

BMS2004: BIOCHEMISTRY

Effective Term

Semester A 2022/23

Part I Course Overview

Course Title

Biochemistry

Subject Code

BMS - Biomedical Sciences

Course Number

2004

Academic Unit

Biomedical Sciences (BMS)

College/School

Jockey Club College of Veterinary Medicine and Life Sciences (VM)

Course Duration

One Semester

Credit Units

3

Level

B1, B2, B3, B4 - Bachelor's Degree

Medium of Instruction

English

Medium of Assessment

English

Prerequisites

Nil

Precursors

Nil

Equivalent Courses

Nil

Exclusive Courses

Nil

Part II Course Details

Abstract

Biochemistry investigates chemical principles in living cells. This course aims to provide students with an overview of fundamental principles and basic knowledge in biochemistry. Topics include the structure and function of biomolecules,

enzyme functions, metabolic pathways of carbohydrates, fatty acids and proteins, biosignaling pathways, biomembranes and important techniques in biochemistry. In particular, students will acquire in-depth knowledge about the chemical structure of biomolecules involved in mammalian metabolism, the concepts in biochemical reactions involved in metabolism, the principles behind the free energy flow in several major metabolic pathways and the interaction and regulation between different metabolic pathways. Another important aspect of this course will be linking the knowledge in biochemistry to human diseases. Biochemical pathways involved in important human diseases will be explored. The knowledge acquired from this course will become the foundation for studying many other biomedical subjects.

Course Intended Learning Outcomes (CILOs)

CILOs		Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Explain basic principles in biochemical reactions. Determine the bioenergetics and chemistry in metabolic reactions.	15			
2	Explore metabolic pathways of carbohydrates, fatty acids and proteins.	15			
3	Describe basic properties of amino acids, protein folding mechanism, protein structures and enzyme functions.	15			
4	Explore the chemical properties of lipids and the composition and function of biomembrane.	15			
5	Acquire knowledge about basic types of biosignaling pathways and their principle of function.	10			
6	Relate biochemistry knowledge to human health and diseases.	15		x	
7	Apply principles and applications of biochemical techniques for the quantification of biomolecules and for the analysis biochemical functions.	15		x	x

A1: Attitude

Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: Ability

Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to real-life problems.

A3: Accomplishments

Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

Teaching and Learning Activities (TLAs)

TLAs	Brief Description	CILO No.	Hours/week (if applicable)
Lectures	Teaching and learning will be delivered mainly in lectures.	1, 2, 3, 4, 5, 6, 7	

2	Student presentation	Prepare and perform the student presentations by using the knowledge learned from the lectures.	1, 2, 3, 4, 5, 6, 7	
3	Mid-term quiz	A short test to evaluate the students' learning outcome.	1, 2, 3, 4, 5, 6, 7	

Assessment Tasks / Activities (ATs)

ATs	CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	Student presentation	1, 2, 3, 4, 5, 6, 7	20
2	Quiz	1, 2, 3, 4, 5, 6, 7	20

Continuous Assessment (%)

40

Examination (%)

60

Additional Information for ATs

Minimum Passing Requirement :

A minimum of 40% in coursework as well as in examination.

Assessment Rubrics (AR)**Assessment Task**

1. student presentation

Criterion

The content and the logic of the presentation.

Excellent (A+, A, A-)

Subject is well researched and the content is well organised. The presentation is logical and coherent.

Good (B+, B, B-)

The content is substantial. The presentation is logical and coherent.

Fair (C+, C, C-)

The content is sufficient. The presentation is easy to understand.

Marginal (D)

The content is correctly presented but lacks details. The presentation is not easy to understand.

Failure (F)

The subject is poorly researched or did not present

Assessment Task

2. Mid-term quiz

Criterion

The number of correct answers.

Excellent (A+, A, A-)

Correct questions > 90%.

Good (B+, B, B-)

Correct questions between 75% and 90%.

Fair (C+, C, C-)

Correct questions between 60% and 75%.

Marginal (D)

Correct questions between 50% and 60%.

Failure (F)

Correct questions < 50%.

Part III Other Information

Keyword Syllabus

- Chemical principles of biological function
- Protein structures and functions
- Metabolism pathways in animals
- Enzymatic reactions
- Bioenergetics
- Lipid biology and biomembrane
- Biosignaling pathways
- Metabolic diseases

Reading List**Compulsory Readings**

Title	
1	Lehninger Principles of Biochemistry, by David L. Nelson and Michael M. Cox. 6th edition, W.H. Freeman, 2012.

Additional Readings

Title	
1	Voet' s Principle of Biochemistry, by Donald Voet, Judith G Voet, Charlotte W. Pratt, .
2	Biochemistry, by Roger L Miesfeld and Megan M McEvoy, 2nd edition, . W.W. Norton & company