Responsibility			
3.1	 -c1-work in a group to conduct an experiment. c2write a short report in specific subject related to the course materials by using advanced information and communication tools . c3- write a report individually or in a team using the library and the internet 	Traini relatio counte others profes the foi	ing students to build good onships with their erparts and collaborate with and develop personal and ssional performance through llowing strategies: perative learning	Students are assessed through: • evaluation of field activities • verbal tests • assessment assignments • style note • Request solutions from each

٧ "اعا کھ الخطة الدراسية لبكالوريوس الغيزياء الطبية رقه التخصص ٤٠٣٠١ كلية العلوم التطبيقية / قسم الغيزياء رقم الاكم علكما معالاهم التوصية ٣٧ the correctness of their peer education group in front of students. c4appraise solution. interpret their results and • Enhance confidence in the same connect it to related areas of medical student and encourage dialogue physics. and discussion. 3.2-c5 justify the essential parts of a problem - Raise the spirit of cooperation - The final evaluation of the and formulate a strategy for solving the collective tasks and discusses among students. problem. their students. Communication, Information Technology, Numerical skills 4.0 4.1 Cooperative Discussing a group work sheets. illustrate _ numeracy and *learning(e.g:*Creating computational skills, including Discuses with them the results of working groups with peers such aspects as correct use of Xcomputations analysis and to collectively prepare: dose software and modes of data solving problems and search presentation. problem solutions. the internet for some topics). operate with basic software, such Give homework's to know how Self-learning to the global of as word processing, spread sheet the student understands the information networks use, and graphic programmes, Medical Physics labs. numerical skills. data-logging and storage. Simulation programs. Give them comments on some Hospital Training. Readymade programs. resulting numbers. Smart Board Power point Give the students tasks to measure • Written tests 4.2information illustrate and communications technology to act their: mathematical skills, Laboratory tests personal responsibly in and computational analysis and • Evaluate the information professional relationships. problem solving. work independently and as a part gathered by the students that learn of a team. and are using information networks. independently with open mindedness and critical enquiry. demonstrate the ability to manage time, priorities workloads, and utilize longand short-term planning skills. 5.0 **Psychomotor** Not applicable (NA) Not applicable Not applicable 5.1

5. Scł	5. Schedule of Assessment Tasks for Students During the Semester				
	Assessment task (e.g. essay, test, group project, examination, speech,	Week Due	Proportion of Total		

۱٤۳۷ کې رفت

الخطة الدراسية لبكالوريوس الغيزياء الطبية

رقه التخصص ٤٠٣٠١

كلية العلوم التطبيقية / قسم الفيزياء

لتوحية ٣٧ ماغامهم الحطة ١٣٦

	oral presentation, etc.)		Assessment
1	Midterm 1	7 th week	10 %
2	Midterm 2	15 th week	10%
3	assay + discussion	1^{st} - 15^{th} week	10%
4	Homework	During the	10%
		semester	
	Discussion and quizzes	1^{st} - 15^{th} week	10%
5	Final exam	End of semester	50 %

D. Student Academic Counseling and Support

 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--office hours per week in the lecturer schedule.
- 2- The contact with students by e-mail and website

E. Learning Resources

1. List Required Textbooks

1- Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)

1- Herman Cember and Thomas E. Johnson "introduction to Health Physics" 4th edi. McGraw-Hill 2009

2- Joseph Magill & Jean Galy "Radioactivity · Radionuclides · Radiation" Springer 2005

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

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

National Council on Radiation Protection and Measurements, Report 147, Structural Shielding Design for Medical X-Ray Imaging Facilities, NCRP, Bethesda, MD. 2004

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5. Other learning material such as computer-based programs/CD, professional standards or regulations and software. None

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.)

-The size of the room should be proportional to the number of students

- Provide enough seats for students.

- The number of student not exceed on 30 in the classroom

- Library

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

-Hall is equipped with a computer.

- Provide overhead projectors and related items

-Smart board

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

None

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching
Student evaluation electronically organized by the University.
2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor
-Revision developmental internal and external.
- Student Assessment tests quarterly and final through questionnaires
-The colleagues who teach the same course discuss together to evaluate their teaching
3 Processes for Improvement of Teaching
-To ensure the teaching aids course.
- The new follow-up, which was linked to the course or effective ways of teaching.
- Create the right atmosphere for study.
- Material and moral incentives.

- Lecture developmental audit, or workshop lesson model

- Course report, Program report and Program self-study.

- A tutorial lecture must be added to this course.

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

-The instructors of the course are checking together and put a unique process of evaluation.

رقم	. <u>▲</u> 12.17V	الخطة الدراسية لبكالوريوس الفيزياء الطبية	رقم التخصص ٤٠٣٠١	كلية العلوم التطبيقية / قسم الفيزياء			
				الاتا على الحالة الالم	التوحية ٣٧		
5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.							
- Cor	nsulting the o	ther professors scheduled.					
- Hosting a visiting professor to evaluate the course.							
- Workshops with professor's course.							
- Reconsider the vocabulary scheduled every two years in order to cope with new developments							
-Student evaluation.							
Cou	Course report.						
Prog	Program report						

Date: 13 December 2015

Head of the Physics Department

Dr. Hatem Alamri

Kingdom of Saudi Arabia National Commission for Academic Accreditation & Assessment



ة السعودية	ـة العربيـ	المملك
ة للتقويم	ة الوطنيـ	الهيئ
, کسادیسمسی	تماد الا	والاعـ

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

كلية العلوم التطبيقية / محسم الفيزياء

لترودية ٣٧ سانحانه الحطة ١٣٦

COURSE SPECIFICATION

Course title Medical radiation physics (2)

Course code: **4033292 - 4**

Revised 13 December 2015

Kingdom of Saudi Arabia

National Commission for Academic Accreditation & Assessment المملكة العربية السعودية

والاعتماد الأكاديمي

COURSE SPECIFICATIONS Medical radiation physics (2) 4034292-4

Institution		Date of Report	
	Umm AL-Qura University	Revised Safar 1437 H	
College/Dep	partment : Science /Physics		

A. Course Identification and General Information

1. Course title and code: Medical radiation physics2 4-4033292

2. Credit hours: 4. (3 lecturer + 1 practical or lab.)

3. Program(s) in which the course is offered.

(If general elective available in many programs indicate this rather than list programs)

Physics Department

4. Name of faculty member responsible for the course :

5. Level/year at which this course is offered :6th level /3rd year

١٤٣٧ هـ رقم	الخطة الدراسية لبكالوريوس الغيزياء الطبية		رقم التخصص ٤٠٣٠١	لبيغية / مُسم الغيزياء	كلية العلوم الت		
				سائما بعد الخطق ١٣٦	التوحية ٣٧		
6. Pre-requisites for this course (if any): Radiation Medical Physics (1) / Code: 4033285-4							
7. Co-requisites for this course (if any): No-Co-requisite							
8. Location if not on ma	ain campus <mark>: within th</mark>	<mark>e university campus</mark>					
9. Mode of Instruction	(mark all that apply)						
a. Traditional classro	om	What percentage?					
b. Blended (tradition	al and online)	What percentage?					
c. e-learning		What percentage?					
d. Correspondence		What percentage?					
Comments:							

B Objectives (hyper link of Medical physics plan)

For students undertaking this course, the aims are to:

1-acquire basics of exposures by cosmic radiation and cosmogenic radionuclides, origin and kinds of cosmic radiation, exposures by cosmic radiations and, terrestrial radiations

2-Acquire the basic of the radiation pprotection quantities and units, and operational quantities.

3-**Calculate** the entrance skin dose for patients undergoing diagnostic X-ray machines using Cal dose software and a mathematical calculations

5-Describe types of phantoms of the human body

6- acquire information about occupational exposures and Environmental source geometries

- 7- List the différents route of radionucléides intime
- 8-Calculate the internal dose using Médical Interna Radiation Dose, MIRD method.
- 9- acquire procedure of direct measurement of internal dosimetry
- 10- describe the methods for decontamination

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)

15. Explain strategy of the course in the beginning of the semester
V۳21 کے رقم

التوحية ٣٧ ماغانه الخطة ١٣٦

16. Outlines of the introduction for radiation physical laws, principles and the associated proofs.

17. Highlighting the radiation experiments corresponding to a theoretical subject.

18. Encourage the students to see more details in the international web sites and reference books in the library.

19. Discussing some selected problems in each chapter.

20. Cooperate with different institution to find how they deal with the subject

21. Renew the course references frequently

10- Development of radiation physics laboratory

11- Joining between the theoretical and industrial applications

Frequently check for the latest discovery in science

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

1 Topics to be Covered		
List of Topics	No of	Contact
		hours
	Weeks	
	Week	
Exposures from natural and man-made radiation sources	(week 1)	3hrs
Exposures by cosmic radiation and cosmogenic radionuclides		
Origin and kinds of cosmic radiation		
Exposures by cosmic radiations	Week	
Terrestrial radiation	(week 2)	
External exposures		3hrs
Internal exposures	Week	
	(week 3)	3hrs
	Week	
	(week A)	
Protection quantities	(Week 4)	2 h na
Operational Quantities		SULS

٧٣٦٢ هـ رقم

التوحية ٣٧ ساعاته الخطة ١٣٦

Dosimetric models(week 5)3hrsModels and phantoms of the human body Idealized geometries representing occupational exposuresImage: Comparison of the human body Image: Comparison of the human body Idealized geometries representing occupational exposuresImage: Comparison of the human body Image: Comparison of the human body Idealized geometries representing occupational exposuresImage: Comparison of the human body Image: Comparison of the human body Idealized geometries representing occupational exposuresImage: Comparison of the human body Image: Comparison of th
Models and phantoms of the human body Idealized geometries representing occupational exposures Idealized geometries representing occupational exposures Idealized geometries representing occupational exposures Week Week Environmental source geometries (week 6) 3hrs Methods of calculating protection quantities in computational models Idealized geometries Idealized geometries
Idealized geometries representing occupational exposures Idealized geometries representing occupational exposures Week Week Environmental source geometries (week 6) Methods of calculating protection quantities in computational models 3hrs
Week (week 6) 3hrs Methods of calculating protection quantities in computational models 0 0
Image: Week Week Environmental source geometries (week 6) Methods of calculating protection quantities in computational models 3hrs
Environmental source geometries (week 6) 3hrs Methods of calculating protection quantities in computational models
Environmental source geometries (week b) 3hrs Methods of calculating protection quantities in computational models (week b) 3hrs
Methods of calculating protection quantities in computational models
Occupational exposure and Environmental exposure
First Periodic Exam Week
(week 7) 3hrs
Medical Term Vacation Week
(week 8)
Absorption through intact skin , Systemic behaviour of radionuclides, Week
Excretion (week 9) 3hrs
- Internal dosimetry of radionuclides Week
(week 10)
Biokinetics of radionuclides in the body, Inhalation, Ingestion Week
, Embryo and foetus, Transfer in maternal milk (week 11) 3hrs
Dose rate per unit estivity. S. fester
Dose rate per unit activity, S-factor (week 12)
MIRD Method for internal docimetry
WIRD Method for Internal dostinetry
Methods of individual monitoring
week 311's
Decontamination (week 14)

١٤٣٧ هـ رقم

الخطة الدراسية لبكالوريوس الغيزياء الطبية

كلية العلوم التطبيقية / قسم الفيزياء

التوحية ٣٧ ماعات الخطة ١٣٦

Second examination 1	Week
	(week 15)
Final examination	Week
	(week 16)

2. Course components (total contact hours and credits per semester):								
	Credit			Co	ontact Hours	Self-Study	Other	Total
X	NCCCA	Lecture	Tutorial	Laboratory	Practical			
	4 ch	41		39	0	90	12	208

3. Additional private study/learning hours expected for students per week.	8 h	

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy ١٤٣٧ هـ رەم

الخطة الدراسية لبكالوريوس الغيزياء الطبية

رقم التخصص ٤٠٣٠١

كلية العلوم التطبيقية / قسم الفيزياء

التوحية ٣٧ ساغات الخطة ١٣٦

	NQF Learning Domains	Course Teaching	Course Assessment
	And Course Learning Outcomes	Strategies	Methods
1.0	Knowledge		
1.1	 knowledge that students should know and understand. At the end of the programme the student should be able to: 1- outline the sources if natural background radiation. 2- list the types of exposures from natural and man-made radiation sources 3- define the external and internal exposure s . 4- acquire basics of exposures by cosmic radiation and cosmogenic radionuclides , origin and kinds of cosmic radiation , exposures by cosmic radiations , terrestrial radiation and external exposures 5- state radiation protection quantities and units,. 6- describe different types of phantoms. 7- list the differents route of radionuclides intake and deposition percentage respiratory tract system. 8- name the basics of medical internal radiation dosimetry in nuclear medicine 10- describe a way of contamination and decontamination 	 Brainstorming. Cooperative learning. Dialogue and discussion. Constructivist. Learning. Self-learning. 	 Conducting scientific research and follow-up of advances in the field. Quarterly tests. By 15 minute multiple choice test on content on completion of each topic with results carrying 20% of final assessment. Duties and discussions within the lecture Multiple choice knowledge item on final exam.
1.2	- state acute radiation syndrom		
2.0	Cognitive Skills		
2.1	 b1. estimate the internal effective dosses for organs in nuclear medicine and related fields of studies b2. justify the mathematical expressions in 		

رقع	لحراسية لبكالوريوس الفيزياء الطبية ١٤٣٧ ه	رقو التخصص ٤٠٣٠١ الخطة اا	كلية العلوم التطبيقية / قسم الغيزياء التوحية ٣٧ ما عامه الدحة ١٣٦
	 calculating the external and internal doses due to external and internal exposure. B3. integrate information technology (IT) based solution into radiation dose measurements in environment and medicine 		
3.0	Interpersonal Skills & Responsibility		
3.1	 -work in a group to conduct an experiment. -write a short report in specific subject related to the course materials by using advanced information and communication tools . - write a report individually or in a team using the library and the internet - appraise the correctness of their solution, interpret their results and connect it to related areas of medical physics. 	Training students to build good relationships with their counterparts and collaborate with others and develop personal and professional performance through the following strategies: • cooperative learning • peer education • Enhance confidence in the same student and encourage dialogue and discussion.	 Students are assessed through: evaluation of field activities verbal tests assessment assignments style note Request solutions from each group in front of students.
3.2	- justify the essential parts of a problem and formulate a strategy for solving the problem.	- Raise the spirit of cooperation among students.	- The final evaluation of the collective tasks and discusses their students.
4.0	Communication, Information Technology	r, Numerical skills	
4.1	 illustrate numeracy and computational skills, including such aspects as correct use of X-dose software and modes of data presentation. operate with basic software, such as word processing, spread sheet use, and graphic programmes, data-logging and storage. 	 Cooperative learning(e.g:Creating working groups with peers to collectively prepare: solving problems and search the internet for some topics). Self-learning to the global of information networks Medical Physics labs. Simulation programs. Hospital Training. Readymade programs. Smart Board Power point 	Discussing a group work sheets. Discuses with them the results of computations analysis and problem solutions. Give homework's to know how the student understands the numerical skills. Give them comments on some resulting numbers.

رقم	▲ 12.WV	دراسية لبكالوريوس الغيزياء الطبية	رقم التخصص ٤٠٣٠١ الخطة ال	كلية العلوم التطبيقية / قسم الفيزياء
				التوحية ٣٧ ما ما من الحملة ١٣٦
4.2	 illustraticommunication communication responsing profession work in of a independent i	e information and nications technology to act bly in personal and onal relationships. dependently and as a part team, and learn dently with open - ness and critical enquiry. rate the ability to manage riorities workloads, and long- and short-term g skills.	Give the students tasks to measure their: mathematical skills, computational analysis and problem solving.	 Written tests Laboratory tests Evaluate the information gathered by the students that are using information networks.
5.0	Psychomoto	r		
5.1	19. Perform t accuracy. 20. Operate i 21. Draw the	he experiments with high nstruments safely. data and curves.	- 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. Schedule of Assessment Tasks for Students During the Semester				
	Assessment task (e.g. essay, test, group project, examination, speech,	Week Due	Proportion of Total	
	oral presentation, etc.)		Assessment	
1	Midterm 1	7 th week	10 %	
2	Midterm 2	15 th week	10%	
3	assay + discussion	1^{st} - 15^{th} week	10%	
4	Homework + quizzes	During the	10%	
		semester		
	Laboratory	15 th week	20	
5	Final exam	End of semester	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)

E. Learning Resources

1. List Required Textbooks

رقم	. <u>▲</u> 12.87V	الخطة الدراسية لبكالوريوس الفيزياء الطبية	رقو التخصص ٤٠٣٠١	داينيغا متع / قيتيبا التعاميم المحلة التعام	كلية العلوم التط التوحية ٣٧
1- Rec	commended Bo	oks and Reference Material (Journals, Reports, etc) (Attach List)		
H.Ce	mber " introd	uction to health physics: 4 th edition, 2009			
<mark>John</mark>	1988 <mark>2-John</mark>	R. Cameron & James G. Skofronick "Medical ph	nysics" Willy		
3. Sin 4 R	mon Cherry, adiation physi	Michael E. Phelps "Physics in Nuclear Mec cs for medical physicists Ervin B. Podgorsak Spri	licine" 3rd add," Saunder nger 2006.	s 2003	
2. Lis	st Essential Re	eferences Materials (Journals, Reports, etc.).			
3. Lis	st Recommenc	led Textbooks and Reference Material (Journals	s, Reports, etc)		
5. Ot	ther learning	material such as computer-based programs/	CD, professional standard	s or regulations ar	nd 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.)

-The size of the room should be proportional to the number of students

- Provide enough seats for students.

- The number of student not exceed on 30 in the classroom

- Library

None

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

-Hall is equipped with a computer.

- Provide overhead projectors and related items

-Smart board

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

None

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching

Student evaluation electronically organized by the University.

2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor

-Revision developmental internal and external.

