

ATTACHMENT 2 (e)

Course Specifications

Kingdom of Saudi Arabia

**The National Commission for Academic Accreditation &
Assessment**

**Course Specifications
(CS)**

Biophysics 408N

Course Specifications

Institution: University of Dammam

Date: 5/3/2014

College/Department: College of Science / Physics Department

A. Course Identification and General Information

1. Course title and code: Bionphysics 408N			
2. Credit hours: 3			
3. Program(s) in which the course is offered: Physics program for Bachelor degree			
4. Name of faculty member responsible for the course: _____			
5. Level/year at which this course is offered: Level 8 (4th year – second semester)			
6. Pre-requisites for this course (if any): Phvs 201 – Phvs 204			
7. Co-requisites for this course (if any): None			
8. Location if not on main campus: Physics department/College of Science			
9. Mode of Instruction (mark all that apply)			
a. Traditional classroom	<input type="checkbox"/>	What percentage?	<input type="checkbox"/>
	Yes		80
	<input type="checkbox"/>		<input type="checkbox"/>
b. Blended (traditional and online)	<input type="checkbox"/>	What percentage?	<input type="checkbox"/>
	Yes		20
	<input type="checkbox"/>		
c. E-learning	<input type="checkbox"/>		
	No		
d.	Correspondence		<input type="checkbox"/>
No			
f.	Other		
No			

B Objectives

1. What is the main purpose for this course?

The objective of the course is to help students to integrate the knowledge gained in physics courses and to use methods of physics to study biological processes. The course will also give a solid grounding in the core topics of biophysics, and to prepare students for further study in this field.

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. Lectures using PowerPoint presentations.
2. Team work.
3. Self-learning using approved references.
4. Documentary videos on the internet.
5. Blackboard Integrated Lectures

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

Course Description:


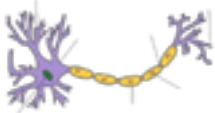

In the Biophysics course we will depend on the skills that have already acquired in the disciplines of mathematics, chemistry, and physics in order to guide students towards solving problems in biology.


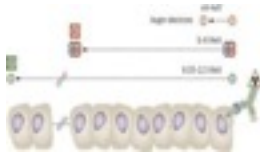

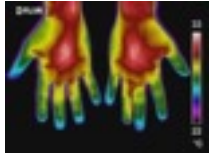
There will be also some new concepts which may not be familiar to students will be developed gradually.



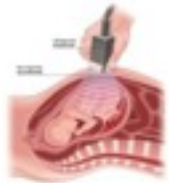
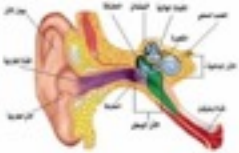
The course will also stress on how use physics to define and solve problems that concern several aspects in our lives specially that concern our health (diagnostic and therapeutic).

1. Topics to be Covered

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	List of Topics	No. of Weeks	Contact	

1a	<p>Biomechanics</p> <ul style="list-style-type: none"> • Laws of motion • Physiological effects of acceleration. • Biomechanics of muscles and skeletal system. • Frictional forces • Elasticity • Fluid mechanics and their application in biology. 	1	3	
2a	<p>Bioelectricity</p> <ul style="list-style-type: none"> • Introduction to basics of electricity. • Electrolysis and electrolytes • Polarization in matter • Electricity of the living cell • Membrane structure and properties • Electrical properties of nerve tissues • Thermal effects on membrane permeability 	1	3	
3a	<p>Bioelectronics</p> <ul style="list-style-type: none"> • Bio-potential Electrodes • Electrode – Electrolyte Interface • Half Cell Potential and over-potential • Polarizable and Non-Polarizable Electrodes • Types of bio-potential electrodes • Amplifiers and Signal Processing • Electrical signal Processing and bio- potential amplifier • Electrocardiography (ECG) • Electroencephalography (EEG) • Electrical signal from muscle fibers and Muscle Twitch • Factors Influencing Signal Measured 	1	3	

