



هيئة تقويم التعليم

Education Evaluation Commission

المركز الوطني للتقويم والاعتماد الأكاديمي
National Center for Academic Accreditation and Evaluation

ATTACHMENT 5.

T6. COURSE SPECIFICATIONS (CS)

**Phys 592
Biomedical physics Lab.**

**By
Prof. Dr. Mohamed Anwar K abdelhalim**

Course Specifications

Institution: King Saud university	Date: 25/12/2017
College/Department : College of Science / Physics and Astronomy	

A. Course Identification and General Information

1. Course title and code: Biomedical Physics Lab. Phys592			
2. Credit hours: 4 (2+2+0)			
3. Program(s) in which the course is offered. Physics Lab. Program (If general elective available in many programs indicate this rather than list programs)			
4. Name of faculty member responsible for the course Prof. Dr. Mohamed Anwar K Abdelhalim			
5. Level/year at which this course is offered: Graduate Course for M.Sc.			
6. Pre-requisites for this course (if any): Radiation Physics Courses and undergraduate elementary physics courses. Principles of Physics and Biophysics			
7. Co-requisites for this course (if any): None			
8. Location if not on main campus: Main campus for Male and Girl Campus for Female			
9. Mode of Instruction (mark all that apply):			
a. Traditional classroom lab.	<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: Presentations of the principles and theories for all the experiments Demonstration of the results with drawing graphs, and with discussion and comments			

B Objectives

What is the main purpose for this course? The main objectives of this course are:
Background and survey as an introduction to each experiment. Students should learn most of the techniques required for the instruments which are used in the different application of bio and medical physics; therapy and diagnosis instruments, in addition to other skills. At the end of the course the students should write a summary or conclusion, in addition their comments on how they can improve the topics of the course as well as addition of other important topics related to the course.

1. 1st Experiment:

a) Investigation of the rheological properties of different liquids (standards and unknowns), blood serum, and other samples related to serious human diseases, such as atherosclerosis, cancer, diabetics, and hypertension. The measured rheological parameters are, viscosity, shear stress, and torque which will be evaluated at wide range of the shear rate.

b) Investigation of the rheological properties as function of the temperature.

2. 2nd Experiment;

Determination the absorption at different concentrations of blood serum, and other samples such as atherosclerosis and cancer compared with the control samples. This technique can be used as a diagnostic tool during the progression of the disease. In addition to evaluation the absorbance of known standard dyes as well as unknown dyes.

3. 3rd Experiment:

Determination of the fluorescence at different concentrations of blood serum, and other samples such as atherosclerosis and cancer compared with the control samples. This technique can be used as a diagnostic tool during the progression of the disease. In addition to evaluation the fluorescence of known standard dyes as well as unknown dyes.

4. 4th Experiment:

Characterizing the thermoluminescence properties of different standard Harshaw dosimeters through the measurement of different dosimetric parameters such as glow curve, linearity, fading, and deconvolution curve using Harshaw reader 3500.

5. 5th Experiment

Determination of the osmotic fragility of normal healthy and diseased subjects.

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

1. The course syllabus and materials were posted on the department Website that could be accessed by the students enrolled in the course.

2. The student should prepare each experiment of the course with the help of his teacher, and with presenting a lecture.

3. Inserting some animation websites and using the library for explaining all of the experiments of the course topics

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

Course Description: Note: General description in the form used in Bulletin or handbook

1. Topics to be Covered		
List of Topics	No. of Weeks	Contact hours
<p>1st Experiment: a) Investigation of the rheological properties of different liquids (standards and unknowns), blood serum, and other samples related to serious human diseases, such as atherosclerosis, cancer, diabetics, and hypertension. The measured rheological parameters are, viscosity, shear stress, and torque which will be evaluated at wide range of the shear rate. b) Investigation of the rheological properties as function of the temperature.</p>	3	12
<p>2nd Experiment; Determination the absorption at different concentrations of blood serum, and other samples such as atherosclerosis and cancer compared with the control samples. This technique can be used as a diagnostic tool during the progression of the disease. In addition to evaluation the absorbance of known standard dyes as well as unknown dyes.</p>	3	12
<p>3rd Experiment: Determination of the fluorescence at different concentrations of blood serum, and other samples such as atherosclerosis and cancer compared with the control samples. This technique can be used as a diagnostic tool during the progression of the disease. In addition to evaluation the fluorescence of known standard dyes as well as unknown dyes.</p>	3	12
<p>4th Experiment: Characterizing the thermoluminescence properties of different standard Harshaw dosimeters through the measurement of different dosimetric parameters such as glow curve, linearity, fading, and deconvolution curve using Harshaw reader 3500.</p>	3	12
<p>5th Experiment Determination of the osmotic fragility of normal healthy and diseased subjects.</p>	3	12

2. Course components (total contact hours and credits per semester): 60 hours credit 4 hours/week



		Lecture	Tutorial	Laboratory/ Studio	Practical	Other:	Total
Contact Hours	Planed				4		
	Actual				4		
Credit	Planed				4		
	Actual				4		

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

3

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

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

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

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	Knowledge		
1.1	a) Investigation of the rheological properties of different liquids (standards and unknowns), blood serum, and other samples related to serious human diseases, such as atherosclerosis, cancer, diabetics, and hypertension. The measured rheological parameters are, viscosity, shear stress, and torque which will be evaluated at wide range of the shear rate. b) Investigation of the rheological properties as function of the temperature.		
1.2	Determination the absorption at different concentrations of blood serum, and other samples such as atherosclerosis and cancer compared with the control samples. This technique can be used as a diagnostic tool during the progression of the disease. In addition to evaluation the absorbance of known standard dyes as well as unknown dyes.		



