Program	Master of Pharmacy (M.Pharm)	**Semester - 2**
Type of Course	-	
Prerequisite		
Course Objective	-	
Effective From A.Y.	2023-24	

Teaching Scheme (Contact Hours)				Examination Scheme				
				Theory Marks		Practical Marks		
Lecture	Tutorial	Lab	Credit	External Marks (T)	Internal Marks (T)	External Marks (P)	Internal Marks (P)	Total Marks
4	-	-	4	75	25	-	-	100

SEE *- Semester End Examination,* ***CIA*** *- Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)*

Course Content

T - Teaching Hours | **W** - Weightage

Sr.	Topics	T	W
1	**modern drug discovery process** An overview of modern drug discovery process: Target identification, target validation, lead identification and lead Optimization. Economics of drug discovery. Target Discovery and validation-Role of Genomics, Proteomics and Bioinformatics. Role of Nucleic acid microarrays, Protein microarrays, Antisense technologies, siRNAs, antisense oligonucleotides, Zinc finger proteins. Role of transgenic animals in target validation.	12	20
2	**Lead Identification** Lead Identification- combinatorial chemistry & high throughput screening, in silico lead discovery techniques, Assay development for hit identification. Protein structure Levels of protein structure, Domains, motifs, andfolds in protein structure. Computational prediction of protein structure: Threading and homology modeling methods. Application of NMR and X-ray crystallography in protein structure prediction	12	20
3	**Traditional vs rational drug design** Rational Drug Design Traditional vsrational drug design, Methods followed in traditional drug design, High throughput screening, Concepts of Rational Drug Design, Rational Drug Design Methods: Structure and Pharmacophore based approaches Virtual Screening techniques: Drug likeness screening, Concept of pharmacophore mapping and pharmacophore based Screening	12	20
4	**Molecular docking** Molecular docking: Rigid docking, flexible docking, manual docking; Docking based screening. Denovo drug design. Quantitative analysis of Structure Activity Relationship History and development of QSAR, SAR versus QSAR, Physicochemical parameters, Hansch analysis, Fee Wilson analysis and relationship between them	12	20
5	**QSAR Statistical methods** QSAR Statistical methods – regression analysis, partial least square analysis (PLS) and other multivariate statistical methods. 3D QSARapproaches like COMFA and COMSIA Prodrug design-Basic concept, Prodrugs to improve patient acceptability, Drug solubility, Drug absorption and distribution, site specific drug delivery and sustained drug action. Rationale of prodrug design and practical consideration of prodrug design	12	20
	Total	60	100

Suggested Distribution Of Theory Marks Using Bloom's Taxonomy			
Level	Remembrance	Understanding	Application
Weightage	40	40	20

NOTE : This specification table shall be treated as a general guideline for the students and the teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcomes

At the end of this course, students will be able to:	
CO1	understand the various stages of drug discovery and the role of genomics, proteomics, and bioinformatics in drug discovery
CO2	Understand the identification and validation of target and method for identification and optimization of lead
CO3	Understand the role of computer aided drug discovery

Reference Books

1.	**Target Discovery and Validation Reviews and Protocols: Volume 2 Emerging Molecular Targets and Treatment Options** By Mouldy Sioud | Humana Press Inc | 2007, Pub. Year 2007
2.	**In. Silico Technologies in Drug Target Identification and Validation** By Darryl León. Scott Markel | Taylor and Francis Group, LLC | 2006, Pub. Year 2006
3.	**Disease Gene Identification. Methods and Protocols** By Johanna K. DiStefano | Springer New York Dordrecht Heidelberg London
4.	**QSAR: Hansch Analysis and Related Approaches. Methods and Principles in Medicinal Chemistry** By Hugo Kubiny | Wiley-VCH
5.	**Hans-Joachim Böhm. Structure-Based Ligand Design. Methods and Principles in Medicinal Chemistry** By Klaus Gubernator | Wiley-VCH
6.	**Rational Drug Design. Novel Methodology and Practical Applications. ACS Symposium Series** By Abby L . Parrill. M . Rami Reddy | American ChemicalSociety:Washington. | 1999, Pub. Year 1999
7.	**Newdrug development design, methodology and, analysis.** By J. Rick Turner. | JohnWiley&Sons,Inc.,New Jersey