



هيئة تقويم التعليم
Education Evaluation Commission
المركز الوطني للتقويم والاعتماد الأكاديمي
National Center for Academic Accreditation and Evaluation

ATTACHMENT 5.

**T6. COURSE SPECIFICATIONS
(CS)**

Medical Physics

(PHS 103)

Course Specifications

Institution: Aljouf University	Date: 20/12/2017
College/Department: Deanship of Preparatory Year	

A. Course Identification and General Information

1. Course title and code: Medical Physics PHS 103			
2. Credit hours: 3 (2,2,0)			
3. Program(s) in which the course is offered. Preparatory year for all Health Collages			
4. Name of faculty member responsible for the course Dr. Dr. Dr.			
5. Level/year at which this course is offered: Preparatory Year			
6. Pre-requisites for this course (if any): None			
7. Co-requisites for this course (if any): None			
8. Location: Main Campus			
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

1. What is the main purpose for this course?

This course aims to study the basic principles of Physics that are relevant to the medical field and apply the principles of physics in understanding various body functions to develop health/medical disciplines.

2. Briefly describe any plans for developing and improving the course that are being implemented.

- Annual review of course by departmental course planning committee.
- Updating the course with latest developments in the field.
- Annual evaluation and updating of practical sessions materials and preparations.
- Updating course resources based on student usability feedback.
- Benchmark the course topics with local and international universities' equivalent courses.

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

This is an introductory course in the principles of medical physics, oriented primarily towards students pursuing a health and medical academic track. Students who master medical physics often acquire some of the tools they will need for future studies in medical science, medicine, and they have also gained a new appreciation for the beauty of everyday phenomena and have substantially developed their reasoning and analytical skills.

1. Topics to be Covered

List of Topics	No. of Weeks	Contact hours
Measurements standards, units and order of magnitude estimates	1	2
Mechanics of the body 1- Forces acting on the body 2- Torques 3- Vector analysis 4- Lever systems	2	4
Pressure and blood flow 1- Properties of Fluids: pressure, viscosity, surface tension 2- Continuity equation, flow of ideal liquid 3- Flow Speed and vessel diameter in the cardiovascular system	1	2
Gasses diffusion and heat flow 1- Phase and temperature change 2- Heat transfer and application to human body 3- Measurement of lung volume 4- Pressure-airflow-volume relationships of the lungs	1	2



Nerve conduction 1- Circuits containing resistance and capacitance 2 -Resistance and capacitance of an axon 3 -The response of weak stimuli	2	4
Light in medicine 1- Properties of light, reflection, refraction, interference and total internal reflection. 2- Type of lenses 3- Eye as an optical system	2	4
Sound in medicine 1- Waves frequency, wavelength and speed 2- Types of waves, Resonance and sound generation 3- Simple medical applications of sound waves	2	4
Radiation in medicine 1- atomic structure, nuclei and isotopes 2-Nuclear decay processes and types of natural radiation (alpha, beta, and gamma). 3- Half life time and decay constant 4-Dosimetry and dose unit's terminology 5-Clinical applications of different isotopes in medicine 6-Radiation safety	2	4
Revision and exams	2	4

Practical Experiments:

No	The name of the experiment	No. of Weeks	Contact hours
1	Introduction to safety and definition of different devices in the laboratory. Graphing and error analysis.	1	2
2	Force table	1	2
3	Coefficient of viscosity	1	2
4	Boyle's law	1	2
5	Surface tension	1	2
6	Cathode Ray Oscilloscope	1	2
7	Specific heat of solids	1	2
8	Ohm's law	1	2
9	Metric bridge	1	2
10	Lens power	1	2
11	Determination of speed of sound in the air	1	2
12	Inverse Square Low for radiation	1	2
13	Revision	1	2

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

		Lecture	Tutorial	Laboratory/ Studio	Practical	Other:	Total
Contact Hours	Planned	30	NA	28	NA	NA	58
	Actual						
Credit	Planned	2	NA	1	NA	NA	3
	Actual						

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

2h

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.