٧ "١٤ هـ الخطة الدراسية لبكالوريوس الغيزياء الطبية رقو التحص ٤٠٣٠١ كلية العلوم التطبيقية / قسم الغيزياء رەم ساعات الخطة ١٣٦ التوصية ٣٧ - Student Assessment tests quarterly and final through questionnaires -The colleagues who teach the same course discuss together to evaluate their teaching 3 Processes for Improvement of Teaching -To ensure the teaching aids course. - The new follow-up, which was linked to the course or effective ways of teaching. - Create the right atmosphere for study. - Material and moral incentives. - Lecture developmental audit, or workshop lesson model - Course report, Program report and Program self-study. - A tutorial lecture must be added to this course. 4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution) -The instructors of the course are checking together and put a unique process of evaluation. 5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement. - Consulting the other professors scheduled. - Hosting a visiting professor to evaluate the course. - Workshops with professor's course. - Reconsider the vocabulary scheduled every two years in order to cope with new developments -Student evaluation. Course report. Program report

Date: 13 December 2015

Head of the Physics Department

Dr. Hatem Alamri

التوحية ٣٧ ماعاده الدكة

Kingdom of Saudi Arabia

The National Commission for Academic Accreditation & Assessment

COURSE SPECIFICATION

Course title Computer Applications in Medical Physics

Course code: 4034291-2

Revised 2015

كلية العلوم التطبيقية / قسم الفيزياء رقم التخصص ٤٠٣٠١

التوحية ٣٧ ماغابه الخطة ٣٧

Course Specification

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

Institution: Umm AL – Qura University

College/Department : College of Applied Sciences – Department of Physics

A Course Identification and General Information

7.	Course title Computer Applications in Medical Physics
8.	Course code: 4034291-2
	2. Credit hours: <mark>(1 + 1 Lab)</mark>
	3. Program(s) in which the course is offered. : B.Sc Medical Physics
9.	Name of faculty member responsible for the course: Dr. Hosam Salaheldin Mohamed Ibrahim
	5. Level/year at which this course is offered: 4 th Year / Level 7
	6. Pre-requisites for this course (if any): 4033292-4 medical radiation physics2
	7. Co-requisites for this course (if any): 8. Location if not on main campus: Main campus
	9. Mode of Instruction (mark all that apply)
	a. Traditional clas $$ What percentage?
	b. Blended (tradnd online) Wntage?

رقع	12TV	الخطة الدراسية لبكالوريوس الغيزياء الطبية	رقع التخصص ٤٠٣٠١	كلية العلوم التطبيقية / قسم الفيزياء
				التوحية ٣٧ ماماها المحلة ١٣٦
		c. e-learning	What percentage	
		d. Correspondence	W nat perce ntage	
		f. Other	Wntage:	
			Comments	:

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لتروحية ٣٧ مانحات الخطة ١٣٦

B Objectives

After completing this course student should be able to:

- 1. Define Storage and transfer of data in computers number
- 2. Explain uses Computer in Imaging Nuclear Medicine.
- 3. Describe Display, Conversion of a Digital Image into an Analog Video Signal.
- 4. List different uses of Information & Communication Technologies (ICT) and medicine and computer in Medicine.
- 5. Explain different types of image filtering.

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

Medical imaging is a vast field that deals with the techniques to create images of the human body for medical purposes. Many of the modern methods of scanning and imaging are largely based on the computer technology. Magnetic resonance imaging employs computer software. Computed tomography makes use of digital geometry processing techniques to obtain 3-D images. Sophisticated computers and infrared cameras are used for obtaining high-resolution images. Computers are widely used for the generation of 3-D images in medicine.

1 Topics to be Covered		
Торіс	No of	Contact
	Weeks	hours
Chapter 1		
Computer Digital and Analog Basics		
1.1 Storage and transfer of data in computers number systems		
1.2 Decimal form (Base 10)		
1.3 Binary form		
1.4 Conversions between decimal and binary forms1.5 Digital Representation of Data Bits, Bytes, and Words	1	2 hrs
1.6 Digital Representation of Different Types of Data		
1.7 Storage of Positive Integers		

٤٠٣ الخطة الدراسية لبكالوريوس الغيزياء الطبية ١٤٣٧ هـ رقع	م التخصص ١	رق	يغية / قسم الغيزياء	كلية العلوم التطبي
			الام الحاد المعادات	التروحية ٣٧
1.8 Binary Representation of Signed Integers				
1.9 Analog Data And Conversion Between Analog and Digital Forms	2	2 hrs		
1.10 Advantages and Disadvantages of the Analog and Digital Forms				
Solved problems				
Quiz 1				
Quiz 2				
Chapter 2	3	2 hrs		
2.1 Computer in Imaging Nuclear Medicine				
2.2 Pulse-Height Analyzer				
2.3 Digital Image Formats in Nuclear Medicine				
2.4 Nuclear medicine computers are used for:				
(1) The Data Acquisition,				
(2) Data Storage.				
(3) Processing of Data.				
2.5 Formation of digital images.				
	4	2 hrs		
	5	2 hrs		
		2 111 5		
	E) has		
	U U	2 115		
			_	
First Midterm Exam	7	2 hrs		
2.6 Display, Conversion of a Digital Image into an Analog Video Signal.				
2.7 Grayscale Cathode Ray Tube Monitors.	8	2 hrs		

٤٠٣٠ الخطة الدراسية لبكالوريوس الفيزياء الطبية ١٤٣٧ هـ رقم	نو التحص ۱	ر ن	بيقية / قسم الفيزيا:	كلية العلوم التط
		11	سائحا بر الخطق ٦	التوصية ۳۷
2.8 Image Acquisition in Nuclear Medicine.				
Frame Mode (Static, dynamic, gated).				
2.9 List-mode acquisition.				
2.10 The advantage of list-mode acquisition.				
2.11 The disadvantage of list-mode acquisition.	9	2 hrs		
Solved problems.				
Quiz 1				
Chapter 3			-	
Information & Communication Technologies (ICT) and medicine				
3. 1-Patient records	10	2 hrs		
3. 2-Medical equipments				
3. 3-Research				
3.4-Web-based diagnosis	11	2 hrs		
3. 5-Expert systems				
3.6-Communications				
3.7 Computers and the disabled				
Chapter 4				
Digital Image Processing				
4.1 Function of Image Processing				
4.2 General Areas of Image Processing				
4.3 Clipping				
I-Point Operations	12	2 hrs		
II-Look-Up Table (LUT)				
4.4 Contrast Point Operation				
4.5 Image Processing in Nuclear Medicine				
Brightness of Image				
Image Contrast				
		1	1	

رقم	<u>→</u> 12.‴V	الخطة الدراسية لبكالوريوس الفيزياء الطبية	٤•٣•١	قو التخصص)	بيغية / قسو الغيزياء	كلية العلوم التطر
					11	المعادية الملحة الم	التوصية ٣٧
		Image Contrast Diffe	rences				
		4.6 Histo	grams				
		Image Hist	ogram				
		4.7 Region or ROI (region of int	terest)	13	2 hrs		
		4.8 Image Histogram Oper	ations				
• Hi • Hi • Hi • O	istogram Str istogram Slic istogram equ Other Histog	etching ling Jalization gram Information					
4.9 Local Convolut • (1	l Operation tion ((kerne l) Low Pass	as el) : Filter					
• (2	2) High Pas	s Filter					
		4.10 Smoothing	Filters	14	2 hrc		
		(1) Linear Smoothing	Filters	74	21113		
		(a) Mean Or Average	Filter				
		(b)Gaussian Smoothed	l Filter				
		(2) Non-linear Smoothing	Filters				
		(a) Mediar	n Filter				
		4.11 Enhance	Filters				
		A-Edge enhanc	ement				
		B-Edge det	ection				
• (a • (b • (c) • (d	a) Directiona) Laplacian E) Sobel Edge I) Prewitt Edg	l Edge Detection Edge Detection Detection ge Detection					
		Revision					

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•/		

التا يحكم الخطة الت

Second Midterm Exam			15	2 hrs
2 Course components (total	contact hours per semester	r):		
Lecture: 15 (Credit Hrs)	Tutorial:	Practical/Fieldwork/Inte rnship:	Other: 30 hrs	5

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)

4. Development of Learning Outcomes in Domains of Learning

For each of the domains of learning shown below indicate:

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

Knowledge : Description of the knowledge to be acquired e.

Upon successful completion of this course The student will be able to:

- 1. Identify Storage and transfer of data in computers number systems
- 2. Describe Decimal form (Base 10)
- 3. Binary form
- 4. Identify the Conversions between decimal and binary forms
- 5. List Digital Representation of Data Bits, Bytes, and Words
- 6. State Digital Representation of Different Types of Data
- 7. Describe Storage of Positive Integers
- 8. Identify Binary Representation of Signed Integers
- 9. Describe Analog Data And Conversion Between Analog and Digital Forms
- 10. list Advantages and Disadvantages of the Analog and Digital Forms.

١٤٣٧ هـ رەم

التوحية ٣٧ ساعات الحطة ١٣٦

(ii) Teaching strategies to be used to develop that knowledge
 The methodology includes a combination of lectures by the lecturer, seminar presentation by the students and web-interactions. Students will be given opportunity to understand the role of important microorganisms in different applications and human service. At the end of the program, students will be divided into groups for seminar presentation on important areas of the course to assess their understanding and comprehension of the course. All students will be involved in on-line learning process and each student is required to create an E-mail address to facilitate student web interactions. Using images and movies Encouraging students to collect the new information about what the new in compute in medicine. Enable the reference books and scientific sites concerning bacteriology in internet.
 (iii) Methods of assessment of knowledge acquired The assessment of these skills is implicit in all forms of assessment, but is not explicitly measured. The overall degree of success achieved by each student reflect the extent to which these skills have been acquired. The project work and growing complexity as the student progresses, are assessed to explicitly measure thacquisition of the ability to handle experimental equipment, plan measurements in logical fashion, analyse the results produced and communicate them through printer and verbal media.
b. Cognitive Skills
 (i) Cognitive skills to be developed Having successfully completed the course students should be able to: 1. Diagram General Areas of Image Processing. 2. Differentiate between Clipping, Point Operations and Look-Up Table (LUT). 3. Evaluate Image Processing in Nuclear Medicine. 4. Differentiate between Histogram Stretching, Histogram Sliding, Histogram equalization, Other Histogram Information. 5. Analyse low pass filter and high pass filter. 6. Explain linear smoothing filters and non-linear smoothing filters. 7. Interpret the effect of Directional Edge Detection, Laplacian Edge Detection, Sobel Edge Detection and Prewitt Edge Detection on image details.
(ii) Teaching strategies to be used to develop these cognitive skills:
- Lectures -Brain storming -Discussion
(iii) Methods of assessment of students cognitive skills

التوحية ٣٧ ساعات الحطة ١٣٦

c. Interpersonal Skills and Responsibility	
At the end of the course, the student will be ab - work effectively in a group to make a decision.	le to:
-Analyse obtained data and how to manage it.	
-make a certain decision fast especially during data acquisition.	
(vi) Teaching strategies to be used to develop these skills and abilities	
- Lab work	
- Case Study	
- Active learning	
- Small group discussion	
 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 	
d. Communication, Information Technology and Numerical Skills	
(iv) Description of the skills to be developed in this domain. At the end of course, the student will be able to:	the
10. Enhancing the ability of students to use computers and internet.	
11. Interpret image pre-processing data	
12. Use effectively image processing package to enhance the obtained image.	
13. Know how to write a report.	
14. Teaching strategies to be used to develop these skills	
19. Homework (preparing a report on some topics related to the course dependit on web sites).	ıg
20. Seminars presentation	
21. Field visits to factories	

رقه		الخطة الدراسية لبكالوريوس الفيزياء الطبية	رقم التخصص ٤٠٣٠١	لبيقية / قسم الفيزياء	كلية العلوم التر
				ساغابهم الخطة ١٣٦	التوحية ٣٧
	(iii) Methods13. Evaluation14. Evaluation	s of assessment of students numerical an n of presentations n of reports	nd communication skills		
	15. Practical e	xam		_	
e. 22. 23. 24.	Psychomotor Perform the ex Operate instru Draw the data	Skills (if applicable) At the end of the c periments with high accuracy. ments safely. and curves.	ourse, the student will be able to	:	
(ii)	Teaching stu	rategies to be used to develop these skill	s		
	- Follow up stu	dents the students in lab and during carryou	it all microbiological techniques		
	22. Methods	of assessment of students psychomotor	skills		
	• Giving add seminar p	litional marks for preparing correct media, resentation	, bacterial slides , good		
	• Practical ex	xam.			

	5. Schedule of A	ssessment Tasks for	Students During the Semester
	Assessment task	Week Due	Proportion of Total
	(e.g. essay, test, group project, examination, speech, oral presentation, etc.)		Assessment
1	Exercises & Home works	All weeks	5 %
2	Participation	All weeks	5 %
3	Written Test (1)	6 th week	15%
4	Written Test (2)	11 th week	15%
5	Assay	15 th week	10%
6	Final Exam (theoretical)	16 th week	50%

D. Student Support

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

Office hours: 10 hrs

E. Learning Resources

Required Text(s):
1- Irene Joos Introduction to Computers for Healthcare Professionals Jones & Bartlett Publishers 2005.
2- William R. Hendee & E. Russell Ritenour"Medical imaging physics" Wiley 2002
Recommended Reading List
Electronic Materials, Web Sites
(eg. Web Sites, Social Media, Blackboard, etc.)
Other learning material such as computer-based programs/CD, professional
standards/regulations
• PPT prepared by Associate prof. Dr. Khaled Elbanna

F. Facilities Required

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

رقه	. <u>▲</u> 12.‴V	الخطة الدراسية لبكالوريوس الغيزياء الطبية	رقم التخصص ٤٠٣٠١	بقية / قسم الفيزياء	كلية العلوم التطب
				الاتل يقلعا معالات	التوحية ٣٧
		1. Accommodation (Lect	ure rooms, laboratories, etc.	.)	
•	Class room The area c and air cor	n is already provided with data show of class room is suitable concerning the numl nditioned.	ber of enrolled students (68 2. Computing resource	3) !S	
•	Providing (class rooms with computers and labs with data	a show.		
	3.Otł	ner resources (specifyeg. If specific laborato	ry equipment is required, lis requirements or attach list)	5t)	
•	Availability Availability	 of some reference bacterial strains different specific media and chemicals used f 	or isolation.		

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.
•	Coupling the theoretical part with laboratory part
•	Periodical revision of course content.
	4. Processes for Verifying Standards of Student Achievement (eg. check marking by an
	independent faculty member of a sample of student work, periodic exchange and
	remarking of a sample of assignments with a faculty member in another institution)
•	After the agreement of Department and Eaculty administrations
•	Atter the appearance of Department and Faculty duministrations
5 De	escribe the planning arrangements for periodically reviewing course effectiveness and
	planning for improvement.

رقم	.▲ 128°V	الخطة الدراسية لبكالوريوس الفيزياء الطبية	رقع التخصص ٤٠٣٠١	قية / قسم الغيزياء 11-1-1 مالد الا 17	كلية العلوم التطبير التهرية ٣٧٧
				سائمان <i>ہ</i> الخطق ۱۳٦	التوحية ٣٧
	Doriodical	rovision by Quality Assurance Units in the Den	partment and institution		
	Periodical	revision by Quality Assurance Onits in the Dep			
				Date: 13 D	ecember 2015

Head of the Physics Department

Dr. Hatem Alamri

Kingdom of Saudi Arabia

The National Commission for Academic Accreditation & Assessment

COURSE SPECIFICATION

Course title Quantum Mechanics (1)

Course code: 4033145-4

رقم	<u></u> − 1Σ۳V	الخطة الدراسية لبكالوريوس الغيزياء الطبية	رقم التخصص ٤٠٣٠١	تطبيغية / قسم الغيزياء	كلية العلوم الز
				الاسم عليما معادله	التوحية ٣٧

Revised 13 December 2015

كلية العلوم التطبيقية / قسم الفيزياء رقم التخصص ٤٠٣٠١

التوحية ٣٧ ماغام الحطة ٣٧

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

Institution: Umm Al-Qura University

College/Department: Faculty of Applied Science – Department of Physics

A Course Identification and General Information

10. Course title: Quantum Mechanics (1)
11. Course code: 4033145-4
2. Credit hours: 4 hrs
3. Program(s) in which the course is offered.: BSc Physics
4.Name of faculty member responsible for the course:
One of the academic staff member
5. Level/year at which this course is offered: 3 rd Year / 5 th Level
6. Pre-requisites for this course (if any): Theoretical Methods in Physics (1) (4032141-4)
7. Co-requisites for this course (if any):
8. Location if not on main campus: Main campus
9. Mode of Instruction (mark all that apply)
a. traditional classroom What percentage?
b. blended (traditional and online) What percentage?
c. e-learning What percentage?



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B Objectives

After completing this course student should be able to:

The quantum mechanics (1) start with the reasons and natural phenomena that have led to the emergence of quantum mechanics; this is done by highlighting the difficulty of the classic mechanics to explain many phenomena that indicate duality of the particle and wave. In order for the student to understand these phenomena we discussed

- Radiation- Planck's law, photoelectric effect, Compton effect, Wave Nature of matter, De Broglie waves, diffraction of matter waves.
- Expectation values, principle of superposition; Quantum mechanical operators: Three important quantum mechanical operators, eigenfunctions and eigenvalues, properties of operators, measurability of different observables at equal times, Heisenberg's uncertainty principle, angular momentum operator.
- 3. Kinetic energy, total energy, bra and ket notation, Schrodinger equation, Postulates, formulation, properties of stationary states.
- 4. Solution of Schrodinger Equation, free particle, harmonic oscillator, particle in a box, constants of motion, conservation laws, Hydrogen atom, Wavefunctions, hydrogen atom spectrum.
- 5. The eigenstates of Spin 1/2, addition of two spins, the addition of spin 1/2 and orbital angular momentum, and general rules for addition of angular momenta.
- 6. Matrix representation of angular momentum operators, and general relations in matrix mechanics.

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

1 Topics to be Covered

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التوحية ٣٧ ساعات الحطة ٣٧

Торіс	No of	Contact
	Weeks	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

رقم	<u></u> 1επν	الخطة الدراسية لبكالوريوس الغيزياء الطبية	٤•٣•١	التخصص	رقم	يغية / قسم الغيزياء	بة العلوم التطر	12
						سانحانهم الخطق الآاا	ِ عية ٢٧	التر
	 Angular M The Angu Raising at Represent 	lomentum lar Momentum Commutation Relations. nd Lowering Operators for Angular Momentum. tation of $ \ell,\mathbf{m} angle$ States in Spherical Coordinates.		1	4			
	 The Schroe Hydrogen The Centre The Hydre The Hydre The Energe The Free 	dinger Equation in Three Dimensions and the Atom ral Potential. ogen Atom. gy Spectrum. Particle.		2	8			
	 Spin Eigenstat The Intrir Addition The Addit General F 	es of Spin 1/2. Instic Magnetic Moment of Spin 1/2 Particles. of Two Spins. tion of Spin 1/2 and Orbital Angular Momentum. Rules for Addition of Angular Momenta.		1.5	6			
	 Matrix Replication Matrices Matrix Replication General For the second second	presentation of Operators in Quantum Mechanics. epresentation of Angular Momentum Operators. Relations in Marix Mechanics. epresentation of Spin 1/2.		1.5	6			
				14	56	-		
				Week	Hours			

2 Course components (total contact hours per semester):						
Lecture: 56 hr	Tutorial:	Practical:	Other: 14 hr			

التوحية ۳۷ <u>ساعات الحطة ۱۳۶</u>

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): 14 hr

4. Development of Learning Outcomes in Domains of Learning

For each of the domains of learning shown below indicate:

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

f. Knowledge: Description of the knowledge to be acquired

Upon successful completion of this course The student will be able to:

- 35-Learn to be acquainted with the historical background of quantum mechanics, wave-particle description-the uncertainty principle and Schrodinger equation.
- 36- Understand the physics of quantum mechanics and their applications mentioned in the text.
- 37-Use mathematical formulation to describe the physical principle or phenomena.
- 38-Explain how things are working.

