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**Part I Course Overview**

**Course Title:** Biotherapy and Nanomedicine

**Course Code:** BMS8105

**Course Duration:** One semester

**Credit Units:** 3

**Level:** R8

**Medium of Instruction:** English

**Medium of Assessment:** English

**Prerequisites:**  
(Course Code and Title) Nil

**Precursors:**  
(Course Code and Title) Nil

**Equivalent Courses:**  
(Course Code and Title) Nil

**Exclusive Courses:**  
(Course Code and Title) Nil

## Part II Course Details

### 1. 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.

### 2. Course Intended Learning Outcomes (CILOs)

No.	CILOs <sup>#</sup>	Weighting	Discovery-enriched curriculum related learning outcomes		
			A1	A2	A3
1.	Clearly articulate the basic principles and applications of various traditional and emerging therapeutic approaches with specific examples	30%	✓	✓	
2.	Critically assess different drug delivery systems and nanomedicine, and apply techniques to enhance their effectiveness, including bioavailability and targeting.	30%	✓	✓	✓
3.	Develop and demonstrate the ability to design biomaterials with appropriate properties and biocompatibility, using various fabrication technologies.	20%	✓	✓	✓
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%	✓	✓	✓
		100%			

**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.*

### 3. Learning and Teaching Activities (LTAs)

LTA	Brief Description	CILO No.				Hours/week
		1	2	3	4	
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.	✓	✓	✓	✓	
Tutorial	To give an oral presentation on a certain topic in cancer therapy and nanomedicine.			✓	✓	

### 4. Assessment Tasks/Activities (ATs)

Assessment Tasks/Activities	CILO No.				Weighting	Remarks
	1	2	3	4		
Continuous Assessment: 100%						
Oral Presentation	✓	✓	✓	✓	50%	
Essay Writing	✓	✓	✓	✓	50%	
					100%	

## 5. Assessment Rubrics

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

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B, B-)	Fair (C+, C, C-)	Marginal (D)	Failure (F)
Oral Presentation	Ability to analyse and criticise the therapeutic approaches	Outstanding performance on all CILOs. Strong evidence of original thinking; good organization, capacity to analyse and synthesize;	Substantial performance on all CILOS. Evidence of grasp of subject, some evidence of critical capacity and analytic ability;	Satisfactory performance on the majority of CILOS possibly with a few weaknesses. Being able to profit from the course experience;	Barely satisfactory performance on a number of CILOS. Sufficient familiarity with the subject matter to enable the student to progress without repeating the course.	Unsatisfactory performance on a number of CILOS. Failure to meet specified assessment requirements, little evidence of familiarity with the subject matter;
Essay Writing	Ability to analyse, state and apply the principles and subject matter learnt in the course	superior grasp of subject matter; evidence of extensive knowledge base.	reasonable understanding of issues; evidence of familiarity with literature.	understanding of the subject; ability to develop solutions to simple problems in the material.		weakness in critical and analytic skills; limited or irrelevant use of literature

Applicable to students admitted from Semester A 2022/23 to Summer Term 2024

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B)	Marginal (B-, C+, C)	Failure (F)
Oral Presentation	Ability to analyse and criticise the therapeutic approaches	Outstanding performance on all CILOs. Strong evidence of original thinking; good organization, capacity to analyse and synthesize;	Substantial performance on all CILOS. Evidence of grasp of subject, some evidence of critical capacity and analytic ability;	Satisfactory performance on the majority of CILOS possibly with a few weaknesses. Being able to profit from the course experience;	Unsatisfactory performance on a number of CILOS. Failure to meet specified assessment requirements, little evidence of familiarity with the subject matter;
Essay Writing	Ability to analyse, state and apply the principles and subject matter learnt in the course	superior grasp of subject matter; evidence of extensive knowledge base.	reasonable understanding of issues; evidence of familiarity with literature.	understanding of the subject; ability to develop solutions to simple problems in the material.	weakness in critical and analytic skills; limited or irrelevant use of literature

## **Part III Other Information**

### **1. 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

### **2. Reading List**

#### **2.1 Compulsory Readings**

Nil

#### **2.2 Additional Readings**

Nil