

Course Code	Course Title	L	T	P	C
BABIT405	Drug Discovery and Development	3	1	0	4
Pre-requisite	BABIT202 - Fundamentals of Bioinformatics	Syllabus Version			
		1			
Course Objectives					
1. Understand the fundamental principles and processes involved in drug discovery and development					
2. Apply computational and experimental strategies for ligand-based and structure-based drug design					
3. Analyze drug targets, biomolecular interactions, and intellectual property aspects in drug discovery					
Course Outcomes					
1. Explain drug discovery history and lead optimization principles					
2. Apply ligand- and structure-based drug discovery methods					
3. Analyze peptide and protein engineering for drug stability					
4. Evaluate classical drug targets and biomolecular interactions					
5. Understand patents and intellectual property in drug discovery					
Module:1	Introduction to Drug Design and Discovery	7 hours			
Historical Perspective of Drug Discovery; Drug Development Process outline; Natural Products in Target Identification and Lead Structures; Basic Principles in Lead Development and Optimization - Bioisosteres, Stereochemistry, Membrane Penetration; Structure-Based Drug Design; Individualized Medicine.					
Module:2	Ligand- based and Structure based Drug discovery	9 hours			
Process of Ligand-Based Drug Design - Determining Hit and Lead Compounds' Building a Model of the Binding Site; Increasing the Affinity of Drugs for Their Protein Target; Functional Groups and Bioisosteres; Steric Occlusion Conformational Constraint and Chirality; Structure based Drug discovery - Anti-Influenza Drugs, HIV Protease Inhibitors, Membrane Proteins, Fast-Acting Insulins					
Module:3	Peptide and Protein Drug design	9 hours			
Peptide and Protein Protraction - Polymer Extension, Albumin as Protractor, Fc-Fusions and Conjugates; Peptide and protein Engineering - Increasing enzymatic stability, methods for structure-activity relationship; De Novo Design; Chemical and Biophysical stability; Immunogenicity.					
Module:4	Classical targets in drug discovery	9 hours			

Protein structure, Enzymes, Inhibition of enzymes: G-protein-coupled receptors, Membrane transport proteins, nuclear receptors; Biomolecular interactions: protein/protein, protein/DNA, and protein/RNA interfaces		
Module:5	Intellectual property and patents in drug discovery	9 hours
Patentable subject matter, Inherent properties and patentability; Novelty and the prior art, Obviousness and the prior art; Inventorship, Assignment and ownership; Classification of patents and patent applications; Impact of overlapping patents; Patent applications and their contents, Contents of a patent application; Case studies in drug discovery		
Module:6	Contemporary Topics	2 hours
Industry expert lectures		
Total Lecture Hours:		45 hours
Tutorial Hours:		15 hours
Text Book(s)		
Kristian Stromgaard, Povl Krogsgaard-Larsen, and Ulf Madsen, " Textbook of Drug Design and Discovery ", CRC Press, 5 th Edition, 2016 Gautam B. Singh, " Fundamentals of Bioinformatics and Computational Biology ", Springer Nature, 1 st Edition, 2015		
Reference Books		
Benjamin E. Blass, " Basic Principles of Drug Discovery and Development ", Elsevier, 2 nd Edition, 2021		
Mode of Evaluation :Continuous Assessment Test, Digital Assignment, Quiz, Final Assessment Test, Seminar, Presentaion		
Recommended by Board of Studies :		26-05-2025
Approved by Academic Council : No. 78		12-06-2025