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

- 1- Demonstrating the basic information and principles through lectures and the achieved applications.
- 2- Discussing phenomena with illustrating pictures and diagrams.
- 3- Lecturing method:
 - a. Blackboard
 - b. Power point
 - c. e-learning

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توحية ٣٧ مانحا بمالخطة ١٣٦

4- Tutorials.

5- Revisit concepts.

6- Discussions.

7- Brain storming sessions.

8- Start each chapter by general idea and the benefit of it.

9- Learn the student background of the subject.

10- Show the best ways to deal with the problem.

11- Keep the question "why" or "how" to explain always there.

12- Build a strategy to solve the problem.

(iii) Methods of assessment of knowledge acquired:

Quizzes and Homeworks 20%

• Short exams (mid term exams) 30%

• Long exams (final) 50%

b. Cognitive Skills

(i) Cognitive skills to be developed

Having successfully completed the course students should be able to:

- Acquired a firm background in the foundations of quantum mechanics and have the students' desire kindled to discover more in the second part of the course.
- 2- Analyse the observed of the particles by solving the Schrodinger equation.
- 3- Understand the theoretical treatments of quantum mechanics problems.

4- Do a small research.

(ii) Teaching strategies to be used to develop these cognitive skills:

- **14.** Preparing main outlines for teaching.
- **15.** Following some proofs.

16. Define duties for each chapter.

17. Home work assignments.

18. Encourage the student to look for the information in different references.

19. Ask the student to attend lectures for practice solving problem.

(iii) Methods of assessment of students cognitive skills

- 1. Midterm exam. Exams, short quizzes.
- 2. Asking about physical laws previously taught.
- 3. Writing reports on selected parts of the course.

رقم	 1217V

التوحية ٣٧ ماغاره الحطة ٣٧

4.	Discussions of how to simplify or analyze some phenomena.
c. Inter	personal Skills and Responsibility
	At the end of the course, the student will be able to:
1.	Work independently.
2.	The students learn independently and take up responsibility.
(vii)	Teaching strategies to be used to develop these skills and abilities
1.	Learn how to search the internet and use the library.
2.	Learn how to cover missed lectures.
3.	Learn how to summarize lectures or to collect materials of the course.
4.	Learn how to solve difficulties in learning: solving problems – enhance educational skills.
5.	Develop the interest in Science through :(lab work, field trips,).
6.	Encourage the student to attend lectures regularly by:
	i. Giving bonus marks for attendance
	ii. Assigning marks for attendance.
7.	Give students' tasks of duties
iii) Me arry r 5. 6. 7. 8.	ethods for assessment of the students interpersonal skills and capacity to esponsibility Quizzes on the previous lecture. Discussion. The accuracy of the result gained by each group will indicate the good group work. Presenting the required research on time and the degree of the quality will show the sense of responsibility.
d. Cor	nmunication, Information Technology and Numerical Skills
(v) 1. 2. 3.	Description of the skills to be developed in this domain. At the end of the course, the student will be able to: Computation Problem solving Data analysis and interpretation.
15. '	l'eaching strategies to be used to develop these skills
12	2. Know the basic mathematical principles.

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				الآم الحطة ١٣٦	التوصية ٣٧
	13.Use the	web for research.			
	14. Discus	s with the student.			
	15. Exams	to measure the mathematical skill.			
	16. Encou	rage the student to ask for help if needed.			
	17.Computa	ational analysis.			
	18.Data rep	resentation.			
	19.Focusing	on some real results and its physical meaning			
	20. Lectur	es for problem solution.			
	21.Encourag	ge the student to ask good questions to help so	olve the problem.		
	22.Display t	he lecture note and homework assignment on	the web.		
((iii) Methods	of assessment of students numerical and	l communication skills		
	6. Their in	teraction with the lectures and discussions.			
	7. The repo	orts of different asked tasks.			
	8. Homewoundersta	ork, Problem solutions, assignment and onding.	exam should focus on the		
	9. Results c	f computations and analysis.			
	10.Commer	ts on some resulting numbers.			
	11.Research	l.		_	
e. I	Psychomotor	Skills (if applicable)			
		At the end of the course, the	ne student will be able to: (NA))	
		(ii) Teaching strategies to be used to	develop these skills (NA)	_	
	(iii) Methods	of assessment of students psychomotor s	skills (NA)		

	5. Schedule of Assessment Tasks for Students During the Semester				
	Assessment task	Week Due	Proportion of Total		
(e.g. e	essay, test, group project, examination, speech, oral presentation, etc.)		Assessment		
1	Exercises & Home works	All weeks	5 %		

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كلية العلوم التطبيقية / مسم الغيزياء

لتوحية ٣٧ ماعات الخطة ١٣٦

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 Support

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

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

E. Learning Resources

Required Text(s):
1. S. Gasiorowicz, "Quantum Mechanics", John Wiley & Sons, Inc., 3 rd Ed. (2003).
Recommended Reading List
1- David J. Griffiths "Introduction to Quantum Mechanics", Pearson Prentice Hall, New York, USA, (2005).
2- Nouredine Zettili, "Quantum Mechanics: Concepts and Applications", John Wiley & Sons, Inc. (2001).
Electronic Materials, Web Sites
 <u>http://en.wikipedia.org/wiki/Quantum Mechanics/</u> <u>http://www.dmoz.org/Science/Physics/Quantum Mechanics/</u>
Other learning material such as computer-based programs/CD, professional standards/regulations (NA)

F. Facilities Required

ه رقم	▲ 1£1°V	الخطة الدراسية لبكالوريوس الفيزياء الطبية	رقم التخصص ٤٠٣٠١	كلية العلوم التطبيقية / مسم الفيزياء
				لتوصية ٣٧ سائمات الخطة ١٣٦
ndicate re umber of	equiremen seats in c	nts for the course including size of classroo classrooms and laboratories, extent of comp	ms and laboratories (ie puter access etc.)	
		1. Accommodation (Lectu	ıre rooms, laboratories, et	tc.)
-	Lecture	room for 30 students		
•	Library.	. com for colorudenta.		
			2. Computing resour	ces
•	Comput	er room.		
Other rea	sources (s	pecifyeg. If specific laboratory equipment in	s required, list requirement	nts
		. , o	or attach list) (N	A)
			G Course Evaluat	ion and Improvement Processe
	1	1. Strategies for Obtaining Student Feedback	on Effectiveness of Teach	ing
•	10 minut	es Quiz per week		
•	Home we	orks.		
•	Term par	per.		
•	Final Ex:	am.		
2.	Other Stra	ategies for Evaluation of Teaching by the Inst	ructor or by the Departmo	ent
	A 4 41	d of towns Of a 1 c Citi a state of		
•	At the en	a of term, Students fill an evaluation Sheet	t (without names).	
•	Suuent N	viains are analyzed by considering standard De	or Improvement of Teach	ing
-	Stratocia	are modified each term according to the start	lent feedback	o
•		for Verifying Standards of Student Ashiever	actic recubleck.	
4.1	indeper	dent faculty member of a sample of student -	work periodic exchange a	an
r	emarking	of a sample of assignments with a faculty me	ember in another institution	on)
In case	e of more	than one section taken this course, the instru- ind they use the same marks distribution for	ictors are cooperated to g	çive nts
can se	<u>e their co</u>	rrected sheet and compare it with key answer	sheet.	
5 Descr	ribe the p	lanning arrangements for periodically review	ing course effectiveness a	and
			planning for improveme	ent.
7- The	following	points may help to get the course effectivenes	SS	
1.1	Studen	at evaluation		
1.1	Course	e report		
	Progra	in report m Self study		
	Progra	in Sell study		

8- According to point 1 the plan of improvement should be given. 9- Contact the college to evaluate the course and the benefit it add to other courses. 10- Add some subject and cut off others depending on the new discoveries in physics.	رقم	. <u>⊿</u> 12‴V	الخطة الدراسية لبكالوريوس الغيزياء الطبية	رقم التخصص ٤٠٣٠١	كلية العلوم التطبيقية / قسم الفيزياء	
 8- According to point 1 the plan of improvement should be given. 9- Contact the college to evaluate the course and the benefit it add to other courses. 10- Add some subject and cut off others depending on the new discoveries in physics. 					الاتم الحطة ١٣٦	التوصية ٣٧
9- Contact the college to evaluate the course and the benefit it add to other courses.10- Add some subject and cut off others depending on the new discoveries in physics.	8-	According to	point 1 the plan of improvement should be g	iven.		
10- Add some subject and cut off others depending on the new discoveries in physics.	9-	Contact the	college to evaluate the course and the benefit	it add to other courses.		
	10	- Add some su	bject and cut off others depending on the new	w discoveries in physics.		

Date: 13 December 2015



Assessment

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

COURSE SPECIFICATION

Course title: Physics of Medical Imaging

Course code: **4034289-3**

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				ما المراجع ٢	التمرية ۳۷

Revised 13 December 2015

Kingdom of Saudi Arabia

National Commission for Academic Accreditation & Assessment



المملكة العربية السعودية الهيئة الوطنية للتقويم

والاعتماد الأكاديمس

COURSE SPECIFICATIONS MPH, 4034289-3

Institution		Date of Report	
	Umm AL-Qura University	Revised Safar 1437 H	
College/Department : Science /Physics			

A. Course Identification and General Information

1. Course title and code: : Physics of Medical Imaging, 4034289-3
2. Credit hours:- 3 Cr. (3 hrs lecture)
3. Program(s) in which the course is offered.
(If general elective available in many programs indicate this rather than list programs)
Medical Physics
4. Name of faculty member responsible for the course
Dr/ Ramadan Ali Hassan 5. Level/year at which this course is offered. 7 th Level / 4 th year 6. Pre-requisites for this course (if any): No-Co-requisite 8. Location if not on main campus :- within the university campus 9. Mode of Instruction (mark all that apply) a. Traditional classroom v what percentage? 100% b. Blended (traditional and online) What percentage? c. e-learning What percentage? d. Correspondence What percentage? f. Other What percentage? 1. Summary of the main learning outcomes for students enrolled in the course. The course aims to give the students the chance to: 6. Understand basic Fundamentals of the physics of different image modalities. 7. Describe, in words, merits and drawbacks of each imaging modality. 8. Compare the different method of image processing of different image modalities. 9. Interpret the images and state the artifacts of each imaging modality. 10. Differentiate between the medical applications of different imaging modalities. 2. Briefly describe any plans for developing and improving the course that are being implemented. (eg increased use of If or web based reference material, changes in content as a result of new research in the field) 3. Matelab program is applied on some imaging modalities to simulate the performana

Dr/ Kamadan AJ Hassan 5. Level/year at which this course is offered 7 th Level /4 th year 6. Pre-requisites for this course (if any) Radiation Medical Physics (2) / Code: 4033292.4 7. Co-requisites for this course (if any): No-Co-requisite 8. Location if not on main campus : within the university campus 9. Mode of Instruction (mark all that apply) a. Traditional classroom V What percentage? b. Blended (traditional and online) What percentage? c. e-learning What percentage? d. Correspondence What percentage? f. Other What percentage? 1. Summary of the main learning outcomes for students enrolled in the course. The course aims to give the students the chance to: 6. Understand basic Fundamentals of the physics of different image modalities. 7. Describe, in words, merits and drawbacks of each imaging modality. 8. Compare the infages and state the artifacts of each imaging modality. 9. Interpret the images and state the artifacts of each imaging modalities. 9. Interpret the images and state the artifacts of each imaging modalities. 9. Interpret the images and state the artifacts of each imaging modalities. 9. Interpret the images and state the artifacts of each imaging modalities. 9. Interpret the images and state the artifacts of each imaging
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6. Pre-requisites for this course (if any) Radiation Medical Physics (2) / Code: 4033292-4 B Objectives (hyper link of Medical physics plan) 7. Co-requisites for this course (if any) : No-Co-requisite 6 Medical physics plan) 8. Location if not on main campus :- within the university campus 6 Medical physics plan) 9. Mode of Instruction (mark all that apply) a. Traditional classroom V a. Traditional classroom V What percentage? 100% b. Blended (traditional and online) What percentage? 100% c. e-learning What percentage? 100% d. Correspondence What percentage? 100% f. Other What percentage? 100% Comments: 1. Summary of the main learning outcomes for students enrolled in the course. The course aims to give the students the chance to: 6 Understand basic Fundamentals of the physics of different image modalities. 9 Interpret the images and state the artifacts of each imaging modality. 8 Compare the different method of image processing of different modalities. 9 Interpret the images and state the artifacts of each imaging modality. 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) 3 Matelab program is applied on some imaging modalities to simulate the performance of the calculations as in the hospital 4 Cooperate with hospitals to find how they deal with the subject 5 Flipped classroom to improve congenial and interpersonal students skill <td>5. Level/year at which</td> <td>ch this course is offered</td> <td>7th Level / 4th year</td> <td></td> <td></td>
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5- Flipped classroom to improve congenial and interpersonal students skill

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

Topics to be achieved		
Topics	No. Of Weeks	Contact hours
1 Introduction to digital image processing Digital images Image quality Basic image operations	2 weeks (2 &3)	6 hrs
2 Radiography Introduction X-ray tube Interaction with matter X-ray detectors Dual-energy imaging Image quality Equipment Clinical use Biologic effects and safety Future expectations	3 weeks (4,5&6)	9 hrs
First Midterm Exam	Week 7	2 hrs
3- X-ray computed tomography	Week 7	1 hrs
3 X-ray computed tomography X-ray detectors in CT Imaging Cardiac CT Dual-energy CT Image quality Equipment Clinical use Biologic effects and safety Future expectations	3weeks (8,9&10)	9 hrs
4 Magnetic resonance imaging Introduction Physics of the transmitted signal Interaction with tissue Signal detection and detector Imaging Image quality Equipment Clinical use Biologic effects and safety Future expectations	3 weeks (11,12,13&14)	9 hrs

رقه	الخطة الدراسية لبكالوريوس الفيزياء الطبية 1287 هـ رقع			رقم التخصص ٤٠٣٠١	داي ١٣٦	بيغية / قسم الغيز ساعاته الخطة	كلية العلوم التط التوحية ٣٧	
Second Midterm Exam			Week 13	2 hrs				
Nuclear Introdu image q Equipm Clinical Biologic Future	Nuclear Imaging (PET/SPECT: Introduction image quality Equipment Clinical use Biologic effects and safety Euture expectations			2 weeks (14, 15&16)	7 hrs			
2. Course	e components	(total contact	t hours and cr	edits per semeste	r):			
Cred	lit	Cont	act Hours		Self-Study	Otl	her	Total
X	NCCCA	Lecture	Tutorial	Laboratory				
•••••	3 Cr.	41	•••••		104		6	151 hrs

3. Additional private study/learning hours expected for students per week.		
Self study (web search, library, reports, homework, etc)	8 hrs	

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

	NQF Learning Domains	Course Teaching	Course Assessment
	And Course Learning Outcomes	Strategies	Methods
1.0		Knowledge	
1.1	 knowledge that students should know and understand. <i>At the end of the</i> <i>coursee the student should be able to:</i> Understand the basic physical principles of different imaging modalities. List the tools required for each imaging modality Outline the merits and drawbacks of each imaging modality. Use mathematical formulation to describe the physical principle of different imaging modes. 	 Brainstorming. Cooperative learning. Dialogue and discussion. Constructivist. Self-learning. 	 Quizzes Electronic exams Homeworks Discussion in the lecture Short exams (midterm exam) Long exam (final exam)
2.0		Cognitive Skills	

رقع	دراسية لبكالوريوس الفيزياء الطبية العلامية المعالم	رقو التخصص ٤٠٣٠١ النطة ال	كلية العلوم التطبيقية / قسم الفيزياء التوحية ۳۷ ماعات الخطة ۱۳ ^۳ ۱
	 Interpret the physical principle of the imaging modality and its usage in the design of the equipment Solve problems related to the mathematical principles of the imaging modality Compare between the properties of different imaging modes and their medical applications Analyse different artefacts of images of different imaging modalities. 	 Problem-solving strategy Cooperative learning strategy Strategy group discussions Assigning students solve the exercises in each chapters Using Matlab program to analyze some imaging modalities 	 Written test Individual and group activities Short cognitive tests. Achievement tests Seminar Electronic exam Some application using software
3.0	Inter	personal Skills & Responsibility	
	 Summarize the different modes of imaging. interpret the artifacts of the images for each imaging modality. justify the essential parts of different clinical situations and formulate a strategy for the optimum setup of each clinical situation. 	Training students to build good relationships with their counterparts and collaborate with others and develop personal and professional performance through the following strategies: - cooperative learning - flipped classroom	Students are assessed through: - evaluation of field activities - Report - Short quiz in class - Discussion in class
4.0	Communication,	Information Technology, Numeric	al skills
	 Use software to analyse the images of different modalities Work in dependently and in group to represent a seminar about topic related to the study. Use internet to search for topics and writing reports Know the standards for writing a good report 	 Group seminar discussion Reports about different tasks 	- Report assignment - Class activities assignment - Electronic exams
5.0		Psychomotor	1
	Not applicable (NA)	Not applicable	Not applicable

5. Sc	hedule of Assessment Tasks for Students During the Semester		
	Assessment task (e.g. essay, test, group project, examination, speech,	Week Due	Proportion of Total
	oral presentation, etc.)		Assessment
			1

رقم	.∡ 128°V	الخطة الدراسية لبكالوريوس الغيزياء الطبية	رقم التخصص ٤٠٣٠١	كلية العلوم التطبيقية / محسم الفيزياء
				التوصية ۳۷ ساعات الحطة ۱۳۶
1	Midterm 1		7 th week	10 %
2	Midterm 2		14 th week	10%
3	Project + Ele	ctronic exams	$5^{\text{th}} - 12^{\text{th}} \text{ we}$	eek 10%
4	Homework		During the	e 10%
			semester	
5	Reports (5 re	ports/semester)	During the	e 10 %
			semester	
5	Final exam		End of seme	ster 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- 5-office hours per week in the lecturer schedule.
- 2- The contact with students by e-mail and website

E. Learning Resources

1. List Required Textbooks

- 1- Medical Imaging Physics. W.R. Hendee &E.R. Ritenour, 2nd Eds, Wiley, 2002
- 2- Essential Nuclear Medicine Physics. R.A.Powsner &E.R.Powsner, 1st Eds, Blackwell publishing Ltd,2006.
- 3- PET Physics, Instrumentation and Scanners. M.E.Phelps, 2nd Eds., Springer,2006
- 4- Positron Emission Tomography. D.L.Bailey & D.V.Townsend, 1st Eds., Springer, 2005,

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

1- Fundamentals of Medical Imaging Second Edition Paul Suetens Cambridge University Press 2009

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

1- Introduction to Medical Imaging Smith and A. Webb Cambridge University Press 2011

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

http://www.excelmedicalimaging.com/

http://ieeexplore.ieee.org/xpl/tocresult.jsp?isnumber=6159236

http://www.nema.org/prod/med/

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

Application of Matlab program on some selected images of different imaging modalities

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and

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وحية ٣٧ ماغاته الخطة ١٣٦

laboratories, extent of computer access etc.)

Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)
 The size of the room should be proportional to the number of students
 Provide enough seats for students.
 The number of student not exceed on 30 in the classroom
 Library
 Computing resources (AV, data show, Smart Board, software, etc.)
 Hall is equipped with a computer.
 Provide overhead projectors and related items
 Smart board
 Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

 None

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching

- Quizzes, midterm and final exams
- Electronic student evaluation is organized by the university measurement and evaluation unit
- 2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor
 - - Electronic exams
 - Evaluation of course by another colleagues

3 Processes for Improvement of Teaching

- - Electronic exams
- Evaluation of course by another colleagues

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.

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

- 11-- The following points may help to get the course effectiveness
 - Student evaluation
 - Course report
 - Program report
 - Program Self study
- 12- According to point 1 the plan of improvement should be given.
- 13-Contact the college to evaluate the course and the benefit it add to other courses.

رقع	Δ 1Σ٣V	س الغيزياء الطبية	الخطة الدراسية لبكالوريو	رقم التخصص ٤٠٣٠١	ةية / قسم الفيزياء إيار المرات 121	كلية العلوم التطبيد """ "
					اا الملكيل هيلاه	التوصية ١٧
					Date: 13 D	ecember 2015
	I	Head of the Physic	s Department			
		Dr. Hatem A	lamri			
Ki Na Ac	ingdom of Sau ational Comm ademic Accre Assessm	ıdi Arabia nission for editation & ent	المتعادية المتعادية والأعداد الإنجابية	المملكة العربية السعودية الهيئة الوطنية للتقويم والاعتماد الأكاديمي		

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

COURSE SPECIFICATION

Course title: Physics of Radiotherapy

Course code: 4034286-4

رقم	. <u>∡</u> 12.‴V	الخطة الدراسية لبكالوريوس الغيزياء الطبية	وقه التخصص ٤٠٣٠١	بيقية / قسم الفيزياء	كلية العلوم التط
				الاكم خلعال معرادات	التمصية ۳۷

Revised 13 December 2015

Kingdom of Saudi Arabia

National Commission for Academic Accreditation & Assessment



المملكة العربية السعودية
الهيئة الوطنية للتقويم
والاعستسمساد الأكساديسمسي

COURSE SPECIFICATIONS MPH, 4034286-4

Institution		Date of Report
	Umm AL-Qura University	Revised Safar 1437 H
College/De	partment : Science / Physics	

A. Course Identification and General Information

1. Course title and code: Physics of Radiotherapy , 4034286-4
2. Credit hours: 4 Cr. (3 + 1 Lab)
3. Program(s) in which the course is offered.
(If general elective available in many programs indicate this rather than list programs)
Physics Department
4. Name of faculty member responsible for the course :
Dr/Taha Elfwal
5. Level/year at which this course is offered 7 level /forth year
6. Pre-requisites for this course (if any): Radiation Medical Physics (2)/ Code: 4033292-4
7. Co-requisites for this course (if any): No-Co-requisite
8. Location if not on main campus: within the university campus
9. Mode of Instruction (mark all that apply)
a. Traditional classroom $$ What percentage? 100%

رقم	م الطبية ١٤٣٧ هـ	الخطة الدراسية لبكالوريوس الغيزيا	رقم التخصص ٤٠٣٠١	كلية العلوم التطبيقية / قسم الفيزياء
				التوحية ٣٧ ما عاده الحطة ٣٧
b	b. Blended (traditional and	online) What percentage?		
c d f.	. e-learning l. Correspondence . Other	What percentage? What percentage? What percentage?		
Con	nments:			

B Objectives (hyper link of Medical physics plan)

1. What is the main purpose for this course?
1- Explain what Is radiotherapy? Why and when we use radiotherapy and the goal of it?
2- Define different Types of Radiotherapy.
3- Understand the basic component of radiotherapy equipment(kilovoltage machine ,co60-
machine, linear acclerators, simulator,)
4-State the different ranges of kilovoltage energies.
5-describe the structure of a typical kilovoltage treatment tube.
6-Describe the basic components of a cobalt unit.
7-Understand the role the components of a linear accelerator play in X -ray production.
8-Describe the unit of absorbed dose and exposure.
9- Explain the dose calculation in radiotherapy.
10- Define the tumour volume in the patient.
11-Calculate the resultant dose distribution in the patient.
8- Understand the basic physical principles of electron beam therapy.
7- Understand the quality assurance in radiotherapy
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)
22. Re-new the course references frequently
23. Check the latest development in science to improve the course objectives
24. Highlighting the day life applications whenever exist.
25. Encourage the students to see more details in the international web sites and reference books in the library
26. Cooperate with different institution to find how they deal with the subject
26. Cooperate with different institution to find how they deal with the subject

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

1 Topics to be Covered :-		
Topics	No of Weeks	Contact hours

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ساعاته الخطة ١٣٦ التروحية ٣٧

(1)Radiation in the treatment of cancer 1-Kilovoltage x-ray Units 2-Linear Accelerator 3-Cobalt Machines 4-Simulator	2 weeks (2&3)	6 hrs
 (2)Dose Distribution and Scatter analysis 1-Phantoms 2- Depth Dose Distribution 3-Percentage Depth Dose 4-Tissue-Air Radio 5-Scatter-air Ratio 	1 weeks (4)	3 hrs
 (3)Patient dose Computation Methods 1- Acquisition of patient data 2-Treatment simulation 3-Source to axis distance and isocentric techniques 	1 weeks (5)	3 hrs
 (4)A system of Dosimetric calculations 1-Dose calculation parameters 2- Practical applications (a)Accelerator Calculations (b)Cobalt-60 Calculations (c) Irregular Fields (D)Asymmetric Fields 	^Y week (6,7)	7 hrs
First Mid Term Exam	Week 8	2 hrs

التوحية ٣٧ ماغارم الحطة ٣٧

(5)Treatment Planning I:Isodose Distribution		
1- Isodose chart	1week	3 hrs
2-Measurement of isodose curves	(9)	
(6)Treatment Planning: Patient data, Corrections, and set-up		
1-parameters of isodose curves		
2-Wedge filters	2 weeks	6 hrs
3-Combination of radiation fields	(10,11)	
4-Wedge field techniques		
E Tumor doce energification for external photon beams		
5-rumor dose specification for external photon beams		
(7)Treatment Planning: Field Shaping, Skin dose, and Field		
Separation.	1 week	3 hrs
1-Field blocks	(12)	
2-Field shaping		
3-Skin dose		
4-Separation of adjacent fields.		
Second Mid-term Exam	Week 13	2 hrs
(8)Electron beam Therapy		
1-Electron interactions	1 week	4 hrs
2-Determination of absorbed dose	(14)	
3-Characteristics of clinical electron beams		
4-Field shaping		
(9)Dose Fractionation in radiotherapy	1 week	3hrs
(10)Quality Assurance	(15)	

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التوحية ٣٧ ما المنطق ٣٧

2. Course	2. Course components (total contact hours and credits per semester):							
	Credit			Co	ontact Hours	Self-Study	Other	Total
X	NCCCA	Lecture	Tutorial	Laboratory	Practical	•		
	4 ch	٤١		٣٩	0	٩٨	٦	178 hrs
3. Addition	3. Additional private study/learning hours expected for students per week. 7-8 h							

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

	NQF Learning Domains	Course Teaching	Course Assessment
	And Course Learning Outcomes	Strategies	Methods
1	Knowledge		
	knowledge that students should know and understand. <i>At the end of the programme the student should</i> <i>be able to:</i> -Understand the role of radiotherapy -calculate the dose distribution for photon and electron beam -Understanding how to do the quality assurance of linear accelerators and cobalt machines	 Brainstorming. Cooperative learning. Dialogue and discussion. Constructivist. Self Learning. 	 Quizzes discussions within the lecture Homeworks Short Exams Long Exam
2	Cognitive Skills		

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				التوحية ٣٧ ما ما معارك الخطة ١٣٦
	compare betwo radiotherapy and Solve the proble dose to the patie techniques.	een different type of external d its applications. m related to the calculation of ent using different types of	 Problem-solving strategy Cooperative learning strategy Strategy group discussions Assigning students solve the exercises in each chapters 	 Practical test Written test Individual and group activities Short cognitive tests. Achievement tests
3	Interpersonal S	kills & Responsibility		
	-work in a group -write a short re the course in information and - write a report library and the in - Use internet reports - evaluate the appropriate tech	to conduct an experiment. eport in specific subject related to materials by using advanced communication tools . individually or in a team using the nternet to search for topics and weite solution to a problem and apply miques to arrive the solution.	 Training students to build good relationships with their counterparts and collaborate with others and develop personal and professional performance through the following strategies: -cooperative learning Enhance confidence in the same student and encourage dialogue and discussion. Raise the spirit of cooperation among student. 	 Students are assessed through:evaluation of field activities verbal tests Request solutions from each group in front of students. The final evaluation of the collective tasks and discusses
4	Communication	n, Information Technology, Numer	rical skills	
	 Work ind represent a to the study Use interr 	lepently and in group to a seminar about topic related y aet to search for topic and	 Group seminar Discussion. Reports about different tasks 	 Report assignment Class activities assignment

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	writing reports		
5	Psychomotor		
	25. Perform the experiments with high accuracy.26. Operate instruments safely.27. Draw the data and curves.	- 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. Sc	5. Schedule of Assessment Tasks for Students During the Semester				
	Assessment task (e.g. essay, test, group project, examination, speech,	Week Due	Proportion of Total		
	oral presentation, etc.)		Assessment		
1	Midterm 1	7 th week	10 %		
2	Midterm 2	13 th week	10%		
3	Project and short Exams	5 th -15 th	10%		
3	practical	1 st - 15 th week	20%		
4	Homework + reports	During the semester	10%		
5	Final exam	End of semester	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)

1-2-office hours per week in the lecturer schedule.

2- The contact with students by e-mail and website

E. Learning Resources

1. List Required Textbooks

(1) Faiz.M.Khan" the physics of radiation therapy"3rd ed.by Lippincott Williams&Wilkins 2003

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

(1) International atomic energy agency (IAEA) reports

(2) American Association of physicist in medicine (AAPM) reports and journals

(3) National Council on Radiation Protection & Measurements (NCRP)

(4) International Commission on Radiation Unit & measurements(ICRU)

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

(1)Philip Mayles, Alan Nahum" handbook of radiotherapy physics: theory and practice"

Taylor&Francis 2007

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- الخطة الدراسية لبكالوريوس الغيزياء الطبية

رقه التحص ٤٠٣٠١

التوحية ٣٧ ماعات الخطة ١٣٦

- (2)) Faiz.M.Khan "Treatment Planning in radiation Oncology" ^{2nd} aedition,Lippincott Williams&Wilkins 2007.
- (3)Podgorsal.E.B."Radiation Oncology Physics:a handbool for teachers and students "international Atomic energy agency,Vienna,2005
- (4)Cherry P.Duxbury A."Practical Radiotherapy Physics and Equipment"Greenwich Medical Media Limited 1998
- (5) Brady L.W.& Heilmann H.P.: Medical Radiology radiation Oncology"Springer 2006.

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

http://www.AAPM.org

- http:// www.sciencedirect.com

5. Other learning material such as computer-based programs/CD, professional standards or regulations and software. None

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.)

- The size of the room should be proportional to the number of students

- Provide enough seats for students.

- The number of student not exceed on 30 in the classroom

- Library

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

-Hall is equipped with a computer.

- Provide overhead projectors and related items
-Smart board

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

None

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching

- Quizzes,midterm,and final exams
- Electronic student evaluation is organized by the university measurement and evaluation unit
- 2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor

-Revision developmental internal and external.

- Student Assessment tests quarterly and final through questionnaires

-The colleagues who teach the same course discuss together to evaluate their teaching

3 Processes for Improvement of Teaching

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التوحية ٣٧ ساغانه الخطة ١٣٦

- Create the right atmosphere for study.

- Lecture developmental audit, or workshop lesson model

- Course report, Program report and Program self-study.

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.

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

- Consulting the other professors scheduled.

- Hosting a visiting professor to evaluate the course.

- Workshops with professor's course.

-Student evaluation.

-Course report.

-Program report

Date: 13 December 2015

Head of the Physics Department

Dr. Hatem Alamri

Kingdom of Saudi Arabia

The National Commission for Academic Accreditation & Assessment

COURSE SPECIFICATION

Course title Electromagnetism I

Course code: 4033132-3

Revised 13 December 2015

الخطة الدراسية لبكالوريوس الغيزياء الطبية ٣٧

Course Specification

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

Institution: UMM AL – QURA UNIVERSITY

رقم التخصص ٤٠٣٠١

College/Department : Faculty of Applied Science – Department of Physics

A Course Identification and General Information

	12. Course title: Electromagnetism I
	13. Course code: 4033132-3
	2. Credit hours: 3hrs
	3. Program(s) in which the course is offered. : B.Sc. Pure Physics
9.	Name of faculty member responsible for the course:
	One of the academic staff member
	5. Level/year at which this course is offered: 3 nd Year / Level 6
	6. Pre-requisites for this course (if any): Theoretical Methods in Physics (2) (4032141-4)
	7. Co-requisites for this course (if any): Theoretical Methods in Physics (1) (4033142-4)
	8. Location if not on main campus: Main Campus & El-Zaher Campus
	9. Mode of Instruction (mark all that apply)
	a. traditional classroom What percentage?
	b. blended (traditional and online) What percentage?
	c. e-learning What percentage?
	d. correspondence What percentage?



لتوصية ٣٧ ماغاته الخطة ١٣٦

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				الاسم الحطة الاسم	التوحية ٣٧
		f. other	What percentage?		
			Comments:		

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B Objectives

After completing this course student should be able to:

- 1. Define the basic fundamentals of electromagnetic phenomena.
- 2. Using the mathematics to solve the problems in electromagnetism.
- 3. Using the mathematics to express the phenomena in electromagnerism.
- 4. Define the electric field, the electric potential, and electric dipole, .
- 5. Calculate the electrostatic field, electrostatic potential of the charge, dipole and multipoles
- 6. Apply the Gauss law to solve some problems.
- 7. Apply Poisson's equation to solve some problems
- 8. Apply Laplace's equation to solve some problems.
- 9. Define the electric displacement, polarization of the materials, dielectric constant, and electric susceptibility.
- 10. Calculate the electric field outside a dielectric materials.
- 11. Calculate the electrostatic field and potential in dielectric materials, microscopic theory of dielectric and electrostatic energy
- 12. Define the Ferroelectricity phenomena.
- 13. Calculate the energy density of the electrostatic field.
- 14. Calculate the energy of a System of Charged Conductors
- 15. 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.

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

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. Description the calculation of the electric field by applying Gauss's law for the fixed charge and dielectric materials. Also, it concern to the study of the polarization and dielectric constant and the boundary conditions at the interface at the two different dielectric medium. The calculation of the molecular field , electrostatic energy and descriptions of moving charges for the case of steady electric currents are also presented.

1. Describe the vector and scalar fields, Cartesian, spherical polar, cylindrical coordinates, integral vector calculus, div, grad, and curl operations with geometric interpretations, stokes and gauss theorems, Dirac delta function

1 Topics to be Covered

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Торіс	No of	Contact
	Weeks	hours
	2	6
 Electrostatics: 		
1-Electric Charge		
2-Coulomb		
3-The Electric Field		
4-Electrostatic Potential		
6-Gauss's Law		
7-The Electric Dipole		
8-Multipole Expansion		
	4	12
Solution of the Electrostatic Problem		
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		
8-Point charge & Conducting Sphere		
9-Line charges & Line Images		
10-System of Conductors		
11-Poisson's Equation.		
	3	9
The Electrostatic Field in Dielectric Media		
1-Polarization		
2-Field Outside of a Dielectric Medium 3 The Electric Field Incide 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.		
Microscopic Theory of Dielectrics	2	6
I-Molecular Field in Dielectric		
3-Polar Molecules		
4-Ferroelectricity		
,		

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						ساغانه الخطة ١٣٦	۳۷	التوصية
				1.5	4.5			
*	Electrostatio	: Energy						
		1-Potential Energy of a Group of Point Charges	s					
		2-Energy Density of an Electrostatic Field	1					
		5-Energy of a System of Charged Conductor	s					
		4-capacito	15.					
*	Electric Curr	ent		1.5	4.5	-		
		1-Current Density & Equation of Continuity	/					
		2-Ohm's Lav	v					
		3-Steady Currents in Continous Media	a					
		4-Microscopic Theory of Conduction	on.					
*				14	42 hrs			
			v	weeks				

2 Course components (total contact hours per semester):					
Lecture : 42 hrs	Tutorial: 28 hrs	Practical: 42	Other: Homework 42 hrs		

14. 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):

28 h (reports and project research for the electrical properties of dielectric materials)

التوحية ٣٧ ماغارم الحطة ٣٧

	4. Development of Learning Outcomes in Domains of Learning
For ea	ch of the domains of learning shown below indicate:
1.	A brief summary of the knowledge or skill the course is intended to develop;
2.	A description of the teaching strategies to be used in the course to develop that
	knowledge or skill.
3.	The methods of student assessment to be used in the course to evaluate learning
	outcomes in the domain concerned.
g. K	nowledge : Description of the knowledge to be acquired
	Upon successful completion of this course the student will be able to:
2.	Describe the vector and scalar fields, Cartesian, spherical polar, cylindrical
	coordinates, integral vector calculus , div, grad, and curl operations with geometric
	interpretations, stokes and gauss theorems, Dirac delta function
3.	Calculate the force between the charges by Coulomb's Law, Electric Field and
	potentials of fixed charge points, linear charge, surface and volume charge density,
	dipole and multipole expansion. Gauss' Law in integral and differential form.
4.	Solve the Electrostatic Problems by Laplace's Equation and Uniqueness by Separation
	of variables in Cartesian, Spherical and cylindrical coordinates, Image Charge Methods
	for grounded planes and spheres in external fields.
5.	Understand the Dielectric materials , Polarization and its Realization in Matter, The
	displacement field D, free charge, and modified Gauss Law, Boundary conditions and
	symmetric problems with displacement field, molecular fields and ferroelectricity.
6.	Determine the electrostatic energy and capacitance of Capacitors
7.	Explain the Currents and the Continuity Equation
(ii) T	eaching strategies to be used to develop that knowledge
1.	The methodology of teaching that includes a curriculum design, planning and
	delivering teaching and assessment, combination of lectures and web-
	interactions by the lecturer. These will be given the opportunity of students to
	understand the basic science of the electromagnetic specially in electrostatic
	case and its different applications in life.

