

# BMS2805: BIOCHEMISTRY FOR VETERINARY SCIENCE

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## Effective Term

Semester A 2022/23

## Part I Course Overview

### Course Title

Biochemistry for Veterinary Science

### Subject Code

BMS - Biomedical Sciences

### Course Number

2805

### 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

Completion of all Year 1 courses with C grade or above

### Precursors

Nil

### Equivalent Courses

Nil

### Exclusive Courses

Nil

## Part II Course Details

### Abstract

This course aims to provide students:

- an understanding of the basic principles of biomolecules involved in vertebrate metabolism;
- concepts in biochemical reactions and functions in metabolism;
- principles of several major metabolic pathways and their controls and integration;
- up-to-date knowledge on the biochemical basis of health, nutrition and some diseases;
- experience with some biochemical techniques.

### Course Intended Learning Outcomes (CILOs)

CILOs		Weighting (if DEC-A1 DEC-A2 DEC-A3 app.)			
1	Demonstrate a broad and coherent body of knowledge in the basic principles that organize the structural, chemical, and functional principles of biomolecules.			x	
2	Explain the relationships between biomolecules and cells in health and disease. Illustrate how biomolecules regulate living processes, using integrated knowledge of the dynamics of metabolism.		x	x	
3	Relate an integrated knowledge of the importance of biomolecules to animal health and society. Interpret and critically evaluate a range of information sources in biochemistry and animal health, from primary literature to multimedia.		x		
4	Summarize, extend, and communicate biochemical concepts through various modes, presenting evidence-based arguments.		x	x	
5	Experiment with acquired knowledge and technical expertise. Analyze and critically interpret results generated through experiments in laboratory.		x	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)**

	<b>TLAs</b>	<b>Brief Description</b>	<b>CILO No.</b>	<b>Hours/week (if applicable)</b>
1	Lectures	Teaching and learning will be based on lectures explaining the thermodynamic principles employed in metabolic pathways, the bioenergetics and chemistry of metabolic reactions, the importance of regulation of metabolism by hormones, and deregulation of metabolism in diseases.	1, 2, 3	1 hours per week
2	Tutorials	Tutorials will explore the thermodynamic principles employed in metabolic pathways, the bioenergetics and chemistry of metabolic reactions, the importance of regulation of metabolism by hormones, and deregulation of metabolism in diseases using recent primary research articles on biochemistry related to health, diseases, and applications in biotechnology. During tutorials students (in small groups) will create a concept map relating biochemistry to health and disease based on case studies of applications of biochemistry in animal health and society.	3, 4	1 hour week

3	Laboratory classes	Students develop basic research skills required for biochemistry including skills in formulating a hypothesis, testing a hypothesis by designing and setting up experiments, data collection, analysis and critical evaluation of data, presentation in graphical and table forms and clear and concise written reports.	5	3 hours every third week
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**Assessment Tasks / Activities (ATs)**

ATs	CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	Essay assignment	1, 2, 3, 4	20
2	Tutorial presentation	3, 4	15
3	Laboratory reports	1, 2, 5	15

**Continuous Assessment (%)**

50

**Examination (%)**

50

**Examination Duration (Hours)**

3

**Additional Information for ATs**

Minimum Passing Requirement : A minimum of 30% in coursework as well as in examination, and the total minimum passing requirement for the whole BVM course is 50%.

**Assessment Rubrics (AR)****Assessment Task**

1. Tutorial essay assignment

**Criterion**

Ability to explain the chemical and biological principles behind the metabolic pathways and integrate the metabolic pathways in various medical conditions and in cancers.

**Excellent (A+, A, A-)**

Excellent in understanding, explaining, exploring and integrating the knowledge in written format.

**Good (B+, B, B-)**

Good in understanding, explaining, exploring and integrating the knowledge in written format.

**Fair (C+, C, C-)**

Basic ability in understanding, explaining, exploring and integrating the knowledge in written format.

**Marginal (D)**

Some deficiencies in understanding, explaining, exploring and integrating the knowledge in written format.

**Failure (F)**

Lack of understanding and inadequate explaining, exploring and integrating the knowledge in written format.

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**Assessment Task**

2. Tutorial presentations

**Criterion**

Ability to explain the chemical and biological principles behind the metabolic pathways and integrate the metabolic pathways in various medical conditions and in cancers; ability to understand the principle and rationale behind the experiment.

**Excellent (A+, A, A-)**

Excellent in understanding, explaining, exploring and integrating the knowledge.

**Good (B+, B, B-)**

Good in understanding, explaining, exploring and integrating the knowledge

**Fair (C+, C, C-)**

Basic ability in understanding, explaining, exploring and integrating the knowledge.

**Marginal (D)**

Some deficiencies in understanding, explaining, exploring and integrating the knowledge.

**Failure (F)**

Lack of understanding and inadequate explaining, exploring and integrating the knowledge.

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**Assessment Task**

3. Laboratory report

**Criterion**

Description of experimental design, scientific terms, facts, key concepts and theories, analysis of the data, and report presentation.

**Excellent (A+, A, A-)**

Complete and correct and provides an insightful and accurate analysis, excellent presentation.

**Good (B+, B, B-)**

Almost complete and correct, provides some insight, analysis and presentation generally quite good.

**Fair (C+, C, C-)**

Largely complete and correct, provides limited insight but analysis largely accurate and adequate presentation.

**Marginal (D)**

Some deficiencies across the criteria of descriptions, underpinning facts, concepts, analysis, insight, and presentation.

**Failure (F)**

Many deficiencies in descriptions, underpinning facts, concepts, analysis, and presentation; lack of insight.

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**Assessment Task**

## 4. Examination

**Criterion**

Ability to explain the chemical and biological principles behind the metabolic pathways and integrate the metabolic pathways in various medical conditions and in cancers.

**Excellent (A+, A, A-)**

Excellent in understanding, explaining, exploring and integrating the knowledge in written format.

**Good (B+, B, B-)**

Good in understanding, explaining, exploring and integrating the knowledge in written format.

**Fair (C+, C, C-)**

Basic ability in understanding, explaining, exploring and integrating the knowledge in written format.

**Marginal (D)**

Some deficiencies in understanding, explaining, exploring and integrating the knowledge in written format.

**Failure (F)**

Lack of understanding and inadequate explaining, exploring and integrating the knowledge in written format.

**Part III Other Information****Keyword Syllabus**

Chemistry, biological functions, metabolic pathways

Thermodynamics, bioenergetics

Metabolism of carbohydrates and lipids

Lipid biosynthesis and fatty acid catabolism

Metabolic integration and regulation

**Reading List****Compulsory Readings**

Title	
1	Engelking, L. (2014). Textbook of Veterinary Physiological Chemistry, 3rd Edition. Academic Press.

**Additional Readings**

Title	
1	Science Daily: <a href="http://www.sciencedaily.com/news/plants_animals/biochemistry/">http://www.sciencedaily.com/news/plants_animals/biochemistry/</a>
2	Nelson, D. and Cox, M. (2013). Lehninger Principles of Biochemistry, 6th edition. W.H. Freeman (Run Run Shaw Library Circulation Collection QD415 .L43 2013).
3	Bhagavan, N. and Ha, C-E (2011). Essentials of medical biochemistry: with clinical cases. Amsterdam ; Oxford : Academic (RB112.5 .B43 2011).