



COURSE SPECIFICATIONS (CS)

Biophysics

PHYS 460

June 2018



Course Specifications

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

A. Course Identification and General Information

1. Course title and code: Biophysics – Phys. 460		
2. Credit hours 3 (3+0+0)		
3. Program(s) in which the course is offered. Physics Program (If general elective available in many programs indicate this rather than list programs)		
4. Name of faculty member responsible for the course		
5. Level/year at which this course is offered Elective course		
6. Pre-requisites for this course (if any) PHYS 481		
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	<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?

- 1- The students should grasp the basic physics knowledge needed for their life.**
- 2- The students should be able to handle the biological phenomenon and its changes with the physical parameters.**
- 3- Adapt and organize the student's mentality.**

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)

- **The course materials were posted on the department Website that could be accessed by the students enrolled in the course.**
- **The student must do Homework to continue lecture understanding.**
- **Insert some animation web sites to explain some course items.**

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

Course Description:

Biomechanics. Forces affects on our bodies. Vector analysis. Levers and equilibrium of rigid bodies. Stress - Strain curve. Young's and Shear modulus for materials and biological tissues. Properties of fluids. Viscosity and surface tension. Bernoulli's equation and its applications. Effect of gravity and acceleration on the blood pressure. Nature of sound and sound intensity level. Ultrasound, production and its applications in diagnostic and treatment. Nervous System and electricity within the body. Equilibrium potential and Nernst equation. Factors affecting the propagation of action potential. Action potential measurements of some organs; ECG, EEG and ERG. Non-ionizing Radiation. Physical and biological effects.

1. Topics to be Covered

List of Topics	No. of Weeks	Contact hours
Biomechanics	1	3
Levers	1	3
Stress – Strain for Biological Tissues	1	3
Properties of fluids	1	3
Bernoulli’s Eq Applications	1	3
Blood Pressure and gravitational Force	1	3
Nature of sound and sound intensity	1	3
Ultrasound and how to produce it - Apply ultrasound in diagnosis and treatment	2	6
The nervous system and the flow of electricity through the body	1	3
Effort of cells and Nernst equation	1	3
The active voltage of the cells and the factors that affect its transition - Measuring the voltage of some body organs	1	3
Electrocardiogram - Electrocardiography - Electrophysiological Retinal Drawing	1	3
Non ionizing radiation - Sources - Physical and biological effects.	1	3
Non ionizing radiation - Natural and Industrial Sources - effects.	1	3

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

Contact Hours	45	-	-	-	-	45
Credit	45	-	-	-	-	45

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	To recognize the forces affects on our bodies.	Through lectures	quarterly tests
1.2	To memorize nonionizing radiation and its biological effects	memorization	speeches
2.0	Cognitive Skills		
2.1	To explain the forces effects on our body	individual presentation	quarterly tests
2.2	To summarize the applications of ultrasound waves in diagnostic and treatment	Discussion during the lecture	long and short essays
3.0	Interpersonal Skills & Responsibility		
3.1	To show work independently and as part of a team.	small group work	group reports
3.2	To manage resources, time and other members of the group	projects	videos, graphs, dramatic performances
4.0	Communication, Information Technology, Numerical		
4.1	To evaluate computational results	Through lectures	tables, demonstrations
4.2	To illustrate how write a report	Discussion during the lecture	group reports
5.0	Psychomotor		

5.1	Not Applicable		
5.2			

6. 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
1	Class activates (in class quizzes, and homework)	Each 2 weeks	10 %
2	Mid Term exams I	6	20 %
3	Mid Term exams II	12	20 %
4	Report on any of one of the course item using the net work	11	10 %
5	Final exam	16	40 %
6			

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)

4h/Week

E Learning Resources

1. List Required Textbooks

- Physics in Biology and Medicine, Paul Davidovits, Academic Press (2012)
 - مقدمة في الفيزياء الحيوية وتطبيقاتها الطبية, السيد محمود سليمان ومحمد العائد (2003م)

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

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

<p>1- Introduction to Biophysics, by: Hallas & Mc Faraland (1987). 2- Medical Physics, by: John R. Cameron & James G. Skofronick; WillyJohn (1978) 3- Introduction to Health Physics, by: H. Cember, New York.(1989)</p>
<p>4. List Electronic Materials, Web Sites, Facebook, Twitter, etc. Web Sites interested with bio and medical Physics</p>
<p>5. Other learning material such as computer-based programs/CD, professional standards or regulations and software. Programs explain bio and medical 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.) i- Lecture room with max 25 seats</p>
<p>2. Computing 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 student ii- Students- faculty meetings</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</p>

- 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.

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

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 Instructor: _____

Signature: _____ Date Report Completed: _____

Name of Field Experience Teaching Staff _____

Program Coordinator: _____

Signature: _____ Date Received: _____

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