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				المارك الخطة ١٣٦	التوحية ٣٧
2.	Feedback	and evaluation that include:			
-	Flipping tl	he lecture by using quizzes, blackboard, p	ower point and e-learning		
•	Effective	by solve some examples during the lecture	2		
•	Reflective	learning, multi-cultural of electromagnet	ic and emotional		
	intelligenc	ce.			
-	Creating p	productive online electromagnetic for learn	ning and teaching, transition		
	and partic	ipation into education.			
•	Observing	teaching and learning and creating produ	ctive classroom.		
•	Small gro	up teaching and assessment learning.			
-	Designing	and implementing an 'outcomes-based' of	curriculum.		
-	Teaching	for reflective learning and research metho	ds.		
•	Seminar pr	esentation and on-line learning process with	(images and movies)		
•	Collect the	new information about what the new in elec	tromagnetic		
•	Enable the	reference books and scientific sites conce	rning electromagnetic and its		
	application	in internet.			
•	Teaching	for employability,			
•	Monitorin	g the student experience			
1	Periodical	(iii) Methods of asses	sment of knowledge acquired:		
2	First and se	econd mid- term exam and final exam			
3.	Emphasis c	of the students in the presence of the lecture	continuously		
4.	Making the	e students are working small projects and rep	ort for electromagnetically		
	and its app	lications around us.			
5.	Ask the stu	dent to clear the miss understanding of the	course		
b. Coş	gnitive Skil	ls			
(i) Co	ognitive ski	lls to be developed			
		At the end of the course st	udents should be able to have		
	1. Unders	standing of the physical principles of	electromagnetism, and their		
	applica	tion to physical phenomena.			
	2. Use ph	ysical laws and principles to understand the	subject		
	3. Simpli	fy problems and analyze phenomena			
	4. Analys	se and explain natural phenomena.			

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				الاكم قلخال حباداه	ټو سية ۳۷
	5. Abilit	y to explain the idea with the student own	words.		
	6. Abilit	y to identify, formulate and solve the electron	romagnetic represent the		
	proble	ems mathematically			
(ii) T	eaching st	rategies to be used to develop these cogn	itive skills:		
1.	Preparing	main outlines for teaching in the starting of th	e lecture		
2.	Define tas	ks for each chapter			
3.	Open disc	ussions during the lectures			
4.	Brain stori	ming, group work, homework assignments and	d small project		
5.	Encourage	the student to look for the information in diff	ferent sources		
(iii) I	Methods of	assessment of students cognitive skills			
1.	All exams	and short quizzes must contain questions that	can measure these skills.		
2.	Asking the	students about physical meaning and laws pr	eviously taught		
3.	Emphasize	e the student writing reports on selected parts	of the course		
4.	ISCUSSION	is of now to simplify or analyse after the lectur	e		
c. Int	erpersonal	Skills and Responsibility			
		At the end of the co	ourse, the student will be able to	b :	
1.	Learn inde	pendently and take up responsibility			
2.	Fluent In C	he opinions of others			
3. 4	Accents cr	iticism			
5.	Evaluate e	lectromagnetic information.			
6.	Analyse el	ectromagnetic data.			
7.	Choose re	presentative examples for each group of elect	romagnetic.		
(v	viii) Teacl	ning strategies to be used to develop thes	e skills and abilities		
1.	Learn how	to search the internet and use the library			
2.	Teamwork	and small group discussion			
3.	Interactive	e learning			
4.	Case Study				
(iz	x) Meth capac	ods for assessment of the students interp city to carry responsibility	ersonal skills and		
1.	- Making qu	Jizzes on the previous lecture.			
2.	Checking	report and evaluate the efforts and scientific v	alues of each student in		
	preparing	report.			
3.	Mini proje	ect and evaluate the work in team			
4.	Evaluation	n of the role of each student in teamwork assi	gnment		
5.	Assignme	nts and evaluation of students presentations			
				_	
d. C	ommunica	tion, Information Technology and Nume	erical Skills		
(v	vi) Descr	iption of the skills to be developed in thi	s domain. At the end of the		
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				الاسم المخطة ١٣٦	التوحية ٣٧
	cours	e, the student will be able to:			
1.	Feelin	g mathematical reality of solving the problem	S		
2.	Enhancin electroma	g the ability of students to use computers a agnetic research.	nd internet for		
3.	Interp	retation and discussing the electromagnetic phe	enomena and data		
4.	Presen	at electromagnetic data orally and know how to v	write a report.		
16	. Teaching	strategies to be used to develop these sl	kills.		
1.	Know	the basic physical principles of electromagnet	tic.		
2.	Discus	s with the student			
3.	Homewor web sites)	k (preparing a report on some topics related t	to the course depending on		
4.	Semin	ars presentation			
5.	Field v	visits to laboratory and factories			
(v)	ii) Meth	ods of assessment of students numerical	and communication skill	s	
1.	Their inter	raction with the lectures and discussions			
2.	Evaluation	of presentations			
3.	Evaluation	of reports			
4.	Practical e	xam			
e. Psy	chomotor	Skills (if applicable)			
(i) Г	Description	of the psychomotor skills to be develop	ed and the level of		
(1) L	escription	of the psychomotor skins to be develop	cu anu the level of		
p	erformanc	ce required			
		NA			
(ii) T	eaching st	rategies to be used to develop these skills	8		
	•	NA			
(viii)	Methods	of assessment of students psychomotor	skills		
	•	NA			

5. Sche	dule of Assessment Tasks fo	r Students During the Semester
Assessment task (eg. essay, test, group project, examination etc.)	Week due	Proportion of Final Assessment
Midterm 1	5 th week	15%
Midterm 2	10 th week	15%

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				ساعاتهم الخطق ١٣٦	التوصية ٣٧
3		Quizzes and In-Class Problem Solving	Each 2 weeks w	5%	
4		Presence of students	All lectures	5%	
5		Small project	12 th week	5%	
6		Homework	Every week	5%	
7		Final exam	End of semester	50%	

D. Student Support

- 3. Arrangements for availability of faculty for individual student consultations and academic advice. (include amount of time faculty are available each week)
- Department and Faculty web-page with communication tolls in black board. •
- 4 Office hours/ week.

E. Learning Resources

1- Required Text(s):

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

2- Recommended Reading List

• Elements of Electromagnetics : M. N. O. sadiku [Oxford University Press, 2001] 3rd Edition.

3-Electronic Materials, Web Sites

- Web Sites, Social Media, Blackboard, Facebook, Twitter, etc.)
- Consult courses in website of the certified universities,.

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				الاحم الحطة ١٣٦	التوصية ٣٧
1					
4-	Other learn	ing material such as computer-based progran	ns/CD, professional		
	Standardsyr	CEdiations			
•	PPT lectures	s prepared by Prof. Dr. Roshdi Seoudi			

F.	Faci	lities	Required	
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Indica numbo	te requirements for the course including size of classrooms and laboratories (ie er of seats in classrooms and laboratories, extent of computer access etc.)
1.	Accommodation (Lecture rooms, laboratories, etc.)
• •	Classrooms enough for 40 students, Black (white) boards Class room is already provided with data show The area of class room is suitable concerning the number of enrolled students (60) and air conditioned. 2. Computing resources
•	Providing class rooms with computers , AV, data show, Smart Board, software, etc.)
•	3.Other resources (specifyeg. If specific laboratory equipment is required, list requirements or attach list) Does not exist

G Course Evaluation and Improvement Processes

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1	. Strategies for Obtaining Student Feedback on Effectiveness of Teaching
•	Questionaries
•	Open discussion in the class room at the end of the lectures
•	Meeting with students
•	Open door policy
	2. Other Strategies for Evaluation of Teaching by the Instructor or by the Department
•	Revision of student answer paper by another staff member.

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التوحية ٣٧ ساعات المخلة ١٣٦

•	Analysis the grades of students
•	E-Learning Suggestions - e-Learning Documentation
	3. Processes for Improvement of Teaching
	Dreparing the source of DDT
•	Preparing the course as PPT.
•	Using scientific movies.
•	Periodical revision of course content.
•	Report writing of the course and determine goals.
•	Fortification of the student learning.
•	Handling the weakness point
4-	Processes for Verifying Standards of Student Achievement (eg. check marking by an independent faculty member of a sample of student work, periodic exchange and remarking of a sample of assignments with a faculty member in another institution) After the agreement of Department and Faculty administrations
•	The instructors of the course are checking together and put a unique process of evaluation.
•	Feedback evaluation of teaching from independent organization.
5 De	escribe 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.

Date: 13 December 2015

Head of the Physics Department

Dr. Hatem Alamri

۱٤۳۷ کے رقم

الخطة الدراسية لبكالوريوس الغيزياء الطبية

رقه التخصص ٤٠٣٠١

التوحية ٣٧ ماغام الخطة ١٣٦

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

COURSE SPECIFICATION

Course title Physics of Nuclear Medicine

Course code: 4034295 - 4

Revised 13 December 2015

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A	Assessment				

COURSE SPECIFICATIONS MPH, 4034295-4

Institution	Date of Report	
Umm AL-Qura University	Revised Safar 1437 H	ł
College/Department : Science /Mathemat	tics	
A. Course Identification and General Inf	ormation	
1. Course title and code: Physics of Nuclear	r Medicine, 4034295-4	
2. Credit hours: <mark>4 Cr. (1 + 3 Lab)</mark>		
3. Program(s) in which the course is offered	d.	
(If general elective available in many progra	ams indicate this rather than list	programs)
Physics Department		
	4. Nar	ne of faculty member responsible for the course :
Dr Ramadan Ali Hassan		
5. Level/year at which this course is offered	d : <mark>7th level / 4th year</mark>	
6. Pre-requisites for this course (if any): Nu	iclear physics / Code: 4034160-4	
7. Co-requisites for this course (if any): No-	-Co-requisite	
8. Location if not on main campus <mark>: within t</mark>	the university campus	
9. Mode of Instruction (mark all that apply	r)	
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?	

۱٤۳۷ کے رقم

التوحية ٣٧ ساغانه الخطة ١٣٦

Comments:

B Objectives (hyper link of Medical physics plan)

1. What is the main purpose for this course?

Physical principles of radioisotopes used in medicine and biology and operation of related equipment, lecture include;

1 Basic Nuclear Medicine Physics,

2 Formation of Radionuclides,

- 3 Nonscintillation Detectors,
- 4 Nonimaging Scintillation Detectors,
- 5 Imaging Instrumentation,
- 6 Radioisotopes medical applications
- 7 Nuclear medicine imaging
- 9 Quality Control
- 10 Radiation protection in nuclear medicine

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-Cooperate with Nuclear medicine centers to find how they deal with the practical subjects.

2- Posting some course material on the websites to help the students.

3-Frequently check the latest discovery in science to improve the course objectives.

4- Cooperate with other educational institutions to find how they deal with the subject..

5- Re- new the course references frequently.

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

1 Topics to be Covered :-		
Topics	No of Weeks	Contact
	(Studying Week No.)	hours
Topics		
1- Basic of Nuclear Medicine Physics,		
- Isotopes, Isotones, and Isobars		

٧٣٦٢ هـ رقم

التوحية ٣٧ ماعاد الخطة ١٣٦

- Radioactive transformations	2 weeks	6 hrs
- Radioactivity	(Week 1& 2)	
- Half & average life	-	
Solved problems, Quizzes and homework exercises	-	
2 Formation of Radionuclides,		
Production & properties of Radio-Isotopes	_	
Methods of Production		
- Radioisotopes Generators		
-Transient & Secular equilibrium	2 weeks	6 hrs
- Cyclotron	(Week 3 &4)	
Nuclear reactors		
Solved problems, Quizzes and homework exercises		
3 Nonscintillation Detectors,		
1- Gas-Filled Detectors (Theory, Principles)		
Characteristics of the Major Voltage Regions		
Types of Gas-Filled Detectors (Ionization Chambers,		
Proportional Counters, Geiger Counters)	2 weeks	6 hrs
3- Semiconductor Detectors	(Week 5 & 6)	0.110
2- Photographic Detectors		
Solved problems, Quizzes and homework exercises		
First Periodic Exam	Week 7	
MIDDLE TERM VACATION	Week 8	
4 Nonimaging Scintillation Detectors,		
- Structure and Characteristics of the Crystal Scintillation	_	
Detector	1 week	3 hrs
- Sodium Iodide Detector Energy Spectrum	(Week 9)	
- Other Peaks in the Energy Spectrum of the Source		
Types of Crystal Scintillation Detectors	-	

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التوحية ٣٧ ماغارم الحطة ٣٧

Solved problems, Quizzes and homework exercises		
5 Imaging Instrumentation,		
- Radiation Scanners & Gamma camera	-	
- Positron emission tomography	-	
Solved problems, Quizzes and homework exercises	2 week	6 hrs
	(Week 10&11)	
	_	
6 Radioisotopes medical applications		
Uses of Radioisotopes in The Study Of Metabolic pathway		2 h
- Radioimmunoassay (RIA)	– 1 weeks	3 nrs
- Radiotherapy	(Week 12)	
Solved problems, Quizzes and homework exercises		
9 Quality Control	1 week	
10 Radiation protection in nuclear medicine	(Week 13)	3 hrs
Nonimaging Devices (Dose Calibrator, Survey Meters ,Crystal	-	
Scintillation Counters)		
Imaging Devices (Planar Gamma Camera)		
Limiting of External & Internal Exposure	1 week	3 hrs
	(Week 14)	
Second Periodic Exam		
Final Practical Exam		
	(Week 15)	2hrs
	(Week 16)	2hrs

2. Course	2. Course components (total contact hours and credits per semester):							
	Credit			Сс	ontact Hours	Self-Study	Other	Total
X	NCCCA	Lecture	Tutorial	Laboratory	Practical			
	4 ch	24		36	0	72	18	150 hrs

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التروحية ٣٧ ساغات الخطة ١٣٦

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

7-8 h

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

	NQF Learning Domains	Course Teaching	Course Assessment
	And Course Learning Outcomes	Strategies	Methods
1.0	Knowledge		
1.1	knowledge that students should know and understand. At the end of the programme the student should be able to: - Understanding the outlines of the Physics of nuclear medicine.	 Brainstorming. Cooperative learning. Dialogue and discussion. Constructivist. Learning. Self-learning. 	 Conducting scientific research and follow-up of advances in the field. Quarterly tests. By 15 minute multiple choice test on content on completion of each topic with results carrying 20% of final assessment. Duties and discussions within the lecture Multiple choice knowledge item on final exam.
2.0	Cognitive Skills		[
2.1	 estimate mathematical and physical formulas to solve problems in Physics of nuclear medicine and related fields of studies interpret the data obtained from QC of instruments integrate information technology (IT) based solution into Physics of nuclear medicine different fields effectively 	 Problem-solving strategy Cooperative learning strategy Strategy group discussions Assigning students solve the exercises in each chapters 	 Practical test Written test Individual and group activities Short cognitive tests. Achievement tests
3.0	Interpersonal Skills & Responsibility		

رقه	لدراسية لبكالوريوس الفيزياء الطبية العلامية الم	رقم التخصص ٤٠٣٠١ النطة ا	كلية العلوم التطبيقية / قسم الفيزياء			
			التوحية ٣٧ ما ما من الحطة ٣٧			
3.1	 work in a group to conduct an experiment. write a short report in specific subject related to the course materials by using advanced information and communication tools . write a report individually or in a team using the library and the internet appraise the correctness of their solution, interpret their results and connect it to related areas of physics of NM. 	Training students to build good relationships with their counterparts and collaborate with others and develop personal and professional performance through the following strategies: • cooperative learning • peer education • Enhance confidence in the same student and encourage dialogue and discussion.	Students are assessed through: • evaluation of field activities • verbal tests • assessment assignments • style note • Request solutions from each group in front of students.			
3.2	 justify the essential parts of a problem and formulate a strategy for solving the problem. evaluate the solution to a problem and apply appropriate techniques to arrive the solution. 	- Raise the spirit of cooperation among students.	- The final evaluation of the collective tasks and discusses their students.			
4.0	Communication, Information Technology	r, Numerical skills				
4.1	 illustrate numeracy and computational skills, including such aspects as error analysis, order-of-magnitude estimations, and correct use of units and modes of data presentation. operate with basic software, such as word processing, spread sheet use, and graphic programmes, data-logging and storage. 	 Cooperative learning(e.g:Creating working groups with peers to collectively prepare: solving problems and search the internet for some topics). Self-learning to the global of information networks Medical Physics labs. Simulation programs. Hospital Training. Readymade programs. Smart Board Power point 	Discussing a group work sheets. Discuses with them the results of computations analysis and problem solutions. Give homework's to know how the student understands the numerical skills. Give them comments on some resulting numbers.			
4.2	 illustrate information and communications technology to act responsibly in personal and professional relationships. work independently and as a part of a team, and learn independently with open - mindedness and critical enquiry. demonstrate the ability to manage 	Give the students tasks to measure their: mathematical skills, computational analysis and problem solving.	 Written tests Laboratory tests Evaluate the information gathered by the students that are using information networks. 			
رقم	12TV	دراسية لبكالوريوس الغيزياء الطبية	٤ الخطة ال	رقم التخصص ٥٣٠١.	لبيغية / قسو الغيزياء	كلية العلوم التر
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					الاتم عليما معادله	التروحية ٣٧
	time, utilize planni	priorities workloads, and long- and short-term ng skills.				
5.0	Psychomot	or				
5.1	28. Perform accuracy. 29. Operate 30. Draw th	n the experiments with high e instruments safely. ne data and curves.	- Follow up the stu and during carryo experimental worl	ıdents in lab out all k.	 Practical exam. Giving additiona for the results with good accuracy 	l marks 1 high and

5. Schedule of Assessment Tasks for Students During the Semester					
	Assessment task (e.g. essay, test, group project, examination, speech,	Week Due	Proportion of Total		
	oral presentation, etc.)		Assessment		
1	Midterm 1	7 th week	10 %		
2	Midterm 2	15 th week	10%		
3	assay	1^{st} - 15^{th} week	10%		
4	Homework + reports	During the	10%		
		semester			
5	Final exam (Lab. + Lecture)	End of semester	(20 % +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)

1- 5-office hours per week in the lecturer schedule.

