

BMS8105: BIOTHERAPY AND NANOMEDICINE

Effective Term

Semester B 2024/25

Part I Course Overview

Course Title

Biotherapy and Nanomedicine

Subject Code

BMS - Biomedical Sciences

Course Number

8105

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

Nil

Precursors

Nil

Equivalent Courses

Nil

Exclusive Courses

Nil

Part II Course Details

Abstract

This course provides an in-depth exploration of advanced therapeutic principles, applications, and methodologies. Students will gain a comprehensive understanding of various therapies, drug delivery systems, and nanomedicine.

The curriculum covers the design, functionality, and clinical relevance of drug delivery systems, emphasizing nanotechnology's transformative impact on medicine. Students will learn about the modification and optimization of drug delivery systems to improve bioavailability, targeting, and minimize side effects. The course also delves into the design principles of biomaterials, focusing on their properties, biocompatibility, and fabrication technologies. Additionally, the course introduces 3D bioprinting and bioelectronics, exploring the creation of complex tissue structures and the interface of electronic devices with biological systems for therapeutic and diagnostic purposes. By the end of the course, students will be equipped with the knowledge to innovate in advanced therapeutic strategies and contribute to next-generation medical treatments and devices.

Course Intended Learning Outcomes (CILOs)

CILOs		Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Clearly articulate the basic principles and applications of various traditional and emerging therapeutic approaches with specific examples	30	x	x	
2	Critically assess different drug delivery systems and nanomedicine, and apply techniques to enhance their effectiveness, including bioavailability and targeting.	30	x	x	x
3	Develop and demonstrate the ability to design biomaterials with appropriate properties and biocompatibility, using various fabrication technologies.	20	x	x	x
4	Integrate and apply knowledge of advanced therapeutic strategies, drug delivery systems, and biomaterials to develop innovative medical treatments and devices for their postgraduate research projects.	20	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.

Learning and Teaching Activities (LTAs)

LTAs		Brief Description	CILO No.	Hours/week (if applicable)
1	Lecture	-To introduce the principles, applications and methodologies of various therapies; -To explain different types of drug delivery systems and nanomedicine, as well as the modification; -To interpret the design principle of biomaterials and their fabrication technology -To introduce 3D bioprinting and bioelectronics.	1, 2, 3, 4	
2	Tutorial	To give an oral presentation on a certain topic in cancer therapy and nanomedicine.	3, 4	

Assessment Tasks / Activities (ATs)

ATs		CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	Oral Presentation	1, 2, 3, 4	50	
2	Essay Writing	1, 2, 3, 4	50	

Continuous Assessment (%)

100

Examination (%)

0

Minimum Continuous Assessment Passing Requirement (%)

0

Minimum Examination Passing Requirement (%)

0

Assessment Rubrics (AR)**Assessment Task**

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

Criterion

Ability to analyse and criticise the therapeutic approaches

Excellent

(A+, A, A-) 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

(B+, B, B-) 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

(C+, C, C-) 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

(D) 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

(F) 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

Essay Writing (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion

Ability to analyse, state and apply the principles and subject matter learnt in the course

Excellent

(A+, A, A-) 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

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Assessment Task

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

Criterion

Ability to analyse and criticise the therapeutic approaches

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(A+, A, A-) 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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Part III Other Information

Keyword Syllabus

- i) Biotherapy
- ii) Cancer therapy
- iii) Photodynamic therapy
- iv) Photothermal therapy
- v) Biomaterials
- vi) Fabrication of nanomaterials
- vii) Microfluidic technology
- viii) 3D printing
- ix) Drug delivery system
- x) Lipid nanoparticles

Reading List

Compulsory Readings

Title	
1	Nil

Additional Readings

Title	
1	Nil