4a	<p>Biomagnetism</p> <ul style="list-style-type: none"> • Biomagnetic properties of the body • Magnetic Field from an Axon • Magnetic Properties in Human • Magnetic Sense • Nuclear Magnetic Resonance (NMR) • Magnetic Resonance Imaging (MRI) • ELF Magnetic field • Biological effects from Inductive electric current • Magnetic effects of extremely low frequency magnetic field on cells and 	1	3	
5a	<p>Ionizing radiation and its biological effects</p> <ul style="list-style-type: none"> • Types of radiation • Binding energy and nuclear stability • Types of ionizing radiation • Nuclear fission and fusion • Radiation units • Equivalent irradiative dose • Biological effects of ionizing radiation • Radiation hazards and limits 	1	2	
6a	<p>Radiation in medicine</p> <ul style="list-style-type: none"> • Radioisotopes in nuclear medicine • Nuclear detectors <ul style="list-style-type: none"> ○ Geiger counter ○ Semiconductors ○ Scintillators • Collimators • Radio-diagnosis scanners <ul style="list-style-type: none"> ○ Rectilinear scanner ○ Gamma Camera ○ Positron Camera 	1	3	
7a	<p>Thermodynamics</p> <ul style="list-style-type: none"> • Temperature scale • Heat quantity • Heat transfer • Transfer of heat • Control of skin temperature • Thermograph • Applications of heat and cool in biology 	1	3	

8a	<p>Theory of light and its application</p> <ul style="list-style-type: none"> • Nature and properties of light • Photometry • Bio-application of light • Microscopes <ul style="list-style-type: none"> ○ Optical microscopes ○ Phase contrast ○ Florescence microscope 	1	3	
9a	<p>Laser Bio-optics</p> <ul style="list-style-type: none"> • Laser production • Properties of laser • Types of laser <ul style="list-style-type: none"> ○ Gas lasers ○ Semiconductor and diodes Lasers ○ Liquid lasers • Laser tissue interactions • Bio-application of laser 	1	3	
10a	<p>Bioacoustics</p> <ul style="list-style-type: none"> • Sound wave and its properties • Resonance • Ultrasound picture of the body <ul style="list-style-type: none"> ○ A scan ○ B scan ○ M scan • Doppler for measuring velocities of moving objects 	1	3	
11a	<p>Physics of speech and hearing</p> <ul style="list-style-type: none"> • Speech production • Physics of ear and hearing • Deaf and hearing aids. 	1	3	
12a	Reviewing the whole course	1	3	

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

	Lecture	Tutorial	Laboratory or Studio	Practical	Other:	Total
Contact Hours	36	Field trip to a				36

Credit	36	-				36
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3. Additional private study/learning hours expected for students per week.

2 hr /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
1.0	Knowledge		
1.1	<ul style="list-style-type: none"> Knowing the physics controlling living systems. 	<ul style="list-style-type: none"> PowerPoint 	<ul style="list-style-type: none"> Oral questions Midterm tests
1.2	<ul style="list-style-type: none"> Linking between physical concepts and their application on living things. 	<ul style="list-style-type: none"> PowerPoint presentation 	<ul style="list-style-type: none"> Oral questions Midterm test MCQs (test yourself questions)
1.3	<ul style="list-style-type: none"> Integrate information provided from all physical tools and processes to analyze 	<ul style="list-style-type: none"> Open discussion 	<ul style="list-style-type: none"> Oral questions
2.0	Cognitive Skills		
2.1	<ul style="list-style-type: none"> How to use physics to explain processes in living organism 	<ul style="list-style-type: none"> PowerPoint presentation 	<ul style="list-style-type: none"> Oral questions Midterm test MCQs (test yourself questions)
2.2	<ul style="list-style-type: none"> Compare between different tools used for diagnosis or analysis and decide which is 	<ul style="list-style-type: none"> Self-learning Open discussion 	<ul style="list-style-type: none"> Oral questions
2.3	<ul style="list-style-type: none"> Analyzing case provided to solve it according to mechanical rules. 	<ul style="list-style-type: none"> PowerPoint presentation 	<ul style="list-style-type: none"> Oral questions Midterm tests an examination MCQs (test yourself