2- The contact with students by e-mail and website

E. Learning Resources

1. List Required	Textbooks
------------------	-----------

- 1. Rachel A. Powsner, Edward R. Powsner "Essential Nuclear Medicine Physics" Blackwell Publishing Ltd 2006
- 2. Peter F. Sharp, Howard G. Gemmell and Alison D. Murray "Practical Nuclear Medicine 3rd add." Springer– Verlag London Limited 2005
- 3. Simon Cherry, Michael E. Phelps "Physics in Nuclear Medicine" 3rd add," Saunders 2003

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

1- Journal of nuclear medicine technology; <u>http://tech.snmjournals.org/</u>

2- Journal of nuclear medicine ; <u>http://jnm.snmjournals.org/</u>

، الطبية ١٤٣٧ هـ رقم

التوحية ٣٧ ماغام الخطة ١٣٦

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

1- Michael E. Phelps "PET physics, instrumentation, and scanners second edition"2006 Springer Science.

2- Habib Zaidi "Quantitative Analysis in Nuclear Medicine Imaging" Springer, 2006.

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

http://www.springer.com

- http:// www.sciencedirect.com

-http:// www.gigabedia .org

5. Other learning material such as computer-based programs/CD, professional standards or regulations and software. None

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.)

 -The size of the room should be proportional to the number of students

 - Provide enough seats for students, .

 - The number of student not exceed on 30 in the classroom

 - Library

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

 -Hall is equipped with a computer.

 - Provide overhead projectors and related items

 -Smart board

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

 None

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching

Student evaluation electronically organized by the University.

2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor

-Revision developmental internal and external.

- Student Assessment tests quarterly and final through questionnaires

-The colleagues who teach the same course discuss together to evaluate their teaching

3 Processes for Improvement of Teaching

-To ensure the teaching aids course.

- The new follow-up, which was linked to the course or effective ways of teaching.

- Create the right atmosphere for study.

- Material and moral incentives.

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				الام قلخال مواذله	۳۷	التوصية
- Lect	ure developm	ental audit, or workshop lesson model				
- Cou	rse report, Pro	ogram report and Program self-study.				
- A tı	itorial lecture	must be added to this course.				
4. Pro	ocesses for Ver	rifying Standards of Student Achievement (e.g.	check marking by an indep	oendent member tea	ching	staff
of a sa	ample of stude	ent work, periodic exchange and remarking of t	tests or a sample of assignm	ents with staff at an	other	
institı	ition)					
-The	instructors of	the course are checking together and put a uni	ique process of evaluation.			
5 Des	cribe the plan	uning arrangements for periodically reviewing o	course effectiveness and pla	nning for improvem	ent.	
- Con	sulting the ot	her professors scheduled.				
- Hos	ting a visiting	; professor to evaluate the course.				
- Woi	•kshops with p	professor's course.				
- Reco	onsider the vo	ocabulary scheduled every two years in order to) cope with new developme	nts		
-Stud	ent evaluation	1.				
Cour	se report.					
Progr	am report					

Date: 13 December 2015

Head of the Physics Department

Dr. Hatem Alamri

Kingdom of Saudi Arabia

The National Commission for Academic Accreditation &

Assessment

التوحية ۳۷ **ساغات الخطة ۱۳٦**

COURSE SPECIFICATION

Course title Physics of Bio-Materials

Course code: 4034296-3

Revised 2015

رقم التخصص ٤٠٣٠١

الما بعد الخطة ١٣٦ ۳V لتهصبة

كلية العلوم التطبيقية / مسم الغيزياء

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

Institution: Umm AL – Qura University

College/Department : College of Applied Sciences – Department of Physics

A Course Identification and General Information

15. Course title Physics of Bio-Materials
16. Course code: 4034296-3
2. Credit hours: 3 hr
3. Program(s) in which the course is offered. : B.Sc Medical Physics
17. Name of faculty member responsible for the course:
Dr. Ahmed Mohamed El-Hadi
5. Level/year at which this course is offered: 4 th Year / Level 7
6. Pre-requisites for this course (if any):Solid state Physics (4034170-4)
7. Co-requisites for this course (if any):
8. Location if not on main campus: Main campus
9. Mode of Instruction (mark all that apply)
a. Traditional clas $\sqrt{100\%}$ What percentage?
b. Blended (tradnd online) Wpercentage?

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رقم	. <u>a</u> 128V	الغطة الدراسية لبكالوريوس الغيزياء الطبية	رقم التخصص ٤٠٣٠١	يقية / قسو الغيزياء	كلية العلوم التطو
				الاسم تلخيا متهادات	التوصية ٣٧
		c. e-learning d. Correspondence f. Other	What percentage? W nat perce ntage? Wntage? Comments:		

س الغيزياء الطبية ١٤٣٧ هـ رقع

توحية ٣٧ سانحات الحطة ١٣٦

B Objectives



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

The Biomaterials course is divided into four sections: macromolecular polymer & material science, physical characterization & properties,.

Biomaterials will concentrate on fundamental principles in biomedical physics and material science. This course uses a combination of lectures and student presentations, self-directed learning to examine the structure and properties of hard materials (ceramics, metals) and soft materials (polymers, hydrogels). Specifically, the class will be divided into two parts: (I) Biomaterial Science and Engineering, (II) and Polymers

1 Topics to be Covered		
Торіс	No of	Contact
	Weeks	hours

٤٠٣ الخطة الدراسية لبكالوريوس الغيزياء الطبية ١٤٣٧ هـ رقم	نو التحصي ١	م رة	بيقية / قسم الفيزيا:	كلية العلوم التط
		11	م قلعال من الحلة	التوحية ٣٧
Chapter 1				
Introduction to Medical Biomaterials: Type of Bio				
materials, Properties of biomaterials: Physical,				
thermal, electrical and optical properties of bio-				
materials and their application to processing solved				
problems	1-3	9 hrs		
Quiz 1	15	5 111 5		
Quiz 2				
Chapter 2				
Novel Biomaterials Uses in medical: Biodegradable				
materials, Hydrogels, self-assembling peptides,		2 hrs		
Implants materials, Metallic implant materials,				
stainless steels, co-based alloys, Ti based alloys,				
ceramic implant materials, aluminum oxides,				
hydroxyapatite, glass, ceramics, and carbons	4-6			
Solved problems.		9 hrs		
Quiz 3				
First Midterm Exam	7	2 hrs	-	
			Ţ	

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الخطة الدراسية لبكالوريوس الغيزياء الطبية

كلية العلوم التطبيقية / مّسم الفيزياء

التوحية ٣٧ ماغايم الخطة ١٣٦

Chapter 3		
Polymers for Medical applications: Polymeric implant. Polymers for drug delivery: types of	8-12	18 hrs
polymer, pharmaceutical polymers.		
physicochemical properties of polymers and		
relationship with structure, properties, kinetics,		
mechanisms and applications and Materials		
Nanostructure Devices (DNA-templated and		
nanowires).		
Chapter 4		
Hydrogels		
Natural vs. Synthetic Hydrogels		
Hydrogels as Tissue Engineering Matrices		
Preparation of Hydrogels		
	13-15	6 hrs

رقه	. <u>⊿</u> 121″V	مية لبكالوريوس الغيزياء الطبية	الخطة الدراء	٤•٣•١	نو التحص	رنه	يقية / قسم الفيزياء	لوم التحم	محال تعياك
						1	المعادية المحلقة الم	۳۷	التوصية
							7		
		Seco	ond Midterm Exam		15	2 hrs			
2 Cours	e components (tota	l contact hours per semester	r):	-					
Lecture	: 15 (Credit Hrs)	Tutorial:	Practical/Fieldwork/Inte rnship:	Other	r: 30 hr s				

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)

4. Development of Learning Outcomes in Domains of Learning

For each of the domains of learning shown below indicate:

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

h. Knowledge : Description of the knowledge to be acquired

رقم	.∡ 128V	الخطة الدراسية لبكالوريوس الغيزياء الطبية	رقم التخصص ٤٠٣٠١	لبيقية / قسم الفيزياء	علوم التد	كلية ال
				ساغانهم الخطق ١٣٦	۳۷ .	التوصية
		Upon successful completion of this cours	se The student will be able to:			
	 Define electri proces Explain Descri Descri Explain Outline Highlig Encour referen Discus Coopen Renew Freque 	Type of Bio materials, Properties of bior cal and optical properties of bio-materia sing n Biomaterials Uses in medical . be Polymers for Medical applications n strategy of the course in the beginning of t es of the physical laws, principles and the as ghting the day life applications whenever ex rage the students to see more details in the nce books in the library. sing some selected problems in each chapte rate with different institution to find how th the course references frequently ently check for the latest discovery in science	naterials: Physical, thermal, ls and their application to the semester ssociated proofs. fist. international web sites and er. ley deal with the subject e			
(ii) '	Feaching stra	ategies to be used to develop that knowle	edge			
- D al D	enforstrating pplications iscussing phen	iomena with illustrating pictures and diagrams	S			
- L(= Pi = Pi	rojector ower point					
• e· • Tu	-learning utorials					
 R D 	evisit concepts iscussions	>				
B	rain storming start each chart	sessions				
- 31 • •	earn the stude	nt background of the subject:				
= Sł	now the best v	vays to deal with problem:				
		Keep the question "why" or "	how" to explain always there			
		(iii) Methods of assess	nent of knowledge acquired.	-		
•	The assess explicitly m the extent complexity acquisition logical fash and verbal	implicit in all form neasured. The overall degree of success achie to which these skills have been acquired. The as the student progresses, are assessed of the ability to handle experimental equipm ion, analyse the results produced and commu- media.	s of assessment, but is not eved by each student reflects project work and growing in to explicitly measure the nent, plan measurements in a unicate them through printed			
b. Co	ognitive Skill	ls				
Prepa chap in di probl	aring main ou ter, Home w ifferent refer lem, Doing si	utlines for teaching, Following some proof ork assignments, Encourage the student to ences, Ask the student to attend lectur mall research, Learn how to search the inte	s, Define duties for each look for the information res for practice solving ernet and use the library.			

ه رقو	1287	المنطة الدراسية لبكالوريوس الغيزياء الطبية	رقم التهنص ٤٠٣٠١	كلية العلوم التطبيقية / قسم الفيزياء
				التوحية ٣٧ مالالم ٣٧ الدلة
Learn ho	w to sum	marize lectures or to collect materials of the	he course. Learn how to	
solve diff	ficulties in	n learning: solving problems – enhance edu	ucational skills.	
(ii) Teac	hing stra	ategies to be used to develop these cognit	tive skills:	
- Lec	tures .			
D19	scussion			
(iii) Met	hods of a	assessment of students cognitive skills		
- Exa - Qu - Disc	am must of iz and ex cussions aff	contain questions that can measure these sl ams ter the lecture	kills.	
c. Interp	ersonal S	Skills and Responsibility		
1		At the end of the cou	urse, the student will be able to	to:
		- work effectively in a	group to make a decision.	
		-make a certain decision fast especially	v during data acquisition	
(x)	Teachi	ing strategies to be used to develop these	skills and abilities	
			- Lab work	
			- Case Study	
			- Active learning	
			- Small group discussion	
(iii) Met	hods for	assessment of the students interpersona	l skills and capacity to	
carry res	sponsibili	ity		
• Ev	valuate th	e efforts of each student in preparing the re	port.	
• Ev	valuate th	e work in team		
• Ev	valuation o	of the role of each student in lab group assignment of students presentations	nt	
- 11	anation 0	n statents presentations		
d. Com	municati	on, Information Technology and Numer	rical Skills	
(iv)	Descri	ntion of the skills to be developed in this	domain At the end of the	e
(IX)	course	, the student will be able to:	uvinani. At the cliu of th	
(x)	Know the	he basic mathematical principles.		
(xi)	Use the	web for research.		
(xii)	Discuss	with the student.		
(xiii)	Exams	to measure the mathematical skill.		
				* * 1

۱٤۳۷ کې د 🕫		الخطة الدراسية لبكالوريوس الغيزياء الطبية	رقو التخصص ٤٠٣٠١	لية العلوم التطبيقية / قسم الفيزياء		
				الاكم للخطة الالم	التوحية ٣٧	
(xiv)	Clear th	he weakness point that should be eliminated.				
(xv)	Encour	age the student to ask for help if needed.				
(xvi)	Compu	itational analysis.				
(XVII) (XVIII)	Data re Focusi	presentation. ng on some real results and its physical mean	ing.			
(xix)	Lecture	es for problem solution.	0			
(xx)	Encou	rage the student to ask good question to h	help solve the problem			
(xxi)	Know h	now to write a report.				
17. Te	aching	strategies to be used to develop these s	kills			
23. Ho on	omewor web sit	k (preparing a report on some topics relat es).	ted to the course depending			
24. Se	minars į	presentation				
(iii) M	lethods	of assessment of students numerical a	nd communication skills			
16. Ev	aluation	of presentations				
17. Ev	aluation	of reports				
Psycho	motor	Skills (if applicable)				
		At the end of the c	course, the student will be able to NA	D:		
i) Teacl	ning str	ategies to be used to develop these skill	ls			
		- Follow up student	ts the students in lab			
				_		
25. M	ethods	of assessment of students psychomotor	[,] skills			
•						

	5. Schedule of Assessment Tasks for Students During the Semester						
	Assessment task	Week Due	Proportion of Total				
	(e.g. essay, test, group project, examination, speech, oral presentation, etc.)		Assessment				
1	Exercises & Home works	All weeks	5 %				
2	Participation	All weeks	5 %				
3	Written Test (1)	6 th week	15%				

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				التوحية ۳۷ ماعات الخطة ۱۳۶	
4		Written Test (2)	11 th week	15%	
5		Assay	15 th week	10%	
6		Final Exam (theoretical)	16 th week	50%	

D. Student Support

4.	Arrangements for availability of faculty for individual student consultations and academic advice. (include amount of time faculty are available each week)
Of	ffice hours: 10 hrs

E. Learning Resources

Required Text(s):
1. BIOMATERIALS SCIENCE : An Introduction to Materials in Medicine, Edited by Buddy D.
Ratner and Allan S. Hoffman.
2. BIOMATERIALS APPLICATIONS FOR NANOMEDICINE, Edited by Rosario Pignatello
Recommended Reading List
Electronic Materials, Web Sites
(eg. Web Sites, Social Media, Blackboard, etc.)
Other learning material such as computer-based programs/CD, professional standards/regulations

رقم	<u>→</u> 128V	الخطة الدراسية لبكالوريوس الغيزياء الطبية	رقو التخصص ٤٠٣٠١	بيغية / قسم الغيزياء ساعام <i>ه</i> المحلة ١٣٦	كلية العلوم التط التوحية ٣٧
•	PPT prepare	d by Associate prof. Dr. Ahmed El-Hadi			
				F. Facilit	ies Required
Indio num	cate requirem ber of seats in	ents for the course including size of classro n classrooms and laboratories, extent of co	ooms and laboratories (ie mputer access etc.)		
		1. Accommodation (Lect	ure rooms, laboratories, et	c.)	
•	 Class room The area c and air cor 	is already provided with data show of class room is suitable concerning the num aditioned.	ber of enrolled students (6	8)	
			2. Computing resourc	es	
•	 Providing c 	lass rooms with computers and labs with data	a show.		

3.Other resources (specify --eg. If specific laboratory equipment is required, list requirements or attach list)

- Availability of some reference bacterial strains
- Availability different specific media and chemicals used for isolation.

G Course Evaluation and Improvement Processes





لتوصية ٣٧ ماعات الخطة ١٣٦

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

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

Date: 13 December 2015

Head of the Physics Department

Dr. Hatem Alamri

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

COURSE SPECIFICATION

Course title Hospital Training

Course code: 4034998-11

Revised 13 December 2015

Kingdom of Saudi Arabia

National Commission for Academic Accreditation & Assessment



المملكة العربية السعودية الهيئة الوطنية للتقويم والاعتماد الأكاديمي

COURSE SPECIFICATIONS MPH, 4034998-11

Institution	Date of Report
Umm AL-Qura University	Revised Safar 1437 H
College/Department : Science /Mathematics	

A. Course Identification and General Information

١٤٣٧ هـ رقم	لوريوس الفيزياء الطبية	الخطة الدراسية لبكا	٤•٣•١	رقم التخصص	بيقية / قسم الفيزياء	كلية العلوم التط
					الم الحطة ١٣٦	الترمية ٣٧
1. Course title and	code: <mark>Hospital Trainin</mark> g	<mark>, 4034998-</mark> 11				
2. Credit hours: 11	Cr					
3. Program(s) in wh	nich the course is offer	ed.				
(If general elective a	wailable in many prog	rams indicate this rath	er than list p	orograms)		
Physics Departmen	t					
			4. Nam	e of faculty me	ember responsible for	the course :
					Prof. S	<mark>aud Allyhani</mark>
5. Level/year at wh	ich this course is offer	ed : <mark>8th level /Fourth y</mark>	<mark>ear</mark>			
6. Pre-requisites for	r this course (if any): <mark>D</mark>	epartment Approval				
7. Co-requisites for	this course (if any): N	<mark>o-Co-requisite</mark>				
8. Location if not or	n main campus <mark>: within</mark>	the Specialist Hospita	ls			
9. Mode of Instruct	ion (mark all that app	y)				
a. Traditional cla	ssroom	What percer	ntage?			
b. Blended (tradi	tional and online)	What percen	tage?			
c. e-learning		What percer	ntage?			
d. Correspondence	ce	What percer	ntage?			
f. Other		What percer	ntage?	100%		
Comments:						

B Objectives (hyper link of Medical physics plan)

1. What is the main purpose for this course?

The student will spend three months (Last-Term of his final year) in Specialist Hospitals were they can gain an experiences in Medical Physics Department within the hospital in the field of Nuclear Medicine, Radiotherapy, Medical Imaging and Radiation Protection Quality Control.

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-Cooperate with Nuclear medicine centers to find how they deal with the practical subjects.

2- Posting some course material on the websites to help the students.

3-Frequently check the latest discovery in science to improve the course objectives.