Code #	NQF Learning Domains and Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	Knowledge		
1.1	Define the physical quantities related to the course	a. Class discussions. b. Lectures. c. Seminars. d. Writing assignments.	a. Direct assessment components such as quizzes, home works, major and final exams. b. Self-assessment feedback. c. Quizzes
1.2	Understand the basic principles of biomechanics, bioelectricity, wave phenomena, and the biological effects of radiation		
1.3	Understand the basic principles and the experimental basis of the various fields of physics and their explanations to major biological processes		
1.4	Know the physical mechanism of medical tools		
2.0	Cognitive Skills		
2.1	Use laws of motion to analyze dynamic problems		



2.2	Interpret some phenomena related to mechanics of fluid movement	<ul style="list-style-type: none"> - Problem solving - Class discussion - Assignments - Exercises - Lab experiment 	<ul style="list-style-type: none"> - Graded homework - Individual and group assignments - Assessment of class participation - Experimental reports - Final Exam
2.3	Explain the applications of radiation in medicine		
2.4	Analyze biological phenomena in body using physical concepts		
2.5	Apply laboratory experiments related to basic physical concepts in the course		
3.0	Interpersonal Skills & Responsibility		
3.1	Work effectively in groups as well as individuals.	<ul style="list-style-type: none"> - Discussion with students. - Making students aware about time management in completing their assignments. - Encourage students to help each other. - Group presentation - Group assignments. 	<ul style="list-style-type: none"> - Take attendance - Class discussions - Grade quizzes. - Respect deadlines. - Give clear and logical arguments.
3.2	Present a short report in a written form and orally using appropriate scientific language.		
4.0	Communication, Information Technology, Numerical		
4.1	Acquire a working knowledge of basic methodologies, data analysis and interpretation. Formulate significant questions and use appropriate methods to answer question and solve problems.	Assign Homework and projects which require the use of web resources	<ul style="list-style-type: none"> - Evaluate student's skills in writing from Homework and projects. - Engage students during class to gauge their ability to communicate their ideas
4.2	Demonstrate effective written and oral communication skills, especially the ability to transmit complex concepts in a clear and concise manner.		
5.0	Psychomotor		
5.1	Demonstrate proper experimental tools to solve physics problems	<ul style="list-style-type: none"> a. Lab. experiment demonstrations. b. Co-operative learning 	<ul style="list-style-type: none"> a. Direct lab work observation b. Lab examination c. Lab log book
5.2	Measure the different physical parameters in the laboratory professionally and accurately		

5. Schedule of Assessment Tasks 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	First Midterm Exam	6 th week	10%
2	Second Midterm Exam	12 th week	10%
3	Laboratory final Exam	14 th week	20%



4	Quizzes and homework	Over the whole period of the semester	10%
5	Final Exam	15 th week	50%

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice.

Four office hours per week are offered to the students for academic advise; office hours are listed in the instruction schedule posted at instructor's office door.

E Learning Resources

List Required Textbooks

- ✦ Physics, Kane and Sternheim, 3rd ed., John Wiley & Sons, 1988
- ✦ Introduction to Biological Physics for Health and Life Sciences, Kristen Franklin & others, Wiley 2010

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

<https://www3.nd.edu/~ns1/Lectures/mphysics/>
<https://openstaxcollege.org/textbooks/college-physics>
<http://www.somalidoc.com/slides/physics.htm>

3. List Electronic Materials, Web Sites, Facebook, Twitter, etc. Wikipedia, MIT open courseware, YouTube Videos

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

Homework, Project Guidelines and topics, reference materials of interest (PDF files, videos).

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.) <ul style="list-style-type: none"> ✚ The hall area must be proportional to the number of students. ✚ Provide enough seats for students. ✚ Nice Voice Instruments.
2. Technology resources (AV, data show, Smart Board, software, etc.) Smart board - White board – Internet..etc A smart board to write on and computer.
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) laboratory equipment's, Library, Seminar Room, and Wi-Fi internet connections.

G Course Evaluation and Improvement Processes

1. Strategies for Obtaining Student Feedback on Effectiveness of Teaching Student Course Evaluation Questionnaire. Student opinion poll on the effectiveness of teaching.
2. Other Strategies for Evaluation of Teaching by the Instructor or by the Department <ul style="list-style-type: none"> ✚ Evaluation of the lecturer by department coordinator. ✚ Observations and assistance from colleagues, independent assessment of standards achieved by students, independent advice on assignment tasks. ✚ Departmental internal review of the course.
3. Processes for Improvement of Teaching <ul style="list-style-type: none"> ✚ Conducting workshops given by experts on the teaching and learning methodologies. ✚ Periodical departmental revisions of its methods of teaching. ✚ Monitoring of teaching activates by senior faculty members. ✚ Self-assessment feedback.
4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution) <ul style="list-style-type: none"> ✚ Efficiency of course will be reflected on the results of the class, which may be 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



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planning for improvement.

- ✦ The course material and learning outcomes are periodically reviewed and the changes to be taken are approved in the departmental and higher councils.
 - ✦ Benefit from the characterization of courses at similar universities.
- Take advantage of all new teaching methods and curriculum.

Name of Course Instructor: _____

Signature: _____

Date Specification Completed: 5/4/1439

Program Coordinator: _____ Dr. Abdullah Al Hajoj _____

Signature: _____

Date Received: 9/5/1440

