

**ANDHRA PRADESH**  
**RECRUITMENT OF ASSISTANT PROFESSORS IN THE UNIVERSITY**  
**SYLLABUS FOR THE SCREENING TEST**

**PHARMACY**

**SUBJECT CODE – 48**

**PHARMACEUTICS**

Introduction to Physical Pharmacy:

Micromeritics and Powder Rheology; Surface and Interfacial Phenomenon; Viscosity and Theology; Dispersion Systems; Complexation;

Importance of Microbiology in Pharmacy:

Identification of Microbes; Control of microbes by physical and chemical methods: Sterilization: Pharmaceutical Biotechnology:

Recombinant DNA Technology, Immunology and Immunological Preparations.

Fermentation Methods for production of Antibiotics, Citric Acid, Vitamin B12,

Introduction to Dispensing and Community Pharmacy:

Prescription, Psology, Alligation Method, Adjustment of Isotonicity, Incompatibilities: Physical and chemical incompatibilities, inorganic incompatibilities including incompatibilities of metals and their salts, non-metals, acids, alkalis, organic incompatibilities. Purine bases, alkaloids. pyrazolone derivatives, amino acids, quaternary ammonium compounds, carbohydrates, glycosides, anesthetics, dyes, surface active agents, correction of incompatibilities. Therapeutic Incompatibilities.

Community Pharmacy:

Organization and Structure of Hospital Pharmacy; Hospital Formulary; Drug Store Management and Inventory Control; Drug Distribution Systems in Hospitals; Drug Information Services.

Importance of Unit Operations in Manufacturing:

Fluid Flow; Heat transfer; Evaporation; Distillation; Drying; Size Reduction; Mixing; Filtration and Centrifugation; Crystallization; Dehumidification and Humidity Control; Refrigeration and Air Conditioning; Materials of Construction; Material Handling Systems.

Dosage Forms, Design and Evaluation:

Pre-formulation studies: Study of physical properties of drug like physical form, particle size, shape, density, wetting, dielectric constant. Solubility, dissolution and organoleptic properties and their effect on formulation, stability and bioavailability. Study of chemical properties of drugs like hydrolysis, oxidation, reduction, racemization, polymerization etc. and their influence on formulation and stability of products. Study of pro-drugs in solving problems related to stability, bioavailability and elegance of formulations.

Design of Dosage Forms and Performance Evaluation Methods: Liquid Dosage Forms:

Semisolid Dosage Forms; Suppositories; Extraction and Galenical Products; Blood Products and Plasma Substitutes; Powders; Pharmaceutical Aerosols; Ophthalmic Preparations: Tablets; Coating of Tablets; Capsules; Micro-encapsulation; Parenteral Products; Different types of Novel Drug Delivery Systems.

Cosmetic Science: Cosmetic Excipients for different cosmetics, Skin Care Products. Hair Care Products and their evaluation methods.

Packaging of Pharmaceutical Products: Materials used for packaging of pharmaceutical products, factors influencing choice of containers, legal and official requirements for containers. Stability aspects of packaging materials, quality control tests.

Design, development and process validation methods for pharmaceutical operations involved in the production of pharmaceutical products with special reference to disperse systems, tablets, capsules and sterile products.

Stabilization and stability testing protocol for the above pharmaceutical products. ICH & WHO Guidelines for stability testing of drug substances and drug products, stress testing.

Biopharmaceutics & Pharmacokinetics:

Biopharmaceutical aspects of Absorption, Distribution, Metabolism and Elimination.

Calculation of Pharmacokinetics using one and two Compartment Models, Non-linear Pharmacokinetics, Non-compartmental Analysis. Determination of Bioavailability and Bioequivalence.

## **PHARMACEUTICAL CHEMISTRY**

Inorganic Pharmaceutical & Medicinal Chemistry:

Importance of inorganic compounds in Pharmacy and Medicine; Gastrointestinal Agents: Major

Intra- and Extra-cellular Electrolytes; Essential and Trace Topical Agents: Gases and Vapors; Products; Miscellaneous Agents.

Pharmaceutical Aids used in Pharmaceutical Industry: Acids, Bases and Buffers; Inorganic Radiopharmaceuticals.

Physical Chemistry and its importance in Pharmacy:

Solutions; Surface and Interfacial Phenomenon; Complexation; pH, Buffers and Isotonic Solutions; Phase Rule; Adsorption; Kinetics and Drug Stability.

