جامعة أم القرى

كلية العلوم التطبيقية

الماجستير في الفيزياء الطبية بالمقررات

والمشروع البحثي

Learning and Teaching

4/1 Learning Outcomes and Graduate Specifications

4/1/1 Main tracks or specializations covered by the program:

(a) Medical Physics
(b)
(c)

4/1/2 Curriculum Study Plan Table

Level	Course Code	Course Title	Required or Elective	Prerequisite Courses	Credit Hours
Level 1	403660-3	Medical Physics Instrumentations	Required		**3**
	403661-3	Advanced Radiotherapy Physics	Required		**3**
	403663-3	Advanced Medical Imaging (1)			**3**
		Elective Course			**3**
	403615-3	Advanced Programming	**Elective**		
	403666-3	Nanotechnology for BioMedical Applications	Elective		
Total credits hours for level 1					**12 hrs**
Level 2	**403667-3**	Medical Radiation Protection	Required		**3**
	403668-3	Brachytherapy Physics	Required		**3**
	403669-3	Advanced Nuclear Medicine	Required		**3**
		Elective Course			***3***
	403671-3	Advanced Medical Imaging (2)	Elective		
	403606-3	Computational physics	Elective		
	403692-3	Image anatomy	Elective		
Total credits hours for level 2					***12 hrs***
Level 3	403673-3	Radiation Measurement in Diagnostic Radiology	Required		**3**
	403662-3	Radiobiology	Required		**3**
	403664-3	Cell Biophysics	Required		**3**
	403675-3	Research Project	**Continue ..**	**Part (1)**	*3*
Total credits hours for level 3					**12 hrs**
Level 4	403676-3	Dosimetry in radiotherapy	Required		**3**
	403674-2	Special topics			*2*
	403670-3	Computational Methods in Medical Physics	Required		**3**
	403675-3	Research Project	**Continue ..**	**Part (2)**	*3*
Total credits hours for level 4					***11 hrs***
Total credits hours for MSc of Medical Physics					***47 hrs***

8/10 Course Specifications

Master of Medical Physics by courses and research project

Study plan module

Level one

First semester of the first year

Level	Course Code	Course Title	Required or Elective	Prerequisite Courses	Credit Hours
Level 1	403660-3	Medical Physics Instrumentations	Required		**3**
	403661-3	Advanced Radiotherapy Physics	Required		**3**
	403663-3	Advanced Medical Imaging (1)	Required		**3**
		Elective Course			**3**
	403615-3	Advanced Programming	Elective		
	403666-3	Nanotechnology for Medical Applications	Elective		
Total credits hours for level 1					**12 hrs**

4/1/4. Course Specification:

COURSE SPECIFICATIONS

Form

Course Title: Medical Physics Instrumentations

Course Code: 403660-3

Date: 5/10/2018.	**Institution**:Umm ALQura University
College of Applied Sciences	**Department**: Physics Department .

A. Course Identification and General Information

1. Course title and code: Medical Physics Instrumentations, 403660-3
2. Credit hours: 3 **(3+0+0) Hr**
3. Program(s) in which the course is offered. Master of Medical Physics

   (If general elective available in many programs indicate this rather than list programs)
4. Name of faculty member responsible for the course Prof. Allehyani S.h
5. Level/year at which this course is offered: Level 1 / First year
6. Pre-requisites for this course (if any): Non
7. Co-requisites for this course (if any): Non
8. Location if not on main campus: Main Campus
9. **Mode of Instruction (mark all that apply):**

a. Traditional classroom	√	percentage?	80
b. Blended (traditional and online)	√	percentage?	20
c. E-learning		percentage?	
d. Correspondence		percentage?	
f. Other		percentage?	

Comments:

B Objectives

1. The main objective of this course

   1. Study of main concepts of Medical Radiation Physics as follows:

Introducing different types of radiation specially those radiation with ionizing radiation (direct or in-direct ionizing radiation) or none-ionizing radiation. Student also study radiation Units, Exposure distribution within the Patient during radiotherapy treatment. X-ray Production with high energy also introduce.

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

To improve the students' expert in the medical physics instrumentations :

- Encourge students to register to webinars and worshops related to the medical physics instrumentations in medical imaging and radiation therapy

Encourage students to write frequently report about selected research topics related to the field

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description:

1. Topics to be Covered

List of Topics	No. of Weeks	Contact hours
Classification of Ionizing Radiation **1- Directly and Indirectly Ionizing Radiation** **2- Low LET and High LET Radiation** **Use of Ionizing Radiation** **Classification of Directly Ionizing Radiation** **1- Electrons** **2- Positrons** **3- Heavy Charged Particles** **4- Pions** **Classification of Indirectly Ionizing Photon Radiation** **1- Radiation Quantities and Units** **2- Dose Distribution in Water for Various Radiation Beams** **3- Dose Distribution in Water for Photon Beams** **4- Dose Distribution in Water for Neutron Beams** **5- Dose Distribution in Water for Electron Beams** **6- Dose Distribution in Water for Heavy Charged Particle Beams** **7- Choice of Radiation Beam and Prescribed Target Dose**	3	9

Production of X Rays **X-Ray Line Spectra** **1- Characteristic Radiation** **2- Fluorescence Yield and Auger Effect** **3- Emission of Radiation by Accelerated Charged Particle (Bremsstrahlung Production).** **4- Interactions of Charged Particles with Matter** **5- Interactions of Photons with Matter** **6- Energy Transfer and Energy Absorption in Photon Interactions with Matter** **1- Interactions of Neutrons with Matter** **2- Machines for Production of Clinical Fast Neutron Beams** **3- Kinetics of Radioactive Decay** **4- Modes of Radioactive Decay** **5- Production of Radionuclides** **6- Waveguide Theory** **Particle Accelerators in Medicine** **Basic Characteristics of Particle Accelerators.**	4	12
Mid-term Exam		
Practical Use of X Rays **Medical Physics** **Industrial Use of X Rays** **X-Ray Crystallography** **X-Ray Spectroscopy** **X-Ray Astronomy** **Practical Considerations in Production of X Rays** **Traditional Sources of X Rays: X-Ray Tubes** **Crookes Tube and Crookes X-Ray Tube** **Coolidge X-Ray Tube** **Carbon Nanotube Based X-Ray Tube**	4	12

X-ray production from medical equpments:- **Conventional X-ray machine and Computed Tomography** **Circular Accelerators:** **1- Betatron** **1- Cyclotron** **2- Microtron** **3- Synchrotron** **4- Synchrotron Light Source** **Clinical Linear Accelerator** **1- Linac Generations** **2- Components of Modern Linacs** **3- Linac Treatment Head** **4- Configuration of Modern Linacs** **Pulsed Operation of Linacs** **Practical Aspects of Megavoltage X-Ray Targets and Flattening Filters**	4	12
Total	15 weeks	45 hrs

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

		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned	*45*		-------	-----		45
	Actual	45					45
Credit	Planned	3					3
	Actual	3					3

3. Individual study/learning hours expected for students per week. 6

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

On the table below are the five NQF Learning Domains, numbered in the left column.

First, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). **Second**, insert supporting teaching strategies that fit and align with the assessment methods and targeted learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

Curriculum Map

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1	Discuss the Classification of Ionizing Radiation, radiation Quantities and Units and Dose Distribution (Reviewer 2)	Lectures Visual presentation Discussions Seminars .	a)Short exams b)Long exams (final) c)Discussions during the lectures. d) Home work. e)Write a report
1.2	Knowledge of the interactions of neutrons with matter in medicine such as mechanisms for the production of rapid clinical neutron beams, and the production of radionuclides.	Lectures Visual presentation Discussions Seminars .	
1.3	Understanding the X-ray , x-ray crystallography, X-ray spectroscopy and X-ray spectroscopy	Lectures Visual presentation Discussions	
2.0	**Cognitive Skills**		
2.1	Enabling students to interpret and general knowledge of x-ray mechanisms	Lectures Visual presentation Discussions.	a) Aissgnments included some open end tasks b) Web-based project c) Homework d) Final exam e) Short exams f) seminars
2.2	Enable students to **analyses** the different type of radiation.	Discussions Seminars	
2.3	Student's ability to **write** Report for different type of interactions	Lectures Visual presentation Discussions .	
3.0	**Interpersonal Skills & Responsibility**		
3.1	Practice radiography of patients by default	Visual presentation Discussions Seminars	a) Essay (Group Assessment) b) Presentations (individual and Group Assessment) c) Homework d) Final exam e) Report in field (Individual Assessment
3.2	Collective and individual action in methods of determining radiation quantities	Discussions Seminars	
4.0	**Communication, Information Technology, Numerical**		
4.1	Radiation dose measurement skill	Visual presentation Discussions Seminars	a) Essay (Group Assessment) b) Presentations (individual and Group Assessment Report in field (Individual Assessment
4.2	Skill analysis of measurements and drawing mode .	Lectures Visual presentation Discussions	
4.3	**illustrate** how to Search in the internet and using	Discussions	

	software programs to deal with technique	Seminars	Home work. Midterm exam and final exam.
5.0	**Psychomotor(if any)**		
5.1	Not applicable	Not applicable	Not applicable
5.2	Not applicable	Not applicable	Not applicable

Learining outcome Materix (Medical Radiation Physics Course)

Topic In weeks	**Knowledge**			**Cognitive Skills**			Interpersonal Skills & Responsibility		**Communication skills, IT skills and numerical skills**			Psychomotor
	1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	4.1	4.2	4.3	**NA**
1st, 2nd and 3ed Week lectures		√	√	√	√	√	√	√	√	√	√	**NA**
4th, 5th, 6th and 7th Week lectures		√	√	√		√	√	√		√	√	**NA**
8th, 9th, 10th and 11th Week lectures		√	√				√	√	√		√	**NA**
12th, 13th, 14th and 15th Week lectures	√	√	√			√		√		√	√	**NA**

5. Assessment Task Schedule for Students During the Semester			
	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	**Week Due**	**Proportion of Total Assessment**
1	Midterm exam	5th week	20 %
2	Essay , quizzes, homework and presentation	10th week	30%
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 counseling. (include the time teaching staff are expected to be available per week)

E Learning Resources

1. List Required Textbooks Fundamental Physics of Radiology (3rd edition) by W.J.Merdith, and J.B.Massey 2013 Rachel A: Powsner, Mattew R. Palmer, Edward R. Powsner " Essential of Nuclear Medicine Physics and Instrumentation, 3rd Edition, Feb 2013, Wiley Blackwell The Physics of Radiology (4TH edn), Thomas, 1983
2. List Essential References Materials (Journals, Reports, etc.) 1) Radiation Physics for Medical Physicists, Second, Enlarged Edition, Biological and Medical Physics, Biomedical Engineering ISSN 1618-7210 ISBN 978-3-642-00874-0 e-ISBN 978-3-642-008745-7, DOI 10.1007/978-3-642-008745-7. 2) PRINCIPLES and PRACTICE of RADIATION ONCOLOGY Matthew B. Podgorsak, PhD Department of Radiation Oncology.
3. List Electronic Materials, Web Sites, Facebook, Twitter, etc. https://www.uni-oldenburg.de/en/medical-radiation-physics/
4. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access, etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) There is enough classrooms with a good accomodation
2. Technology resources (AV, data show, Smart Board, software, etc.) Computers with simulation software and a good access to internet are required for web-based projects
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

G Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching
   Course reports
   Course evaluation

2. Other Strategies for Evaluation of Teaching by the Instructor or the Department
   - Revision of student answer paper by another staff member.
     Analysis the grades of students

3. Procedures for Teaching Development
   Instructors, who teach the course, have regualer meeting to update the course materials and activities

4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members 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..
   Evaluation by the accreditation committee in the university.

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

1- The following points may help to get the course effectiveness

- Student evaluation
- Course report
- Program report
- Program Self study

2.According to point 1 the plan of improvement should be given.

Name of Course Instructor: __Prof. Saud H-Allyhani
Signature: *Prof. Allehyani S H* **Date Completed: 5-10-2018**

Program Coordinator

Signature: Taha Alfawwal Date Received: 20-11-2018

4/1/4. Course Specification:

COURSE SPECIFICATIONS
Form

Course Title: Advanced Radiotherapy Physics

.Course Code: 403661–3

Date 23-10-2108 -	**Institution:** ..uqu.
College: Faculty of Applied Science...	**Department:** .... Physics department...

A. Course Identification and General Information

1. Course title and code: advanced radiotherapy physics and **403661–3**	
2. Credit hours: 3 **(3+0+0) Hr** hrs	
3. Program(s) in which the course is offered. Master of Medical Physics (If general elective available in many programs indicate this rather than list programs)	
4. Name of faculty member responsible for the course: Prof Dr. Samir Nitto	
5. Level/year at which this course is offered: Level 1 / First year	
6. Pre-requisites for this course (if any):	
7. Co-requisites for this course (if any):	
8. Location if not on main campus: Abdeia Campus – Alzahr Campus	
9. Mode of Instruction (mark all that apply): a. Traditional classroom	√ percentage? 80

b. Blended (traditional and online)	√	percentage?	10
c. E-learning	√	percentage?	10
d. Correspondence		percentage?	
f. Other		percentage?	

Comments:

B Objectives

1. The main objective of this course: This course explains the analysis of radiation doses and explains the physical and medical quantities used to measure doses in hospitals and radiation therapy centers. The explanation of the planning of radiotherapy is one of the most important contents of this course, with the distribution of doses of radiation and the curves of the similarity of doses in water. It is important for the master student to the collection of data for therapeutic package modeling, calculation of corrections, formation and separation of therapeutic packages. The student will also learn about electron therapy for cases that are preferred to be treated and how to determine the absorbed dose in this case and the protocols followed.

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

To improve the students' expert in the radiation therapy physics :

- Encourge students to register to webinars and worshops related to the radiation therapy

Encourage students to write frequently report about selected research topics related to the field

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description:

1. Topics to be Covered		
List of Topics	**No. of Weeks**	**Contact hours**
Dose distribution and scatter analysis: 1. **Phantoms** 2. **Depth dose Distribution (PDD- TAR- SAR)**	3	9
A system of dosimetric calculations: 1- **Dose Calculation Parameters** 2- **Practical Applications** **Other Practical Methods of Calculating Depth Dose Distribution**	3	9
Mid-term 1		

Treatment Planning I: Isodose distributions: **1- Isodose Chart** **2- Measurement of Isodose Curves** **3- Parameters of Isodose Curves** **4- Wedge Filters** **5- Combination of Radiation Fields** **6- Isocentric Techniques** **7- Wedge Field Techniques** **8- Tumor Dose Specification for External Photon Beams**	3	9
Treatment Planning II: Patient data, Corrections, and set-up: **Acquisition of Patient Data** **1- Treatment Simulation** **2- Treatment Verification** **3- Corrections for contour Irregularities** **4- Corrections for Tissue Inhomogeneities** **5- Tissue Compensation** **Patient Positioning**	2	6
Treatment Planning III: **1- Field shaping** **2- skin dose and field separation** **3- Field Blocks** **4- Field Shaping** **Skin Dose and Separation of Adjacent Fields**	2	6
Electron beam therapy: **1- Electron Interactions** **2- Energy Specification and Measurements** **3- Determination of Absorbed Dose** **4- Characteristics of Clinical Electron Beams** **5- Treatment Planning** **6- Field Shaping** **7- Electron Arc Therapy** **Total Skin Irradiation**	2	6

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

		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned	3					45
	Actual	3					45
Credit	Planned	3					3
	Actual	3					3

3. Individual study/learning hours expected for students per week. 6

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

On the table below are the five NQF Learning Domains, numbered in the left column.

First, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). **Second**, insert supporting teaching strategies that fit and align with the assessment methods and targeted learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and e valuate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

Curriculum Map

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1	recognize the radiation therapy planning process	1- Lectures 2- Discussions Visual presentation	a)Short exams b)Long exams (final) c)Discussions during the lectures. d) Home work. e)Write a report
1.2	Define the location of cancerous tumors in the body and the dose distribution process	1- Lectures 2- Discussions Visual presentation	
1.3	producing the process of measurement and treatment of various radiotherapy devices	3- Lectures 4- Discussions Visual presentation.	
2.0	**Cognitive Skills**		

2.1	Summarizing different of tumor cancers	**Encourage** the student to look for some books in the different references describing radiation.	a. assignments included some open end tasks b.Web-based project c.Homework d.Final exam e.Short exams f.seminars
2.2	justify the Use of therapeutic planning for different therapeutic fields	**Ask** the student to attend lectures for radiation effects.	
2.3	Calculation how to reduce exposure to peaceful cells	Homework , assignments.	
3.0	**Interpersonal Skills & Responsibility**		
3.1	Demonstrate the work in front of treatment planning specialists.	Ask the students to search the internet and use the library. Encourage them how to attend lectures regularly by assigning marks for attendance.	a.Essay (Group Assessment) b.Presentations (individual and Group Assessment) c.Homework d.Final exam e.Report in field (Individual Assessment
3.2	Evaluate the Skill in planning and handling	Teach them how to cover missed lectures. Give students tasks of duties	
4.0	**Communication, Information Technology, Numerical**		
4.1	Outline how to communicating with: Peers, Lecturers and Community.	Creating working groups with peers to collectively prepare: solving problems and search the internet for some topics.	c) Essay (Group Assessment) d) Presentations (individual and Group Assessment Report in field (Individual Assessment
4.2	The student should **interpret** how to Know the basic principles using the internet for radiation measurements.	Give the students tasks to measure their: practical skills, analysis and problem solving.	
4.3	The student should **appraise** how to Use the computer skills and library.	Encourage the student to ask for help if needed.	
4.4	demonstrate how to Search I the internet and using software programs to deal with technique.	Encourage the student to ask good question to help solve the problem.	
5.0	**Psychomotor(if any)**		
5.1	Not applicable	Not applicable	Not applicable
5.2	Not applicable	Not applicable	Not applicable

5. Assessment Task Schedule for Students During the Semester			
	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	**Week Due**	**Proportion of Total Assessment**
1	Midterm 1	5th week	20 %
2	Research assignment, Quizzes, presentation, homework and reports	10th week	30%
3			
4	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 counseling. (include the time teaching staff are expected to be available per week) 1- 8-office hours per week in the lecturer schedule. 2- The contact with students by e-mail and website.

