



Program	Master of Pharmacy (M.Pharm)	Semester - 1
Type of Course	-	
Prerequisite		
Course Objective	-	
Effective From A.Y.	2023-24	

Teaching Scheme (Contact Hours)				Examination Scheme				
Lecture	Tutorial	Lab	Credit	Theory Marks		Practical Marks		Total Marks
				External Marks (T)	Internal Marks (T)	External Marks (P)	Internal Marks (P)	
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	UNIT I Cell biology Structure and functions of cell and its organelles Genome organization. Gene expression and its regulation, importance of siRNA and micro RNA, gene mapping and gene sequencing. Cell cycles and its regulation. Cell death – events, regulators, intrinsic and extrinsic pathways of apoptosis. Necrosis and autophagy.	12	20
2	UNIT II Intercellular and intracellular signaling pathways. Classification of receptor family and molecular structure ligand gated ion channels; G-protein coupled receptors, tyrosine kinase receptors and nuclear receptors. Secondary messengers: cyclic AMP, cyclic GMP, calcium ion, inositol 1,4,5-trisphosphate, (IP3), NO, and diacylglycerol. Detailed study of following intracellular signaling pathways: cyclic AMP signaling pathway, mitogen-activated protein kinase (MAPK) signaling, Janus kinase (JAK)/signal transducer and activator of transcription (STAT) signaling pathway.	12	20
3	UNIT III Principles and applications of genomic and proteomic tools DNA electrophoresis, PCR (reverse transcription and real time), Gene sequencing, micro array technique, SDS page, ELISA and western blotting, Recombinant DNA technology and gene therapy Basic principles of recombinant DNA technology-Restriction enzymes, various types of vectors. Applications of recombinant DNA technology. Gene therapy- Various types of gene transfer techniques, clinical applications and recent advances in gene therapy.	12	20
4	UNIT IV Pharmacogenomics Gene mapping and cloning of disease gene. Genetic variation and its role in health/ pharmacology Polymorphisms affecting drug metabolism Genetic variation in drug transporters Genetic variation in G protein coupled receptors Applications of proteomics science: Genomics, proteomics, metabolomics, functionomics, nutrigenomics Immunotherapeutics Types of immunotherapeutics, humanisation antibody therapy, Immunotherapeutics in clinical practice	12	20
5	UNIT V a. Cell culture techniques Basic equipments used in cell culture lab. Cell culture media, various types of cell culture, general procedure for cell cultures; isolation of cells, subculture, cryopreservation, characterization of cells and their application. Principles and applications of cell viability assays, glucose uptake assay, Calcium influx assays Principles and applications of flow cytometry b. Biosimilars	12	20
Total		60	100



Suggested Distribution Of Theory Marks Using Bloom's Taxonomy

Level	Remembrance	Understanding	Application	Analyze	Evaluate
Weightage	40	30	30	0	0

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:

C01	Understanding molecular pathway, receptor level and drugs acting on receptors
C02	Understanding the molecular and biotechnology process in research field

Reference Books

1.	PRINCIPLES OF PHARMACOLOGY (TextBook) By HL SHARMA, KK SHARMA PARAS PUBLICATION 3rd, Pub. Year 2008
2.	Biotechnology (TextBook) By Satyanarayana. U. Books & Allied Ltd
3.	Basic Cell Culture protocols By Cheril D.Helgason and Cindy L.Miller
4.	Basic Cell Culture (Practical Approach) By J. M. Davis (Editor)
5.	Pharmacogenomics: The Search for Individualized Therapies (TextBook) By J. Licinio and M-L. Wong
6.	The Cell, A Molecular Approach By Geoffrey M Cooper
7.	Molecular Pharmacology: From DNA to Drug Discovery By John Dickenson et.al
8.	A text book of Pharmaceutical Microbiology By Mehra P.S. IK International Publishing House