

DEREE COLLEGE SYLLABUS FOR: BI 3443 BIOCHEMISTRY LAB

UK LEVEL: 5
UK CREDITS : 5
US Credits: 0/2/1

(Updated Fall 2025)

PREREQUISITES:

BI 1000 Introduction to Biology I
BI 1101 Introduction to Biology II
CH 2015 General Chemistry
CH 2121 Organic Chemistry

CO-REQUISITES:

BI 3434 Biochemistry
This course needs to be taken simultaneously with BI 3434 Biochemistry.

CATALOG DESCRIPTION:

This lab provides an analytical approach to modern biochemistry to help students understand the major nutritional and biochemical processes related to health and disease. In the laboratory, students will examine the structure and chemical properties of biomolecules, enzyme kinetics, the intermediate metabolism of biomolecules, reactions and regulatory mechanisms of the main biochemical pathways.

The course is designed for Nutrition and Dietetics students, life sciences majors, and students interested in learning more about biochemistry.

RATIONALE:

Biochemistry is the combination of biology and chemistry to study biological processes at the cellular and molecular level. Biomolecules (proteins, carbohydrates, lipids, and nucleic acids) are important substances for the living organism since they perform significant functions, such as providing a source of stored energy and structural support, storing and recovering genetic information, and speeding up biochemical reactions. On the other hand, metabolism and its regulation are the basis of life, health and disease.

In the laboratory, students will acquire laboratory techniques in biochemistry, demonstrate appropriate interpretation of the experimental results, and communicate the results through lab reports.

LEARNING OUTCOMES:

As a result of taking this course, the student should be able to:

1. Identify the chemical structures and biochemical functions of the biomolecules (proteins, carbohydrates, lipids, and nucleic acids).
2. Examine the metabolic pathways and their role in homeostasis and different functions in the body.
3. Explain the kinetics of enzymatic reactions, and the factors that affect their rate.
4. Design an independent laboratory experiment while examining a

	research problem, and communicate the results of the experiment in the form of a comprehensive journal article.								
METHOD OF TEACHING AND LEARNING:	In congruence with the teaching and learning strategy of the college, the following tools are used: • Laboratory work (practical engagement, reporting calculations and data processing). • Instruction and demonstration of techniques through online, virtual and physical resources. • Lab tutorials. • Office hours held by the instructor to provide further assistance to students. • Use of library facilities for further study and preparation for the assignments. • Use of the Blackboard course management platform to further support communication, by posting notes, assignment instruction, timely announcements, formative quizzes and online submission of assignments.								
ASSESSMENT:	Summative: <table border="1"> <tr> <td>1st assessment: Laboratory Portfolio (Worksheets, short answers, investigations)</td><td>50%</td></tr> <tr> <td>Final assessment: Formal Laboratory Report: Students will write a formal scientific laboratory report for a biochemical problem. The report should follow the format and style of an article in a peer-reviewed Biochemical Journal (2,000 – 2,300 words).</td><td>50%</td></tr> </table> Formative: <table border="1"> <tr> <td>Essay questions/problems (in-class or as homework assignments)</td><td>0</td></tr> <tr> <td>In-class or online quizzes</td><td>0</td></tr> </table> The Formative Assessments [essay questions as homework assignments] aim to prepare students for the summative assessments. The First Assessment tests Learning Outcomes 1, 2, and 3. The Final Assessment tests Learning Outcomes 2, 3, and 4. <i>The final grade for this course will be determined by averaging all summative assessment grades, based on the predetermined weights for each assessment. Students need to receive passing grades, i.e. 40 or higher, in both Summative Assessments. Students can resit failed assessments. If students fail the first assessment they get one chance to resubmit. If students fail the final assessment they get one chance to</i>	1st assessment: Laboratory Portfolio (Worksheets, short answers, investigations)	50%	Final assessment: Formal Laboratory Report: Students will write a formal scientific laboratory report for a biochemical problem. The report should follow the format and style of an article in a peer-reviewed Biochemical Journal (2,000 – 2,300 words).	50%	Essay questions/problems (in-class or as homework assignments)	0	In-class or online quizzes	0
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In-class or online quizzes	0								

	<i>resubmit.</i>
INDICATIVE READING:	REQUIRED READING: Biochemistry: An Integrative Approach with Expanded Topics, Publisher Wiley. Author: Tansey J.T. ISBN: 9781119402633 (Latest Edition) RECOMMENDED READING: Biochemistry, Publisher: Freeman. Author Stryer L. ISBN: 1319114679 (Latest Edition) Other sources, including journal and newspapers' articles, research papers etc. recommended by the instructor throughout the semester.
INDICATIVE MATERIAL: (e.g. audiovisual, digital material, etc.)	REQUIRED MATERIAL: Laboratory Notebook (22.5x 28.6 cm) 100 pages, Scientific Format Grid. Laboratory Coat Scientific Calculator RECOMMENDED MATERIAL: N/A
COMMUNICATION REQUIREMENTS:	Verbal and written skills, using relevant academic/professional terminology
SOFTWARE REQUIREMENTS:	MS Office and Blackboard CMS
WWW RESOURCES:	1. The Journal of Biochemistry: https://academic.oup.com/jb 2. Biochemistry: https://pubs.acs.org/journal/bichaw 3. Experimental & Molecular Medicine: https://www.nature.com/emm/journal-information
INDICATIVE CONTENT:	1. Isolation and purification of macronutrients: proteins, carbohydrates, and lipids. 2. Quantitative and qualitative identification of proteins. 3. Quantitative and qualitative identification of carbohydrates. 4. Quantitative and qualitative identification of lipids. 5. Enzyme kinetics: Determination of the optimal conditions 6. Enzyme kinetics: Determination of K_M 7. Enzyme kinetics: Determination of V_{max} 8. Enzyme kinetics: Determination of enzyme inhibitor 9. Determination of total protein, carbohydrates, lipids, metabolites and hormones in natural products and biological samples 10. Instrumentation and methodology of Clinical Chemistry