E Learning Resources

1. Required Text(s) **Hendee's Radiation Therapy Physics, Fourth Edition, Todd Pawlicki , Daniel J. Scanderbeg, George Starkschall, , February 2016. (Reviewer 1)** The Physics of Radiation Therapy (3rd edition), LWW, 2003 Radiation Therapy Physics, (3rd edition.),William R, Hendee, Geoffrey S. Ibbott and Eric G. Hendee, Willey-Liss, 2004
2.List Essential References Materials (Journals, Reports, etc.) https://www.cancer.org/treatment/treatments-and-side-effects/treatment-types/radiation.html
3.List Electronic Materials, Web Sites, Facebook, Twitter, etc. https://www.cancer.org/treatment/treatments-and-side-effects/treatment-types/radiation.htm.
4. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access, etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) There is enough classrooms with a good accomodation
2. Technology resources (AV, data show, Smart Board, software, etc.) Computers with simulation software and a good access to internet are required for web-based projects
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

G Course Evaluation and Improvement Procedures

1.Strategies for Obtaining Student's Feedback on Effectiveness of Teaching Course reports Course evaluation
2.Other Strategies for Evaluation of Teaching by the Instructor or the Department • - Revision of student answer paper by another staff member. Analysis the grades of students
3.Procedures for Teaching Development Instructors, who teach the course, have regualer meeting to update the course materials and activities
4.Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members 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.. Evaluation by the accreditation committee in the university.
4.Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it. 1-The following points may help to get the course effectiveness • Student evaluation • Course report • Program report • Program Self study 2.According to point 1 the plan of improvement should be given.

Name of Course Instructor: Prof.Dr.Samir Nitto

Signature: Prof.Dr.Samir Nitto _ Date Completed: 1-11-2018
Program Coordinator

Signature: Taha Alfawwal Date Received: 20-11-2018

4/1/4. Course Specification:

COURSE SPECIFICATIONS

Form

Course Title: Advanced Medical Imaging (1)

Course Code.. (403663-3)..

Date: 20....–.....–.....	**Institution**:Umm AL-QUra Uiversity
College: College of Aplied Sciences.	**Department**: .Physics Department.

A. Course Identification and General Information

1. Course title and code: Medical Imaging (1) – 403663-3
2. Credit hours: 3 **(3+0+0) Hr**
3. Program(s) in which the course is offered. Master of Medical Physics

   (If general elective available in many programs indicate this rather than list programs)
4. Name of faculty member responsible for the course Prof. Allehyani SH
5. Level/year at which this course is offered: Level 1 **/ First year**
6. Pre-requisites for this course (if any): No Pre-requisites
7. Co-requisites for this course (if any): No Co-requisites
8. Location if not on main campus: on main campus
9. Mode of Instruction (mark all that apply):

a. Traditional classroom	√	percentage?	80%
b. Blended (traditional and online)	√	percentage?	20%
c. E-learning		percentage?	
d. Correspondence		percentage?	
f. Other		percentage?	

Comments:

B Objectives

1. The main objective of this course

Enable the student to learn how to make a picture of a particular member of the human body using medical imaging devices and understanding the meaning of physics to build the image on the camera

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

In this section, students learn about medical imaging devices used in hospitals, such as CT scans, magnetic resonance imaging devices, and nuclear medicine devices such as camera cameras and digital cameras. It is also exposed to the method of image formation and factors affecting image formation in addition to its medical structure and common names. In addition to dealing with radioisotopes in medicine and how to obtain diagnostic images for a number of cases. The course also discusses the quality of the images of these medical devices and how to monitor them and ensure their safety and suitability for daily or periodic work. This course explains the computerization of these devices and how to connect them to computer systems

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description:

1. Topics to be Covered

List of Topics	No. of Weeks	Contact hours
Digital Image Processing	2	6
Image construction	1	3
Radiography	1	3
X- ray	1	3
Interaction of radiation with matter	1	3
Radiation Detectors	1	3
Screen Detectors	1	3
Image Capacitor	1	3
Image quality	1	3
Computed tomogaphay (CT)	2	6
Electron tomography	1	3
Magnetic resonance imaging (MRI)	1	3
Gamma Camera	1	3

2. Course components (total contact and credit hours per semester):							
		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned	45	--	------	-----	-----	45
	Actual	45	----	-----	-----	-----	45
Credit	Planned	3					3
	Actual	3					3

3. Individual study/learning hours expected for students per week.	6

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

On the table below are the five NQF Learning Domains, numbered in the left column.

First, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). **Second**, insert supporting teaching strategies that fit and align with the assessment methods and targeted learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

Curriculum Map

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1	Understanding Radiographic Imaging (X-RAY)	Lectures - Seminars - Discussions - Video presentations	a) Short exams b) Long exams (final) c) Discussions during the lectures. d) Home work. e) Write a Report
1.2	Describing the Role of operayion of an x-ray imaging	Lectures - Seminars - Discussions - Video presentations	Tests - Reports - Image analysis Seminar .work shops and Oral dissusion

1.3	Definning Concept of Imaging using Magnetic Resonance Imaging (MRI)	Lectures - Seminars - Discussions - Video presentations	Tests - Reports - Image analysis Seminar .work shops and Oral dissusion
2.0	**Cognitive Skills**		
2.1	Skill how to iamge clips	Lectures - Seminars - Discussions - Video presentations	Aissgnments included some open end tasks a) Web-based project b) Homework c) Final exam d) Short exams e) seminars
2.2	The skill of locating tumor size using imaging	Lectures - Seminars - Discussions - Video presentations	
3.0	**Interpersonal Skills & Responsibility**		
3.1	Participation with specialists in the field of radiography	Lectures - Seminars - Discussions - Video presentations	a.Essay (Group Assessment) b.Presentations (individual and Group Assessment) c.Homework d.Final exam e.Report in field (Individual Assessment
3.2			
4.0	**Communication, Information Technology, Numerical**		
4.1	Acquiring communication skills and taking field experiences	Lectures - Seminars - Discussions - Video presentations	a.Essay (Group Assessment) b.Presentations (individual and Group Assessment Report in field (Individual Assessment
4.2	Training in medical imaging		
5.0	**Psychomotor(if any)**		
5.1	Not Applicable	Not Applicable	Not Applicable
5.2			

√

Learining outcome Materix (Medical Imaging Optional Course)

Topics per weeks	**Knowledge**			**Cognitive Skills**		Interpersonal Skills & Responsibility	**Communication skills, IT skills and numerical skills**		Psychomotor
	1.1	1.2	1.3	2.1	2.2	3.1.	4.1	4.2	**NA**
1st, 2nd and 3ed Weeks lectures	√	√	√	√		√	√	√	**NA**
4th, 5th , 6th and 7th Weeks lectures		√	√	√		√	√		**NA**
8th, 9th , 10th and 11th Weeks lectures		√	√			√		√	**NA**
12th, 13th , 14th Weeks lectures	√	√	√	√		√		√	**NA**

5. Assessment Task Schedule for Students During the Semester			
	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	**Week Due**	**Proportion of Total Assessment**
1	Midterm exam	5th week	20 %
2	Essay , quizzes, homework and presentation	10th week	30%
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 counseling. (include the time teaching staff are expected to be available per week)

Sunday	Tuesday	Wednesday
8-10 Am	9-10 Am	11-12 Am

E Learning Resources

1. List Required Textbooks

Digital Image Processing for Medical Applications, GEOFF DOUGHERTY2 2013

Medical Imaging Second Edition , Suetens , 2009, ESBN-13 978-0-511-59640-7

Rachel A: Powsner, Mattew R. Palmer, Edward R. Powsner " Essential of Nuclear

Medicine Physics and Instrumentation, 3rd Edition, Feb 2013, Wiley Blackwell

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

3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.
https://www.amazon.com/Fundamentals-Medical-Imaging-Paul-Suetens/dp/0521519152

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

F. Facilities Required

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

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)
There is enough classrooms with a good accomodation

2. Technology resources (AV, data show, Smart Board, software, etc.)
Computers with simulation software and a good access to internet are required for web-based projects

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

G Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching • Course reports • Course evaluation
2. Other Strategies for Evaluation of Teaching by the Instructor or the Department • Revision of student answer paper by another staff member. • Analysis the grades of students.
3. Procedures for Teaching Development • Instructors, who teach the course, have regualer meeting to update the course materials and activities
4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members 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.. • Evaluation by the accreditation committee in the university.
5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it. 1.The following points may help to get the course effectiveness • Student evaluation, Course report • Program report • Program Self study 2.According to point 1 the plan of improvement should be given.

Name of Course Instructor: Prof. Allehyani SH

Signature: _ *Prof. Allehyani S H* **Date Completed: _____**

Program Coordinator: Taha Al-fawwal
Signature: _____ Date Received: _____

4/1/4. Course Specification:

Advanced programming Course Title:

Course Code: 403615-3

6(1-6)

2018-10.-**Date: 5**	**Institution: UMM AL– QURA UNIVERSITY**
College: Faculty of Applied Science	**Department: Department of Physics**

A. Course Identification and General Information

1. Course title and code: **Advanced programming (403615-3)**
2. Credit hours: **3 hrs**
3. Program(s) in which the course is offered. **MSc in Physics** (If general elective available in many programs indicate this rather than list programs)
4. Name of faculty member responsible for the course: **One of the academic staff member**
5. Level/year at which this course is offered: **Level 1 / 1th Year**
6. Pre-requisites for this course (if any): **403602-3**
7. Co-requisites for this course (if any):
8. Location if not on main campus: **Main campus and Al-Zaher Branch**
9. Mode of Instruction (mark all that apply): a. Traditional classroom ✓ percentage? **80%** b. Blended (traditional and online) ☐ percentage? ☐ c. E-learning ✓ percentage? **20%** d. Correspondence ☐ percentage? ☐ f. Other ☐ percentage? ☐
Comments:

B Objectives

1. The main objective of this course

After completing this course student should be able to:

1. Grasp the idea of Object oriented Programming
2. Learn how to create Classes.
3. Write Programs in C++.

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description: Object oriented programming (OOP) is becoming more and more important, and this course will address this. OOP offers a new and powerful way to cope with complexity. In this course, the student will learn how to write a program as a group of objects that have certain properties and can take certain actions, instead of viewing a program as a series of steps to be carried out. At the end of the course, the programs that the student shall write will be clearer, more reliable and easy to maintain.

C++ is quite similar to other languages with two or three grand ideas thrown in. These new ideas are fascinating in themselves and they are becoming part of the programming culture.

In particular, the student will learn C++ algorithms and will enable to perform

- Write Object Oriented Programming.
- Use Pointers and Classes.
- Solve real Programming problems.

1. Topics to be Covered		
List of Topics	**No. of Weeks**	**Contact hours**
Basics- Program construction, Output using "cout", Header files, when to use comments, Integer variables, variable names, integer constants the "endl" manipulator, exercises.	1	3
Basics- Character variables, character constants, escape sequence, input with "cin", floating point type, type bool, "setw" manipulator, the "iomanip" header file, arithmetic operation, library functions, exercises.	1	3
Loops and decisions – Relational operators, Loops, the "for" loop, the "while" loop, the "do" loop, Decisions, the "if" statement, the "if else" statement, the "switch" statement, the conditional operator	1	3
Loops and decisions- Logical operators, logical "AND" operator, logical "OR" operator, logical "Not" operator, the "break" statement, the "continue" statement, exercises	1	3
Structures- A simple structure, Defining the structure, accessing structure members, Structure within Structures, Structures and Classes, Enumeration, examples, exercises	1	3
Functions- Simple functions, the function declaration, calling the function, the function definition, passing arguments to functions, passing constants, passing variables, passing by value, Returning values from functions, the return statement, Returning structure variables	1	3
Functions- Reference arguments, Passing Data types by reference, Passing more complex pass by Reference, Passing Structures by Reference, Overloaded functions, inline functions, Returning by References.	1	3
Objects and Classes- A simple class, classes and objects, defining the class, using the class, calling member functions	1	3

Objects and Classes- Constructors, Destructors, objects as function arguments, overloaded constructors, Member functions defined outside the class, Static class data, const and classes.	1	3
Arrays- Array fundamentals, arrays as class member data, arrays of objects and exercises	1	3
Pointers– Addresses and pointers, Pointers and arrays, examples	1	3
Pointers- Pointers and functions, the "new" and "delete" operators examples.	1	3
Inheritance- Derived class and base class, Derived class constructors, class inheritance, Public and private inheritance.	1	3
Virtual functions- Normal member functions accessed with pointers, virtual member functions accesses with pointers, friend functions, static functions, examples	2	6
Total number	15	45

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

		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned	45 hrs			45 hrs		90 hrs
	Actual	45 hrs			45 hrs		90 hrs
Credit	Planned	3 hrs			45 hrs		3 hrs
	Actual	3 hrs			45 hrs		3 hrs

3. Individual study/learning hours expected for students per week.	**8**

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

On the table below are the five NQF Learning Domains, numbered in the left column.

First, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). **Second**, insert supporting teaching strategies that fit and align with the assessment methods and targeted learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

Curriculum Map

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
	Upon successful completion of this course.The student will be able to:	Demonstrating the basic information and principles through lectures and the achieved applications. -Discussing C++ statements with illustrating pictures and diagrams	- Online quizze -Midterm's exam. -Assignments Seminar .work shops and Oral dissusion
1.1	-learn the syntax of the C++ programming language.		
1.2	-understand the concept of arrays.		
1.3	-apply fundamental syntax rules for identifiers, declarations, expressions, statements, and functions		
1.4	-understand the concept of pointers and dynamic memory allocation.		
1.5	-apply techniques of structured (functional) decomposition to decompose problem.		
1.6	-create and call functions that use parameter passing and return		

	values.		
1.7	-learn how to design C++ classes		
1.8	-learn how to handle private and protected members of a class		
1.9	-understand the concept of data abstraction and encapsulation		
1.10	-learn how to overload functions and operators in C++		
1.11	-learn how inheritance and virtual functions work.		
1.12	-learn how to design and implement generic classes with C++ templates.		
2.0	Cognitive Skills		
	Having successfully completed the course students should be able to:		.
2.1	-explain how an existing C++ program works	-Demonstrating the basic information and principles through lectures and the achieved applications. -Discussing C++ statements with illustrating pictures and diagrams	- Online quizzes -Midterm's exam -Assignments
2.2	-discover errors in a C++ program and describe how to fix them		
2.3	-critique a C++ program and describe ways to improve it		
2.4	-analyze a problem and construct a C++ program that solves it.		
2.5	-modify and extend short programs that use standard conditional and iterative control structures and functions		
2.6	-choose and apply the required Linux commands to develop C++ programs in a command-line environment		

3.0	**Interpersonal Skills & Responsibility**		
3.1	**At the end of the course, the student will be able to:** Do calculations independently. Make programs in a form of classes.	-Extensive use of C++ library. -Lab work. -Case Study. -Small group discussion. -Learn independently and take up responsibility. -Develop their interest in programming. -Give students tasks of duties	f) Essay (Group Assessment) g) Presentations (individual and Group Assessment) h) Homework i) Final exam j) Report in field (Individual Assessment
3.2			
4.0	**Communication, Information Technology, Numerical**		
4.1	**At the end of the course, the student will be able to:** -Enhance the ability of students to use computers and internet. -Computation -Problem solving -Data analysis and interpretation. Feeling physical reality of results	Small project	-Evaluation of presentations Evaluation of reports Practical exam Online quizzes -Research .
5.0	**Psychomotor(if any)**		
5.1	Not applicable		

5. Assessment Task Schedule for Students During the Semester

	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Exercises & Home works	All weeks	5%
2	Online quizzes	All weeks	5%
3	Oral exam	5th Week	5%

4	Participation in activities lectures and labs	All weeks	5%
5	Test (1)	6th week	10%
6	Test (2)	13th week	10%
7	Scientific project	14th Week	10 %
8	Final Exam	16th week	50%

D. Student Academic Counseling and Support

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

Each student will be supervised by an academic adviser and the time table will be given to the student each semester.

E Learning Resources

1. List Required Textbooks

1- Object oriented programming in C++, Robert Lafore, fourth edition, Pearson and Sam Publishing (2001), ISBN 0-672-32308-7.
2- Object oriented programming using C++, Joyce Farrel, fourth edition, 2009, ISBN-13: 978-1-4239-0257-7.
3- Bjarne Stroustrup, The C++ Programming Language, 4th Edition (2013), ISBN-13: 978-0321563842.

4--"Applied Computational Physics 1st Edition" Joseph F. Boudreau, Eric S. Swanson ISBN-13: 978-0198708643 (2018).

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

-Siddhartha Rao, "C++ in One Hour a Day, Sams Teach Yourself (8th Edition)", (2016) ISBN-13: 978-0789757746 .

-Bjarne Stroustrup, "A Tour of C++ (C++ In-Depth Series)" , (2018), ISBN-13: 978-0134997834.

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

(eg. www.youtube.com.)

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

F. Facilities Required

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

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) • Class room is already provided with data show • Computer Lab provided with data show • The area of class room is suitable concerning the number of enrolled students and air conditioned. • King Abdulah Library (Umm Al-Qura University)
2. Technology resources (AV, data show, Smart Board, software, etc.) • Computer room. • C++ software.
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

G Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching • Questionaries using the e-learning gate of Umm Al-Qura university • Open discussion in the class room using the e-learning gate of Umm Al-Qura university.
2. Other Strategies for Evaluation of Teaching by the Instructor or the Department • Revision of student answers by another staff member. Analysis the grades of students using the e-learning gate of Umm Al-Qura University..
3. Procedures for Teaching Development • Preparing the course as PPT. • Using the e-learning gate of umm Alqura university • Using scientific movies. • Coupling the theoretical part with laboratory part • Periodical revision of course content.
4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution) • After the agreement of Department and Faculty administrations
5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it. Periodical revision by Quality Assurance Units in the Department and institution

Name of Course Instructor: Badie

Signature: _____ Date Completed: _____

Program Coordinator: Khaled Abdel-Waged

Signature: _____ Date Received: _____

4/1/4. Course Specification:

COURSE SPECIFICATIONS

Form

Course Title. **Nanotechnology for Biomedical Applications**

.

Course Code: ...403666-3

Date: 20....–.....–.....	**Institution**: Umm AQura University
College: .... Applied Sciences College....	**Department**: .....Physics Department.....