Organic Chemistry and its importance in Pharmacy:

Stereochemistry; Stereo selective and Stereospecific Reactions; Structure, Nomenclature, Preparation and Reactions of: Nucleophilic and Electrophilic Aromatic Substitution Reactions; Elimination Reactions; Conservation of Orbital Symmetry and Rules.

Neighboring Group Effects; Catalysis by Transition Metal Complexes; Heterocyclic Compounds.

Medicinal Chemistry

Drug Metabolism and Concept of Prodrugs; Principles of Drug (Theoretical Aspects): Synthetic Procedures, Mode of Action, Uses, Structure Activity Relationships including Physico-chemical of the Following Classes of Drugs:

Autacoids; Steroidal Drugs; Drugs acting on the Central Nervous System;

Diuretics; Cardiovascular Drugs; Thyroid and Anti Thyroid Drugs; Insulin and Oral Hypoglycemic Agents; Microbial Transformations; Enzyme Immobilization.

### **Biochemistry**

Enzymes; Co-enzymes; The Citric Acid Cycle; Lipids Metabolism; Biological Oxidation-Metabolism of Ammonia and Nitrogen containing Monomers; Purine Biosynthesis; Biosynthesis of Nucleic Acids;

### **PHARMACEUTICAL ANALYSIS**

Fundamentals of Volumetric Analysis: Acid Base Titrations; Oxidation Reduction Titrations: Precipitation Titrations; Gravimetric Analysis; Non-aqueous Titrations; Complexometric Titrations.

Extraction procedures including separation of drugs from excipients;

Potentiometry; Conductometry; Coulometry; Polarography; Amperometry; Different Chromatographic Techniques and their applications in Qualitative and Quantitative estimation of drugs.

Theoretical Aspects, Basic Instrumentation, Elements of Interpretation of Spectra, and Applications (quantitative and qualitative) of the following Analytical Techniques:

Ultraviolet and Visible Spectrophotometry, Fluorimetry, Infrared Spectrophotometry. Nuclear Magnetic Spectroscopy, Mass Spectrometry, Flame Photometry Atomic Absorption Spectroscopy, X-ray Diffraction Analysis, Radioimmunoassay.

Quality Assurance:

GLP, ISO 9000; Total Quality Management (TQM); Quality Review and Quality Documentation; Regulatory Control; Regulatory Drug Analysis; Interpretation of Analytical Data; Validation; Quality Audit: Quality of Equipment; Validation of Equipment: Validation of Analytical Procedures.

## **PHARMACOLOGY**

Pathophysiology of common diseases: Basic Principles of Cell Injury and Adaptations: Basic Mechanisms involved in the process of Inflammation and Repair; Immuno pathophysiology;

Pathophysiology of Common Diseases:

Asthma, Diabetes, Rheumatoid Arthritis, Gout, Ulcerative Colitis, Neoplasia. Psychosis, Depression, Mania, Epilepsy, Acute and Chronic Renal Failure, Hypertension, Angina- Congestive Heart Failure, Atherosclerosis, Myocardial Infarction, Congestive Heart Failure. Peptic Ulcer, Anemias, Hepatic Disorders, Tuberculosis, Urinary Tract Infections and Sexually Transmitted Diseases.

Fundamentals of General Pharmacology: Pharmacology of Peripheral Nervous System:

Pharmacology of Central Nervous System; Pharmacology of Cardiovascular System: Drugs Acting on the Hemopoietic System; Drugs acting on Urinary System; Autacoids; Drugs Acting on the Respiratory System; acting on the Gastrointestinal Tract; Pharmacology of Endocrine System; Chemotherapy.

Important Disorders of Organs, Systems and their Management:

Cardio-vascular disorders: Hypertension, Congestive Heart Failure, Angina, Acute Myocardial Infarction, Cardiac Arrhythmias.

CNS Disorders; Respiratory Disease; Gastrointestinal Disorders; Endocrine Disorders; Infectious Joint and Connective Tissue Disorders; Neoplastic Diseases.

General Principles of Chemotherapy; Bacterial Resistance; Sulfonamides and Cotrimoxazole:

Antibiotics - Penicillins, Cephalosporins, Aminoglycosides, Chloramphenicol, Macrolides.

Tetracyclines, Quinolones, Fluoroquinolones and Miscellaneous Antibiotics; Chemotherapy of

Tuberculosis, Leprosy, Fungal Diseases, Viral Diseases, HIV and AIDS, Urinary Tract Infections and Sexually Transmitted Diseases, Malaria, Amoebiasis and other Protozoal Infections Anthelmintics. Chemotherapy of Malignancy and Immunosuppressive Agents.

