



Course Specifications

Course Title:	Biophysics
Course Code:	BIO310
Program:	Bachelor of Science in Biology
Department:	Department of Biology
College:	Faculty of Science
Institution:	University of Tabuk

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A. Course Identification

1. Credit hours:	3 (2 Theoretical + 1 Practical) hours
2. Course type	
a.	University <input type="checkbox"/> College <input checked="" type="checkbox"/> Department <input type="checkbox"/> Others <input type="checkbox"/>
b.	Required <input checked="" type="checkbox"/> Elective <input type="checkbox"/>
3. Level/year at which this course is offered:	Level 5/ First semester/ Third year
4. Pre-requisites for this course (if any):	None
5. Co-requisites for this course (if any):	None

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	2	50%
2	Blended		
3	E-learning		
4	Distance learning		
5	Laboratory	2	50%

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	26
2	Laboratory/Studio	26
3	Tutorial	
4	Others (specify)	
	Total	52

B. Course Objectives and Learning Outcomes

1. Course Description

- The course includes introduction to biophysics and its concepts, physical basis of life, force and energies at nanometer scales, thermodynamics basis of life, chemical composition of living organisms, protein; structure and function, nucleic acids and genetic information, bioenergetics, neuron, molecular machines, social aspects of biological organisms, cell membrane, origin of life.

2. Course Main Objective

By the end of this course, the students should be able to:

- To familiarize students with biomechanics; fluid properties; flow of fluids; flow of heat in biological systems and its medical applications.
- Function of DNA, RNA and Proteins.
- Techniques in biophysics (For example: X-ray; ELISA; Magnetic resonance).
- Introduce students to radiation hazards and radiation protection; physiological biophysics.



3. Course Learning Outcomes

CLOs		Aligned PLOs
1	Knowledge and Understanding	
1.1	To state techniques associated with basic biological experiments.	K2
1.2	To describe the use various techniques in biophysics and in medical biology laboratories.	K2
2	Skills:	
2.1	To interpret some biological phenomena according to laws of physics.	S1
2.2	To explain the proper usage of various laborites techniques such as DNA extraction, proteins analysis, distillation techniques, microscopes, X-ray; ELISA, magnetic resonance.	S2
2.4	To assess the necessity of using nano technologies in medical and biological field.	S5
3	Values:	
3.1	To work independently as a member or as a part of a team.	V1

C. Course Content

No	(List of Topics (Theory Part	Contact Hours
1	Introduction of the concepts of biophysics	2
2	Life and its physical basis	2
3	Forces and energies at nanometer scales	2
4	Thermodynamics basis of life	2
5	Chemical composition of living organisms -Part I	2
6	Chemical composition of living organisms-Part II	2
7	Protein: structure and function-Part I	2
	Mid Term exam	
8	Protein: structure and function-Part II	2
9	Nucleic acids and genetic information	2
10	Bioenergetics- Part I	2
11	Bioenergetics- Part II	2
12	Neuron	2
13	Lights optics	2
	Final Exam	
Total		26

C. Course Content

No	(List of Topics (Practical Part	Contact Hours
1	Introduction and Essential instruments	2
2	Various laboratory's equipment in the Field of Biophysics	2
3	Subatomic particles of chemical substances.	2
4	Physical-chemical separation techniques.	2
5	Physical-chemical separation techniques.	2



6	ELISA technique.	2
7	Test for the presence of sugar starch proteins and fat detection in suitable plant and animal materials.	2
Mid Term Practical Exam		
8	Test for the presence of sugar starch proteins and fat detection in suitable plant and animal materials.	2
9	Test for the presence of sugar starch proteins and fat detection in suitable plant and animal materials.	2
10	The principle of gel electrophoresis.	2
11	The principle of SDS PAGE.	2
12	Microscope types and centrifuges.	2
13	Microscope types and centrifuges	2
Final Exam		
Total		26

