BMS8112: VIRUSES, IMMUNITY AND AGEING

Effective Term
Semester A 2025/26

Part I Course Overview

Course Title
Viruses, Immunity and Ageing

Subject Code
BMS - Biomedical Sciences
Course Number
8112

Academic Unit
Biomedical Sciences (BMS)

College/School
College of Biomedicine (BD)

Course Duration
One Semester

Credit Units
3

Level
R8 - Research Degree

Medium of Instruction
English

Medium of Assessment
English

Prerequisites
Completed course(s) in Biochemistry/Molecular Biology and Cell Biology before

Precursors
NIL

Equivalent Courses
NIL

Exclusive Courses
NIL

Additional Information
NIL

Part II Course Details

Abstract

Many viruses (SARS-CoV-2, DENV, ZIKV, HBV, HCV, HIV, HPV, etc) are highly prevalent and cause severe human diseases, including immunodeficient diseases and ageing related diseases (e.g., human cancers, neurodegenerative diseases, etc). This course aims to provide students with knowledge that (1) how viruses take advantage of host machinery to facilitate virus infection and evade from host defence; (2) how virus-host interactions modulate and damage host immunity; (3) how these host responses contribute to ageing-related diseases; and (4) how we can develop better antiviral/antiaging strategies through vigour scientific research. This is a new field of biomedicine, a highly exciting and fast-moving subject with new discoveries for us to build a clearer picture of the multi-factorial causes of ageing and the interventions we can use to slow or even reverse it.

The major aim of this course to equip students which strong scientific knowledge and skills for virological issues related to scientific research and drug development.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	To understand how viruses infect host cells and take advantage of host machinery for their replication and evade host innate immunity.	20	x	x	
2	To understand how viruses modulate host immunity (both innate immunity and adaptive immunity, and the mechanism of human diseases caused by viruses.	20	x	x	x
3	To understand how viral activities immortalize cells (carcinogenesis) and induce senescence (ageing), and how the senescence cells impact virus infections through modulating host immunity.	30	x	x	x
4	To understand the technologies and skills in virus-ageing studies for antiviral/antiaging strategies such as drug development or management.	30		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.

Learning and Teaching Activities (LTAs)

	LTAs	Brief Description	CILO No.	Hours/week (if applicable)
1	Lectures	Weekly lectures	1, 2, 3, 4	
2	Tutorial	Oral presentation and participation in journal discussions	1, 2, 3, 4	

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks ("-" for nil entry)	Allow Use of GenAI?
1	Oral Presentation/ discussion	1, 2, 3, 4	20	-	No
2	Research proposal/ essay	1, 2, 3, 4	40	-	No

Continuous Assessment (%)

60

Examination (%)

40

Examination Duration (Hours)

2

Minimum Continuous Assessment Passing Requirement (%)

0

Minimum Examination Passing Requirement (%)

0

Assessment Rubrics (AR)

Assessment Task

Oral Presentation (Applicable to students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion

Ability to analyze and critical evaluation of ageing and the science of human longevity

Excellent

Outstanding performance on all CILOs. Strong evidence of original thinking; good organization, capacity to analyse and synthesize; superior grasp of subject matter; evidence of extensive knowledge base.

Good

Substantial performance on all CILOS. Evidence of grasp of subject, some evidence of critical capacity and analytic ability; reasonable understanding of issues; evidence of familiarity with literature.

Fair

Satisfactory performance on the majority of CILOS possibly with a few weaknesses. Being able to profit from the course experience; understanding of the subject; ability to develop solutions to simple problems in the material.

Marginal

Barely satisfactory performance on a number of CILOS. Sufficient familiarity with the subject matter to enable the student to progress without repeating the course

Failure

Unsatisfactory performance on a number of CILOS. Failure to meet specified assessment requirements, little evidence of familiarity with the subject matter; weakness in critical and analytic skills; limited or irrelevant use of literature.

Assessment Task

Research proposal (Applicable to students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion

Ability to address a specific scientific question through drafting a detailed research proposal (Based on the knowledge obtained from the course).

Excellent

Outstanding performance on all CILOs. Strong evidence of original thinking; good organization, capacity to analyse and synthesize; superior grasp of subject matter; evidence of extensive knowledge base.

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Assessment Task

Final Examination (Applicable to students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion

Ability to apply materials taught in class and evaluate their performance based on their performance on the final exam.

Excellent

Outstanding performance on all CILOs. Strong evidence of original thinking; good organization, capacity to analyse and synthesize; superior grasp of subject matter; evidence of extensive knowledge base.

Good

Substantial performance on all CILOS. Evidence of grasp of subject, some evidence of critical capacity and analytic ability; reasonable understanding of issues; evidence of familiarity with literature.

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Assessment Task

Oral Presentation (Applicable to students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion

Ability to analyse and critical evaluation of ageing and the science of human longevity

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Part III Other Information

Keyword Syllabus

- Viruses
- Virus life cycle
- Virus-host interactions
- Innate immunity
- Adaptive immunity
- Viral carcinogenesis
- Ageing biomarkers
- Ageing hallmarks
- Ageing pathways
- Cell senescence
- Antiviral
- Antiaging
- Mechanism of human diseases caused by viruses

Reading List

Additional Readings

	Title
1	Principles of Virology by SJ Flint, LW Enquist, VR Racaniello and AM Skalka (5th Edition)
2	Juvenescence: Investing in the Age of Longevity by Al Chalabi & Jim Mellon
3	The Telomere Effect by Elizabeth Blackburn
4	Lifespan: Why We Age – and Why We Don't Have To by David Sinclair