Basic Concepts of Pharmacotherapy:

Clinical Pharmacokinetics and individualization of Drug therapy, Drug delivery systems and their Biopharmaceutics & Therapeutic considerations, used during infancy and in the elderly persons (Pediatrics & Geriatrics), used during Drug Induced Diseases. The basics of Drug Interactions, General principles of clinical toxicology, Common Clinical Laboratory Tests and their Interpretation.

Pharmacy Practice:

Organization of Hospital Pharmacy, Community Pharmacy, Drug Distribution Systems in Hospital, Hospital Formulary, Pharmacotherapeutic Committee, Drug Information Centre. Monitoring of Adverse Drug Reactions and their reporting.

## **PHARMACOGNOSY**

Sources of Drugs; Classification of Drugs; Study of medicinally important plants belonging to the families with special reference to:

Apocynaceae, Solanaceae, Rutaceae, Umbelliferae, Leguminosae, Rubiaceae, Liliaceae Graminae, Labiatae, Cruciferae, Papaveraceae.

Cultivation, Collection, Processing and Storage of Crude Drugs: Quality Control of Crude Drugs:, Introduction to Active Constituents of Drugs.

Systematic Pharmacognostic study of the followings:

Carbohydrates and Derived Products, Lipids, Resins, Tannins, Volatile Oils, Fibers, Phytochemical Screening.

Study of the sources, cultivation, collection, commercial varieties, chemical constituents, substitutes, adulterants, diagnostic macroscopic and microscopic features and specific chemical tests of following groups of drugs.

Glycoside containing Drugs:

Saponins, Cardio active Glycosides, Anthraquinone Cathartics.

Alkaloid containing Drugs:

Pyridine-piperidine, Tropane, Quinoline and Isoquinoline, Indole, Imidazole, Steroidal. Alkaloidal Amine, Glycoalkaloid, Purines.

Studies of Traditional Drugs:

Common vernacular names, Botanical sources, morphology, chemical nature of chief constituents, pharmacology, categories and common uses and marketed formulations of following indigenous drugs: Amla, Kantkari, Satavari, Tylophora, Bhilawa, Kalijiri, Bach, Rasna, Punamava, Chitrack, Apamarg, Gokhru, Shankhapushpi, Brahmi, Adusa, Atjuna. Ashoka, Methi, Lahsun, Palash, Guggal, Gymnema, Shilajit, Nagarmotha and Neem.

The holistic concept of drug administration in traditional systems of medicine. Introduction to Ayurvedic preparations like Arishtas, Asvas, Gutikas, Tailas, Chumas, Lehyas and Bhasmas.

General Techniques of Biosynthetic Studies Basic Metabolic Pathways/Biogenesis: Brief introduction to Biogenesis of Secondary of Pharmaceutical importance. Terpenes. Carotenoids, Glycosides, Alkaloids.

Lignans, Quassanoids and Flavonoids. Role of plant based drugs on National Economy:

A brief account of plant based industries and institutions involved in work on Medicinal and Aromatic Plants in India - Utilization and production of phyto-constituents such as Quinine, Calcium, Sennosides, Podophyllotoxin, Diosgenin, Solasodine, and Tropane Alkaloids.

Utilization of Aromatic Plants and derived products with special reference to Sandalwood Oil, Mentha Oil, Lemon Grass Oil, Vetiver Oil, Geranium Oil and Eucalyptus Oil. World-wide trade in medicinal plants and derived products with special reference to Diosgenin (Disocorea), Taxol (Taxus spp) Digitalis, Tropane Alkaloid containing plants, Papain, Cinchona, Ipecac, Liquorice. Ginseng, Aloe, Valerian, Rauwolfia and plants containing laxatives. Plant bitters and sweeteners. Plant Tissue Culture

## **BIostatistics AND RESEARCH METHODOLOGY**

Correlation and Regression, Parametric and Non-parametric Tests, Design and Analysis of Experiments, Methods to be followed for Literature Survey and Documentation of Research Proposals and Research Outcomes. Referencing Styles.

## **PHARMACEUTICAL JURISPRUDENCE & ETHICS**

An elaborate study of the following: Pharmaceutical Ethics; Pharmacy Act 1948; Drugs and Cosmetics Act 1940 and Rules 1945; Medicinal & Toilet Preparations (Excise Duties) Act 1955; Narcotic & Psychotropic Substances Act 1985 & Rules; Prevention of Cruelty to Animals Act 1960; Drugs Price Control Order 2013.