



# **COURSE SPECIFICATIONS (CS)**

**Medical Physics**

**PHYS 462**

June 2018

## Course Specifications

Institution	King Saud University	Date	2017
College of Science/ Department Physics and Astronomy			

### A. Course Identification and General Information

1. Course title and code: Medical Physics/ Phys 462		
2. Credit hours: 2 (2+0+0)		
3. Program(s) in which the course is offered: <b>BSc. Physics</b>		
4. Name of faculty member responsible for the course		
5. Level/year at which this course is offered: Elective		
6. Pre-requisites for this course :		
7. Co-requisites for this course : PHYS 460		
8. Location if not on main campus: Main campus for Male		
9. Mode of Instruction (mark all that apply)		
a. traditional classroom	<input checked="" type="checkbox"/> What percentage?	<input type="text" value="100%"/>
b. blended (traditional and online)	<input type="checkbox"/> What percentage?	<input type="text"/>
c. e-learning	<input type="checkbox"/> What percentage?	<input type="text"/>
d. correspondence	<input type="checkbox"/> What percentage?	<input type="text"/>
f. other	<input type="checkbox"/> What percentage?	<input type="text"/>
Comments:		

## B Objectives

<p>1. What is the main purpose for this course? The students should grasp the Medical physics basics and its applications in diagnosis and treatment.</p>
<p>2. Briefly describe any plans for developing and improving the course that are being implemented.</p> <ul style="list-style-type: none"> <li>✚ Explain strategy of the course in the beginning of the semester</li> <li>✚ Outlines of the physical laws and principles.</li> <li>✚ Highlighting the day life applications whenever exist.</li> <li>✚ Encourage the students to see more details in the international web sites and reference books in the library.</li> <li>✚ Cooperate with different institution to find how they deal with the subject</li> <li>✚ Frequently check for the latest discovery in medical Physics.</li> <li>✚ The course materials were posted on the department Website that could be accessed by the students enrolled in the course.</li> </ul>

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

Course Description:
<p>Introduction to Medical Physics, Electromagnetic Spectrum and Radiation, Interactions of ionizing and non-Ionizing Radiation with biological matter.</p> <p>-Radiological Imaging: Introduction to Imaging, Conventional X-ray imaging, Computed Tomography, Diagnostic Ultrasound.</p> <p>-Radiation Therapy: Introduction to Radiotherapy Physics, Linear Accelerators, Introduction to treatment Planning, Brachytherapy, Machine calibration and quality assurance.</p> <p>-Magnetic Resonance Imaging: Introduction, Basic NMR Physics, MR Imaging Principles, Medical Applications.</p> <p>- Nuclear Medicine: Introduction, Isotopes, PET scan</p>

1 Topics to be Covered		
List of Topics	No of Weeks	Contact hours

Introduction to Medical Physics	1	2
Electromagnetic Spectrum and Radiation,	1	2
Interactions of ionizing and non-Ionizing Radiation with biological matter	2	4
Radiological Imaging, Conventional X-ray imaging, Computed Tomography, Diagnostic Ultrasound.	2	4
Radiation Therapy: Introduction to Radiotherapy Physics, Linear Accelerators, Introduction to External Beam Treatment Planning, Brachytherapy, Machine calibration and quality assurance.	3	6
Magnetic Resonance Imaging: Introduction, Basic NMR Physics, MR Imaging Principles, medical Applications.	3	6
Nuclear Medicine: Introduction, Isotopes, PET scan	3	6

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

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

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

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

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

Code	NQF Learning Domains	Course Teaching	Course Assessment
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#	And Course Learning Outcomes	Strategies	Methods
<b>1.0</b>	<b>Knowledge</b>		
1.1	Outline the fundamentals of Medical Physics	lecture	Exams
1.2	Recognize electromagnetic Spectrum and Radiation, Basic Interactions of ionizing and non-Ionizing Radiation with biological matter	individual presentation	speeches
<b>2.0</b>	<b>Cognitive Skills</b>		
2.1	Explain the physical laws and principles to understand the subject	small group work	long and short essays
2.2	Calculate problems and analyze phenomena	lecture	tables, demonstrations
<b>3.0</b>	<b>Interpersonal Skills &amp; Responsibility</b>		
3.1	To show work independently and as part of a team.	small group work	group reports
3.2			
<b>4.0</b>	<b>Communication, Information Technology, Numerical</b>		
4.1	To operate of ICT in searching for information.	projects.	peer evaluations
<b>5.0</b>	<b>Psychomotor</b>		
5.1			
5.2			

Schedule of Assessment Tasks for Students during the Semester			
Assessment	Assessment task	Week due	Proportion of Final Assessment%
1	Midterm 1	5 <sup>th</sup> week	15
2	Midterm 2	10 <sup>th</sup> week	15
3	project	7 <sup>th</sup> , 12 <sup>th</sup> week	15
4	HW& Attendance	Every week	15
5	Final exam	End of semester	40

#### D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice: 4 office hours per week
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#### E Learning Resources

1. List Required Textbooks
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<ul style="list-style-type: none"> <li>✚ Medical Imaging Physics, by W.R. Hendee and E.R. Ritenour, 4th ed. Wiley- 2003</li> </ul>
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2. List Essential References Materials (Journals, Reports, etc.)
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<ul style="list-style-type: none"> <li>✚ Physics of Radiology, by A.B. Wolbarst, Medical Physics Publishing, 2004</li> <li>✚ The Essential Physics of Medical Imaging, by J.T. Bushberg, et al., Lippincott Williams &amp; Wilkins, 2012</li> </ul>
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3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.
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<ul style="list-style-type: none"> <li>✚ <a href="#">medical physics and radiology</a></li> <li>✚ <a href="http://www.Biophysics on the internet.com">http://www.Biophysics on the internet.com</a></li> <li><a href="http:// International union for pure and applied biophysics">http:// International union for pure and applied biophysics</a></li> </ul>
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4. Other learning material such as computer-based programs/CD, professional standards or regulations and software.
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#### 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.)
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1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)
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Lecture room for 30 students
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Library
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2. Computing resources (AV, data show, Smart Board, software, etc.)
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Computer room
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3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)
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## G Course Evaluation and Improvement Processes

<p>1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching</p> <p>Course Evaluation Survey by students at the end of semester.</p>
<p>2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department</p> <p>Analysis the students course evaluation survey. Discussion of the notices of course teaching staff.</p>
<p>3 Processes for Improvement of Teaching</p> <p>(a) Workshops of teaching and learning ways organized by skills improvement deanship. (b) Discussion the teaching ways at the beginning of semester.</p>
<p>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)</p> <ul style="list-style-type: none"> <li>✚ The instructors of the course are checking together and put a unique process of evaluation</li> <li>✚ Check marking of a sample of papers by others in the department.</li> </ul> <p>Feedback evaluation of teaching from independent organization.</p>
<p>5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.</p> <p>Reviewing the course content every five years.</p>

Name of Instructor: \_\_\_\_\_

Signature: \_\_\_\_\_ Date Report Completed: \_\_\_\_\_

Name of Field Experience Teaching Staff \_\_\_\_\_

Program Coordinator: \_\_\_\_\_

Signature: \_\_\_\_\_ Date Received: \_\_\_\_\_