4- Cooperate with other educational institutions to find how they deal with the subject.

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التوحية ٣٧ ماعات الحطة ١٣٦

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

1 Topics to be Covered :-		
Topics	No of Weeks	Contact
		hours
	(Studying Week No.)	
Conventional X-ray		
X-ray Imaging	2 weeks	
Structure of X-ray imaging	(Wook 18, 2)	
A-ray Production	(WEEK ICE 2)	
Quality Control of Radiology	-	50 hrs
Nuclear Medicine		
Hot Laboratory	-	
Radiopharmaceuticals	-	
Radiation Detectors	-	
	2 weeks	
Radiation Doses	2 WEEKS	50 hrs
Quality Control in Hot Laboratory	(Week 3 &4)	
Radiation protection in Medicine		
Radiation protection in Medicine		
Computer Tomogram		
Computer Tomogram, CT		
Comparison between CT and Other imaging modalities		
Structure of CT		
Making an CT Imaging	2 weeks	
Quality Control of C T	(Week 5 & 6)	50 hrs
First report and discussion	Week 7	
MIDDLE TERM VACATION	Week 8	
MRI		
Magnetic Resonance Imaging, MRI		
Structure of MRI	1 week	
MRI Principle	(Week 9)	25 hrs
Advantages of MRI		
Quality control tests for MRI		
Radiotherapy		
Principle of linear accelerator		
Percentage depth dose distribution		

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التوحية ٣٧ ماغادها الحطة ١٣٦

Back scatter factor calculation	2 week	
Collimator factor calculation	(Week 10&11)	50 hrs
Monitoring unit		
Quality Control in Radiotherapy		
Radiation protection in Radiotherapy		
Final Reports and seminar	(Week 15)	2hrs
	I	1

2. Course	2. Course components (total contact hours and credits per semester):								
Credit Contact Hours				Self-Study	Other	Total			
Х	NCCCA	Lecture	Tutorial	Laboratory	Practical				
	4 ch	24	•••••		0	72	18	150 hrs	

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

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

	NQF Learning Domains	Course Teaching	Course Assessment
	And Course Learning Outcomes	Strategies	Methods
1.0	Knowledge		
1.1	knowledge that students should know and understand. At the end of the programme the student should be able to: - Understanding the outlines of the Physics of nuclear medicine.	 Brainstorming. Cooperative learning. Dialogue and discussion. Constructivist. Learning. Self-learning. 	 Conducting scientific research and follow-up of advances in the field. Quarterly tests. By 15 minute multiple choice test on content on completion of each topic with results carrying 20% of final assessment. Duties and discussions within the lecture Multiple choice knowledge item on final exam.

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التوحية ٣٧ ساعات الحطة ١٣٦

2.0	Cognitive Skills		
2.1	 estimate mathematical and physical formulas to solve problems in medical physics and related fields of studies interpret the data obtained from QC of instruments integrate information technology (IT) based solution into medical physics different fields effectively 	 Problem-solving strategy Cooperative learning strategy Strategy group discussions Assigning students solve the exercises in each chapters 	 Practical test Written test Individual and group activities Short cognitive tests. Achievement tests
3.0	Interpersonal Skills & Responsibility		
3.1	 work in a group to conduct an experiment. write a short report in specific subject related to the course materials by using advanced information and communication tools . write a report individually or in a team using the library and the internet appraise the correctness of their solution, interpret their results and connect it to related areas of physics of NM. 	Training students to build good relationships with their counterparts and collaborate with others and develop personal and professional performance through the following strategies: • cooperative learning • peer education • Enhance confidence in the same student and encourage dialogue and discussion.	Students are assessed through: • evaluation of field activities • verbal tests • assessment assignments • style note • Request solutions from each group in front of students.
3.2	 justify the essential parts of a problem and formulate a strategy for solving the problem. evaluate the solution to a problem and apply appropriate techniques to arrive the solution. 	- Raise the spirit of cooperation among students.	- The final evaluation of the collective tasks and discusses their students.
4.0 4.1	Communication, Information Technology - illustrate numeracy and computational skills, including such aspects as error analysis, order-of-magnitude estimations, and correct use of units and modes of data presentation.	 Numerical skills Cooperative learning(e.g:Creating working groups with peers to collectively prepare: solving problems and search the internet for some topics). 	Discussing a group work sheets. Discuses with them the results of computations analysis and problem solutions.

دقه	احراسية ليكالهريمس الفيزياء الطبية	رقم التخصى ٤٠٣٠١ الخطة ال	كلية العلمه التطييقية / قسم الفيزياء
,,			التوحية ٣٧ ما عارت الدحلة ١٣٦
	- operate with basic software, such as word processing, spread sheet use, and graphic programmes, data-logging and storage.	 Self-learning to the global of information networks Medical Physics labs. Simulation programs. Hospital Training. Readymade programs. Smart Board Power point 	Give homework's to know how the student understands the numerical skills. Give them comments on some resulting numbers.
4.2	 illustrate information and communications technology to act responsibly in personal and professional relationships. work independently and as a part of a team, and learn independently with open - mindedness and critical enquiry. demonstrate the ability to manage time, priorities workloads, and utilize long- and short-term planning skills. 	Give the students tasks to measure their: mathematical skills, computational analysis and problem solving.	 Written tests Laboratory tests Evaluate the information gathered by the students that are using information networks.
5.0	Psychomotor		
5.1	31. Perform the experiments with high accuracy.32. Operate instruments safely.33. Draw the data and curves.	- 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. Schedule of Assessment Tasks for Students During the Semester					
	Assessment task (e.g. essay, test, group project, examination, speech,	Week Due	Proportion of Total		
	oral presentation, etc.)		Assessment		
1	1 st Report	7 th week	10 %		
2	Final report	15 th week	20%		
3	Seminar	1 st - 15 th week	10%		
4	Hospital report	End of semester	60 %		

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- 5-office hours per week in the lecturer schedule.

2- The contact with students by e-mail and website

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التوحية ۳۷ <u>ساعات الحطة ۱۳۶</u>

E. Learning Resources

- 1. List Required Textbooks
- 4. Failz M. Khan "the physics of radiation therapy" 3rd add.2003 by Lippincott Williams & Wilkins.
- 5. Peter F. Sharp, Howard G. Gemmell and Alison D. Murray "Practical Nuclear Medicine 3rd edition." Springer– Verlag London Limited 2005
- 6. Simon Cherry, Michael E. Phelps "Physics in Nuclear Medicine" 3rd edi.," Saunders 2003

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

1- Journal of nuclear medicine technology; <u>http://tech.snmjournals.org/</u>

2- Journal of nuclear medicine ; <u>http://jnm.snmjournals.org/</u>

3-Journal of medical physics ; <u>http://www.jmp.org.in/md.asp</u>

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

1- Michael E. Phelps "PET physics, instrumentation, and scanners second edition"2006 Springer Science.

2- Habib Zaidi "Quantitative Analysis in Nuclear Medicine Imaging" Springer, 2006.

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

http://www.springer.com

- http:// www.sciencedirect.com

-http:// www.gigabedia .org

5. Other learning material such as computer-based programs/CD, professional standards or regulations and software. None

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.)

- The number of student not exceed on 15 in each group

- Library

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

-Hall is equipped with a computer.

- Provide overhead projectors and related items

-Smart board

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

None

G Course Evaluation and Improvement Processes

كلية العلوم التطبيقية / قسم الغيزياء رقم التخصص ٤٠٣٠١ الخطة الدراسية لبكالوريوس الغيزياء الطبية 🛛 🗶 رقم
التوحية ٣٧ سامارهم المحلة ١٣٦
1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching
Student evaluation electronically organized by the University.
2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor
-Revision developmental internal and external.
-The colleagues who teach the same course discuss together to evaluate their teaching
3 Processes for Improvement of Teaching
-To ensure the teaching aids course.
- The new follow-up, which was linked to the course or effective ways of teaching.
- Create the right atmosphere for study.
- Material and moral incentives.
- Lecture developmental audit, or workshop lesson model
- Course report, Program report and Program self-study.
- A tutorial lecture must be added to this course.
4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff
of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another
institution)
-The instructors of the course are checking together and put a unique process of evaluation.
5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.
- Consulting the other professors scheduled.
- Hosting a visiting professor to evaluate the course.
- Workshops with professor's course.
- Reconsider the vocabulary scheduled every two years in order to cope with new developments
-Student evaluation.
Course report.
Program report

Date: 13 December 2015

Head of the Physics Department

Dr. Hatem Alamri

التوحية ٣٧ مالاله الدعلة ١٣٦

Kingdom of Saudi Arabia

The National Commission for Academic Accreditation & Assessment

COURSE SPECIFICATION

Course title Nuclear Physics

Course code: 4034160-4

Revised 13 December 2015

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Course Specification

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

Institution: UM AL – QURA UNIVERSITY

College/Department : Faculty of Applied Science – Department of Physics

A Course Identification and General Information

18. Course title Nuclear physics
19. Course code: 4034160-4
2. Credit hours: 4hrs (three hours lecture and one hour Lab.)
3. Program(s) in which the course is offered. : BSc Physics
10. Name of faculty member responsible for the course:
One of the academic staff member
5. Level/year at which this course is offered: 4 th Year / Level 7
6. Pre-requisites for this course (if any): Quantum mechanics (1) (4033145-4)
7. Co-requisites for this course (if any):
8. Location if not on main campus: Main campus
9. Mode of Instruction (mark all that apply)
a. traditional classroom What percentage?
b. blended (traditional and online) What percentage?
c. e-learning What percentage?

رقم التخصص ٤٠٣٠١

كلية العلوم التطبيقية / مسم الغيزياء

ساعات الخطة ١٣٦ ۳V



۷۳۱۵۱ کس رقم

التوحية ٣٧ ماعات الخطة ١٣٦

B Objectives

1. Summa The object	ry of the main learning outcomes for students enrolled in the course. tive of this course is to establish the meaning of the ends of the computational and use in communication, and differentiation, integration and applications of it.	
The object and ele	ctives of this course are to establish the meaning of the concepts of nuclear physics ementary 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. 2.	To understand basic fundamentals of nuclear properties. The students should be trained on physical and generic skills (knowledge – cognitive – interpersonal – communication – problem solving – IT)	
5.	To understand the nuclear drop model.	
4. F	To understand the origin of alpha transition within the puslous	
5.	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 implement content as	describe any plans for developing and improving the course that are being ed. (eg increased use of IT or web based reference material, changes in a result of new research in the field)	
27. Exp 28. Out 29. Hig 30. Enc refe 31. Disc 32. Coc 33. Ren 34. Free	lain strategy of the course in the beginning of the semester lines of the Nuclear concepts, theories and the associated proofs. hlighting the day life applications whenever exist. ourage the students to see more details in the international web sites and erence books in the library. cussing some selected problems in each chapter. operate with different institution to find how they deal with the subject new the course references frequently quently check for the latest discovery in science	

التوحية ٣٧ ماغاده الخطة ١٣٦

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

1 Toj	pics to be (Covered :-
Tonics	No of	Contact
τομισ		hours
	Weeks	nours
1- Nuclear Properties		
1- Definitions & Nuclear radii		1
2- Nuclear Mass-Binding Energy	1	1
3- Nuclear Radiation, Energy levels.	_	1
4- Nuclear Isomers.		1
5- Angular Momentum, Parity and Symmetry	1	1
6- Dipole moment, qudropole moment	-	1
2- Liquid Drop Model		
1- Finding Energy		1
2- Sem-emperical Formula		2
3- Mass Spectrometer		1
4- Nuclear Reactions and Q-value		2
3- Nuclear Shell Model		
1- Single Particle model with square well and Harmocia Oscillator		1
2- Magic Numbers	1	1
3- Spin for Different nuclei	-	1
4- Excited rootes nuclear magnetic moments		1
5. Darity	1	2
S- railty		Ζ

رەم 6- Isotopic spin 1 **4- Gamma Transitions** 1- Multiple Moments 1 2- Decay Constants 1 1 3- Selection Nucles 1 4- Angular Correlation 2 1 5- Internal Conversion 1 **5-** Alpha Transitions 1- Heavy Ions-Stalitlity 2 1 2- Decay Constants 1 3- Tunnel Effect 2 1 4- Energy Levels 1 **6- Beta Transitions** 1- Theorgy of B-decay 2 1 2- Allowed and Forbiddin transitions 1 3- Selection Nucles 2 1 4- Non Conservation of Parity 1 **7- Elementary Particles** 1- Nucler Force and Meson Theory 2 1 2- Pions & Mions 1 3- Kaons & Hyperons 2 1

4- Classi Fiction of demeray Pancles

التوحية ٣٧ مادام ١٣٩

1

الخطة الدراسية لبكالوريوس الغيزياء الطبية

رقه التخص ٤٠٣٠١

<u>⊿</u> 1Σ۳V

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لتوحية ٣٧ ماغات الخطة ١٣٦

		Total	14	42	
2 Course components (total contact hours per semester):					
Lecture : 42 hr	s Tutorial:	Lab: 10 hrs	Total: 52 hrs		
Lecture : 42 hr	s Tutorial:	Lab: 10 hrs	Total: 52	hrs	

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)

4. Development of Learning Outcomes in Domains of Learning

For each of the domains of learning shown below indicate:

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

i. Knowledge : Description of the knowledge to be acquired

- (i) **knowledge that students should know and understand when they complete the course are as follow:**
 - (viii) Learning fundamentals in nuclear physics.
 - (ix) Understanding the models and theories which explain the nuclear properties.
 - (x) Improving logical thinking.
 - (xi) To use concepts of nuclear physical in daily life.
 - (xii) Ability to describe the nuclear phenomena.

التوحية ٣٧ ماعات الخطة ١٣٦

(ii)	Teaching strategies to be used to develop that knowledge
12	. Demonstrating the basic information and principles through lectures and the
	achieved applications
13	. Discussing phenomena with illustrating pictures and diagrams
14	a. E-learning gate of Umm Al-Oura university
	b. Power point
15	Tutorials
16	. Revisit concepts
17	Discussions
18	. Brain storming sessions
19	. Start each chapter by general idea and the benefit of it;
20	. Learn the student background of the subject;
21	. Show the best ways to deal with problem;
22	. Keep the question "why" or "how" to explain always there;
23	. Build a strategy to solve problem.
	(iii) Methods of assessment of knowledge acquired:
6.	Solve some example during the lecture.
7.	Exams:
	a) Online Quizzes
	b) First mid-term exam
	c) Second Mild term exam d) Oral exams
	e) Final exams
8.	Discussions with the students.
9.	Ask the student to clear the misunderstanding of some mathematical principle.
10	Ask quality question.
b. Co	gnitive Skills
(i) Co	gnitive skills to be developed
Comi	tive skills to be developed
Cogin	7 How to use physical lows and principles to understand the subject
	 now to use physical laws and principles to understand the subject 8 How to simplify problems and analyze phenomena
	9 Analyse and explain natural phenomena
	10 Ability to explain the idea with the student own words
i i	10. Homey to explain the fact with the student own words.
	11. Represent the problems mathematically

رقم	. <u>▲</u> 128V	الخطة الدراسية لبكالوريوس الفيزياء الطبية	رقع التخصص ٤٠٣٠١	جيغية / قسم الغيزياء	كلية العلوم التط
				الاسم المحلة المسلم	التروحية ٣٧
/••>					
(11) [eaching sti	rategies to be used to develop these cogni	uve skills:		
2 2	1. Following	main outlines for teaching some proofs			
2	2. Define du	ties for each chapter			
2	3. Home wo	rk assignments			
2	4. Encourage	e the student to look for the information in a	different references		
2	5. Ask the st	tudent to attend lectures for practice solving	g problem		
2	6. Ask the st	tudent to do small research.			
(iii)	Methods of	assessment of students cognitive skills			
9	Midterm	's exam. Exams, short online quizzes			
1	0. Asking at 1. Writing re-	pout physical laws previously taught ports on selected parts of the course			
1	2. Discussion	ns of how to simplify or analyze some phe	nomena		
				_	
c. In	terpersonal	Skills and Responsibility			
(i) D devel	Description of loped	f the interpersonal skills and capacity to car	rry responsibility to be		
	Work indeThe studer	ependently. Its learn independently and take up responsibi	lity.		
(ii) 7	Feaching stra	tegies to be used to develop these skills and	d abilities		
1	2. Learn how	to search the internet and use the library.			
1 1	4. Learn how	v to cover missed lectures. v to summarize lectures or to collect materia	als of the course.		
1	5. Learn hov	v to solve difficulties in learning: solving p	roblems – enhance		
1	education 6. Develop b	at skills. her interest in Science through (lab work f	field trips, visits to		
1	scientific	and research.			
	4 Encoura	ge the student to attend lectures regularly b	y:		
		 Assigning marks for attendance. 			
		 give students tasks of duties 			
(iii) respo	Methods of a onsibility	assessment of students interpersonal skills a	and capacity to carry		
-	9. Online 10. Creati	e Quizzes on the previous lecture ng reports			
		<u> </u>		759	

رقه		النطة الدراسية لبكالوريوس الغيزياء الطبية	رقم التخصص ٤٠٣٠١	بيقية / قسم الفيزياء	كلية العلوم التط
				الاتل قلخال معالالم	التوحية ٣٧
	11. Discus	sion			
	12. The ac work	curacy of the result gained by each group v	will indicate good group		
	13. Presen show t	ting the required research on time and the one he sense of responsibility.	degree of the quality will		
				_	
d. (Communicat	ion, Information Technology and Numer	rical Skills		
(i) D	escription of	the skills to be developed in this domain.			
4 5.	Computation Problem so	on Ilving sis and interpretation			
7	Feeling phy	/sical reality of results			
(ii) T	'eaching stra	tegies to be used to develop these skills			
(**) -	23. Know	the basic physical principles.			
	24. Use the	e web for research.			
	25. Discus	s with the student.			
	26. Exams	to measure the physical skill.			
	27. Clear th	he weakness point that should be eliminated.			
	28. Encou	rage the student to ask for help if needed.			
	29. Compu 30. Data re	itational analysis. presentation.			
	31. Focusir	ng on some real results and its physical meaning	ıg.		
	32. Lectur	es for problem solution.			
	33. Encour	age the student to ask good question to help s	solve the problem.		
	34. Display	the lecture note and homework assignment a	it the web.		
(iii)	Methods of a	esessment of students numerical and comm	unication skills		
(111)			Manication SKIIIS		
	12. Unline	; quizzes			

