Shifa College of Pharmaceutical Sciences
Shifa Tameer-e-Millat University, Islamabad

COURSE OUTLINE

MPHIL PHARMACOLOGY (MOLECULAR)

2 YEARS/ 4 SEMESTERS

36 CREDIT HOURS

CURRICULUM AS APPROVED BY

HIGHER EDUCATION COMMISSION

&

ACADEMIC COUNCIL OF STMU

PRINCIPLES OF MOLECULAR PHARMACOLOGY (Core Course)

Course Code: PPMC 6113

CREDIT HRS: 3

Basics of Molecular Pharmacology, An introduction to omics sciences (Genomics, Proteomics, Transcriptomics, Metabolomics), Study of omics as the basis of PK/ PD attributes, Relationship between biological chemistry, physiology and the drug actions, Molecular Biology aspects of drug action, Molecular pathways in Pharmacology, Molecular interactions (protein-protein and protein-ligand interactions), Case studies of application of molecular principles in the clinical manifestations and therapeutic interventions in ID, CVD, CNS disorders and oncology.

MOLECULAR BIOINFORMATICS (Core Course)

Course Code: PBCH 6053

CREDIT HRS: 3

Applications of Bioinformatics in pharmaceutical sciences, Gene structure and function, Protein structure and function, Computer aided molecular design, Protein engineering, Molecular Simulations.

BIOSTATISTICS (Core Course)

Course Code: PBST 6012

CREDIT HRS: 3

Descriptive statistics, sample size and collection, organization and display of data, summarizing data and variation, curve fitting, probability, regression and correlation, test of hypothesis and significance, student's T, F and chi-square distribution, analysis of variance, statistical package (SPSS).

RESEARCH METHODOLOGY (Core Course)

Course Code: PRTM 6002

CREDIT HRS: 3

Basic Research-objectives, terminologies, types of research, scientific methods. Methodology-types of study, variables, data collection techniques, sampling, data processing & analysis, pilot study protocols. Bioethics-ethical code, ethical considerations, reporting, plagiarism.

CELL SIGNALLING (Elective Course)

Course Code: PBCH 6043

CREDIT HRS: 3

Signalling Thru Ion Channels, Signalling Thru G-protein Coupled Receptors- Adenylate Cyclase, Signalling Thru G-protein Coupled Receptors- Phospholipase C, Signalling Thru G-protein Coupled Receptors- Arachidonic Acid Metabolites, Signalling Thru catalytic Receptors- Guanyl Cyclases, Signalling Thru catalytic Receptors- Serine/Threonie Kinases, Signalling Thru catalytic Receptors- Tyrosine Kinases, Signalling Thru catalytic Receptors-Associated Tyrosine Kinases, Signalling Thru catalytic Receptors- Tyrosine Phosphatases, Signalling Thru Nuclear Receptors, Signalling Thru receptors with Intra-membrane Proteolysis, Signalling Thru MAP Kinases- Erk1/2 Pathway, Signalling Thru MAP Kinases-p38 Pathway, Signalling Thru MAP Kinases- JNK Pathway, Signalling Thru PI3 Kinase Pathway, Signalling Thru Small G Proteins, Signalling Thru mTOR Pathway, Signalling Thru Wnt Pathway

PHARMACOGENETICS (Elective Course)

Course Code: PPMC 6103

CREDIT HRS: 3

Introduction, molecular perspectives on the non-responder phenomenon, molecular sources of the non-responder phenomenon, clinical and regulatory implications, clinical and economic impact of the non-responder phenomenon –implications for systems based discovery, the economics of non-response, systems based implications of the non-responder problem, present challenges, current techniques for identifying non-responder phenomenon.

MODERN TECHNIQUES IN BASIC MOLECULAR PHARMACOLOGY

(Elective Course)

Course Code: PPMC 6133

CREDIT HRS: 3

Isolation, Separation and Purification of Nucleic Acids, polymerase chain reaction (PCR), allele-specific PCR, restriction digestion, restriction fragment length polymorphism, plasmid engineering, plasmid amplification, plasmid extraction, gene cloning, Separation, Purification and Characterization of Proteins, Sequencing and Synthesis of Nucleic Acids and Peptides, western blotting, chromatin immunoprecipitation

CANCER BIOLOGY AND PHARMACOLOGY (Elective Course)

Course Code: PPMC 6123

CREDIT HRS: 3

Cell-Autonomous Mechanisms (tumor suppressor and oncogene function, DNA repair pathways, senescence, apoptosis); Non Cell-Autonomous Mechanisms (tumor microenvironment, hypoxia, angiogenesis); Organ Systems (pancreatic cancer, hematopoetic malignancies); and Therapeutic Approaches (protein kinase inhibitors, immunotherapy, radiation therapy).

ANS PHARMACOLOGY (Elective Course)

Course Code: PPMC 6143

CREDIT HRS: 3

Physiology of ANS, Neurohumoral transmission, The autonomic and somatic motor nervous system, Types of receptors and their role, Cholinergic agonists, Choline esters, Natural alkaloids, Anticholinesterases, Antimuscrinic drugs, Natural alkaloids i.e atropine & hyoscine, Semi – synthetic anticholinergic drugs, Ganglion blocking drugs i.e. Trimetaphan, Neuro-muscular blocking drugs, Adrenergic drugs, Catecholamines, Non-catecholamines, A adrenergic receptor blocking drugs & ergot alkaloids, β□adrenergic receptor blocking drugs, Adrenergic neuron blocking drugs, Drugs acting a neuromuscular junction and autonomic ganglia.

KIDNEY, CVS & RESPIRATORY SYSTEM (Elective Course)

Course Code: PPMC 6153

CREDIT HRS: 3

The course contents of this subject include; Antihypertensive drugs and drug therapy of hypertension, Cardiac glycosides and treatment of cardiac failure, Anti -anginal drugs, Antiarrhythmic drugs, Lipid lowering drugs, Diuretics, Carbonic anhydrase inhibitors, Thiazide diuretics, Loop diuretics, K+ sparing diuretics, Osmotic diuretics, Anti - diuretics agents, Oxytocin, Expectorants, Mucolytics, Antitussives.

SYNOPSIS AND RESEARCH WORK

Course Code: PPMC 7006

CREDIT HRS: 6

The student will present his/her synopsis for approval from GSRMC and start his/her research in light of approval and suggestions of the supervisor and GSRMC.

PUBLICATION(S) & THESIS

Course Code: PPMC 7016

CREDIT HRS: 6

Student will publish/present at least one paper/poster in a local/international journal/conference prior to defence of thesis before the GEC/Examiners panel.