



Course Syllabus

BIOC 392: Computer Applications in Biochemistry

Fall semester 2021

Instructor	Dr. Wedam Alghazzawi	Classroom	Blackboard
Office	2-132	Sections	XBR & XER
E-mail	walghazzawi@kau.edu.sa	Office Hours	Sun and Tuesday: 1:00 pm to 2:00 pm Monday, Wednesday, and Thursday: 1:00 pm to 3:00 pm
URL	http://walghazzawi.kau.edu.sa	Classtime	Section XBR, Monday: 8:00 am to 10:50 am Section XER, Wednesday: 8:00 am to 10:50 am

Note: Appointments outside office hours can be arranged by e-mail. Please use only your KAU e-mail account and update it in your OdusPlus account.

I. COURSE DESCRIPTION:

The applied biochemistry courses deal with the basis of biotechnology and full concepts of two types of biotechnology (classic and modern).

II. COURSE PREREQUISITES

BIOC 231: Enzymes and BIOC 312: General Metabolism II

III. COURSE MAIN OBJECTIVE:

By the end of the course the students will be able:

- to know the basic bioinformatics concepts and programs as a necessity in the biological sciences.
- to draw biochemical carbohydrate, protein, DNA and RNA structures and reactions by using different tools.
- to improve students' skills in using computer and apply them in biochemistry.
- to train students how visualize different biochemical compounds and complexes using different molecular graphic tools as: RasMol, Pymol, etc.

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- to specify the different levels of protein structures.
- to recognize the different available biological databases.
- to differentiate between the different available databases.
- to manipulate multiple sequence alignment of DNA, RNA, and protein sequences.
- to identity different diseases accompanied with gene mutations.

IV. COURSE LEARNING OUTCOMES

1	Knowledge:		
1.1	Recognize the different biological databases.		
1.2	Identify levels of protein structures & functions.		
2	Skills:		
2.1	Assess the difference between different gene banks		
2.2	Manipulate proteins and nucleic acids		
2.3	Calculate dihedral angles, angles and distance for proteins		
3	Competence:		
3.1	Demonstrate ability to explain some bioinformatic websites briefly		
3.2	Draw different biochemical structures		

V. ASSESSMENT METHODS:

- The exams will contain several types of questions such as MCQs, fill in the blanks, match, short answer questions, essay questions, and practical examination.
- Assignments
- Presentation
- Individual project

VI. COURSE TOPICS:

- Introduction of Bioinformatics
- Sequence analysis
- Protein structure and its analysis
- Molecular viewer software
- Chemical structure program

VII. COURSE POLICIES

• Attendance is mandatory. Any student-missing class/classes will be counted absent and her absence will fall within the 25% absence range.





- Unexcused absences of 25% of the total number of lectures will lead to DN (i.e. not allowed to attend final exam). The study and exams regulations can be found at https://prod.kau.edu.sa/admission/Guides/STUDENT.PDF
- Ten minutes are marked late, and thirty minutes are counted as absent for that lecture.
- Grades in both lecture and laboratory are required to pass the course. Failure in either of these will result in failure of the course.
- It is the student's responsibility to make sure she is not missing any exam, quizzes or any other course class assignments. All students are responsible for work missed during their absence. The course instructor is NOT obliged to repeat her lecture or coursework missed by the student due to her absence.
- Any late/missed assignments will not be accepted after the due date, automatically resulting in a zero.

VIII. ACADEMIC INTEGRITY:

In academic work, you can share ideas with your course partners and classmates, but copying is not acceptable. It means you are responsible for submitting the assignment individually and writing using your own words. The plagiarized work will receive a zero grade for the assignment. Please read more about <u>avoiding plagiarism in scientific research.</u>

IX. COURSE EVALUATION/GRADING

Indicator	Points
Practice and assignments	20
First periodic exam	20
Second periodic exam	10
Third periodic exam	10
Project	10
Final exam	30
Total	100

X. GRADING SCALE

95-100	=A+
90-94	= A
85-89	= B+
80-84	= B
75-79	= C+
70-74	= C
65-69	= D+
60-64	= D
<60	= F





XI. TEXTS & MATERIALS

Required Textbooks:

Computational Biochemistry and Biophysics, Beeker, Oren M. (2002).

Essential References Materials:

Analysis of Biochemical systems: A practical Guide for Biochemists and Molecular Biologists, Eberhard, Voit, O. (2000).

Electronic Materials: https://walghazzawi.kau.edu.sa/Pages-biochemcs.aspx

Other Learning Materials:

A Guide to Bioinformatics Tools: A Beginner's Guide to Bioinformatics https://www.amazon.com/Guide-Bioinformatics-Tools-Beginners/dp/109516385X





XII. COURSE PLAN

Week #	Date	Торіс		
1	14/1/1442 2/9/2020	Course introductory		
2	21/1/1442 9/9/2020	What is the bioinformatics?		
3	28/1/1442 16/9/2020	Sequence analysis – part 1		
4	6/2/1442 23/9/2020	Sequence analysis – part 2		
5	13/2/1442 30/9/2020	Protein structure and its analysis		
6	20/2/1442 7/10/2020	Exam 1 (20X)		
7	27/2/1442 14/10/2020	RasMol program - Part 1		
8	4/3/1442 21/10/2020	RasMol program - Part 2 Ramachandran plot		
9	11/3/1442 28/10/2020	Ramachandron plot explorer		
10	18/3/1442 4/11/2020	Exam 2 (10X)		
11	25/3/1442 11/11/2020	BIOVIA Draw program		
12	3/4/1442 18/11/2020	Exam 3 (10X)		
13	10/4/1442 25/11/2020	Revision		
14	17/4/1442 2/12/2020	Project (10X)		
Final exam (30X)				

Assignments and practice (20X)