



Course Specifications

Course Title:	Biophysical Chemistry
Course Code:	2044206-2
Program:	Bachelor in Chemistry
Department:	Department of Chemistry
College:	College of Sciences
Institution:	Taif University

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A. Course Identification

1. Credit hours: 2 (Theoretical)
2. Course type
a. University <input type="checkbox"/> College <input type="checkbox"/> Department <input checked="" 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: 8 th Level / 4 th Year
4. Pre-requisites for this course (if any): Biochemistry (2043106-3)
5. Co-requisites for this course (if any): NA

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	2 Theoretical hours/ Week	100 %
2	Blended	-	-
3	E-learning	-	-
4	Distance learning	-	-
5	Other	-	-

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	30
2	Laboratory/Studio	-
3	Tutorial	-
4	Others (specify)	-
	Total	30

B. Course Objectives and Learning Outcomes

1. Course Description

The course describes the behavior of biological systems and the fundamentals of reactions inside the living cell.

2. Course Main Objective

The course aims to develop the general understanding of how physical laws govern biological processes, and the relation between structure, function, and dynamics of biological macromolecules, besides the application of biophysical techniques to understand the properties of biological membranes.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	Knowledge and Understanding:	
1.1	Recognize the forces in proteins and protein folding and unfolding	K1
1.2	Explain biophysical techniques	K2
2	Skills:	

CLOs		Aligned PLOs
2.1	Classify types of amino acids, proteins, lipids, membranes, DNA and RNA	S1
2.2	Apply enzyme kinetics in environmental applications	S3
3	Values:	
3.1	Participate in the development of the performance of work teams	V1

C. Course Content

No	List of Topics	Contact Hours
1	General introduction of Biophysical systems	2
2	Forces in proteins	2
3	Protein folding and unfolding	2
4	Enzyme kinetics	4
5	Biophysical techniques	4
6	Conformational transitions in peptides and proteins	4
7	Membrane biophysics	2
8	Electron transfer processes	4
9	Case study: stopped flow fluorimetry using Voltage sensitive fluorescent membrane probes	2
10	Energy production through metabolism of carbohydrates and fats	4
Total		30

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	Recognize the forces in proteins and protein folding and unfolding	Lecture	Written exam
1.2	Explain biophysical techniques	Lecture	Written exam
2.0	Skills		
2.1	Classify types of amino acids, proteins, lipids, membranes, DNA and RNA	Discussion	Homework Assignments
2.2	Apply enzyme kinetics in environmental applications	Discussion	Homework Assignments
3.0	Values		
3.1	Participate in the development of the performance of work teams	Collaborative Learning	Individual presentations

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Homework Assignments (Electronic)	Throughout Semester	15%
2	Individual presentations	Throughout Semester	5%
3	Periodical Exam	7/8	15%
4	Mid Term Exam	11/12	15%
5	Final exam	16	50%

*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 :

Commitment to the rules of the Academic Advising Department at the university in accordance with the academic guidance manual approved by the university and the attached forms, there are different arrangements made by teaching staff to support student consultations including;

- Office hours: 8 hours per a week for each academic member.
- Academic guidance: an academic member has a number of students to guide them throughout degree journey.

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	<ul style="list-style-type: none"> • Principles of Physical Biochemistry, Kensal. E. van Holde, W. Curtis. Johnson, P. Shing. Ho, (2006), Latest Edition. Pearson Education Inc. (USA). ISBN: 0-13-046427-9. • Physical Chemistry: Principles and Applications in the Biological Sciences, I. Tinoco, K. Sauer; J. Wang, J. Puglisi, G. Harbison, and D. Rovnyak (2013), Latest Edition. Prentice-Hall, Inc. (USA). ISBN: 978-0-1-3605606-5.
Essential References Materials	<ul style="list-style-type: none"> • Pumps, Channels, and Transporters: Methods of Functional Analysis, Ronald J. Clarke and Mohammed Khalid (2015), Latest Edition. Wiley & Sons Inc. (USA). ISBN: 978-1-118-85880-6.
Electronic Materials	<ul style="list-style-type: none"> • Saudi Digital Library (SDL)
Other Learning Materials	<ul style="list-style-type: none"> • Learning Management System (Black board) • Computer programs for graphing biomolecules and chemical reactions.

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	A classroom with movable tables and chairs conducive to group discussion and teamwork.
Technology Resources (AV, data show, Smart Board, software, etc.)	Data show, smart board
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	--

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of Teaching and assessment	Students	Survey (indirect method)
Extent of achievement of course learning outcomes	Program leader	Reports (Direct method)
Quality of learning resources	Peer referees Students	Reports (Direct method) Survey (indirect method)

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	Department Council/ Quality assurance committee
Reference No.	7-3-1445
Date	27/2/1445 HJ 12/09/2023 G



Chemistry Program