A. Course Identification and General Information

1. Course title and code: Nanotechnology for Biomedical Applications- 403666-3
2. Credit hours: 3 hours
3. Program(s) in which the course is offered. Master of Medical Physics

   (If general elective available in many programs indicate this rather than list programs)
4. Name of faculty member responsible for the course

Level/year at which this course is offered: Level 1 / First year

6. Pre-requisites for this course (if any):
7. Co-requisites for this course (if any):
8. Location if not on main campus: Abdeia Campus – Alzahr Campus
9. Mode of Instruction (mark all that apply):

a. Traditional classroom	√	percentage?	50
b. Blended (traditional and online)	√	percentage?	20
c. E-learning	√	percentage?	20
d. Correspondence	√	percentage?	10
f. Other		percentage?	

Comments:

B Objectives

1. The main objective of this course

- Describe the physics principles underlying the fundmentals of mcrofabrication.
- List, in words, merits and drawbacks of nanomedicine and nanobiosensors.
- Demonstrate an understanding of and apply nanofabrications of biological systems
- Compare the different methods of biosensors applications in different biological systems.
- Demonstrate an understanding of aspects of clinical applications of bionanomedicine

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

To improve the students' expert in the nanotechnology field for medical applications:

- Cooperate with external organization to practicize synthesis of nanotechnology materials for different medical applications.
- Encourge students to register to webinars and worshops related to the synthesis and characterization of nanotechnology field for different medical applications
- Encourage students to write frequently report about selected research topics related to the field

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description: Nanotechnology is a multidescrpancy field. It has an innovative applications in both medical imaging and therapy. This course is designed to introduce the students to the world of nanotechnology and its medical applications. It focuses on the different applications of nanoparticles in medical and research level, since nanoparticles can enhance the most of the medical imaging modalities in addition to greatly increasing the targeting and effectiveness of therapy.

1. Topics to be Covered

List of Topics	No. of Weeks	Contact hours
Fundamentals of Micro Fabrication: Photolithography - Deposition, and Selective Etching - Thin Film Growth and Deposition - Diffusion and Dopants - Atomic Layer Epitaxy - Soft Lithography. Self-assembled organized systems: Dendrimers, Liposomes, Vesicles, Supramolecular Complexes, Langmuir Blodgett films. Atomic Force Microscopy (AFM)	4	12
Micro Fluidic Pattering and Biopolymer Pattering: Fundamentals of Laminar Fluids Micro Fluidic Processes - The Role of Micro-Scale Fluid Dynamics in BioMEMS Neuro MEMS - Microelectrodes and Neuronal Interfaces, Microstereolithography	3	9

Nanofabrication: Molecular Engineering and Quantum Dots, Nanoscale Structures as Biological Tags and as Functional Interfaces with Biological Systems	2	6
Nano-Biotechnology: Nanoparticles and Microorganisms, Nano-materials in Bone Substitutes and Dentistry, Nanoparticles in medical imaging modalities, Drug delivery and its applications.	3	9
Nanobiosensors: Biochips and analytical devices, Biosensors Nanomedicine, Nanobiosensor, Nanofluidics, Nanocrystals in Biological Detection, Electro-chemical DNA Sensors, Integrated Nanoliter Systems. Clean rooms practice and environmental issues; Applications.	3	9
	15 weeks	45 hrs

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

		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned	3					45
	Actual	3					45
Credit	Planned	3					3
	Actual	3					3

3. Individual study/learning hours expected for students per week. 10

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

On the table below are the five NQF Learning Domains, numbered in the left column.

First, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). **Second**, insert supporting teaching strategies that fit and align with the assessment methods and targeted learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

Curriculum Map			
Code #	**NQF Learning Domains And Course Learning Outcomes**	**Course Teaching Strategies**	**Course Assessment Methods**
1.0	**Knowledge**		
1.1	List nanofabrication techniques used with biological systems	1. Lectures 2. Tutorials 3. Individual Assignment 4. Discussions	a)Short exams b)Long exams (final) c)Discussions during the lectures. d) Home work. e)Write a Report
1.2	Recognize nanoparticles chracteristics in different medical applications		
1.3	Outline the different types of nanobiosensor and its applications		
2.0	**Cognitive Skills**		
2.1	The ability to explain the different types of nanofabrication	1. Web-based activities 2. Individual and Group Assigments 3. Group Discussions	a) Aissgnments included some open end tasks b) Web-based project c) Homework d) Final exam e) Short exams f) seminars
2.2	The ability to analyze merits and drawbacks of different types of biosensors and their applications		
2.3	The ability to differentiate between micro fluidic pattering and biopolymer pattering and their applications.		
3.0	**Interpersonal Skills & Responsibility**		
3.1	Write an essay about the requirements of nanoparticles' fabrication used in drug delivery and therapy.	1. Writing an essay 2. Presentations in some selected topics 3. Small Group Discussion. 4. Visits to nanotechnology research laboratory to Improve Students' Expert in Field	k) Essay (Group Assessment) l) Presentations (individual and Group Assessment) m)Homework n) Final exam o) Report in field (Individual Assessment
3.2	Choose the appropriate nanoparticles for different medical imaging modalities.		
4.0	**Communication, Information Technology, Numerical**		
4.1	Demonstrate the use of nanoparticles in different medical imaging modalities.	1. Group Discussions 2. Reports 3. Presentations	e) Essay (Group Assessment) f) Presentations (individual and Group Assessment g) Report in field (Individual Assessment)
4.2	Illustrate the Protocol of using nanoparticles in drug delivery to enhance the targeting and effectiveness of therapy.		
5.0	**Psychomotor(if any)**		
5.1	N/A	N/A	N/A
5.2			

5. Assessment Task Schedule for Students During the Semester			
	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	**Week Due**	**Proportion of Total Assessment**
1	Short exams	5 th week	20%
2	Oral presentations/ seminars	All weeks	30%
3	Essay/research report		
4	Final written exam	16th week	50%

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week) 2hrs/week

E Learning Resources

1. List Required Textbooks
   - Gabriel A. Silva, **Nanotechnology for biology and medicine**, 1st Ed., Springer, 2012.

2. List Essential References Materials (Journals, Reports, etc.)
   - Michael Koch, Alan Evans, Arthur Brunnschweiler, **Micro fluidic Technology and Applications (Micro technologies and Microsystems Series)**, 1st Ed., CRC Press; London, 2001.
   - Eugene J. Koprowski, Gene Koprowski, **Nanotechnology in medicine: Emerging applications**, Mcgraw-Hill Education, 2011
   - Sarah Hurst Petrosko and Emily S. Day. **Biomedical Nanotechnology**,.2nd Eds., Springer, 2017

3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.
   - https://www.nano.gov/nanotech-101/what/definition
   - http://iopscience.iop.org/journal/0957-4484

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

F. Facilities Required

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

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)
There is enough classrooms with a good accomodation

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

Computers with simulation software and a good access to internet are required for web-based projects

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

G Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching • Course reports • Course evaluation
2. Other Strategies for Evaluation of Teaching by the Instructor or the Department • Revision of student answer paper by another staff member. • Analysis the grades of students.
3. Procedures for Teaching Development • Instructors, who teach the course, have regualer meeting to update the course materials and activities
4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members 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.. • Evaluation by the accreditation committee in the university.
5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it. 2- The following points may help to get the course effectiveness • Student evaluation • Course report • Program report • Program Self study 3- According to point 1 the plan of improvement should be given.

Name of Course Instructor: Dr.Hanan
Signature: _ **Date Completed: _**

Program Coordinator: Taha ALFAWWAL
Signature: _____ **Date Received: _____**

4/1/4. Course Specification:

Level Two

Second semester of the first year

Level	Course Code	Course Title	Required or Elective	Prerequisite Courses	Credit Hours
Level 2	**403667-3**	Medical Radiation Protection	Required		**3**
	403668-3	Brachytherapy Physics	Required		**3**
	403669-3	Advanced Nuclear Medicine	Required		**3**
		Elective Course			***3***
	403671-3	Advanced Medical Imaging (2)	Elective		
	403602-3	**Computational physics**	Elective		
	403692-3	**Image Anatomy**	Elective		
Total credits hours for level 2					***12 hrs***

4/1/4. Course Specification:

COURSE SPECIFICATIONS

Form

Course Title: Medical Radiation Protection

Course Code: 403667-3

Date 6–10–2018....-	**Institution**: .....Umm Al-Quraa University...
College: ..... Faculty of Science	**Department**: .....Physics Department ..

A. Course Identification and General Information

1. Course title and code: Medical Radiation Protection and 403667-3

2. Credit hours:3 hrs

3. Program(s) in which the course is offered. Master of Medical Physics

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

4. Name of faculty member responsible for the course. **Dr. Taha Alfawwal**

5. Level/year at which this course is offered: Level 2 / First year

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: Abdeia Campus – Alzahr Campus

9. Mode of Instruction (mark all that apply):

a. Traditional classroom		percentage?	80
b. Blended (traditional and online)		percentage?	20
c. E-learning		percentage?	
d. Correspondence		percentage?	
f. Other		percentage?	

Comments:

B Objectives

1. The main objective of this course: Course Description:

This course aims to introduce the radiation protection principles in radiology practices. Identify the types of radiation exposure, medical , professional and the public..It aims to calculate protective shields for rooms of conventional x-ray , mammography ,computer tomography and fluoroscopy. Radiation Protection for radiosensitive orgsans for patients under going mammogram, fluoroscopy, computed tomography and radiography examinations.

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

-To improve the students' expert in the radiation protection for different x-ray modalities

1.Encourge students to register to webinars and worshops related to the radiation protection

2-Encourage students to write frequently report about selected research topics related to the field.

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description:

1. Topics to be Covered

List of Topics	No. of Weeks	Contact hours
Introduction to radiation protection **Goals of radiation protection** **Concepts of radiation protection** **Justification and responsibility for image procedures. Aa low as reasonably achievable (ALARA principles) -** **Patient protection and patient education**	3	9
Radiation quantities and units **Historical evolution of radiation quantities,and units.** **Radiation Quantities and their SI units and units of measureurements.**	1	3

Radiation Monitoring **Personnel Monitoing, Personnel, dosimeters,Rradiation Survey Instruments for area monitoring. Instruments used to measure X-ray Exposure in Radiology.**	3	9
Dose Limits for exposure to ionizing radiation , **Basis of effective dose limiting system. Radiation Protection Standards organizations. Radiation Safety Program. ALARA concepts.dose lomits. Basis for the effective dose limiting system . occupational and non occupational dose limits.**	2	6
Equipment design for radiation protection . **Radiation safety features of radiographic equipment , Fluroscopic , digital Fluroscopy and mobil C-Arm , devices and accessories.**	2	6
Management of patient radiation dose during some x-ray procedures. Protection shielding , technical exposure factors protecting the pregnant .Pediatric considerations during radiographic imaging.	1	3
Methods for reduction of patient dose in Computed Tomograpjy. Computed Tomography dose parameters . **Goal of computed tomography imaging from a radiation protection point of view. Patient dose in mammography.**	1	3
Management of Imaging Personnel Radiation dose during diagnostic X-ray procedures. **Annual limit for occupational exposed personnel. ALARA Concept. Dose reduction methods and techniques. Protection for pregnant personnel . Basic Principles of Radiation Protection for personnel exposure . Protecting during fluoroscopic procedures. Protection during Mobile Radiographic examinations. Protection during C-Arm Fluroscopy .**	2	6
Total	15 weeks	45 hrs

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

		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned	45					45
	Actual	45					45
Credit	Planned	3					3
	Actual	3					3

3. Individual study/learning hours expected for students per week.	9

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

On the table below are the five NQF Learning Domains, numbered in the left column.

First, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see sug
gestions below the table). **Second**, insert supporting teaching strategies that fit and align with the assessment methods and targeted learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

Curriculum Map

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1	Outline **Justification and optimization in clinical practice**	**Lectures** **Discussions** **Visual presentation**.	a)Short exams b)Long exams (final) c)Discussions during the lectures. d)Home work. e)Write a Report
1.2	Describeing **Types Radiation Quantities and their SI units .**	**Lectures** **Discussions** **Visual presentation**.	
1.3	list **Radiation Monitoring and personnel dosimeters**	**Lectures** **Discussions** **Visual presentation**.	
1.4	**State methods of dose reduction in radiology**	**Lectures** **Discussions** **Visual presentation**.	
2.0	**Cognitive Skills**		
2.1	Summarize the radiation protection principles	**Encourage** the student to look for	a.Aissgnments

		some books in the different references describing radiation protection	included some open end tasks b.Web-based project c.Homework d.Final exam e.Short exams f.seminars
2.2	Design **the Shielding thickness for mammogram, radiography, CT and fluoroscopy rooms.**	**Ask** the student to attend lectures for radiation protection	
2.3	create the **Radiation protection shielding garment to protect radiosensitive organs**	**Ask** the student to attend lectures for radiation effects.	
3.0	**Interpersonal Skills & Responsibility**		
3.1	Choose the appropriate shielding material for certain x-ray modalities.	Teach them how to cover missed lectures. Give students tasks of duties	a.Essay (Group Assessment) b.Presentations (individual and Group Assessment) c.Homework d.Final exam Report in field (Individual Assessment
3.2	Modify **personnel Monitoring for the current x-ray modalities**		
4.0	**Communication, Information Technology, Numerical**		
4.1	Outline how to communicating with: Peers, Lecturers and Community.	Creating working groups with peers to collectively prepare: solving problems and search the internet for some topics	h) Essay (Group Assessment) i) Presentations (individual and Group Assessment Report in field (Individual Assessment
4.2	The student should illustrate procedures for design radiation shield	Give the students tasks to measure their: practical skills, analysis and problem solving.	
4.3	The student should **appraise** how to use the computer skills and library.	Encourage the student to ask for help if needed	
4.4	demonstrate how to Search I the internet and using software programs to deal with technique.	Encourage the student to ask for help if needed.	
5.0	**Psychomotor(if any)**		
5.1	NA		

5.2	NA		

Learining outcome Materix (Radiation Protection in Medicine Course)

Topic In weeks	*Knowledge*	*Cognitive Skills*	*Interpersonal Skills & Responsibility*	*Communication skills, IT skills and numerical skills*	*Psychomotor*
	1.1 1.2 1.3 1.4	*2.1 2.2 2.3*	*3.1 3.2 3.3*	*4.1 4.2 4.3 4,4*	*NA*
1st, 2nd and 3ed Week lectures	√ √	√ √		√ √ √	*NA*
4th, 5th , 6th and 7th Week lectures	√ √	√ √ √		√ √ √ √	*NA*
8th, 9th , 10th and 11th Week lectures		√ √	√	√ √ √ √	*NA*
12th, 13th , 14th and 15th Week lectures	√ √	√ √	√ √	√ √ √ √	*NA*

5. Assessment Task Schedule for Students During the Semester			
	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	**Week Due**	**Proportion of Total Assessment**
1	Midterm exam	5th week	20%
2	**Essay , quizzes, home work and presentation**	10th week	30%
3	Final exam	16 th	50%

D. Student Academic Counseling and Support

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

E Learning Resources

1. List Required Textbooks Radiation Protection in Medical Radiography , 8th edition , Mary Alice, Paula J Viscont, E-Russel Ritenour, Keli Welch Haynes., 2018. Leonie Munro.Basics of radiation protection for every day use. How to achive ALARA: working tips and Guidelines, WHO, 2004. Radiation Protection in Medical Physics Edited by Yves Lemoigne Alessandra Caner, 2009
3.List Essential References Materials (Journals, Reports, etc.) 1)James E. Martin " Physics for Radiation Protection" 3rd edition, 2013 2)Journal of Radiological Protection.Publisher: Society for Radiological Protection, IOP Publishing IAEA, Diagnostic Radiology Physics, 2014
3. List Electronic Materials, Web Sites, Facebook, Twitter, etc. https://www.amazon.com/Radiation-Protection-Medical-Radiography- https://www.epa.gov/radiation/protecting-yourself-radiation
3.Other learning material such as computer-based programs/CD, professional standards or regulations and software. Radiation Shielding software

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access, etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) There is enough classrooms with a good demonstration rooms in building W in Faculty of Science
2-Technology resources (AV, data show, Smart Board, software, etc.) Computers with simulation laboratory and a good access to internet are required for web-based projects
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) Computers with simulation laboratory and a good access to internet are required for web-based projects

G Course Evaluation and Improvement Procedures

Strategies for Obtaining Student's Feedback on Effectiveness of Teaching 1. Course reports 2. Course evaluation
2. Other Strategies for Evaluation of Teaching by the Instructor or the Department Revision of student answer paper by another staff member. Analysis the grades of students.
3.Procedures for Teaching Development. VIisual presentation using power point and learning video Instructors, who teach the course, have regualer meeting to update the course materials and activities
4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members 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.. Evaluation by the accreditation committee in the university.
4.Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it. The following points may help to get the course effectiveness • Student evaluation • Course report • Program report • Program Self study According to point 1 the plan of improvement should be given.

Name of Course Instructor: Taha A-Fawwal

Signature: _____  **_____ Date Completed: ___6-10-2018_____**

Program Coordinator: Dr. Taha Alfawwal

Signature: _____ Date Received: _____

4/1/4. Course Specification:

COURSE SPECIFICATIONS

Form

Course Title: **Brachytherapy** Physics

Course Code: 403668-3

Date: 20....-.....-.....	**Institution**: .....uqu.....
College: .... Faculty of Applied Science.....	**Department**: ..... Physics Department..

A. Course Identification and General Information

1. Course title and code: Brachtherapy Physics and 403668-3
2. Credit hours: 3 hrs
3. Program(s) in which the course is offered. Master in Medical Physics

   (If general elective available in many programs indicate this rather than list programs)
4. Name of faculty member responsible for the course Prof. F.H .Al-ghourabi
5. Level/year at which this course is offered: Level 2 /First year
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 .
9. Mode of Instruction (mark all that apply):

a. Traditional classroom	√	percentage?	70
b. Blended (traditional and online)	√	percentage?	10
c. E-learning	√	percentage?	20
d. Correspondence		percentage?	
f. Other		percentage?	

Comments:

B Objectives

1. What is the main purpose for this course?

Course Description: This course is considered an extension of modern radiotherapy. It explains another type of radiotherapy, a treatment using radioactive isotopes that can be inserted into the patient's body. This type is called internal radiation therapy. Therefore, this course reviews the radioactive isotopes used and how they are produced and calibrated in addition to their physical properties. The dosimetry in this case must be recognized, along with the Monte Carlo methods for dose measurement during treatment. Radiation therapy is closely related to recent changes and developments, which are explained in detail in this course

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

To improve the students' expert in the Brachytherapy physics.

1.Encourge students to register to webinars and worshops related to the advances in brackytherapy .

