

Subject Description Form

Subject Code	ABCT5101
Subject Title	Modern Approaches in Biopharmaceutical Development
Credit Value	3
Level	5
Pre-requisite	Nil
Co-requisite	Nil
Exclusion	Nil
Objectives	<ol style="list-style-type: none"> 1. To provide a comprehensive review on the nature and principle of therapeutics currently available in the market. 2. Foster understanding on target identification to clinical drug development process with specific examples, on how clinical therapeutics are developed, from target identification to product development. 3. To provide a comprehensive understanding on different approaches used in early drug discovery process. 4. Provide understanding on the principles of different omics technology and discuss how drug discovery process can be fostered by the use of omics. 5. To introduce the concept, uses and developments of biologics for the treatment of diseases.
Intended Learning Outcomes	<p>Upon completion of the subject, students will be able to:</p> <ol style="list-style-type: none"> a) familiarize with human immunology and immunotherapy. b) Introduce the properties, production, and applications of different biologics. c) Learn the importance of structural biology in drug discovery d) Understand and apply the principles and tools of bioinformatics in the context of drug development. e) Introduce the basic knowledge on immunology and the recent advanced immunotherapy.
Subject Synopsis/ Indicative Syllabus	<ol style="list-style-type: none"> 1. Introduction to Biopharmaceuticals <ul style="list-style-type: none"> • Pharmaceuticals vs biologics. • Currently available therapeutics: small molecules, peptides, cytokines enzymes, and antibodies. • Nature, working principles, applications, manufacturing process, limitations of pharmaceuticals vs biologics • Combined pharmaceuticals and biologics as a new class of therapeutics. 2. Biopharmaceutical development: from drug target identification to therapeutics. <ul style="list-style-type: none"> • Introduction to drug development process – from target

	<p>identification to clinical trial.</p> <ul style="list-style-type: none"> • Case studies of biopharmaceutical development in different therapeutic area (cancer, diabetes, hypertension, hypercholesterolemia, infectious diseases). <ul style="list-style-type: none"> • Drug discovery in neuroscience Structural Biology in Drug Discovery • Overview of structural biology and its importance in drug discovery. • Comparison of structural biology techniques: X-ray crystallography, NMR spectroscopy, and Cryo-EM. • Fundamentals of Cryo-Electron Microscopy • Application of Cryo-EM in Drug Discovery <p>3. Bioinformatic</p> <ul style="list-style-type: none"> • Principles and applications of bioinformatic • Bioinformatic in drug development <p>4. Immunology</p> <ul style="list-style-type: none"> • Introduction to immunology • Cancer biology and immunotherapy <p>5. Biologics: enzymes, antibodies, peptides</p> <ul style="list-style-type: none"> • Overview of biologics. • Nature of protein structure and function (primary, secondary, tertiary, and quaternary protein structure, protein folding and denaturation) • Development and manufacturing of biologics. • Biotherapeutics. Examples of therapeutic proteins and antibodies, and their role in treating diseases. • Biosimilars: The concept of biosimilars, comparison to generic drugs, and relevance in the market. <p>6. Cancer Biology</p> <ul style="list-style-type: none"> • Drugs Discovery in Cancer.
Teaching/Learning Methodology	<p>Lectures, midterm, examination</p> <p>1. Mini project – Students are required to conduct a mini project related to drug discovery. Students will conduct a presentation, followed by the submission of an essay, on a selected topic. They will be assessed on their understanding of the topic's content. Students have to demonstrate their insights into the topic in concern, in both presentation and essay.</p> <p>2. Attendance – Students who attended less than 80% of both the lecture and tutorial classes will result in fail of this component.</p> <p>1. In-class participation – Students are expected to attend the classes and participate in the in-class activities including discussion and quizzes.</p> <p>2. Midterm Examination – To assess how much students have learned the concepts of the principle of biopharmaceutical development</p> <p>3. Final Examination – To assess how much students have learned the concepts</p>

	of the principle of biopharmaceutical development						
Assessment Methods in Alignment with Intended Learning Outcomes	Specific assessment methods/tasks	% (weighting)	Intended subject learning outcomes to be assessed (Please tick as appropriate)				
			a	b	c	d	e
	1. In-class participation	10	√		√		√
	2. Midterm examination	35		√	√	√	√
	3. Final examination	55		√	√	√	√
	Total	100 %					
	Students are allowed to use GenAI tools to support their writing of and essays. If GenAI tools are used to support their essay writings, students must declare the use of such tools and how they have been used in the assessments. It should be noted that submitting a work generated by GenAI, in part or in whole, as your own (even in paraphrased form) constitutes an act of academic dishonesty; it is no different from asking another person to write your assignment or claiming others’ ideas as yours.						
Student Study Effort Expected	Class contact:						
	▪ Lecture				33 Hrs.		
	▪ Tutorial				6 Hrs.		
	Other student study effort:						
	▪ Mini-project				15 Hrs.		
	▪ Self study				60 Hrs.		
	Total student study effort				114 Hrs		
Reading List and References	1. Drug discovery and development technology in transition. Hill, R. G. (Raymond G.) ; Rang, H. P. ; ebrary, Inc. Edinburgh : Churchill Livingstone Elsevier; c2013; 2nd ed 2. Biologics, biosimilars, and biobetters : an introduction for pharmacists, physicians and other health practitioners.Ramzan, Iqbal, 1951- editor. Hoboken, New Jersey : Wiley; 2021						