			questions) provided on the
3.0	Interpersonal Skills & Responsibility		
3.1	• Self Confidence.	• Research strategies	• Thesis • Oral presentation
3.2	• Responsibility as member of a		
3.3	• Accept criticism		
3.4	• Time management skills.		
4.0	Communication, Information Technology, Numerical		
4.1	• Research on one of the biophysical fields.	• Research strategies • Team work • Online discussion	• Thesis • Oral presentation
4.2	• Communicate with others		
4.3	• Integrate Knowledge within teamwork (Brain storming)		
4.4	• Using keywords to facilitate navigation through internet		
5.0	Psychomotor		
5.1			

5. Map course LOs with the program LOs. (Place course LO #s in the left column and program LO #s across the top.)

Course LOs #	Program Learning Outcomes															
	(Use Program LO Code #s provided in the Program)															
	1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4		
1	√	√	√													
2				√	√	√										
3							√	√	√	√						
4											√	√	√	√		
5																

6. Schedule of Assessment Tasks for Students During the Semester

	Assessment task (e.g. essay, test, group project, examination,	Week Due	Proportion of Total
1	First midterm test	Fourth week	10 %
2	Second midterm test	Eighth week	10 %
3	Third midterm test	Twelfth	10 %

4	Assignments (Best five out of seven assignments)	During semester	5%
5	Participation during lectures	During semester	5%

6	Research work and presentation	During semester	10 %
7	Final Examination	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 advice. (include amount of time teaching staff are expected to be available each week)

- Academic working days: Monday through Wednesday.
- Academic office hours: Two hours on Monday + Two hours on Tuesday.
- Online Consultancy: Open time through Blackboard and email.

E Learning Resources

1. List Required Textbooks
2. List Essential References Materials (Journals, Reports, etc.) 1- Medical Physics. John R. Cameron, James G. Skofronick. Wiley- Interscience Publication, 1978. 2- Physics in Biology and Medicine: Paul Davidovits, Elsevier Inc., 2008. 3- Biophysics An Introduction: Roland Glaser, Springer Berlin Heidelberg Pub., 2012.
3. List Recommended Textbooks and Reference Material (Journals, Reports, etc) <ul style="list-style-type: none"> • www.biophysics.org • University of Dammam electronic library
4. List Electronic Materials, Web Sites, Facebook, Twitter, etc. <ul style="list-style-type: none"> • Blackboard • Group on WhatsApp.
5. Other learning material such as computer-based programs/CD, professional standards or regulations and software. 1- PowerPoint 2- Adobe Reader 3- Adobe Flash

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"> • Lecture room suitable for 50 students
2. Computing resources (AV, data show, Smart Board, software, etc.)
<ul style="list-style-type: none"> • Data show • Real player • Adobe reader • Adobe flash
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)
<ul style="list-style-type: none"> • None

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching
<ol style="list-style-type: none"> 1- Results from midterm tests and their statistical analysis. 2- Results of Final examination and their statistical analysis. 3- Open discussion during lectures. 4- Questionnaire provided during the semester evaluating course
2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department
<ol style="list-style-type: none"> 1- Self-evaluation. 2- Peer review through course descriptions provided on internet.
3 Processes for Improvement of Teaching
<ol style="list-style-type: none"> 1- Improvements based on statistical analysis. 2- Attending workshops provided for academic improvements.
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)
<ol style="list-style-type: none"> 1- Examination reviewing with staff at the same department. 2- Check marking by teaching staff within the same department

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

1- Review and make a comparative study with equivalent courses provided internationally that fulfill the course and the program objectives and aims.

2- Reviewing results of reports and evaluations with outside reviewers.