2-Encourage students to write frequently report about selected research topics related to the field

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description:

1. Topics to be Covered

List of Topics	No. of Weeks	Contact hours
BRACHYTHERAPY RADIONUCLIDES AND THEIR PROPERTIES:- **1. Introduction** **2. Notation** **3. Cobalt-60** **4. Caesium-137** **5. Gold-198** **6. Iridium-192** **7. Iodine-125** **8. Palladium-103** **9. Ytterbium-169** **Thullium-170**	3	9

PRODUCTION AND CONSTRUCTION OF SEALED SOURCES:- 1. **Introduction** 2. **Iridium Sources-192** 3. **Iodine LDR Seeds-125** 4. **Palladium LDR Seeds-103** 5. **Ytterbium LDR Seeds-169** 6. **Cobalt-60 HDR Sources** 7. **Cesium-137 LDR Sources** 8. **Gold-198 HDR Seeds** 9. **Thulium-170 High Activity Seeds** 10. **Caesium-137 LDR Seeds** 11. **Enrichment Methods** **ß-ray Emitting Microparticles and Nanoparticles**	3	9
SOURCE SPECIFICATION AND SOURCE CALIBRATION:- Source Specification, Source Calibration	2	6
Mid-term 1		
SOURCE DOSIMETRY:- 1. **Introduction** 2. **Coordinate Systems and Geometry Definition** **Models of Dose Rate and Dose Calculation**	2	6
MONTE CARLO-BASED SOURCE DOSIMETRY:- **Introduction** 1. **Monte Carlo Photon Transport Simulations** 2. **Monte Carlo-Based Dosimetry of Monoenergetic Photon Point Sources** 3. **Monte Carlo-Based Dosimetry of 103Pd, 125I, 169Yb, and 192Ir Point Sources** 4. **Monte Carlo-Based Dosimetry of Commercially Available 192Ir Source Designs** **Monte Carlo-Based Dosimetry of 125I and 103Pd LDR Seeds**	2	6
EXPERIMENTAL DOSIMETRY:- 1. **Introduction** 2. **Phantom Material** 3. **Ionization Dosimetr** 4. **TLD Dosimetry** **Polymer Gel Dosimetry in Brachytherapy**	2	6
MODEN BRACHYTHERAPY:- 1. **HDR Brachytherapy** 2. **High Dose Rate Unit** 3. **Licensing Requirements** 4. **High Dose Rate Source Calibration** 5. **Treatment Planning** 6. **Quality Assurance** 7. **Prostate implants**	1	3
Total	15 weeks	45 hrs

2. Course components (total contact and credit hours per semester):							
		Lecture	**Tutorial**	**Laboratory/ Studio**	**Practical**	**Other**	**Total**
Contact Hours	Planned	45					45
	Actual	45					45
Credit	Planned	3					3
	Actual	3					3

3. Individual study/learning hours expected for students per week.	6

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

On the table below are the five NQF Learning Domains, numbered in the left column.

First, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). **Second**, insert supporting teaching strategies that fit and align with the assessment methods and targeted learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

Curriculum Map

Code #	**NQF Learning Domains And Course Learning Outcomes**	**Course Teaching Strategies**	**Course Assessment Methods**
1.0	**Knowledge**		
1.1	RECOGNIZE THE **RADIONUCLIDES AND THEIR PROPERTIES**	**Lectures** **Discussions** **Visual presentation**	a)Short exams b)Long exams (final) c)Discussions during the lectures. d)Home work. e)Write a Report
1.2	DEFINING THE **SOURCE SPECIFICATION AND SOURCE CALIBRATION**	**Lectures** **Discussions** **Visual presentation**	
1.3	DESCRIBING THE **PRODUCTION AND CONSTRUCTION OF SEALED SOURCES**	**Lectures.** **Discussions** **Visual presentation**.	

2.0	**Cognitive Skills**		
2.1	Summarizing the **Coordinate Systems and Geometry Definition**	**Encourage** the student to look for some books in the different references describing radiation.	a.Aissgnments included some open end tasks a) Web-based project b) Homework c) Final exam d) Short exams e) seminars
2.2	Evaluating **Models of Dose Rate and Dose Calculation**	**Ask** the student to attend lectures for radiation effects.	
3.0	**Interpersonal Skills & Responsibility**		
3.1	Demonstrate the Ionization Dosimetr.	Ask the students to search the internet and use the library. Encourage them how to attend lectures regularly by assigning marks for attendance.	a.Essay (Group Assessment) b.Presentations (individual and Group Assessment) c.Homework d.Final exam
3.2	Evaluate the Dose deposition kernel of a radionuclide	Teach them how to cover missed lectures. Give students tasks of duties	Report in field (Individual Assessment
4.0	**Communication, Information Technology, Numerical**		
4.1	The student should **interpret** how to Know the basic principles of **Internal dosimetry** .	Creating working groups with peers to collectively prepare: solving problems and search the internet for some topics.	j) Essay (Group Assessment) k) Presentations (individual and Group Assessment Report in field (Individual Assessment
4.2	The student should **appraise** how to Use the computer skills and library.	Give the students tasks to measure their: practical skills, analysis and problem solving.	
4.3	demonstrate how to Search I the internet and using software programs to deal with technique.	Encourage the student to ask for help if needed.	
5.0	**Psychomotor(if any)**		
5.1	Not applicable	Not applicable	Not applicable
5.2	Not applicable	Not applicable	Not applicable

5. Assessment Task Schedule for Students During the Semester			
	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	**Week Due**	**Proportion of Total Assessment**
1	Midterm exam	5th week	20 %
2	Essay , quizzes, homework and presentation	10th week	30%
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 counseling. (include the time teaching staff are expected to be available per week) 1- 8-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 The physics of Radion Therapy " Forth Edition" Faiz M.Khan, 2010. The Physics of Radiation Therapy (3rd edn), LWW, 2003 The Physics of Modern Brachytherapy for Oncology Dimos Baltas, Loukas Sakelliou, Nikolaos Zamboglou
2. List Essential References Materials (Journals, Reports, etc.) https://www.radiologyinfo.org/en/info.cfm?pg=brachy
2. List Electronic Materials, Web Sites, Facebook, Twitter, etc.
4. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

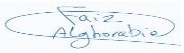
Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access, etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) There is enough classrooms with a good accomodation
2. Technology resources (AV, data show, Smart Board, software, etc.) Computers with simulation software and a good access to internet are required for web-based projects
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

G Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching • Course reports • Course evaluation
2. Other Strategies for Evaluation of Teaching by the Instructor or the Department • Revision of student answer paper by another staff member. • Analysis the grades of students.

3. Procedures for Teaching Development • Instructors, who teach the course, have regualer meeting to update the course materials and activities
4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members 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.. • Evaluation by the accreditation committee in the university.
5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it. 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.

Name of Course Instructor: Prof. Al-ghourabi F.H

Signature:  **Date Completed: _____**

Program Coordinator: Taha AL-Fawwal
Signature: _____ Date Received: _____

4/1/4. Course Specification:

COURSE SPECIFICATIONS

Form

Course Title: Advanced Nuclear Medicine

Course Code: 403669-3

Date: 20.-.....-..... 10/10/2018...	**Institution:** UMM ALQUA UNIVERSITY.....
College: ..... Faculty of Applied Science....	**Department:** ..... Physics Department.....

A. Course Identification and General Information

1. Course title and code: Advanced Nuclear Medicine 403669-3			
2. Credit hours: 3Hours			
3. Program(s) in which the course is offered. Master of Medical Physics Degree (If general elective available in many programs indicate this rather than list programs)			
4. Name of faculty member responsible for the course Ramadan Ali Hassan			
5. Level/year at which this course is offered: Level 2r/First year			
6. Pre-requisites for this course (if any): Noon			
7. Co-requisites for this course (if any): Noon			
8. Location if not on main campus: Main Campus			
9. Mode of Instruction (mark all that apply):			
a. Traditional classroom	√	percentage?	70
b. Blended (traditional and online)	√	percentage?	10
c. E-learning	√	percentage?	20
d. Correspondence		percentage?	
f. Other		percentage?	
Comments:			

B Objectives

1. The main objective of this course

   In this section, the student will learn about nuclear medicine equipment, materials and medical chemical preparations used in nuclear medicine. As well as the method of production and production places in addition to the composition and medical names common. In addition to dealing with radioisotopes in medicine and how to obtain diagnostic images for a number of cases. It also discusses the quality of these medical devices and how to monitor them and ensure their safety and suitability for daily or periodic work. This course explains the computerization of these devices and how to connect them to computer systems.

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

To improve the students' expert in the nuclear medicine imaging

1.Encourge students to register to webinars and worshops related to the advances in nuclear medicine imaging .

2-Encourage students to write frequently report about selected research topics related to the field

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description:

1. Topics to be Covered

List of Topics	No. of Weeks	Contact hours
RADIOACTIVE DECAY:- 1. Exponential Decay, Specific Activity, Decay Of A Mixed Radionuclide Sample 2. Parent-Daughter Decay	1	3
RADIATION COUNTING SYSTEMS:- 1. NaI(Tl) well counter 2. 2. Counting with conventional NaI(Tl) detectors Liquid scintillation counters 4. Gas-filled detectors 5. In vivo counting systems	2	6
THE GAMMA CAMERA: PERFORMANCE CHARACTERISTICS:- 1. basic performance characteristics 2. detector limitations: nonuniformity and nonlinearity measurements of gamma camera performance	2	6

IMAGE QUALITY IN NUCLEAR MEDICINE:- 1. basic methods for characterizing and evaluating image quality 2. spatial resolution 3. contrast 4. noise	2	6
SINGLE PHOTON EMISSION COMPUTED TOMOGRAPHY:- 1. SPECT systems 2. practical implementation of SPECT 3. performance characteristics of SPECT systems applications of SPECT	3	9
POSITRON EMISSION TOMOGRAPHY:- 1. basic principles of PET imaging 2. PET detector and scanner designs 3. data acquisition for PET 4. data corrections and quantitative aspects of PET 5. performance characteristics of PET systems clinical and research applications of PET	3	9
RADIATION SAFETY IN NUCLEAR MEDICINE:- 1. quantities and units 2. regulations pertaining to the use of radionuclides 3. safe handling of radioactive materials disposal of radioactive waste	2	6

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

		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned	41	7				48
	Actual	41	7				47
Credit	Planned	3					3
	Actual	3					3

3. Individual study/learning hours expected for students per week. 3

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

On the table below are the five NQF Learning Domains, numbered in the left column.

First, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). **Second**, insert supporting teaching strategies that fit and align with the assessment methods and targeted learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

Curriculum Map

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1	RECOGNIZE THE Exponential Decay, Specific Activity, Decay Of A Mixed Radionuclide Sample	5- Lectures 6- Discussions Visual presentation	a)Short exams b)Long exams (final) c)Discussions during the lectures. d) Home work. e)Write a Report
1.2	DEFINING THE RADIATION COUNTING SYSTEMS	3- Lectures 4- Discussions Visual presentation	
1.3	DESCRIBING THE THE GAMMA CAMERA: PERFORMANCE CHARACTERISTICS	7- Lectures 8- Discussions Visual presentation.	
2.0	**Cognitive Skills**		
2.1	Summarizing the IMAGE QUALITY IN NUCLEAR MEDICINE	Encourage the student to look for some books in the different references describing radiation.	a.Aissgnments included some open end tasks b.Web-based project c.Homework d.Final exam e.Short exams f.seminars
2.2	Evaluating Models of Dose Rate and Dose Calculation	Ask the student to attend lectures for radiation effects.	
3.0	**Interpersonal Skills & Responsibility**		
3.1	Demonstrate the SINGLE PHOTON EMISSION COMPUTED TOMOGRAPHY.	Ask the students to search the internet and use the library. Encourage them how to attend lectures regularly by assigning marks for attendance.	a.Essay (Group Assessment) b.Presentations (individual and Group Assessment) c.Homework d.Final exam Report in field (Individual Assessment
3.2	Evaluate the clinical and research applications of PET	Teach them how to cover missed lectures. Give students tasks of duties	
4.0	**Communication, Information Technology, Numerical**		
4.1	Outline how to communicating with: Peers, Lecturers and Community.	Creating working groups with peers to collectively prepare: solving problems and search the internet for some topics.	l) Essay (Group Assessment) m) Presentations (individual and Group Assessment
4.2	The student should interpret how to Know the basic principles of	Give the students tasks to measure their:	

	Internal dosimetry .	practical skills, analysis and problem solving.	Report in field (Individual Assessment
4.3	The student should appraise how to Use the computer skills and library.	Encourage the student to ask for help if needed.	
4.4	demonstrate how to Search I the internet and using software programs to deal with technique.	Encourage the student to ask good question to help solve the problem.	
5.0	**Psychomotor(if any)**		
5.1	Not applicable		
5.2			

5. Assessment Task Schedule for Students During the Semester

	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Midterm 1	5th week	10 %
2	Midterm 1	10th week	20%
3	Midterm 1	15th week	20%
4	Homework + reports	During the semester	10%
5	Final exam	End of semester	40 %
6			
7			
8			

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week) 1- 8-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 Physics in nuclear medicine, 4th Add 2012, Simon R. Cherry, James Sorenson and Michael E. Phelps, Philadelphia, PA 19103-2899, ISBN: 978-1-4160-5198-5
2. List Essential References Materials (Journals, Reports, etc.) -Rachel A. Powsner, Edward R. Powsner "Essential Nuclear Medicine Physics" Blackwell Publishing Ltd 2006 -Peter F. Sharp, Howard G. Gemmell and Alison D. Murray "Practical Nuclear Medicine 3rd add." Springer–Verlag London Limited 2005 -Basics of PET Imaging, Second Edition, Gopal B. Saha Springer Science& Business Media, LLC 2010, ISBN; 978-1-4419-0804-9 -Radiation Safety in Nuclear Medicine, Second Edition, Max H. Lombardi, 2007 by Taylor & Francis Group, ISBN: 0-8493-8168-1
3. List Electronic Materials, Web Sites, Facebook, Twitter, etc. https://www.justdial.com/Chennai/Advanced-Nuclear-Medicine-Research-Centre-Opposite-Hotel-Saravana-Bhavan-Purasawalkam/044P9019449_BZDET
4. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access, etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) There is enough classrooms with a good accomodation
2. Technology resources (AV, data show, Smart Board, software, etc.) Computers with simulation software and a good access to internet are required for web-based projects
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

G Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching • Course reports • Course evaluation
2. Other Strategies for Evaluation of Teaching by the Instructor or the Department

- Revision of student answer paper by another staff member.
- Analysis the grades of students.

3. Procedures for Teaching Development

- Instructors, who teach the course, have regualer meeting to update the course materials and activities

4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members 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..
- Evaluation by the accreditation committee in the university.

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

1-The following points may help to get the course effectiveness

- Student evaluation
- Course report
- Program report
- Program Self study

2-According to point 1 the plan of improvement should be given.

Name of Course Instructor: _____ Ramadan Ali Hassan Ali ___

Signature: _____ **Date Completed:** __10/10/2018___

Program Coordinator: _____ Ramadan Ali Hassan Ali _____

Signature: _____ **Date Received:** ____10/10/2018_____

Elective courses

403671-3 Advanced Medical Imaging (2)

403606-3 Computational Physics

403677-3 Image Anatomy

4/1/4. Course Specification:

COURSE SPECIFICATIONS

Form

Course Title: Advanged Medical Imaging (2)

Course Code: 403671-3

Date: 20....–.....–.....	**Institution**: Umm ALQura University.
College: College of Applied Sciences	**Department**: Physics Department.

A. Course Identification and General Information

1. Course title and code: Advanced Medical Imaging (2) and 403671-3
2. Credit hours: 3 Hr
3. Program(s) in which the course is offered. Mean CAMPUS

   (If general elective available in many programs indicate this rather than list programs)
4. Name of faculty member responsible for the course Prof. Allehyani S
5. Level/year at which this course is offered: Level 2 /First year
6. Pre-requisites for this course (if any): No Pre-requisites
7. Co-requisites for this course (if any): No Co-Pre-requisites
8. Location if not on main campus:
9. Mode of Instruction (mark all that apply):

a. Traditional classroom	√	percentage?	%80
b. Blended (traditional and online)	√	percentage?	%20
c. E-learning		percentage?	
d. Correspondence		percentage?	
f. Other		percentage?	

Comments:

B Objectives

1. The main objective of this course

The mean objective , introduce medical imaging devices used in hospitals, such as CT scans, magnetic resonance imaging devices, and nuclear medicine devices such as camera cameras and digital cameras. It is also exposed to the method of image formation and factors affecting image formation in addition to its medical structure and common names. In addition to dealing with radioisotopes in medicine and how to obtain diagnostic images for a number of cases. The course also discusses the quality of the images of these medical devices and how to monitor them and ensure their safety and suitability for daily or periodic work. This course explains the computerization of these devices and how to connect them to computer systems

2.Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

To improve the students' expert in the medical imaging
1.Encourge students to register to webinars and worshops related to the avances in medical imaging

2-Encourage students to write frequently report about selected research topics related to the field

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description:

1. Topics to be Covered		
List of Topics	**No. of Weeks**	**Contact hours**
Medical imaging methods 1 - X-ray images 2 - Images of gamma rays 3 - Ultrasound imaging 4 - MRI	2	6
The basics of digital image processing 1 - Gray color chart 2 - Graph shifts and search tables	2	6

Improved image in spatial area 1. Algebraic processes 2. Logical processes 3. Engineering operations 4. Torsion-based processes	2	6
Optimize image in frequency range 1 - Forer field 2 - Freer conversions 3. Characteristics of Fourier Transformations 4. Simplification 5. Reciprocal correlation and self-association	2	6
Imaging Systems 1- Function of a spread point 2. Optical propagation function 3. Frequency band filters 4 - Reconstruction of the CT image	1	3
Restore the image 1 - deterioration of the picture 2. Noise 3. Filters to reduce noise 4 - Misty 5 - deterioration of modeling image 6 - geological deterioration	1	3
Treatment of morphological images 1 - Mathematical Morphology 2. Morphological operators 3 - extension of grayscale images	1	3
Image fragmentation 1. What is fragmentation 2 - threshold 3. Area-based approaches 4. Border-based methods 5 - Other methods	1	3
Highlight and sort the image 1 - Identify the member to be filmed and classified 2 - Connect the related members 3 - Features Statistical Classification 5 - Applications in the analysis of medical images	1	3
3D visualization 1 - format images 2 - flatten images 3 - Image size 4. Its true form	2	6

2. Course components (total contact and credit hours per semester):							
		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned	45	-----	-----	-----	----	45
	Actual	45					45
Credit	Planned	3					3
	Actual	3					3

3. Individual study/learning hours expected for students per week.	6 hr

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

On the table below are the five NQF Learning Domains, numbered in the left column.

First, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). **Second**, insert supporting teaching strategies that fit and align with the assessment methods and targeted learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

Curriculum Map

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1	Knowing the types of imaging devices	Lectures Visual presentation - Discussions - Seminars	a)Short exams b)Long exams (final) c)Discussions during the lectures. d) Home work. e)Write a report
1.2	Determination of imaging characteristics	Lectures Visual presentation - Discussions - Seminars	

1.3	Understanding How to process images	Lectures Visual presentation - Discussions - Seminars	
2.0	**Cognitive Skills**		
2.1	Acquire the skill of how the image is three-dimensional	Lectures Visual presentation - Discussions - Seminars	a.Aissgnments included some open end tasks b.Web-based project c.Homework d.Final exam e.Short exams f.seminars
2.2			
3.0	**Interpersonal Skills & Responsibility**		
3.1	Practice applying Fourier transforms	Lectures Visual presentation - Discussions - Seminars	**a. Essay (Group Assessment)** **b.Presentations (individual and Group Assessment)** **c.Homework** **b.Final exam** **Report in field (Individual Assessment**
3.2	Analyze image data	Lectures Visual presentation - Discussions - Seminars	
4.0	**Communication, Information Technology, Numerical**		
4.1	The skill of building the image on the camera	Lectures Visual presentation - Discussions - Seminars	a.Essay (Group Assessment) b.Presentations (individual and Group Assessment Report in field (Individual Assessment
4.2			
5.0	**Psychomotor(if any)**		
5.1	Not applicable	Not applicable	Not applicable
5.2			

Learining outcome Materix (Advanced Medical Imaging Course)

Topics per weeks	**Knowledge**			**Cognitive Skills**	Interpersonal Skills & Responsibility		**Communication skills, IT skills and numerical skills**	Psychomotor
	1.1	1.2	1.3	2.1	3.1	3.2	4.1	**NA**
1st, 2nd and 3ed Weeks lectures	√	√	√	√	√	√	√	**NA**
4th, 5th , 6th and 7th Weeks lectures		√	√	√		√	√	**NA**
8th, 9th , 10th and 11th Weeks lectures		√	√			√	√	**NA**
12th, 13th , 14th and 15th Weeks lectures	√	√	√	√	√		√	**NA**

5. Assessment Task Schedule for Students During the Semester			
	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	**Week Due**	**Proportion of Total Assessment**
1	Midterm exam	5th week	20 %
2	Essay , quizzes, homework and presentation	10th week	30%
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 counseling. (include the time teaching staff are expected to be available per week)

Sunday	Monday	Wednesday
9-10 Am	12-1 afternon	8-10 morning

E Learning Resources

1.List Required Textbooks

1-Medical Inaging Proceesing : Concepts and applications , C.R. Pattel, 2014 ,Kindel edition.

2 -Digital Image Processing for Medical Applications, Geoff Dougherty, Cambridge University Press 2009, ISBN-13 978-0-511-53343-3.

3-Quantitative Analysis in Nuclear Medicine Imaging Habib Zaidi 2006 Springer ScienceBusiness Media, Inc. ISBN-13: 978-0387-23854

1- List Essential References Materials (Journals, Reports, etc.)

2- List Electronic Materials, Web Sites, Facebook, Twitter, etc.
http://www.amibozeman.com/

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

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.)

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

Smart panels in the department as well as the Internet inside the central library

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

G Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching • Course reports • Course evaluation
2. Other Strategies for Evaluation of Teaching by the Instructor or the Department • Revision of student answer paper by another staff member. • Analysis the grades of students.
3. Procedures for Teaching Development • Instructors, who teach the course, have regualer meeting to update the course materials and activities
4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members 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.. • Evaluation by the accreditation committee in the university.
5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it. 1-The following points may help to get the course effectiveness • Student evaluation • Course report • Program report • Program Self study 2-According to point 1 the plan of improvement should be given.

Name of Course Instructor: Prof. Allehyani S. H

Signature: . *Prof. Allehyani S H* **Date Completed: _____**

Program Coordinator: _Taha Al-Fawwal

Signature: _____ Date Received: _____

Course Title: Computational Physics

Course Cod: 403606

....-.....-..... **Date: 20**	.**Institution: UMM AL – QURA UNIVERSITY**
De**partment:** Physics	College: .**Faculty of Applied Science**

A. Course Identification and General Information

.1. Course title and code: Condensed Matter Physics and 403606-3
2. Credit hours: **3 h**.
3. Program(s) in which the course is offered. **M.Sc. physics** (If general elective available in many programs indicate this rather than list programs)
4. Name of faculty member responsible for the course **One of the academic staff member**
5. Level/year at which this course is offered: **Level 2/ 1st Year /**
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**

9. Mode of Instruction (mark all that apply):

a. Traditional classroom	✓	percentage?	80%
b. Blended (traditional and online)		percentage?	
c. E-learning	✓	percentage?	20%
d. Correspondence		percentage?	
f. Other		percentage?	

Comments:

B Objectives

1. The main objective of this course

The aim of the course is show how the power of computers to solve physics problems, which is distinct from, traditional theoretical approaches. The material covered will be useful in any project or problem solving work that contains a strong computational or data analysis element. The course is designed such that a significant fraction of the student's time is spent actually programming specific physical problems rather than learning abstract techniques.

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field).

-The most recent versions of Matlab software.

-Personal counselling for issues affecting study.

-Academic Support with Mathematics.

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description:

This course is designed to provides an introduction to computational methods in physical science. It teaches (using calculus software) programming tactics, numerical methods and their implementation, together with methods of linear algebra. These computational methods are applied to problems in physics, including the modelling of classical physical systems to quantum systems, as well as to data analysis such as linear and nonlinear fits to data sets.

1. Topics to be Covered

List of Topics	No. of Weeks	Contact hours
-Programming: Variables and arrays. Displaying output data, Data files, scalar and array operations, Built in functions. , the while Loop, the FOR Loop. Preserving data between calls to a function, subroutines.	2	6
-Linear Algebra: Solving a linear system, Gaussian elimination . Finding eigenvalues and eigenvectors, Matrix factorizations and examples.	1	3

-Curve fitting and interpolation: Polynomial fitting, Least square fitting, non-linear fits and examples, interpolation of data.	1	3
-Numerical integration and differentiations: Integration, differentiations, solving first order and second order Linear equation.	1	3
-Modelling: Harmonic motion example using a variety of numerical approaches.	2	3
-Modelling: The Solar system: Kepler's laws, planetary motion using different time steps, Orbits using different force laws. The three body problem and the effect of Jupiter on Earth.	1	**3**
Modelling: Potentials and Fields: Solution of Laplace's equation using the Jacobi relaxation method. Solutions of Laplace's Equation for a finite sized capacitor. Potentials and Fields near Electric Charges, Poisson Equation.	2	**3**
-Modelling: Waves: Waves on a string. Waves on a string with free ends. Frequency spectrum of waves on a string.	2	**3**
Modelling: Monte-Carlo. Random Walk simulation. Markov-Chain techniques for simulating the Ising spin model in statistical mechanics.	2	**3**
-Modelling: -Quantum Mechanics: Time independent Schrodinger Equation. Wave packet construction. Time dependent Schrodinger Equation.	1	**3**
	15 weeks	**45 hrs.**

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

		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned	45 hrs		45 hrs			90 hrs
	Actual	45 hrs		45 hrs			90 hrs
Credit	Planned	3 hrs		45 hrs			3 hrs
	Actual	3 hrs		45 hrs			3 hrs3

3. Individual study/learning hours expected for students per week.	8 hrs.

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

On the table below are the five NQF Learning Domains, numbered in the left column.

First, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). **Second**, insert supporting teaching strategies that fit and align with the assessment methods and targeted learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

Curriculum Map

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
	Upon successful completion of this course. The student will be able to :		
1.1	Familiar with strings and matrices and their use.	-Demonstrating the basic information and principles through lectures -Discussing statements with illustrating pictures and diagrams.	- Assignments -Projects -Online quizzes -Written Exams
1.2	Demonstrate knowledge in essential methods and techniques for numerical computation in physics.		
1.3	Employ appropriate numerical method to interpolate and extrapolate data.		
1.4	Use appropriate numerical method to solve differential equations		
2.0	**Cognitive Skills**		
	Having successfully completed the course students should be able to:		

2.1	Able to use Matlab for interactive computations.	-Demonstrating the basic information and principles through lectures -Discussing statements with illustrating pictures and diagrams.	-Assignments -Projects -Online quizzes -Written Exams
2.2	Able to generate plots and export this for use in reports and presentations.		
2.3	Able to program scripts and functions using the Matlab development environment.		
2.4	Able to use basic flow controls (if-else, for, while).		
2.5	Apply Monte Carlo method to solve deterministic as well as probabilistic physical problems		
3.0	**Interpersonal Skills & Responsibility**		
3.1	To learn how to incorporate modern computation and visualization into scientific problem.	-Lab work. -Case Study. -Small group discussion.	a- Essay (Group Assessment) b.Presentations (individual and Group Assessment Report in field (Individual Assessment
3.2	To provide a framework and motivation to learn compiled language.		
3.3	Participate in learning activities and complete tasks on time.		
4.0	**Communication, Information Technology, Numerical**		
4.1	To understand how their graduate research will be advanced by the use of modern scientific computing skills and tools.	-Small group discussion.	Small Project
5.0	**Psychomotor(if any)**		
5.1	Not applicable.	Not applicable.	Not applicable.

5. Assessment Task Schedule for Students During the Semester			
	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	**Week Due**	**Proportion of Total Assessment**
1	Exercises & Home works	All weeks	5%
2	Online quizzes	All weeks	5%
3	Oral exam	5th Week	5%
4	Participation in activities lectures and labs	All weeks	5%
5	Test (1)	6th week	10%
6	Test (2)	13th week	10%
7	Scientific project	14th Week	10 %
8	Final Exam	16th week	50%

D. Student Academic Counseling and Support

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

Each student will be supervised by an academic adviser and the time table will be given to the student each semester.

E Learning Resources

1. List Required Textbooks

-"Mastering Matlab 7" by Duane C. Hanselman and Bruce L. Littlefield, Prentice Hall, ISBN-13: 978-0136013303 (2011).
-"Computational Physics using Matlab" Second Edition, by Nick Giordano and Hisao Nakanishi, ISBN: 0-13-146990-8 (2005).

-"Introduction To Computational Physics Using Matlab", Khusniddin K. Olimov, Erkin Kh. Bozorov , (2017).

-"Computational Physics (2nd Edition)" Nicholas J. Giordano, Hisao Nakanishi, ISBN-13: 978-0131469907 (2005).

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

-"Mathematics for Physics: An Illustrated Handbook (Computational Mathematical and) 1st Edition,

Kindle Edition" ISBN-13: 978-9813233911 (2017). -"Computational Physics 2nd Edition", Jos Thijssen, ISBN-13: 978-1107677135 (2013)
3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.
4. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access, etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) Computer room.
2. Technology resources (AV, data show, Smart Board, software, etc.)
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

G Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching • Questionnaires • Open discussion in the computer room.
2. Other Strategies for Evaluation of Teaching by the Instructor or the Department • Revision of student answer paper by another staff member. • Analysis the grades of students.
3. Procedures for Teaching Development • Course report.
4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution)
5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it. • Periodical revision by Quality Assurance Units in the Department and institution

Name of Course Instructor: Khaled Abdel-Waged

Signature: _____ Date Completed: _____

Program Coordinator: Khaled Abdel-Waged

Signature: _____ Date Received: _____

4/1/4. Course Specification:

COURSE SPECIFICATIONS
Form

Course Title: Image Anatomy....

Course Code: 403692-3..

Date: 20....–.....–.....	**Institution**: .....uqu.....
College: ..... applied Science.....	**Department**: ..... **Department of Biology**..

A. Course Identification and General Information

1. Course title and code: image anatomy- 403692-3
2. Credit hours: 3 hrs
3. Program(s) in which the course is offered. Master of Medical Physics

   (If general elective available in many programs indicate this rather than list programs)
4. Name of faculty member responsible for the course: **Prof. Dr. Osama M. M. Sarhan (email:omsarhan@uqu.edu.sa - Sarhanomm5975@gmail.com)**
5. Level/year at which this course is offered: Level 2/ First year
6. Pre-requisites for this course (if any):
7. Co-requisites for this course (if any):
8. Location if not on main campus: Campus and Al-Zaher
9. Mode of Instruction (mark all that apply):

a. Traditional classroom	☐	percentage?	☐	
b. Blended (traditional and online)	☐	percentage?	☐	
c. E-learning	☐	percentage?	☐	
d. Correspondence	☐	percentage?	☐	
f. Other	☐	percentage?	☐	

Comments:

B Objectives

1) Reinforce and expand on anatomic knowledge (learned in previous undergraduate course) as it pertains to the structures commonly evaluated in medical imaging.

To let the student learn more about his body and how its work. To know more about all systems in the human and animal body and how they work. System structures and function and the role of each one and their correlations activity together. The role in maintain the good health for their bodies and how each system work and cooperative work for all human systems between each others

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

The most important plan to improve this course is to have suitable reference books updated in Arabic and English for students to study easily and encourage them to visit the web sites regarding this course subjects. Also the practical side of the course must be developed by implemented new experiments for each system in this course.

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description:

1. Topics to be Covered		
List of Topics	**No. of Weeks**	**Contact hours**
Head and neck CT scan.	3	5/week
Chest CT scan, cardiac and musculoskeletal structure. Periodical exam	3	5/week
Midterm exam	7th week	
Abdominal CT scan, biliary, pancreatic, gastric and renal structures. Periodical exam	2 9th week	5/week
CT scan of male and female pelvis.	2	
X-ray figures for body regions Participation	2 13th week	5/week
Participation and Revision	14th week	
Practical and Final exam	15-16th week	

2. Course components (total contact and credit hours per semester):							
		Lecture	**Tutorial**	**Laboratory/ Studio**	**Practical**	**Other**	**Total**
Contact Hours	Planned	75	12		12		99
	Actual	75					99
Credit	Planned	3					3
	Actual	3					3

3. Individual study/learning hours expected for students per week.	6

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

On the table below are the five NQF Learning Domains, numbered in the left column.

First, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). **Second**, insert supporting teaching strategies that fit and align with the assessment methods and targeted learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

Curriculum Map

Code #	**NQF Learning Domains And Course Learning Outcomes**	**Course Teaching Strategies**	**Course Assessment Methods**
1.0	**Knowledge**		
1.1	The student must learn the basic and advance radiographic informations of human body	By choosing specialized websites which will covers the main ideas about the present course.	a)Short exams b)Long exams (final) c)Discussions during the lectures. d) Home work. e)Write a report
2.0	**Cognitive Skills**		
2.1	The student(s) must assign a report labelled CT radiographs represent body regions.	Lectures, training practically by using CT radiographs, assign reposts.	
2.2	How can the student identify radiographs for different body regions.		By giving the student some topics to make assays about some

			topics being developed also by mid and final exams
3.0	**Interpersonal Skills & Responsibility**		
3.1	At the end of the course, the student will be able to: • The ability to assume responsibility for self-education • Work effectively in a group • The ability to express their own opinion without fear or hesitation and improves their self-confidence Ability to lead a team to work	By using the updated information using specialised websites.	a.Essay (Group Assessment) b.Presentations (individual and Group Assessment) c.Homework d.Final exam Report in field (Individual Assessment
3.2			
4.0	**Communication, Information Technology, Numerical**		
4.1	Through personal communication, mobile, friends, office hours and in the practical class.	By developing lectures, and to guide students to seek information from different sources of knowledge such as web sites and YouTube videos	Personally, mobile, friends, essays, exams, techniques, projects.
4.2			
5.0	**Psychomotor(if any)**		
5.1			
5.2			

5. Schedule of Assessment Tasks for Students During the Semester

	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment	Exam duration
1	Periodical exam, Exercises, Home works,	4th and 8th W	5 %,	15 min
2	Participation	13th - 14th W	5 %	15 min
3	Midterm "Written Test (1)"	7th W	15%	30 min
4	Practical Test (1)	7th W	15%	30 min
5	Final Exam "Practical test (2)"	15th W	20%	60 min
6	Final Exam "written test (2)"	16th W	40%	60 min

D. Student Academic Counseling and Support

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

Throughout the term in lecture and office hours personally

Lecture notes prepared by the subject staff.

E Learning Resources

1. Required websites

Head and neck region

https://www2.med.wayne.edu/diagRadiology/Anatomy_Modules/axialpages/Overview.html

http://www.radiologyassistant.nl/en/p48f4c4ccd9682/brain-anatomy.html

https://www2.med.wayne.edu/diagRadiology/Anatomy_Modules/axialpages/Overview.html

https://www.youtube.com/watch?v=udVjvvL5xjY

http://headneckbrainspine.com/Neck-CT.php\

Chest region

https://www.youtube.com/watch?v=4pjkCFrcysk

https://www.youtube.com/watch?v=AAc6oLviZNc

Abdominal region

https://www.slideshare.net/sakherkh/ct-abdomen-anatomy

http://www.startpuntradiologie.nl/coschappen/interne-geneeskunde/buik/ct-abdomen-algemeen/

https://www.slideshare.net/doctoranish/sectional-anatomy-of-abdomen

Male pelvis

https://www.uaz.edu.mx/histo/Webpatutah/histhtml/Radnorm/ABCT56.HTM

https://www.uaz.edu.mx/histo/Webpatutah/histhtml/Radnorm/ABCT53.HTM

https://emedicine.medscape.com/article/390416-overview

Female pelvis

http://radiology-anatomy.blogspot.com/2014/12/mri-anatomy-of-female-pelvis.html

https://www.alamy.com/stock-photo/ct-of-the-female-pelvis.html

https://www.researchgate.net/figure/A-29-year-old-female-with-pelvic-tuberculosis-Non-enhanced-CT-scan-of-the-abdomen-and_fig2_301308891

https://posterng.netkey.at/esr/viewing/index.php?module=viewing_poster&task=viewsection&pi=1=07924&ti=332734&si=1049&searchkey

X-ray

Head:

https://www.bmj.com/content/356/bmj.i6315

http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0100-39842016000500013

Chest

http://www.thoracicmedicine.org/viewimage.asp?img=AnnThoracMed_2009_4_3_149_53349_u8.jpg

https://www.nature.com/articles/ncpendmet0639/figures/1

https://canadiem.org/boring-question-lung-ultrasound-vs-cxr-dx-pneumothorax/

Abdomen and pelvis

http://www.ijoonline.com/viewimage.asp?img=IndianJOrthop_2018_52_2_140_226713_f2.jpg

http://www.thetrp.net/viewimage.asp?img=ThyroidResPract_2012_9_3_102_99660_u5.jpg

Upper and lower limbs

http://www.startradiology.com/internships/general-surgery/shoulder/x-shoulder/

http://www.ijoonline.com/viewimage.asp?img=IndianJOrthop_2013_47_3_283_111500_u2.jpg

https://theultrasoundsite.co.uk/ultrasound-case-studies/freiberg-disease-of-the-2nd-mtpj/xrayfrei/

http://www.startradiology.com/internships/general-surgery/shoulder/x-shoulder/

http://iranjradiol.com/en/articles/56262.html

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

3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.
http://www.radiologyassistant.nl/en/p48f4c4ccd9682/brain-anatomy.html

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

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access, etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) a- Class rooms are already provided with data show, audiovisual equipments b- The areas of class rooms are suitable, concerning the number of enrolled students; and air conditioned.
2. Technology resources (AV, data show, Smart Board, software, etc.) Upgrading book database in the main library
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) CD prepared by the staff members containing U-tube video.

G Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching 1.Continuous follow up, Questionaries and discussions 2.By asking them about the course; looking at their periodical exams, attending one lecture and lab
2. Other Strategies for Evaluation of Teaching by the Instructor or the Department a- Revision of student answer paper by another staff member. b- Analysis the grades of students.
3. Procedures for Teaching Development Modify course contents continuously and upgrade lectures presentation.

4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution) Continuous evaluation of student's activities and homeworks.
5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it.

Name of Course Instructor: _1. **Prof Dr. Osama Mohamed Sarhan**
Signature: _____ Date Completed: __ November 2018_____

Program Coordinator: __ Dr. Hussein Abulreesh
Signature: _____ Date Received: __Date: November 2018

4/1/4. Course Specification:

Level Three

Third semester of second year

Level	Course Code	Course Title	Required or Elective	Prerequisite Courses	Credit Hours
Level 3	403673-3	Radiation Measurements in Diagnostic Radiology	Required		**3**
	403662-3	Radiobiology	Required		**3**
	403664-3	Cell Biophysics	Required		**3**
	403675-3- Part2	Research Project	**Continue ..**		*3*
Total credits hours for level 3					**12 hrs**

4/1/4. Course Specification:

COURSE SPECIFICATIONS
Form

Course Title: Radiation Measurements in Diagnostic Radiology

Course Code: 403673-3

Date:.**10–3–2018**	**Institution**: ……. uqu…..
College: **Applied Science** …..	**Department**: …..**Physics Department** ……..

A. Course Identification and General Information

1. Course title and code: **Radiation Measurements in Diagnostic Radiology**, 403673-3
2. Credit hours**: 3 hrs**
3. Program(s) in which the course is offered.

   Master of Medical Physics

   (If general elective available in many programs indicate this rather than list programs)
4. Name of faculty member responsible for the course : **Dr. Taha Alfawwal**
5. Level/year at which this course is offered: Level 3 /Second year
6. Pre-requisites for this course (if any): **none**
7. Co-requisites for this course (if any): **none**
8. Location if not on main campus: main campus and Al-Zhar
9. Mode of Instruction (mark all that apply):

a. Traditional classroom	√	percentage?	80
b. Blended (traditional and online)	√	percentage?	10
c. E-learning	√	percentage?	10
d. Correspondence		percentage?	
f. Other		percentage?	

Comments:

B Objectives

3. What is the main purpose for this course?

Course Description: This course aims to explain some types of patient dosimetric quantities and units used for assessment of doses for patients. Discuss code of practice for measurements of patients doses in diagnostic radiology, radiography, fluoroscopy, mammography, dental and computer tomography.

4. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field).

To improve the students' expert in the dosimetry in diagnostic radiology

1.Encourge students to register to webinars and worshops related to the dosimetry in diagnostic radiology

2.Encourage students to research assignment about selected specialized topics related to the field

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description:

1. Topics to be Covered		
List of Topics	**No. of Weeks**	**Contact hours**
Dosimetric Quantities - **1. Basic dosimetric quantities** **2- Application specific quantities** **3- Quantities related to stochastic and deterministic effect** **4- Conversion coefficient for the assessment of organ tissue dose**	3	9
Fundamental of x-ray production: x-ray tubes, energizing and controlling the x-ray tube, x-ray tube abd generating ratings, collimation and filtration, factors influencing x-ray output and filtration.	2	6
Mid-term exam	7th week	

Code of practice for clinical measurements **General radiography : Indirect dose measurement , Free in air and direct dose measurements , Design of phantoms, , X-ray phantoms, Choice of dosimetric quantities, measurements using phantom,patient dosimetry,** **Fluroscopy : Choice of dosimetric quantities, measurements using phantoms, patient dosimetry, fluoroscopy, Interventional procedures,**	4	12
Mammography: choice of dosimetric quantities, chpice the breast phantom, measurement practicalities, patient dosimetry,.Dose calculation for measurements with phantoms. Reference dose level	2	6
Computed Tomography: special dosimetric quantities for CT, measurement using phantom and free in air and measurements o1n patients. **dental radiography: Choice of disimetric quantities , measurements using phantoms, patient dosimetry,.**	3	9
Reference dose levels and Risks in Diagnostic Imaging **Reference dose levels for different x-ray modalities.** Effective dose calculations and X-ray risk assessment.	1	3

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

		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned	45	-	-	-		45
	Actual	45					45
Credit	Planned	3					3
	Actual	3					3

3. Individual study/learning hours expected for students per week. 9 hrs/week

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

On the table below are the five NQF Learning Domains, numbered in the left column.

First, insert the suitable and measurable course learning outcomes required in the appropriate lear

Learining outcome Materix (Radiation Protection in Medicine Course)

Topic In weeks	*Knowledge*	*Cognitive Skills*	*Interpersonal Skills & Responsibility*	*Communication skills, IT skills and numerical skills*	*Psychomoto*
	1.1 1.2 1.3 1.4	*2.1 2.2 2.3*	*3.1 3.2 3.3 3.4*	*4.1 4.2 4.3 4,4*	*NA*
st, 2nd and 3ed eek lectures	√ √	√	√	√ √	*NA*
5th , 6th and 7th eek lectures		√ √ √	√	√ √	*NA*
9th , 10th and 11th Veek lectures		√ √	√ √	√ √ √	*NA*
h, 13th , 14th and 15th Veek lectures	√	√	√ √	√ √ √ √	*NA*

ning domains (see suggestions below the table). **Second**, insert supporting teaching strategies that fit and align with the assessment methods and targeted learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

Curriculum Map

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1	Outline the specific application quantities in **X-ray for ploy clinical medical practices**	**Lectures**	a)Short exams b)Long exams (final) c)Discussions during the lectures. d) Home work. e)Write a report
1.2	Describeing **Quantities related to stochastic and deterministic effect**	**Discussions**	
1.3	describe **Fundamental of x-ray production:**		
1.4	**State the different methods fol dosimetry in radiology .**		
2.0	**Cognitive Skills**		
2.1	Summarize the types of specific application quantities radiology and phantoms	**Encourage** the student to look for some books in the different references describing radiation doae measureements.	a.Aissgnments included some open end tasks b.Web-based project c.Homework
2.2	Explain methods **for measurement a dose in mammogram, radiography, CT and fuoroscopy x-ray modalities.**	**Ask** the student to attend lectures for physics of radiology	
2.3	create the new method for calibration of **CT,**		

	Mamogram, Fluoroscopy and Radiography		d.Final exam e.Short exams f.seminars
3.0	**Interpersonal Skills & Responsibility**		
3.1	choose a suitable methods for m**easurement of a absorbed dose in radiography, mammogram,**	Teach them how to cover missed lectures. Give students tasks of duties	a.Essay (Group Assessment) b.Presentations (individual and Group Assessment) c.Homework d.Final exam Report in field (Individual Assessment
3.2	Modify the direct and indirect methods of patient dose assessment for **fluoroscopy , computed tomography.**		
4.0	**Communication, Information Technology, Numerical**		
4.1	Choose the appropriate phantom and procedure for certain x-ray modalities.	Creating working groups with peers to collectively prepare: solving problems and search the internet for some topics	a.Essay (Group Assessment) b.Presentations (individual and Group Assessment Report in field (Individual Assessment
4.2	Assess **entrance skin dose to patients undergoing diagnostic x-ray and CT examination for the current x-ray modalities**	Give the students tasks to measure their: practical skills, analysis and problem solving.	
4.3	Outline how to communicating with: Peers, Lecturers and Community. The student should illustrate procedures for patint dosimetry	Encourage the student to ask for help if needed	
4.4	The student should **appraise** how to use the computer skills and library.	Encourage the student to ask for help if needed.	
4.5	demonstrate how to Search the internet and using software programs to deal with technique.		
5.0	**Psychomotor(if any)**		
5.1			
5.2			

5. Assessment Task Schedule for Students During the Semester			
	Assessment task (i.e., essay, test, quizzes, group project,	**Week Due**	**Proportion of**

	examination, speech, oral presentation, etc.)		Total Assessment
1	Midterm exam	5th week	20%
2	Research assignment report, Presentation, discussion	10th week	20%
3			
5	Final exam	16 th	50 %

D. Student Academic Counseling and Support

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

E Learning Resources

1. List Required Textbooks

Patient Dosimetry and Quality Control in Diagnostic Radiology: Radiation dose measurements, quality criteria and quality control in digital and interventional radiology Paperback – June 5, 2011 , by Ibrahim Idris Suliman (Author)

Dosimetry in Diagnostic Radiology: An International Code of Practice (TECHNICAL REPORTS SERIES) 1st Edition, by Frantisek Pernicka (Author), Iain D McLean (Author), International Atomic Energy Agency (Author), 2005.

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

JRRAS, ANSI N13.11 , EC, IAEA, NRPB

Patient dose measurements in diagnostic radiology procedures in Korea. February 2007, Radiation Protection Dosimetry 123(4):540-5, DOI: 10.1093/rpd/ncl501

Patient dosimetry techniques in diagnostic radiology. Wall, B.F. (National Radiological Protection Board, Chilton (UK)); Harrison, R.M. (Newcastle General Hospital (UK)); Spiers, F.W. Institute of Physical Sciences in Medicine, London (UK), 1988.

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

http://www.webcir.org

https://www.sciencedirect.com/science/a

https://www-pub.iaea.org/

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

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access, etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) There is enough classrooms with a good demonstration rooms in building W in Faculty of Science
2. Technology resources (AV, data show, Smart Board, software, etc.) Data show and computers with simulation laboratory and a good access to internet are required for web-based projects
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) Caldose software

G Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching 1-Course reports 2-Course questionares and program questionares
2. Other Strategies for Evaluation of Teaching by the Instructor or the Department • Revision of student answer paper by another staff member. Analysis the grades of students.
3. Procedures for Teaching Development Instructors, who teach the course, have regualer meeting to update the course materials and activities
4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members 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.. Evaluation by the accreditation committee in the university
5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it. The following points may help to get the course effectiveness • Student evaluation • Course report • Program report • Program Self study According to point 1 the plan of improvement should be given.

Name of Course Instructor: Taha Al-Fawwal
Signature: _____ _____ Date Completed: _____

Program Coordinator: __Taha AL-Fawwal

Signature: _Taha AL-Fawwal Date Received: _____

COURSE SPECIFICATIONS

Form

Course Title. Radiobiology

.

Course Code: 403662-3

Date: 20....–.....–.....	**Institution**: Umm AQura University
College: .... Applied Sciences College....	**Department**: .....Physics Department.....

A. Course Identification and General Information

1. Course title and code: Radiobiology [403662-3]
2. Credit hours: 3 hours
3. Program(s) in which the course is offered. M.Sc. Medical Physics Program

   (If general elective available in many programs indicate this rather than list programs)
4. Name of faculty member responsible for the course Dr/ Hanan Amer
5. Level/year at which this course is offered: : Level 3 /Second year
6. Pre-requisites for this course (if any):
7. Co-requisites for this course (if any):
8. Location if not on main campus: Abdeia Campus – Alzahr Campus
9. Mode of Instruction (mark all that apply):

a. Traditional classroom	√	percentage?	70
b. Blended (traditional and online)	√	percentage?	10
c. E-learning	√	percentage?	20
d. Correspondence		percentage?	
f. Other		percentage?	

Comments:

B Objectives

1. The main objective of this course

- Describe the biological impact on living cells and tissue at the DNA, cellular, organ, and whole animal levels.
- Describe the physical-chemical events which follow an ionizing event, in terms of Dose–Response Characteristics and modification.
- Predict the expected radiobiological outcome, when presented with the ambient conditions of irradiation (e.g. energy, dose, dose rate/fractionation, oxygen level, drugs).
- Apply radiobiological principles and models to fractionated radiation therapy.
- Become aware of heritable effects of radiation and the radiological aspects of brachytherapy.

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

To improve the students' expert in the nanotechnology field for medical applications:

- Encourge students to register to webinars and worshops related to the radiobiology in medical imaging and radiation therapy
- Encourage students to write frequently report about selected research topics related to the field

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description: The course is designed to provide a fundamental knowledge of the mechanisms and biological responses of human beings to ionizing and non-ionizing radiations through the study of the effects of radiation on biological molecules, cells, and man including cancer and mutagenesis. The course will develop the ability to make objective decisions regarding the relative risks and benefits of radiation use in a variety of applications.

1. Topics to be Covered

List of Topics	No. of Weeks	Contact hours
Basic Physics of Radiobiology: Dose–Response Characteristics - Particle Track Structure (LET definition, RBE definition, Alternative Radiation Beams, Radiation Quantities and Units)	1	3
Radiation Chemistry: Water Radiolysis - Radical Interactions - Oxygen Effect (OER) and Radiosensitizers - RadioProtectors (DMF)	2	6
DNA Damage and Repair: Types of Radiation Damage - Chromosome Aberrations - Lethal and Non-Lethal Lesions - DSB and Lesion Yields - Basics of Carcinogenesis	2	6

Cell Survival Curves : Experimental Technique - Dual Action theory (Linear Quadratic) - Statistics of cellular "hits" - Mathematical Models	1	3
"4 R's" of Radiobiology : Dose Rate Effects - Repair of radiation damage - Redistribution (cell cycle) - Repopulation of cells - Re-Oxygenation (OER)	1	3
Radiation Effects on Humans: Acute Whole Body Exposures - Stochastic *versus* non-stochastic effects - Carcinogenesis	1	3
Radiobiology Aspects in Radiotherapy: Early-Reacting Tissue (TCP Calculations) - Late-Reacting Tissue Normal Tissue Response (NTCP) - Dose Fractionation/Rate (BED calculations)	2	6
Radiologic Terrorism: Scenarios for radiologic terrorism – External contamination – Internal Contamination – Medical Management Issues in the event of radiologic terrorism	1	3
The Dose Rate Effect: Mechanisms underlying the dose-rate effect - Isoeffect relationships between fractionated and continuous low dose-rate irradiation - Radiobiological aspects of brachytherapy – Radiological aspects of diagnostic radiology and nuclear medicine	2	6
Heritable Effects of Radiation Germ cell production and radiation effects on fertility - Radiation-Induced heritable effects in humans - International Commission on Radiological Protection estimates of heritable risks - Mutations in the children of the A-bomb survivors changing concerns for risks	1	3
Chemotherapeutic Agents from the Prespective of the Radiobiology Classes of agents and their mode of action – Dose-response relationship - Sublethal and potentially lethal damage repair – resistance to chemotherapy and hypoxic cytotoxins – drug resistance and cancer stem cells – comparison of chemotherapeutic agents with radiation – adjunct use of chemotherapeutic agents with radiation – assays for sensitivity of individual tumors	1	3
	15weeks	45 hrs

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

		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned	3					45
	Actual	3					45
Credit	Planned	3					3
	Actual	3					3

3. Individual study/learning hours expected for students per week. 6

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

On the table below are the five NQF Learning Domains, numbered in the left column.

First, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). **Second**, insert supporting teaching strategies that fit and align with the assessment methods and targeted learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

Curriculum Map

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1	List 4R's of Radiobiology	5. Lectures 6. Tutorials 7. Individual Assignment 8. Discussions	f) Short exams g) Long exams (final) h) Discussions during the lectures. i) Home work. j) Write a Report
1.2	Recognize the heritable risk of Radiation exposure		
1.3	Outline the different DNA damage and repair types		
2.0	**Cognitive Skills**		
2.1	The ability to explain the radiological difference between early- and late- reacting tissue in radiotherapy.	4. Web-based activities 5. Individual and Group Assigments 6. Group Discussions	a) Aissgnments included some open end tasks b) Web-based project c) Homework d) Final exam e) Short exams f) seminars
2.2	The ability to analyze cell survival curves		
2.3	The ability to differentiate between different radiation effects on human		
3.0	**Interpersonal Skills & Responsibility**		
3.1	Write an essay about the radiation effects on humans and related carcinogensis	5. Writing an essay 6. Presentations in some selected topics 7. Small Group Discussion.	a) Essay (Group Assessment) b) Presentations (individual and Group Assessment) c) Homework d) Final exam e) Report in field (Individual Assessment
3.2	Choose the appropriate scenario of radiologic terrorism		
4.0	**Communication, Information Technology, Numerical**		
4.1	Demonstrate the radiological risk versus benfit in radiotherapy and brachytherapy	4. Group Discussions 5. Reports 6. Presentations	a) Essay (Group Assessment) b) Presentations (individual and Group Assessment c) Report in field (Individual Assessment)
4.2	Illustrate the isoeffect relationships between fractionated and continuous low dose-rate irradiation		
5.0	**Psychomotor(if any)**		

5.1	N/A	N/A	N/A
5.2			

5. Assessment Task Schedule for Students During the Semester			
	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	**Week Due**	**Proportion of Total Assessment**
1	Short exams		
2	Oral presentations/ seminars		
3	Essay/research report		
4	Final written exam		
5			
6			
7			
8			

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week) 4hrs/week

E Learning Resources

1. List Required Textbooks
   - Eric J. Hall, and Amato J. Giaccia. **Radiobiology for the Radiobiologist**, 7th Eds., Lippincott Williams& Wilkins, 2012.

