DEREE COLLEGE SYLLABUS FOR: BI 3434 BIOCHEMISTRY	3/0/3
(Previously: CH 3325 ORGANIC AND BIOLOGICAL CHEMISTRY) (Updated: Fall 2024)	**UK LEVEL: 5** **UK CREDITS: 15**
PREREQUISITES:	BI 1000 Introduction to Biology I BI 1101 Introduction to Biology II CH 2015 General Chemistry CH 2121 Organic Chemistry
CATALOG DESCRIPTION:	A study on the chemistry of living systems, exploring the molecular nature of biomolecules focused on examining the relationship between structure and function, as well as the organization and regulation of metabolic pathways and gene expression. Emphasis will be given to the application of biochemistry to nutrition, physiology and medicine.
RATIONALE:	This course is designed to provide students with a detailed understanding of the structure, function, and biophysical properties of important biomolecules such as carbohydrates, lipids, amino acids, proteins and nucleic acids and integrate these to enzymatic reactivity and kinetics and the use of cofactors & coenzymes. Emphasis will be given to the organization and regulation of metabolic pathways including glycolysis, TCA, electron-transport system, fatty acid and amino acid pathways as well as enzyme cascades involved in signalling, analysing the clinical and diagnostic significance of metabolites and biomarkers.
LEARNING OUTCOMES:	*As a result of taking this course, the student should be able to:* 1. Demonstrate knowledge and understanding of the structure and function of biomolecules and apply basic principles of chemistry towards the understanding of chemical phenomena in biological systems. 2. Demonstrate knowledge of organic and biological chemistry and how it applies to the organization and regulation of metabolic pathways, enzymatic mechanisms, kinetics and gene expression. 3. Develop biochemical reasoning skills that enable scientific problem solving and prepare students for research and scientific communication. 4. Utilize knowledge of metabolic pathways and key metabolites to identify their role as key clinical and diagnostic markers.
METHOD OF TEACHING AND LEARNING:	In congruence with the teaching and learning strategy of the college, the following tools are used: • Lectures and class discussions. • Homework assignments. • Office hours held by the instructor to provide further assistance to students. • Use of library facilities for further study and preparation for the exams • Use of the Blackboard course management platform to further support communication, by posting lecture notes, assignment instruction, timely announcements, formative quizzes and online submission of assignments.

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<tr><td>ASSESSMENT:</td><td>Summative:
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<tr><td>1st assessment: Midterm Examination (Multiple choice and /or short answers/essay questions)</td><td>40%</td></tr>
<tr><td>2nd assessment: Portfolio (assignments aimed at the preparation of written assessments and scientific communication)</td><td>10%</td></tr>
<tr><td>Final assessment: Final Examination (2 hours) (Multiple choice and /or short answers/essay questions)</td><td>50%</td></tr>
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Formative:
<table>
<tr><td>Homework</td><td>0</td></tr>
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The formative Homework aims to prepare students for the summative assessments.
The 1st Assessment tests Learning Outcomes 1 and 2
The 2nd Assessment tests Learning Outcome 3
The Final Assessment tests Learning Outcomes 1,2 and 4</td></tr>
<tr><td>INDICATIVE READING:</td><td>REQUIRED READING:
Tansey J.T., Biochemistry: An Integrative Approach with Expanded Topics, (Latest Edition), Publisher: Wiley. ISBN: 9781119402633

RECOMMENDED READING:
Stryer L., Biochemistry, (latest Edition), Publisher: Freeman. ISBN: 1319114679
Other sources, including journal and newspapers' articles, research papers etc. recommended by the instructor throughout the semester.</td></tr>
<tr><td>INDICATIVE MATERIAL:
(e.g. audiovisual, digital material, etc.)</td><td>REQUIRED MATERIAL:
N/A

RECOMMENDED MATERIAL:
Molecular Model Set</td></tr>
<tr><td>COMMUNICATION REQUIREMENTS:</td><td>Verbal and written skills using academic / professional English</td></tr>
<tr><td>SOFTWARE REQUIREMENTS:</td><td>MS Office and Blackboard CMS</td></tr>
<tr><td>WWW RESOURCES:</td><td>• Royal Society of Chemistry: www.rsc.org/learn-chemistry
• American Chemical Society: www.acs.org
• Online Resources for Teaching and Learning Chemistry: www.chemcollective.org/</td></tr>
<tr><td>INDICATIVE CONTENT:</td><td>1. Bioenergetics and thermodynamics
· Energy transfer processes
2. Protein structure and function
· Amino Acids: Structure and Properties
· Peptide bond, Peptides
· Proteins
· Structure
· Non-Enzymatic Protein Function</td></tr>
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	· Enzyme Function · Enzyme Kinetics 3. Carbohydrates structure and function · Monosaccharides · Oligo and Polysaccharides · Lipids · Fatty Acids and Triglycerides · Membrane Lipids: Structure and Processes 4. Metabolic Pathways · Carbohydrate Metabolism · Fatty Acid and Protein Metabolism · Regulation of Metabolic Pathways · Enzyme Cascades 5. Nucleic Acids · Structure · Replication of DNA · Regulation of Gene Expression · DNA Technology 6. Clinical Biochemistry · Principles and Applications of Clinical Biochemistry ·Clinical Enzymology and Biomarkers