رقم		الخطة الدراسية لبكالوريوس الغيزياء الطبية	وقو التخصص ٤٠٣٠١	بيقية / قسم الفيزياء	كلية العلوم التط
				الاس علميا مرادله	التوحية ٣٧
	13. Their	interaction with the lectures and discussion	15.		
	14. The re	ports of different asked tasks.			
	15. Home unders	work, Problem solutions assignment and e standing.	xam should focus on the		
	16. Results 17. Comm 18. Resear	s of computations and analysis. ents on some resulting numbers. rch.			
e. Ps	sychomotor	Skills (if applicable)			
	-				
		At the end of the co	urse, the student will be able	to:	
3	4. Perform the	e experiments with high accuracy.			
3	5. Operate ins	struments safely.			
3	6. Draw the d	ata anu curves.			
(ii)]	Feaching str	rategies to be used to develop these skills			
	- Follow up	the students in lab and during carryout all e	xperimental work.		
2	6. Methods	of assessment of students psychomotor s	skills		
_	Dractical				
•	Giving add	ditional marks for the results with high and	good accuracy		
			<u> </u>		

	5. Scł	nedule of Assessment Tasks for	Students During the Semester
1	Midterm 1	5 th week	20
2	Midterm 2	10 th week	20
3	Online quizzes	every week	10
4	Homework	Every week	10
5	Interactive discussions	Every week	10
5	Final exam	End of semester	30

D. Student Support

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

١٤٣٧ ک. رقم

التوحية ٣٧ ماغادها الخطة ١٣٦

8 office hours per week

E. Learning Resources

K. Heyde, Basic ideas and concepts in nuclear Physics, An introductory approach second edition, Institute of physics publishing, Bristol and Philadelphia (1999) ISBN 7503-0534 7 hbk, 07503 0535 pbk.	1)
Irving Kaplan, Nuclear Physics, Second Edition, Addison-Wesley Publishing Compan (1977).	2)
Kenneth S. Krane , Introductory nuclear Physics, , first edition, Jone Wily & Sons Ind (1988) ISBN 0 - 471-80553-X .	3)
Burcham, Nuclear and Particle Physics, 2 Edition, Longman Publisher (1995),ISBN-10 : 0582 450888 , -13: 978 - 0582 450888	4)
Recommended Reading Lis	
[1] Introductory Nuclear Physics, Krene, 198	
[1] Introductory Nuclear Physics, Krene, 198 Electronic Materials, Web Sites	

F. Facilities Required
رقع	- <u></u>	الخطة الدراسية لبكالوريوس الغيزياء الطبية	رقم التحصص ٤٠٣٠١	بيغية / قسم الغيزياء	كلية العلوم التط
				سائماتهم الخطق ١٣٦	التوحية ٣٧
Indica numb	ate requirem per of seats in	ents for the course including size of class n classrooms and laboratories, extent of co	rooms and laboratories (ie omputer access etc.)		
		1. Accommodation (Lec	ture rooms, laboratories, etc	c.)	
•	Class room The area o conditione Lab with fo	i is already provided with data show f class room is suitable concerning the numb d. or 20 students	er of enrolled students and a	air	
			2. Computing resource	es	
•	Providing of	lass rooms with computers and labs with dat	ta show.		
	3.Oth	ner resources (specifyeg. If specific laborate	ory equipment is required, li requirements or attach lis	st t)	

G Course Evaluation and Improvement Processes

1. Strategies for Obtaining Student Feedback on Effectiveness of Teaching
 Questionaries (using of e-learning gate of Umm Al-Qura university) Online Quizzes (using of e-learning gate of Umm Al-Qura university) Open discussion (using of e-learning gate of Umm Al-Qura university)
2. Other Strategies for Evaluation of Teaching by the Instructor or by the Department
 Revision of student answer paper by another staff member if evaluable Analysis the grades of students.
3. Processes for Improvement of Teaching
 Preparing the course as PPT. Using scientific movies. Coupling the theoretical part with laboratory part Periodical revision of course content.
4. Processes for Verifying Standards of Student Achievement (eg. check marking by an independent faculty member of a sample of student work, periodic exchange and remarking of a sample of assignments with a faculty member in another institution)
After the agreement of Department and Faculty administrations

رقم		الخطة الدراسية لبكالوريوس الغيزياء الطبية	رقم التحصص ٤٠٣٠١	بيقية / قسم الغيزياء	كلية العلوم التطبيقية / متسم الفيزياء		
				الاسم المحلة الالم	التوحية ٣٧		
•	The instru	ctors of the course are checking together and	put a unique process of				
	evaluation						
•	Check mai	king of a sample of papers by others in the de	partment.				
•	Feedback	evaluation of teaching from independent orga	nization.				
5 D	escribe the	planning arrangements for periodically review	wing course effectiveness an	d			
			planning for improvemen	t.			
14	- The follov • Stude	ving points may help to get the course effectiv nt evaluation	reness				
	• Cours	e report					
	Progra	am report					
	Progra	am Self study					
	• E-lea	rning					
15	- According	to point 1 the plan of improvement should be	given.				
16	- G- Contact th	e college to evaluate the course and the bene	fit it add to other courses.				
	Add s	ome subject and cut off others depending on t	the new discoveries in physic	5.			

Date: 13 December 2015

Head of the Physics Department

Dr. Hatem Alamri

Kingdom of Saudi Arabia

The National Commission for Academic Accreditation & Assessment

COURSE SPECIFICATION

Course title Solid State Physics I

Course code: 4034170-4

Revised 13 December 2015

كلية العلوم التطبيقية / متسم الغيزياء

الاكم الحطة 117

Course Specification

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

رقه التخص ٤٠٣٠١

Institution: UM AL – QURA UNIVERSITY

College/Department : Faculty of Applied Science - Department of Physics

A Course Identification and General Information

20. Course title Solid State Physics I

21. Course code: 4034170-4

2. Credit hours: 4 hrs

3. Program(s) in which the course is offered. : BSc Physics

11. 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 7

6. Pre-requisites for this course (if any): Quantum Mechanics (1) - 4033145-4

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)

a. traditional classroom	100%] What pero	centage?
b. blended (traditional and online)] What pe	rcentage?
c. e-learning] What pe	rcentage?
d. correspondence		What pe	rcentage?
	-]	407

رەم

رقم	121°V	الخطة الدراسية لبكالوريوس الغيزياء الطبية	رقم التخصص ٤٠٣٠١	يغية / قسم الغيزياء	كلية العلوم التطر
				ساعاتهم الحطة ١٣٦	التوحية ٣٧
		f. other		What percentage?	
				Comments:	

۱۲۳۷ <u>م</u> رقم

لتودية ٣٧ ماعات الخطة ١٣٦

B Objectives

After completing this course student should be able to: 1. Define the principles and concepts of solid state physics. 2. Compare the origin of bonding in materials 3. Define the lattice planes & directions. 4. Explain the different types of defects in solid state and understand how it affect the physical properties of matter. 5. Explain how X-Rays Diffraction can be used in studying the solid structure. 6. Define phonons in crystals and distinguish between their different modes 7. Choose the right formulas to calculate specific heat & thermal conductivity of the lattice. 8. Recognize the main drawbacks of the free electron model in metals. 9. Identify: Bloch's theorem, Brillouin zones & Fermi surface in metals. 10. Classify different types of solid according to The Band Theory. 11. Distinguish between intrinsic & extrinsic Semiconductors and know their properties and applications. 12. Recognize the idea behind the Superconductivity phenomenon and be aware of its applications. **13.** Evaluate students' interest in ethical aspects in the exploitation of solid state physics

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

The course will cover An introduction to the physics governing the different types of binding in solid state materials, Geometry of Solids and crystalline state of matter, Reciprocal Lattice, Brillouin zone, Modern theories describing lattice vibrations, Energy bands, X-Ray Diffraction, Electrons in solids, and Optical properties of solid materials. Free electron theory in metals ,band theory, thermal properties of solid materials, Lecture 4 hours..

	1 Topics to	be Covered
Торіс	No of	Contact
	Weeks	nours

ب ٤٠٣٠١ الخطة الدراسية لبكالوريوس الفيزياء الطبية ١٤٣٧ ه رقم	<u>رقم</u> التخصص	يقية / قسم الفيزياء	كلية العلوم التطب
		ساعات الحلة ١٣٦	التروحية ٣٧
The atomic Theory and Binding Forces	1.5	6	
1- Review of atomic structure			
2- Atomic binding and band theory			
3- Binding forces between atoms			
4- Lattice Energy Calculations			
5- Types of bonds			
6- Nucleation and growth kinetic			
7-Experimental methods of crystal growth			
	1.5	6	
Crystalline Structure 1- Long range and short rang order			
2- The crystalline state			
3- Basic definitions of crystallography			
4- The seven crystal systems			
5- Wigner Seitz primitive cell			
6- Symmetry elements of crystals			
7- Important plane systems in a cubic crystals8- Miller's indices for crystal planes,			
Crystals Properties	1.5	6	
1- Crystal Directions and distance between crystal plans			
2- Zone, Zone Axis and angles between zones			
3- Atomic structure of crystals			
4- Cubic and hexagonal close-packed			
5- Characteristic of FCC and BCC structure			
6- The crystal structure of some simple crystals			
Structural Defects in Crystals	1	4	
1- Point defects and Free energy of a crystal			
2- Point defects in ionic crystals			
3- Line defects and types of dislocation			
4- Planer defects			
5- Determination of vacancies concentration and the activation energy			

رقم	. <u>⊿</u> 121″V	وريوس الفيزياء الطبية

التوحية ٣٧ ماعاره الحطة ١٣٦

* X-Rays Diffraction in Crystals	1.5	6
1- Used rays in studying crystal structure		
2- Generation and properties of X-rays		
3- X-Rays scattering from an atom		
4- X-Rays scattering from a crystal and Reciprocal lattice		
Lattice Vibrations	1	4
1- Elastic waves		
2- Modes of vibrations and density of states of a continuous medium		
3- The phonon		
4- Elastic and non-elastic scattering		
5- Lattice waves of one-atomic linear chain		
6- Vibration Modes of 1D diatomic		
Free electrons in metals	2	8
1. The Electrical Conductivity in Metals		
2. The Specific Resistance in Metals		
3. The Electrical and Thermal Conductivity in Metals		
4. The Quantum Theory in Free Electrons		
5. Ground State Property of Free Electrons		
6. Electronic Specific Heat of Metals		
7. Some Problems in Free Electron Model		
Band theory in the solids	2	8
1. Origin of the Bands in Solid		
2. Periodic Potential		
3. Bloch Function		
4. Crystal Structure in One-Dimensional Atomic Chain		
5. Brillouin Zones		
6. Band Theory in Free Electron Model		
7. Density of States		
8. The Effective Mass		
9. Concept of Holes		
10.Fermi Surfaces		

\$ \$) <u> </u>	النطة الدراسية لبكالوريوس الغيزياء الطبية	ی ۲۰۳۰۱	رقم التخصر	يقية / قسم الفيزياء	كلية العلوم التطب
					ساغارهم الخطق الالم	التوحية ٣٧
	*	Thermal properties of solid materials		3	12	
	 Specific Einstein Debye m Heat cap Heat cap Thermal Thermal 	heat: model for specific heat, nodel for specific heat, pacity of solid body, pacity of electron gas, l conductivity of solid body, l expansion				
				14weeks	56 hrs	

2 Course components (total contact hours per semester):					
Lecture : 56	Tutorial:	Practical:	Other:		

3. Additional private study/learning hours expected for students per week. (This should be an average :for the semester not a specific requirement in each week): 12h (reports & essay)

4. Development of Learning Outcomes in Domains of Learning

For each of the domains of learning shown below indicate:

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

Upon successful completion of this course The student will be able to:

22. Describe the importance of solid state physics in relation to physics and environment.

23. Define the principles and concepts of solid state physics.

24. Describe the different types of binding in material.

- ١٤٣٧ کے رقم
- الخطة الدراسية لبكالوريوس الغيزياء الطبية

التوحية ٣٧ مامانه المحطة ١٣٦

25. List different types of crystal structures. 26. Describe how the crystal defects and x-ray diffraction. 27. Apply the use mathematical formulation to describe the physical principle or phenomena in solid state physics. 28. Describe Methods of measurement and assessment of properties of solids (ii) Teaching strategies to be used to develop that knowledge The methodology includes a combination of lectures by the lecturer, seminar presentation by the students and web-interactions. Students will be given opportunity to understand the role of important solid state physics in different applications and human service. At the end of the programme, students will be divided into groups for seminar presentation on • important areas of the course to assess their understanding and comprehension of the course. All students will be involved in on-line learning process and each student is required to create an E-mail address to facilitate student web interactions. Using images and movies Encouraging students to collect the new information about what the new in solid state physics Enable the reference books and scientific sites concerning solid state physics in internet. (iii) Methods of assessment of knowledge acquired: Periodical exam and reports 20% Mid-terms theoretical exam 30% Final exam 50% **b.** Cognitive Skills (i) Cognitive skills to be developed Having successfully completed the course students should be able to: 1. Differentiate between the different types of binding in solid materials. 2. Diagram the different types of crystal structure 3. Analyse the electrical and thermal conductivity in Metals 4. Explain how solid state physics is important to a relevant societal issue. 5. Interpret the band theory in solids 6. Explain methods of measurement and assessment of properties of solids. (ii) Teaching strategies to be used to develop these cognitive skills: - Lectures -Brain storming -Discussion (iii) Methods of assessment of students cognitive skills - Exam must contain questions that can measure these skills. - Ouiz and exams - Discussions after the lecture c. Interpersonal Skills and Responsibility

رقم	. <u>▲</u> 128V	الغطة الدراسية لبكالوريوس الغيزياء الطبية	وقو التخصص ٤٠٣٠١	<u> هية</u> / هسم الهيزياء	كلية العلوم التطبي
				الاتم تدخيلا حبالالم	لټوحية ۳۷
			At the end of the course, the stude - Evaluate solid state physics	ent will be able to: information.	
			-Analyse solid state p	physics data.	
			-Judge the importance of solid s	tate physics.	
		-Choose representative	examples for each group of solid s	tate physics.	
	(xi) Teachi	ng strategies to be used to develo	p these skills and abilities		
				- Case Study	
			- Act	tive learning	
			- Small grou	p discussion	
(iii	i) Methods for	assessment of the students interp	ersonal skills and capacity to	o carry	
re	sponsibility				
	• Evaluate th	e efforts of each student in preparin	g the report.		
	 Evaluate th Evaluate th 	e scientific values of reports. e work in team			
	Evaluation o	f the role of each student in lab group as	ssignment		
	• Evaluation o	f students presentations			
d.	Communicati	on, Information Technology and	Numerical Skills		
	(xxii) Descrij studen	ption of the skills to be developed t will be able to:	in this domain. At the end of t	he course, the	
	18. Enhancing	the ability of students to use comput	ers and internet.		
	19. Interpret sol	id state physics data			
	20. Present solid	l state physics data orally.			
	21. Know how to	o write a report.			
	22. Teaching	strategies to be used to develop th	ese skills		
	27. Homework sites).	(preparing a report on some topics	related to the course dependin	g on web	
	28. Seminars p	resentation			
	29. Field visits	to factories			
	(iii) Methods	of assessment of students numeri	cal and communication skills		
	18. Evaluation	of presentations			

رقم	<u>→</u> 12.‴V	الخطة الدراسية لبكالوريوس الغيزياء الطبية	رقو التخصص ٤٠٣٠١	وم التطبيقية / قسم الغيزياء	ملعاا قيلك
				۱۳۶ <u>مالالم</u> ۳۷	التروصية
	19. Evaluation	of reports			
	20. Practical e	xam			
e. 3	Psychomotor	Skills (if applicable)			
			At the end of the course, the stude	nt will be able to:	
(ii)	Teaching str	ategies to be used to develop these	skills		
	30. Methods	of assessment of students psychom	otor skills		

	5. Schedule of Assessment Tasks for Students During the Semester					
	Assessment task	Week Due	Proportion of Total			
(e.g	g. essay, test, group project, examination, speech, oral presentation, etc.)		Assessment			
1	Exercises & Home works	All weeks	10 %			
2	Participation	All weeks	10 %			
3	Written Test (1)	6 th week	15%			
4	Written Test (2)	11 th week	15%			
6	Final Exam (theoretical)	16 th week	50%			

D. Student Support

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

Office hours: 10 hrs

	ואדשו ובל אמור לאלא אלקאל אישור איז ואידע בי	رقوالتخصص ٢٠١٠	بيقية / قسو الفيزياء	العلوم التط
			الاكم الخطة ١٣٦	ية ۳۷
Learning Resou	irces			
		Requ	ired Text(s):	
 - C.Kittel / I Walter A. H 	ntroduction to Solid State Physics. 7th. di arrison/ Solid State Theory, Dover editio	tion n 1979		
		Recommende	d Reading List	
جامعة الملك عبد العزير	Elementary So د يسري مصطفى و د احمد الغامدي، مركز النشر العلمي،	lid State Physics by M. A وتطبيقاتها (المرجع الشامل) تأليف	li Omar, 1997 فيزياء الحالة الصلبة	
·- ·			جدة، ١٤٣٦.	
		Electronic Mater	ials, Web Sites	
http://www.phy	rs.lsu.edu/~jarrell/COURSES/SOLID_STATE_H	TML/course_solid.html		
http://www.enc	yclopedia.com/topic/solid-state_physics.asp	x		
http://www.phy	vsics.byu.edu/research/condensed			
http://web.utk.e	edu/~tbarnes/website/cm/cm.html			
	http://w	ww.answers.com/topic/sol	id-state-physics	
Other learnin	ng material such as computer-based program	ns/CD, professional standa	rds/regulations	
		РРТ р	repared by	
		Prof.Dr. Yosry	Moustafa,	
		Dr. Ameena Alał	nmadi, and	
		Dr. Abdelrahr	man Lashin	

F. Facilities Required

التوحية ٣٧ ساعات الخطة ١٣٦

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

1. Accommodation (Lecture rooms, laboratories, etc.)

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.

2. Computing resources

Providing class rooms with computers and labs with data show.

3.Other resources (specify --eg. If specific laboratory equipment is required, list requirements or attach list)

G Course Evaluation and Improvement Processes

1. Strategies for Obtaining Student Feedback on Effectiveness of Teaching

- 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 (eg. check marking by an independent faculty member of a sample of student work, periodic exchange and remarking of a sample of assignments with a faculty member in another institution)

• After the agreement of Department and Faculty administrations

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for

رقم	.▲ 12.WV	النطة الدراسية لبكالوريوس الغيزياء الطبية	رقو التخصى ٤٠٣٠١	كلية العلوم التطريقية / قسم الفيزياء	
				improvement.	التوصية ٢٧
•	Periodical	revision by Quality Assurance Units in the Dep	partment and institution		

Date: 13 December 2015

Head of the Physics Department

Dr. Hatem Alamri