2. List Essential References Materials (Journals, Reports, etc.)
   - International Atomic Energy Agency (IAEA). Radiation Biology for teacher and student,academic press, 2010
   - Michael J.r and Albert v. K. Basic Clinical Radiobiology, 4th Eds., Edward Arnold, 2009.

3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.
https://www.astro.org/Affiliate/ARRO/Resident-Resources/Educational-Resources/Radiobiology-Lectures
https://www.unscear.org

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

F. Facilities Required

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

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)
There is enough classrooms with a good accomodation

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

Computers with simulation software and a good access to internet are required for web-based projects
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

G Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching • Course reports • Course evaluation
2. Other Strategies for Evaluation of Teaching by the Instructor or the Department • Revision of student answer paper by another staff member. • Analysis the grades of students.
3. Procedures for Teaching Development • Instructors, who teach the course, have regualer meeting to update the course materials and activities
4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members 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.. • Evaluation by the accreditation committee in the university.
5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it. 6- The following points may help to get the course effectiveness • Student evaluation • Course report • Program report • Program Self study 7- According to point 1 the plan of improvement should be given.

Name of Course Instructor: _____Dr/ Hanan Amer_____

Signature: __*Hanan Amer*_____ Date Completed: _____

Program Coordinator: Taha Alfawwal

Signature: Date Received: _____

4/1/4. Course Specification:

Course Title: Cell Biophysics

Course Code:403664-3

30-10 – **Date:** 2018	.**Institution:** Umm Al-Qura University
College: Applied Science	**Department:** Physics

A. Course Identification and General Information

403650-3 : 1. Course title and code: Cell Biophysics Code: 403664-3

2. Credit hours: 3 (3+0+0) hrs

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

Ms. C Medical Physics Program

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

4. Name of faculty member responsible for the course

Dr. Hosam Salaheldin Ibrahim & hsibrahim@uqu.edu.sa.

All Medical Physics academic staff members are involved in teaching this course.

5. Level/year at which this course is offered: Level 3/second year

6. Pre-requisites for this course (if any): Non

7. Co-requisites for this course (if any): Non

8. Location if not on main campus: **Main campus (Abdeia) and Alzaher campus**

9. Mode of Instruction (mark all that apply):

A. Traditional classroom	✓	What percentage?	80%
B. Blended (traditional and online)	✓	What percentage?	10%
C. E-learning	✓	What percentage?	10%
D. Correspondence		What percentage?	
F. Other		What percentage?	

Comments. The traditional classroom with about 80%, while blended mode of instruction and E-learning mode with 10%. and 10%, respectively.

B Objectives

1. The main objective of this course

After completing this course student should be able:

1. To understand the basics of cellular biophysics.
2. To acquire the difference between various models and theories describing the cellular conduction e. g: Nernst equation, Donnan equation, Cable theory, and Voltage Clamp.
3. To define the cellular ion channels, activation and inactivation.
4. To describe different types of separation methods of cellular proteins, and DNA.

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. Increased use of the IT or online reference material, changes in content as a result of new research in the field)

- The E-Learning system is being conducted.
- To carry out an assay, encourage the students to use different web search engines, writing software packages, statistical softwares ....etc.
- Interpersonal skills, relating to the ability to interact with other people and to engage in team- working through group discussion.
- Problem solving skills, relating to qualitative and quantitative information.

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description:

1. Topics to be Covered

List of Topics	No. of Weeks	Contact hours
• Background Physics and Mathematics	1	**3**
• Membrane structure and basic Evoked Potential (EP) • Ion Transport, Resting Potential, and Cellular Homeostasis • Composition of cell membranes. • Membrane transport. • Diffusion with an external force in a frictional system. • Steady-state equilibrium for a single ion. • Nernst equation. • Modeling of resting potential: the Bernstein and Gibbs-Donnan models. • Steady-state, non-equilibrium. • Modifications of the steady-state membrane model. • Cellular homeostasis.	**2**	**6**

• /John Bridge on resting potential and Donan Equillibrium.
  ○ Ionic concentration of cell at resting.
  ○ Measuring Membrane Potential.
  ○ Membrane Equivalent Circuit.
  ○ The Donnan equilibrium system.
  ○ The Osmotic Argument.
  ○ Driving Forces of ions across the cell membrane.
  ○ Ohms Law and Electrophysiolgy.
• John Bridge on Action potentials and Excitation Contraction Coupling.
  ○ At the steady state (resting membrane) when there is not net current:
  ▪ The “sodium theory” of the action potential.
  ▪ Voltage Clamp.
  ▪ Channel (Gating) Simulations
  ▪ Cardiac Ion Currents
  ▪ Cardiac Action Potential
  ▪ Cardiac Cell Currents
  ▪ Calcium Cycle in Cardiac Muscle!
	2	**6**

• Introduction to ion channels
  ○ Ion channels: general properties.
  ○ Four major breakthroughs in ion channel biology.
  ○ Classification of ion channels.
  ○ Physiological functions of ion channels.
  ○ Ion channels can be highly localized.
  ○ Channel Gating: closed-open-inactivated.
  ○ Channel structure.
• Activation gate
  ○ Gates.
  ▪ Activation
  ▪ Inactivation
• Ion Selectivity
  ○ Selectivity filter.
  ○ Selective"ion"permeability.
• Voltage sensing
  ○ VSD: the voltage sensor domain.
  ○ Voltage sensor.
  ○ Voltage!gated"ion"channel"="pore"domain"+"VSD.
	2	**6**

• John White on Neurons ○ Neurons. ○ What makes neurons different from cardiomyocytes? ○ The father of modern neuroscience. ○ Morphological polarity. ○ Cajal's art. ○ Microtubule-based transport. ○ Neuronal action potentials are Na^+ and K^+ dominated. ○ Refractory periods are short. ○ Crucial features of the neuronal action potential. ○ Neurons can fire at high rates. ○ Spike-rate adaptation is very common in neurons. • Types of glia in the CNS ○ Astrocytes in neurovascular coupling. ○ Short-term enhancement is linked to presynaptic Ca^{2+}.	**2**	**6**
Midterm Class test Exam	1	**3**
Methods in Cellular Biophysics Principle, instruments and application of spectroscopic instruments: • UV Visible: absorption of light, radiation sources, sample holders, monochroamtors, radiation detectors, single and double beam instruments, colorimeter. IR spectroscopy: • Rotational and vibration spectra, Instrumental features, applications. Raman effect, strokes and anti-strokes, lines, advantages, applications. CD ORD principles and applications. Fluorescence: • Fluorescence and phosphorescence, bioluminescence and chemiluminiscence phenomenon, quenching, energy transfer, and applications. Atomic absorption spectroscopy: • Principle and instrumentations.	**2**	**6**

Separation techniques Electrokinetics methods: • Electrophoresis, • Electrophoretic mobility (epm), • Factors affecting epm, paper, Page, • SDS-Page, disc gel, gradient gel, • Electrophoresis of nucleic acid and its application, • Pulse field electrophoresis, • Single cell gel electrophoresis, • Isolectrophoresis, preparative electrophoresis, • 2-D gel electrophoresis, Capillary, Iso-Electric focusing, • Applications in biology and medicine. • Chromatography, tlc, • Adsorption, partition, • Ion exchange, • Gel filtration, affinity and FPLC, GLC	**3**	**9**
	15 weeks	**45 hrs**

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

		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned	45	-	-	-	-	45
	Actual	45	-	-	-	-	45
Credit	Planned	3	-	-	-	-	3
	Actual	3	-	-	-	-	3

3. Individual study/learning hours expected for students per week. 6

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

On the table below are the five NQF Learning Domains, numbered in the left column.

First, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). **Second**, insert supporting teaching strategies that fit and align with the assessment methods and targeted learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

Learning outcome Materix (Cell Biophysics Course)

Topic In weeks	*Knowledge*		*Cognitive Skills*			*Interpersonal Skills & Responsibility*		*Communication skills, IT skills and numerical skills*		*Psychomotor*
	1.1	**1.2**	**2.1**	**2.2**	**2.3**	**3.1**	**3.2**	**4.1**	**4.2**	**5.1**
1st, 2nd and 3ed Week lectures	√	√		√		√				***NA***
4th, 5th , 6th and 7th Week lectures	√	√	√				√	√		
8th, 9th , 10th and 11th Week lectures	√	√	√		√	√		√	√	
12th, 13th , 14th and 15th Week lectures	√	√	√		√	√	√	√	√	√

Learning domains (see suggestions below the table). **Second**, insert supporting teaching strategies that fit and align with the assessment methods and targeted learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

Curriculum Map

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1	Conduct the basic knowledge of cellular biophysics.	9. Lectures 10. Tutorials 11. Individual Assignment 12. Discussions	k) Short exams l) Long exams (final) m) Discussions during the lectures. n) Homeworks. o) Write a Report
1.2	Recognize advanced methods of cellular macromolecules (e.g. Proteins, lipids, and DNA) separation techniques.		
2.0	**Cognitive Skills**		
2.1	The ability to differentiate between different theories of ionic conduction, mechanisms through cellular membrane.	7. Web-based activities 8. Individual and Group Assigments 9. Group Discussions	g) Assignments included some open end tasks h) Web-based project i) Homeworks j) Final exam k) Short exams l) Seminars
2.2	Differentiate between the basic types of protein, and carbohydrates by modern analysis techniques .		
2.3	Analysis and interpret the physical and chemical methods of macromolecules separation techniques.		
3.0	**Interpersonal Skills & Responsibility**		

3.1	Work effectively in groups as well as individuals.	8. Writing an essay 9. Presentations in some selected topics 10. Small Group Discussion. 11. Visits to spectroscopic labs to enhance the students' expert	f) Essay (Group Assessment) g) Presentations (individual and Group Assessment) h) Homework i) Final exam j) Report in field (Individual Assessment
3.2	Justify a short report in a written form and/or orally using appropriate scientific language.		
4.0	**Communication, Information Technology, Numerical**		
4.1	Demonstrate information technology and modern computer tools to locate and retrieve scientific information relevant to image processing.	7. Group Discussions 8. Reports 9. Presentations	d) Essay (Group Assessment) e) Presentations (individual and Group Assessment f) Report in the field (Individual Assessment or in group)
4.2	Appraise the cooperation through teamwork to assess and criticize various emergent problems.		
5.0	**Psychomotor(if any)**		
5.1	Not applicable (NA)		

5. Assessment Task Schedule for Students During the Semester			
	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	**Week Due**	**Proportion of Total Assessment**
1	Exercises, Homework, Participation, In-Class Discussion Essay, Reports and Oral Presentations.	All weeks	30%
2	Mid-Term Class Test Exam	Week 8	20%
3	Final Exam	Week 15	50%

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)
There is an academic counseling teaching staff for every postgraduate student enrolled in the medical physics program.

E Learning Resources

1. List Required Textbooks

1. Biophysical Chemistry, The Behaviour of biological macromolecules, Vol I, II, III, Cantor and Schimmel, (2008), W H Freeman & Co.

2. Applied Biophysics, A Molecualr Approach for Physical Scientist, Tom A Weigh, (2007), Wiley

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

1. Molecular biophysics journal
https://www.nature.com/subjects/molecular-biophysics

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

- Syllabus in HTML, also available as PDF file
- Current-Voltage Curve Tutorial by James Dilger at Stonybrook University.
- Some notes on effective reading (and writing) of science papers from Dana Brooks (Northeastern University)
- The Science of Scientific Writing, also in pdf format . This is the best article I know for scientific writing. Mandatory reading!
- MATLAB information
- Additional CV physiology and bioelectricity background information.

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

1. The Microsoft Office for editing reports.

2. The Matlab and Image J software package to train the student about how making image processing.

F. Facilities Required. Facilities Required

Indicate requirements for the course, including the size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) There are enough classrooms provided with a good accommodation, including good air condition, good data show slide projector, and suitable white board .
2. Computing resources (AV, data show, Smart Board, software, etc.) In each lecture classroom and laboratory, there is a data show, and a suitable white board.
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) **N/A**

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching **Question to students on the course evaluation.** **Question to students on the exam evaluation.**
2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department **Internal revisions by the staff members about the courses and examinations.** **Questionnaires to job owners in the graduate employer evaluation.**
3 Processes for Improvement of Teaching

Periodical revisions to the course specification, reports and evaluations of the instructor.

Continuous training courses on teaching improvements for staff member

Using scientific flash and movies.

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)

- **Efficiency of course will be reflected in the results of the class, which reviewed by members of the teaching staff in addition to other duties such as discussing ideas and ways of teaching and learning.**
- **The course should be developed periodically to ensure that it contains the latest developments in the field of study.**
- **Development could be put as an objective in the report of the course to be achieved each semester**

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

Continuous observations of the following processes:

- **Statistical data feedback from questionnaires to students on the Instructor evaluation.**
- **Internal revisions by the staff members about the courses and examinations.**
- **Statistical data feedback from questionnaires to job owners in the graduate employer evaluation in order to improve the course according to the needs of the outer community.**
- **Statistical data feedback from questionnaires to the student needs in order to improve the course according to the needs of the students.**
- **Observation of the student results from examinations...**

Name of Course Instructor: Dr. Hosam Salaheldin Ibrahim

Signature: Hosam _____ **Date Completed:** 30/10/2018

Program Coordinator: Dr. Taha Alfawal_____

Signature: ___ _____ **Date Received:** _____

COURSE SPECIFICATIONS

Form

Course Title: Research Project

Course Code: 403675-3 (Part (1)

403675-3 (Part (2)

Date: 20....–.....–.....	**Institution**: uqu.....
College: College of Applied Science	**Department**: .....Physics Department.....

A. Course Identification and General Information

1. Course title and code: Research Project and 403675-3 (part 1 and part 2)
2. Credit hours: 3 credit hours per semester (i.e. level 3 and level 4) for the research project
3. Program(s) in which the course is offered. Master of Medical Physics

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

5. Name of faculty member responsible for the course
   All medical staff members
5. Level/year at which this course is offered:3rd level and 4th level /second year
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 Zaher
9. Mode of Instruction (mark all that apply):

a. Traditional classroom		percentage?		
b. Blended (traditional and online)		percentage?		
c. E-learning		percentage?		
d. Correspondence		percentage?		
f. Other	100	percentage?	100	

Comments: the research project will be conducted starting from the third level , continued and finished at the fourth level

B Objectives

1. The main objective of this course :

To identify a driving question for the project and project endpoint

To improve project/time management skills

To lean to identify and manage resources and risks

To communicate project results clearly and effectively th

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

To improve the students' expert in the research project subjects:-
1.Encourge students to register to webinars and worshops related to the dosimetry in diagnostic radiology , radiotherapy , nuclear medicine and radiation protection, quality control and quality assurance for diagnostic x-ray , radiotherapy and nuclear mediine.

2.Encourage students to research assignment about selected specialized topics related to the field

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description: A supervisor of the research

1. Topics to be Covered

List of Topics researches	Period	Contact hours
Physics application in Medicine and Biology	1st term and 2nd term of the second year	90
quality control and quality assurance for diagnostic x-ray machiners , Linear accelerators and and hot laboratorty and gamma camera of nuclear medicine imaging.	1st term and 2nd term of the second year	90
dosimetry in diagnostic radiology , radiotherapy and nuclear medicine	1st term and 2nd term of the second year	90

Radiation protection for workers Radiation protection and dosimetry for patients undergoing diagnostic and computed tomography examination.	1st term and 2nd term of the second year	90
Generation of nanoparticle of radiopharmaceticalls and its application in imaging and treatment	1st term and 2nd term of the second year	90
Treatment planning system for linear accelerators .	1st term and 2nd term of the second year	90
Comparison study for the modern radiotherapy technology	1st term and 2nd term of the second year	90
Special Topics: the suprervisor will	1st term and 2nd term of the second year	90
Total	32 weeks	90 hrs

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

		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned	90					90
	Actual	90					90
Credit	Planned	6					6
	Actual	6					6

3. Individual study/learning hours expected for students per week. 6

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

On the table below are the five NQF Learning Domains, numbered in the left column.

First, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). **Second**, insert supporting teaching strategies that fit and align with the assessment methods and targeted learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

Curriculum Map			
Code #	**NQF Learning Domains And Course Learning Outcomes**	**Course Teaching Strategies**	**Course Assessment Methods**
1.0	**Knowledge**		
1.1	To Identify a driving question for the project and project endpoint	Seminars	Assignments Presentations Essays research project. Write a dissertation and introduce seminar to examination Committee (Reviewer 1 +2)
1.2	Outline the quality control and quality assurance for X-ray modalities, nuclear medicine and radiotheraoy.	Discussions	
1.3	Describeing set up for experiment arrangement for calibration and dose assessment.		
1.4	Stat the methodlgy of blood sampling and separation its components		
2.0	**Cognitive Skills**		
2.1	Explain methods for measurement a dose in mammogram, radiography, CT and fuoroscopy x-ray modalities.	Seminars	Presentations Focus group discussion research project. Assignments Assaya-seminars , web based project Write a dissertation and discuss it in front of examination Committee (Reviewer 1 +2)
2.2	create the new method for calibration of advanced new dosimetrs in CT, Mamogram, Fluoroscopy ,Radiography, gamma camera and linear accelerators	Discussions	
2.3	Explain methods for measurement absorption of a hemoglobin and other biological macrmolecue using UV-IR scpectrophotmeter.		
3.0	**Interpersonal Skills & Responsibility**		
3.1	To improve project/time management skills	Presentation	Essay Presentation Assignments Written reports for the research project. Write a dissertation and discuss it in front of examination Committee (Reviewer 1 +2)
3.2	choose a suitable methods for measurement of a absorbed dose in radiography, mammogram and computed tomography, medical imaging and radiotherapy	Discussions	
3.3	Modify the direct and indirect methods of patient dose assessment for radiograpgy fluoroscopy , computed tomography , nuclear imaging and radiotherapy.	Discussions	
3.4	To improve medical imaging and radiotherapy using nanomedicine, nanoparticle of radiopharmaceticalls .	Discussions	
4.0	Communication, Information Technology, Numerical		
4.1	To communicate project results clearly and effectively through high quality oral and written reports	Seminars	a.Essay Assessment) b.Presentations individual c.Write dissertation e.discuss the dissertation in front of examination Committee (Reviewer 1 +2)
4.2	The student should illustrate seminar for the research project	Discussions	
.0	Psychomotor(if any)		
5.1			
5.2			

5. Assessment Task Schedule for Students During the Semester			
	Assessment task (i.e., essay, research project, write a thesis , project, examination, oral presentation, etc.)	**Week Due**	**Proportion of Total Assessment**
1	**., essay, research project, write a thesis , project, examination, oral presentation**	All weeks	Examination Commitee
2	**project, examinationtation**	Week 15	

D. Student Academic Counseling and Support

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

E Learning Resources

1. List Required Textbooks

Dosimety in Diagnostic Radiolgy, IAEA, 2014.

