

BMS3205: OMICS, GENOME EDITING AND ADVANCED TECHNIQUES FOR BIOMEDICAL RESEARCH

Effective Term

Semester A 2023/24

Part I Course Overview

Course Title

Omics, Genome Editing and Advanced Techniques for Biomedical Research

Subject Code

BMS - Biomedical Sciences

Course Number

3205

Academic Unit

Biomedical Sciences (BMS)

College/School

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

Course Duration

One Semester

Credit Units

2

Level

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

Medium of Instruction

English

Medium of Assessment

English

Prerequisites

BMS2205 Essential Techniques in Biomedical Sciences

Precursors

Nil

Equivalent Courses

Nil

Exclusive Courses

Nil

Part II Course Details

Abstract

This course aims at providing students with hand-on experience of working on the bench with advance molecular biology techniques. This course emphasises on the acquisition of experimental skills and practical abilities to conduct research in biomedical sciences. The main objective of the course is to allow the students to develop critical thinking and troubleshooting skills. At the end of the course, the students should be able to handle more complicated experiments in the laboratory of molecular biology setting, and perform experiments independently.

Course Intended Learning Outcomes (CILOs)

CILOs		Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Familiarize with advance research technologies and principle	n/a	x	x	x
2	Develop advance research skills required for biomedical research	n/a	x	x	x
3	Design and setup of experiments to interrogate specific scientific questions in molecular biology	n/a	x	x	x
4	Analyse and critically evaluate the data collected from experiments	n/a	x	x	x
5	Summarize and report the observations in a concise scientific format	n/a	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)

TLAs	Brief Description	CILO No.	Hours/week (if applicable)
1	Practical	Teaching and learning is primarily based on the protocols set in the course	1, 2, 3, 4, 5
2	Lecture	Principle of practical and experimental background will be introduced before experiments	1, 2, 3, 4, 5

3	Experimental results and assignments	Data collection, group discussion and result analyses will be conducted after each practical	4, 5	
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Assessment Tasks / Activities (ATs)

ATs	CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)	
1	Practical performance (skill demonstration, participation in class activities, attendance)	1, 2, 3, 4, 5	50	
2	Group discussion and quizzes	1, 2, 3, 4, 5	10	
3	Experimental Reports and Assignments	1, 2, 3, 4, 5	40	

Continuous Assessment (%)

100

Examination (%)

0

Additional Information for ATs

“Minimum Passing Requirement” for this course:

A minimum of 40% in both practical and assignment components.

Assessment Rubrics (AR)**Assessment Task**

1. Practical performance (skill demonstration, participation in class activities, attendance)

Criterion

Ability for self-learning, task implementation, team work and completion of experiment

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Assessment Task

2. Group discussion and quizzes

Criterion

Ability to understand the principle of experiment

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Assessment Task

3.Experimental Reports and Assignments

Criterion

Ability to present results and interpret data scientifically

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Part III Other Information

Keyword Syllabus

- Advance Bioinformatics: Genomics, proteomics, metabolomics analysis and interpretation
- Genome editing, LoxP-Cre system, CRISPR/Cas9 system
- Cell culture techniques
- Transfection, overexpression, Knockdown/knockout
- Immunofluorescence microscopy
- Chromatin immunoprecipitation
- ELISA

Reading List

Compulsory Readings

Title	
1	Nil

Additional Readings

Title	
1	Practical skills in biomolecular sciences (3rd edition) Rob Reed, David Holmes, Jonathan Weyers, and Allan Jones. Pearson Education Limited. ISBN: 978-0-13-239115-3. Publication date: 2007