# M. PHARMACY (PHARMACOLOGY)
## COURSE STRUCTURE AND SYLLABUS

### I YEAR I SEMESTER

<table>
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<tr>
<th>Code</th>
<th>Group</th>
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MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES
(Common to all Branches)

Unit-I
A detailed study of separations and determination involved in the following chromatographic techniques.
   b. Thin layer chromatography : Theory, preparation, procedures, detection of compounds
   c. Paper Chromatography : Theory, different techniques employed, filter papers used, quantitative and quantitative detections.
   d. Counter current extraction, soild phase extraction techniques.

Unit-II
   a. Gas chromatography: fundamentals, Instrumentation, columns preparation and operations, detection, derivitisation, LC-MS, GC-MS.
   b. HPLC : Principles and Instrumentations.

Unit-III
   a. UV-Visible Spectroscopy : Principle, Beer Lambert’s law, study and working principle of instrumentation, applications in pharmaceutical analysis and derivatives spectroscopy.
   b. IR Spectroscopy: Theory, different types of molecular vibrations, sampling techniques, instrumentation and applications in pharmaceutical analysis, FTIR
   c. Flurorimetry: Theory, fluorescence and chemical structure, factors affecting the fluorescence, study of working principles of the instrument and applications in pharmaceutical analysis.

Unit-IV
   a. NMR: theory, Chemical-shift, spin-spin coupling, shielding, working principle of instrumentations and applications in pharmaceutical analysis, HNMR, and cosy 13CNMR.
   b. Mass: principle, different methods of production of ions metastable ions, working principle of mass spectrometer and applications in pharmaceutical analysis.

Unit-V
   a. Differential thermal analysis, partial thermal analysis.
   b. Radiometric techniques, Radio immunoassay, Elisha test.
   c. X-ray diffraction, polarimetry.

Recommended Books:
2. Willard Dean Merrit “Instrumental Methods of Analysis”
3. David underwood, Text Book of Quantitative analysis.
ADVANCED BIOSTATISTICS AND RESEARCH METHODS

Unit-I:
Developing a research question, Resources for research question,
Literature Review: Traditional Qualitative Review
Meta-Analysis—A Quantitative Review
Preparation of Research Proposal

Variables—Definition of Variable, Types of variables—Dependent and Independent variables,
Confounded variables, Measurement of variables, Types of measurement scales and their comparison.
Reliability and Validity of Measurements.

Unit-II:
Validity, Types of validity—Internal validity, Construct validity, External validity, Threats to validity.
Control: Subject as own control (Within Subject control), Statistical control.

Unit-III:
Non-experimental Research:
Observational Research: Naturalistic Observation, Participant-Observer Research.
Archival Research: Archival Data Collection and Compilation.
Case Studies: Characteristic of Case Studies.

Non-experimental Research: Survey Research—Designing of Questionnaire, Methods of
Administration, Response Rates. Types of Samples—Haphazard Samples, Purposive Samples,
Convenience Samples and Probability Samples.

Unit-IV:
True Experiments: Single-Factor Designs, Factors, Levels, Conditions, and Treatments. Within-
Subject Designs.


Unit V:
Single-Subject Experiments: Advantages and Disadvantages.
Quasi Experiments: The differences between Quasi and True Experiments.
Design without Control Groups—Interrupted Time Series Designs and Repeated Treatment Designs.

Text Books
1. Donald H. McBurney -Theresa L. White “Research Methods” (Cengage learning India Pvt. Ltd)
3. Biostatistics & Computer applications by GN Rao and NK Tiwari

Reference Books
1. Remingtons pharmaceutical Sciences
2. Theory & Practice of Industrial Pharmacy by Lachman
ADVANCED PHARMACOLOGY – I

Unit-I

Drugs acting at Synaptic and neuro effector junctional sites.

A. Autonomic & Somatic nervous systems.
B. Muscarinic receptor agonists & antagonists.
C. Anticholinesterases.
D. Agents acting at Neuro Muscular Junction and autonomic ganglia.
E. Sympathomimetic drugs, Catecholamines and Adrenergic antagonists.

Unit-II

Drugs acting on the Central Nervous System.

a. Neurotransmission and CNS.
b. Drugs used in the treatment of
   1. Anxiety & Psychosis
   2. Depression & Mania
   3. Epilepsy
   4. Migraine
   5. CNS degenerative disorders
   6. Parkinson’s Disease
   7. Pain
c. Drug addiction, dependence and abuse.

Unit-III

Drugs affecting renal and cardiovascular function.

d. Diuretics
e. Renin & Angiotensin
f. Drugs used in the treatment of
   1. Myocardial Ischemia
   2. Hypertension
   3. CHF
   4. Hyperlipidemia

Unit-IV

Drugs acting on the blood & blood forming organs.

g. Growth factors
h. Anticoagulants, Thrombolitics & antiplatelet drugs.

Unit-V

Dermatological pharmacology, Vitamins & Chelating agents
Pharmacokinetics and Drug metabolism

Unit - I
Drug Absorption: Gastrointestinal, percutaneous and rectal kinetics and factors affecting drug absorption.

Unit - II

Unit - III
Elimination of drugs: Concept of renal clearance and excretion of drugs – biological half – life.

Unit - IV
Bioavailability of drug products: Bioavailability ests. Reaction of the body to foreign substances: Biotransformation of drugs, phase I and phase II metabolic reactions.

Unit - V
Drug interaction: Pharmacokinetic, Pharmacodynamic drug interactions, Food drug and drink interactions food – herb drug interaction.
Unit-I

Principles of Pharmacokinetics

A. Revision of basic concepts.
B. Clinical Pharmacokinetics.
   i) Dose – response in man
   ii) Influence of renal and hepatic disease on Pharmacokinetics
   iii) Therapeutics drug monitoring
   iv) Population Pharmacokinetics.

Unit-II

Adverse Drug Reactions, Drug Interactions and ADR monitoring.

Unit-III

Pathophysiology and drug therapy of the following disorders.

Schizophrenia, anxiety, depression, epilepsy, Parkinson’s, alzheimer’s diseases, migraine, hypertension, angina pectoris, arrhythmias, atherosclerosis, myocardial infarction, TB, leprosy, leukemia, solid tumors, lymphomas, psoriasis, respiratory, urinary, g.i. tract infections, endocarditis, fungal and HIV infection, rheumatoid arthritis, glaucoma, menstrual disorders, menopause.

Unit-IV

Drug therapy in

A. Geriatrics
B. Pediatrics
C. Pregnancy & Lactation.

Unit-V

Pharmacogenetics : Inter-racial and individual variability in drugs metabolism.
MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES LAB
(Common to All Branches)

1. Use of spectrophotometer for analysis of Pharmacopoeial compounds and their formulations
2. Simultaneous determination of combination formulations (Minimum of 04 experiments)
3. Effect of pH and solvent on UV spectrum of certain drugs
4. Experiments of Chromatography
   a. Thin layer chromatography
   b. Paper chromatography: Ascending, Descending, circular and two-dimensional techniques
5. Experiments based on HPLC and GC
6. IR, NMR and mass spectra: Interpretation for the structural elucidation of organic compounds
7. Any other relevant experiments