Michael J.r and Albert v. K. Basic Clinical Radiobiology, 4th Eds., Edward Arnold, 2009.

Biophysical Chemistry, The Behaviour of biological macromolecules, Vol I, II, III, Cantor and Schimmel, (2008), W H Freeman & Co.

Applied Biophysics, A Molecualr Approach for Physical Scientist, Tom A Weigh, (2007), Wiley

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

International Atomic Energy Agency (IAEA). Radiation Biology for teacher and student,academic press, 2010

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

https://www.amazon.com/Accelerators-Radiation-Therapy-Biomedical-Engineering/dp/0750304766

https://uqu.edu.sa/lib/917

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

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access, etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) There is enough classrooms with a good demonstration rooms in building W in Faculty of Science
2. Technology resources (AV, data show, Smart Board, software, etc.) Data show and computers with simulation laboratory and a good access to internet are required for web-based projects
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

G Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching 1-Course reports 2-Course questionares and program questionares
2. Other Strategies for Evaluation of Teaching by the Instructor or the Department Analysis the research reports of students.
3. Procedures for Teaching Development Instructors, who teach the course, have regualer meeting to update the course materials and activities
4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution) Evaluation by the accreditation committee in the university
5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it. The following points may help to get the course effectiveness • Student evaluation • Course report • Program report • Program Self study According to point 1 the plan of improvement should be given.

Name of Course Instructor: Medical physics staff members._____

Signature: _____ Date Completed: _____

Program Coordinator: _Taha AlFawwal
Signature: _____ Date Received: _____

Level Four

Four semester of second year

Level	Course Code	Course Title	Required or Elective	Prerequisite Courses	Credit Hours
Level 4	403676-3	Dosimetry in radiotherapy			**3**
	403670-3	Computational Methods in Medical Physics	Required		**3**
	403674-2	Special topics	**Continue ..**		*2*
	403675-3-Part2	Research Project	**Continue ..**		*3*
Total credits hours for level 4					***11 hrs***

4/1/4. Course Specification:

COURSE SPECIFICATIONS
Form

Course Title: Dosimetry in radiotherapy

Course Code: 403676-3

Date: 2018-10-17.	**Institution**: Umm AQura University.
College: . Applied Sciences College..... .	**Department**: .... Physics Department.

A. Course Identification and General Information

1. Course title and code: Dosimetry in radiotherapy – 403676-3
2. Credit hours: 3 Hours
3. Program(s) in which the course is offered. Master of Medical Physics Degree

   (If general elective available in many programs indicate this rather than list programs)
4. Name of faculty member responsible for the course Dr. Amani Alalawi
5. Level/year at which this course is offered: Level 4 / Second year
6. Pre-requisites for this course (if any): Non
7. Co-requisites for this course (if any):Non
8. Location if not on main campus: Main Campus + AL-Zaher Campus
9. Mode of Instruction (mark all that apply):

a. Traditional classroom	√	percentage?	70
b. Blended (traditional and online)	√	percentage?	10
c. E-learning	√	percentage?	20
d. Correspondence		percentage?	
f. Other		percentage?	

Comments: f. Other:- Easements, Presentation

B Objectives

1. The main objective of this course
- To understand the theoretical basis for medical dosimetry
- To have knowledge of the interaction of ionizing radiation with matter.
- To discuss the use of each dosimeter and their underpinning theory.

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

To improve the students' expert in the dosimetry in radiotherapy
1.Encourge students to register to webinars and worshops related to the dosimetry in radiotherapy

2.Encourage students to research assignment about selected specialized topics related to the field

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description: This course is designed to teach students how to calculate and measure radiation dose in different ways and techniques. The student has to know the radiation dose and the difference between it and other similar concepts. The student will also learn how to transfer energy from therapeutic or diagnostic radiation to the patient. Therefore, the radiation exposure and the absorbed dose must be included in the contents of the course and the work theory of these different devices and the different between them.

1. Topics to be Covered

List of Topics	No. of Weeks	Contact hours
1. Prime quantities in medical radiation dosimetry **2. Energy Transfer (kerma and absorbed dose)** **3. Electronic equilibrium** **4. Basic concepts in metrology (traceability and uncertainty).**	2	6
5. Theoretical basis for medical dosimetry (cavity theory). **6. Determination of absorbed dose using an absolute ion chamber** **7. Effect of Temperature and Pressure on Ionization Measurements** **8. Exposure – The Roentgen** **9. Standard Air Chamber**	3	9

10. Practical Ion Chamber- The Thimble Chamber 11. Effective Atomic Number 12. Types of Ion Chambers 13. Solid State Detectors-The Diode, TLD, Chemical Dosimetry, Film as a dosimeter, the Calorimeter 14. Basics of the TRS-398 measurement protocol for high-energy photons and electrons	3	9
Mid-term 1		
15. Dosimetry problems related to measurements in standard conditions using the TRS-398 formalism 16. Dosimetry problems related to measurement in non-standard conditions. (measurements in the build-up zone, in small fields or in heterogeneous media). 17. Fluence spectra and dose deposition for simple situations using the EGSnrc Monte Carlo user codes flurznrc and dosnrcrz 18. Signal-generating mechanisms and the basis characteristics for a range of dosimetry systems such as ion chambers and solid-state detectors 19. Dose deposition kernel of a radionuclide decaying in water. 20. Concept of biokinetic distribution models	2	6
21. Organ doses from S-factors and MIRD values 22. Sources of ionizing radiation in medical radiation dosimetry 23. Quantities and metrology 24. Monte Carlo introduction	2	6
25. Charge-particle and radiation equilibria 26. Monte Carlo calculations 27. Cavity theory and ionometry 28. Dosimetry protocols 29. Micro dosimetry 30. Internal dosimetry 31. Chemical dosimetry 32. EPR and Film dosimetry in practice 33. Solid-state dosimetry	3	9
Total	15 weeks	45

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

		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned	45					45
	Actual	45					45
Credit	Planned	3					3
	Actual	3					3

3. Individual study/learning hours expected for students per week.	9

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

Course Learning Outcomes, Assessment Methods, and Teaching Strategy work together and are aligned. They are joined together as one, coherent, unity that collectively articulate a consistent agreement between student learning, assessment, and teaching.

The ***National Qualification Framework*** provides five learning domains. Course learning outcomes are required. Normally a course has should not exceed eight learning outcomes which align with one or more of the five learning domains. Some courses have one or more program learning outcomes integrated into the course learning outcomes to demonstrate program learning outcome alignment. The program learning outcome matrix map identifies which program learning outcomes are incorporated into specific courses.

On the table below are the five NQF Learning Domains, numbered in the left column.

First, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). **Second**, insert supporting teaching strategies that fit and align with the assessment methods and intended learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy ought to reasonably fit and flow together as an integrated learning and teaching process. **Fourth**, if any program learning outcomes are included in the course learning outcomes, place the @ symbol next to it.

Every course is not required to include learning outcomes from each domain.

On the table below are the five NQF Learning Domains, numbered in the left column.

First, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). **Second**, insert supporting teaching strategies that fit and align with the assessment methods and targeted learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

Curriculum Map

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1	recognize the **Prime quantities in medical radiation dosimetry**	**9- Lectures** **10- Discussions** **11- Visual presentation**	a)Short exams b)Long exams (final)
1.2	Defining the absorbed dose using an absolute	**5- Lectures**	c)Discussions

	ion chamber	**6- Discussions** **7- Visual presentation**	during the lectures. d) Home work. e)Write a report
1.3	Describing Signal-generating mechanisms and the basis characteristics for a range of dosimetry systems such as ion chambers and solid-state detectors	**1- Lectures** **2- Discussions** **3- Visual presentation.**	
2.0	**Cognitive Skills**		
2.1	Summarizing the **Sources of ionizing radiation in medical radiation dosimetry**	**Encourage** the student to look for some books in the different references describing radiation.	a.Aissgnments included some open end tasks b.Web-based project c.Homework d.Final exam e.Short exams f.seminars
2.2	Evaluating **Organ doses from S-factors and MIRD values**	**Ask** the student to attend lectures for radiation effects.	
3.0	**Interpersonal Skills & Responsibility**		
3.1	Demonstrate the Dosimetry protocols.	Ask the students to search the internet and use the library. Encourage them how to attend lectures regularly by assigning marks for attendance.	a.Essay (Group Assessment) b.Presentations (individual and Group Assessment) c.Homework d.Final exam Report in field (Individual Assessment
3.2	Evaluate the Dose deposition kernel of a radionuclide	Teach them how to cover missed lectures. Give students tasks of duties	
4.0	**Communication, Information Technology, Numerical**		
4.1	Outline how to communicating with: Peers, Lecturers and Community.	Creating working groups with peers to collectively prepare: solving problems and search the internet for some topics.	a.Essay (Group Assessment) b.Presentations (individual and Group Assessment Report in field (Individual Assessment
4.2	The student should **interpret** how to Know the basic principles of **Internal dosimetry** .	Give the students tasks to measure their: practical skills, analysis and problem solving.	
4.3	The student should **appraise** how to Use the	Encourage the student	

	computer skills and library.	to ask for help if needed.	
4.4	demonstrate how to Search I the internet and using software programs to deal with technique.	Encourage the student to ask good question to help solve the problem.	Give them comments on some resulting numbers.
5.0	**Psychomotor(if any)**		
5.1	Not applicable	Not applicable	Not applicable
5.2	Not applicable	Not applicable	Not applicable

5. Assessment Task Schedule for Students During the Semester			
	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	**Week Due**	**Proportion of Total Assessment**
1	Midterm 1	5th week	10 %
2	Midterm 1	10th week	20%
3	Midterm 1	15th 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 counseling. (include the time teaching staff are expected to be available per week)

1- Eight 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**

   Introduction to Radiological Physics and Radiation Dosimetry, 1991, Frank H. Attix, John Willey and Sons, 1991
   Principles of Radiological Physics, , Donald Graham and Paul Clock, 2007
   Introduction to Radiological Physics and Radiation Dosimetery, Frank H. Attix, John Willey and Sons, 1986.

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

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

https://www.zapmeta.ws/ws?q=radiation%20dosimetry&asid=ws_gc9_09&mt=b&nw=g&de=c&ap=1o2

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

F. Facilities Required

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

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

There is enough classrooms with a good demonstration rooms in building W in Faculty of Science

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

Data show and computers with simulation laboratory and a good access to internet are required for web-based projects

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

G Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching 1-Course reports 2-Course questionares and program questionares
2. Other Strategies for Evaluation of Teaching by the Instructor or the Department • Revision of student answer paper by another staff member. Analysis the grades of students.
3. Procedures for Teaching Development Instructors, who teach the course, have regualer meeting to update the course materials and activities
4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members 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.. Evaluation by the accreditation committee in the university
5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it. The following points may help to get the course effectiveness • Student evaluation • Course report • Program report • Program Self study According to point 1 the plan of improvement should be given.

Name of Course Instructor: Dr. Amani Alalawi _____

Signature: _____ **Date Completed:** _____

Program Coordinator: ___Taha Alfawwal
Signature: _____ **Date Received:** _____

4/1/4. Course Specification:

SPECIFICATIONS
Form

Course Title: Computational Methods in Medical Physics

Course Code: 403670-3

Date: 20....–.....–.....	**Institution**: .....uqu.....
College: Faculty of Applied Science	**Department**: Physics Department.

A. Course Identification and General Information

1. Course title and code: Computational Methods in Medical Physics -403670-3		
2. Credit hours: 3 hrs		
3. Program(s) in which the course is offered. Master of Medical Physics (If general elective available in many programs indicate this rather than list programs)		
4. Name of faculty member responsible for the course. ProF.Dr.Samir Nitto		
5. Level/year at which this course is offered: Level 4/ Second year		
6. Pre-requisites for this course (if any):		
7. Co-requisites for this course (if any):		
8. Location if not on main campus:		
9. Mode of Instruction (mark all that apply):		
a. Traditional classroom	√ percentage?	70
b. Blended (traditional and online)	√ percentage?	10
c. E-learning	√ percentage?	20
d. Correspondence	percentage?	
f. Other	percentage?	
Comments:		

B Objectives

1. The main objective of this course: : Course Description: In this course, students will familiarize themselves with the modeling of radiation fields during modern radiotherapy and on the real patients' daily cases. And identify the physical bases behind all the options of these mathematical programs. The student does all the necessary dependencies of the planning that he works. The student will actually visit a hospital in the area to work on the planning equipment for external and internal radiation therapy

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description:

1. Topics to be Covered		
List of Topics	**No. of Weeks**	**Contact hours**
Digital Image Coomunication (DICOM) and Picture Archeiving Communication Sysrtem (PACS) Iintroduction to DICOctionM **DICOM and Clinical data** **Medical Image in DICOM** **DICOM Communicationa** **DICOM and Teleradiology** **DICOM Applications**	3	9
Medical Simulators Simulation Modalities and Technology Simulation for health care displines	3	9
Monte Carlo Calculations	3	9
Mid-term 1		
Computational Methods for Radiological Sciences	2	6
Mathematical Methods for Radiological Sciences	1	3
Mathematical Methods for Imaging in Medicine	2	6
Digital X-Ray Imaging and Computed Tomography **Biomedical image processing** **Noise reduction** **Biomedical image segmentation**	1	3
Final Exam		

2. Course components (total contact and credit hours per semester):							
		Lecture	**Tutorial**	**Laboratory/ Studio**	**Practical**	**Other**	**Total**
Contact Hours	Planned	45					45
	Actual	45					45
Credit	Planned	3					3
	Actual	3					3

3. Individual study/learning hours expected for students per week.	9

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

On the table below are the five NQF Learning Domains, numbered in the left column.

First, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). **Second**, insert supporting teaching strategies that fit and align with the assessment methods and targeted learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

Curriculum Map

Code #	**NQF Learning Domains And Course Learning Outcomes**	**Course Teaching Strategies**	**Course Assessment Methods**
1.0	**Knowledge**		
1.1	recognize the Medical Simulators and understand it operational method	**Lectures** **Discussions** **Visual presentation**	Exams Midterms Final examination
1.2	Define the Mathematical Methods for Imaging in Medicine	**Lectures** **Discussions** **Visual presentation**	Home work. Quizzes
1.3	Describing Digital X-Ray Imaging and Computed Tomography	**Lectures** **Discussions** **Visual presentation**	Continuous discussions with the students during the lectures.
2.0	**Cognitive Skills**		
2.1	Summarizing the Medical Simulators operational method	**Encourage** the student to look for some books in the different	a.Aissgnments included

		references describing radiation.	some open end tasks
2.2	evaluate Mathematical Methods for Imaging in Medicine	**Ask** the student to attend lectures for radiation effects	b.Web-based project c.Homework d.Final exam e.Short exams f.seminars
3.0	**Interpersonal Skills & Responsibility**		
3.1	Demonstrate the medical Simulators Tech.	Ask the students to search the internet and use the library. Encourage them how to attend lectures regularly by assigning marks for attendance.	a.Essay (Group Assessment) b.Presentations (individual and Group Assessment) c.Homework d.Final exam e.Report in field (Individual Assessment
3.2	Evaluate the Medical Simulators in Imaging	Teach them how to cover missed lectures. Give students tasks of duties	
4.0	**Communication, Information Technology, Numerical**		
4.1	Outline how to communicating with: Peers, Lecturers and Community.	Creating working groups with peers to collectively prepare: solving problems and search the internet for	Discussing a group work sheets.
4.2	The student should **interpret** how to Know the basic principles using the internet for radiation measurements	Give the students tasks to measure their: practical skills, analysis and problem solving	Discuses with them the results of computations analysis and problem solutions.
4.3	The student should **appraise** how to Use the computer skills and library.	Encourage the student to ask for help if needed.	Give homework's to know how the student understands the numerical

			skills.
4.4	demonstrate how to Search I the internet and using software programs to deal with technique.	Encourage the student to ask good question to help solve the problem.	Give them comments on some resulting numbers
5.0	**Psychomotor(if any)**		
5.1	Not applicable	Not applicable	Not applicable
5.2	Not applicable	Not applicable	Not applicable

5. Assessment Task Schedule for Students During the Semester			
	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	**Week Due**	**Proportion of Total Assessment**
1	Midterm 1	5th week	20 %
2	Research	10th week	10%
4	Homework + reports	15th week	20%
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 counseling. (include the time teaching staff are expected to be available per week)

1- 8-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

Digital Imaging and Communications in Medicine (DICOM), Oleg S. Pianykh
A Practical Introduction and Survival Guide Second Edition, 2012
The Comprehensive Textbook of Healthcare Simulation, Adam I. Levine • Samuel DeMaria Jr. Andrew D. Schwartz • Alan J. Sim Editors, 2014.

Essential References

Digital Image Processing for Medical Applications, GEOFF DOUGHERTY2 2013

Handbook of Physics in Medicine And Biology, Robert Splinter, CRC Press is an imprint of Taylor & Francis Group, an Informa business, 2010.

Digital Image Processing for Medical Applications, GEOFF DOUGHERTY2 2013

3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.
https://www.slideshare.net/VictorEkpo2/the-role-of-computers-in-medical-physics

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

F. Facilities Required

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

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)
Classroom with capacity of 10-students.

- Library.

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

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

G Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching. Student evaluation electronically organized by the University.

2. Other Strategies for Evaluation of Teaching by the Instructor or the Department. The colleagues who teach the same course discuss together to evaluate their teaching.

3. Procedures for Teaching Development. Course report, Program report and Program self-study.

4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution)
The instructors verify the students achievement from the course by evaluating the student reports and exams .

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

1-The following points may help to get the course effectiveness:

Student evaluation.

* Course report

* Program report.

* Program self-study

2- According to point 1 the plan of improvement should be given

Name of Course Instructor: Prof.Dr. Samir Nitto
Signature: _____ Date Completed: _____

Program Coordinator: __Taha ALFAWWAL

Signature: _____ Date Received: _____