1.3	Determination of the fluorescence at different concentrations of blood serum, and other samples such as atherosclerosis and cancer compared with the control samples. This technique can be used as a diagnostic tool during the progression of the disease. In addition to evaluation the fluorescence of known standard dyes as well as unknown dyes.		
1.4	Characterizing the thermoluminescence properties of different standard Harshaw dosimeters through the measurement of different dosimetric parameters such as glow curve, linearity, fading, and deconvolution curve using Harshaw reader 3500.		
1.5	Determination of the osmotic fragility of normal healthy and diseased subjects.		
2.0	Cognitive Skills		
2.1	The ability to be aware about some advanced techniques in the deferent medical applications, which are used in diagnosis and therapy.		
2.2	To understand and know the sub branches of lab. medical physics		
	The ability to learn how to think and solve the related problems of the serious diseases. In addition to, how these techniques interact with the biological materials		
3.0	Interpersonal Skills & Responsibility		
3.1	General discussion for each experiment, preparing the materials of each experiment, performing the practical part, interpreting the results with drawing , and then commenting and discussing the final results. Work as a part of a team, or can work independently		
3.2	Communicate the results of the work with the others		
3.3	Manage resources, time and other members of the group		
4.0	Communication, Information Technology, Numerical		
4.1			
4.2			
5.0	Psychomotor		
5.1	Not Applicable		
5.2			

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	Class activities (oral presentation on line; quizzes and homework)	Each week	10%
2	Mid Term Lab. Exam. (1)	6	20%
3	Mid Term Lab. Exam. (2)	11	20%
4	The student must think in a new experiment, and writing experiment report on this experiment with interpreting the results, and writing the comments	14	10%
5	Final Lab. Exam.	16	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 advice. (include amount of time teaching staff are expected to be available each week)

4 hours / week

E Learning Resources

1. List Required Textbooks

1. William R. Hendee and E. Russell Ritenou. rMedical Imaging Physics, 4th edition
2. Introduction to Biophysics: Hallas & MC Faraland (1987).
3. Medical Physics by: John R. Cameron & James G. Skofronick; Willy John (1978). .
4. Introduction to Health Physics by: H. Cember, New York (1989)

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

2. Burton AC. Physiology and Biophysics of the circulation.
3. Guyton AC. Human Physiology and mechanisms of disease.
4. Introduction to Medical physics



<p>3. List Electronic Materials, Web Sites, Facebook, Twitter, etc. Websites related to Biophysics, Medical Physics, Introduction to Medical Physics, and Introduction to Health Physics.</p>
<p>4. Other learning material such as computer-based programs/CD, professional standards or regulations and software. All programs or software's which explain the biomedical Physics</p>

F. Facilities Required

<p>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.)</p>
<p>1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) 1. Lab room with max. of 15 seats with five long pinches 2. Auditorium of capacity of not less than 100 seats for presentation lecture.</p>
<p>2. Technology resources (AV, data show, Smart Board, software, etc.)</p>
<p>3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)</p>

G Course Evaluation and Improvement Processes

<p>1. Strategies for Obtaining Student Feedback on Effectiveness of Teaching i. Course evaluation by the student ii. Students Faculty Meeting</p>
<p>2. Other Strategies for Evaluation of Teaching by the Instructor or by the Department i. Peer consultation on teaching ii. Departmental council discussions iii. Discussions within the group of faculty teaching the course.</p>
<p>3. Processes for Improvement of Teaching i- Conducting workshops given by experts on the teaching and learning Methodologies. ii- Periodical departmental revisions of its methods of teaching iii- Monitoring of teaching activates by senior faculty members.</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)

- i- Providing samples of all kind of assessment in the departmental course portfolio of each course.
- ii- Assigning group of faculty members teaching the same course to grade same questions for various students. Faculty from other institutions are invited to review the accuracy of the grading policy.
- iii- Conducting standard exams such as the American Chemical Society exams or others.

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

- i- The course material and learning outcomes are periodically reviewed and the changes to be taken are approved in the departmental and higher councils.
- ii- The head of department and faculty take the responsibility of implementing the proposed changes.

Name of Course Instructor: Prof. Dr. Mohamed Anwar K Abdelhalim

Signature: Prof. Dr. Mohamed AK Abdelhalim Date Specification Completed: 25/12/2017

Program Coordinator: _____

Signature: _____ Date Received: _____