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	Knowledge and Understanding		
1.1	To state techniques associated with basic biological experiments.	- Lectures. - Activities and homework.	- Quizzes. - Homework.
1.2	To describe the use various techniques in biophysics and in medical biology laboratories.	- Lectures.	- Homework.
2.0	Skills		
2.1	To interpret some biological phenomena according to laws of physics.	- Lectures. - Activities and homework.	- Quizzes. - Homework. - Periodic exam. - Final exam.
2.2	To explain the proper usage of various laborites techniques such as DNA extraction, proteins analysis, distillation techniques, microscopes.	- Lectures. - Activities and homework.	- Quizzes. - Homework. - Periodic exam. - Final exam.
2.3	To assess the necessity of using nano technologies in medical and biological field.	- Lectures.	- Quizzes. - Homework - Final exam.
3.0	Values		
3.1	To work independently as a member or as a part of a team.	- Individual or group presentation and working as a part of =group. (Cooperative	- Interactive discussion and participation



Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
		learning and Teamwork).	

2. Assessment Tasks for Students

#	*Assessment task	Week Due	Percentage of Total Assessment Score
1	Quizzes + Assignments + Class discussion	1-13	10%
2	Midterm Theoretical Exam	8	25%
3	Midterm Practical Exam	8	25%
	Final Practical Exam	14	25%
4	Final Theoretical Exam	15	40%

*Assessment task (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

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

- Office hours 6 hrs./ week at least.
- Academic Guidance: about 30 students allotted to each faculty member.
- Direct supervision of staff for lab works.
- Electronic communication through black board and e-mail.

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	<ul style="list-style-type: none"> - Madigan, M., Matinko, J., Dunlap, P. V. and Clark, D. P. (2008). Brock Biology of Microorganisms, 12th edition. Prentice Hall, USA. - White, D. (2007). The physiology and biochemistry of prokaryotes, 3rd edition. Oxford University Press, UK. - Willey, J. M., Sherwood, L., Prescott, M. L. and Woolverton, C. J. (2008). - Prescott, Harley, and Klein's Microbiology, McGraw-Hill Higher Education. - Griffin, D. H. (1994). - Fungal Physiology, 2nd edition. John Wiley & Sons, Inc. ISBN: 978-0-471-16615-3.
Essential References Materials	<ul style="list-style-type: none"> - Madigan, M., Matinko, J., Dunlap, P. V. and Clark, D. P. (2008). Brock Biology of Microorganisms, 12th edition. Prentice Hall, USA. - White, D. (2007). The physiology and biochemistry of prokaryotes, 3rd edition. Oxford University Press, UK. - Willey, J. M., Sherwood, L., Prescott, M. L. and Woolverton, C. J. (2008). - Prescott, Harley, and Klein's Microbiology, McGraw-Hill Higher Education. - Griffin, D. H. (1994). - Fungal Physiology, 2nd edition. John Wiley & Sons, Inc. ISBN: 978-0-471-16615-3.



Electronic Materials	<ul style="list-style-type: none"> - Websites on the internet that are relevant to the topics of the course. - www.sciencedirect.com.
Other Learning Materials	<ul style="list-style-type: none"> - Multi media associated with the text book and the relevant websites.

2. Facilities Required

Item	Resources
Accommodation Classrooms, laboratories, demonstration) (.rooms/labs, etc)	<ul style="list-style-type: none"> - A sufficient number of classrooms, well equipped - Practical laboratories are available to accommodate students - Virtual session provided by the blackboard (which allow discussions and sharing PowerPoint and video)
Technology Resources AV, data show, Smart Board, software,) (etc)	<ul style="list-style-type: none"> - Data show. - Wireless connection in the building for students and faculties.
Other Resources Specify, e.g. if specific laboratory equipment is required, list requirements or (attach a list	<ul style="list-style-type: none"> - Spectrophotometer, various columns demonstrating different types of chromatography, magnetic stirrer, dialysis bags, different types of centrifuges, electrophoresis apparatus etc.

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
- Effectiveness of teaching and assessment.	- Students.	Indirect - Questionnaires.
- The extent of achieving the course learning outcomes.	- Program committee. - Staff members. - Students.	Direct - Questionnaires. - Reports. - Meetings
- Quality of learning resources.	- Program leaders. - Peer Reviewer.	Direct & Indirect - Questionnaires. - Reports. - Meetings

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)

Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)

Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	Biology Department Council
Reference No.	
Date	1/6/2022

