

## **Pharmaceutical Management (BPH 601)**

### **Unit -I**

#### **Pharmaceutical Management :**

Concepts on Management, Principles of Management, Administrative and Operative Management Entrepreneurship Development. Project formulation, evaluation and implementation. Status of pharmaceutical industries in India.

Pharmaceutical Factory Planning and layouts, preparation of flow diagrams, technical data sheets.

### **Unit -II**

#### **Pharmaceutical Economics:**

Principles of economics with special reference to the laws of demands and supply, demand schedule, demand curves, general principles of insurance and inland and foreign trade, procedure of exporting and importing goods.

### **Unit-III**

#### **Pharmaceutical Production Management :**

Different aspects of Production Management, Performance Evaluation Technique, flow-process, know how process and maintainence.

Material management: Basic principles of Material Management, Purchase, Store and Inventory control.

### **Unit-IV**

**Accountancy:** Principles of accountancy, Journal entries and ledger posting, preparation of trial balance, cash book, bank reconciliation statement, rectification of errors, profits and loss account, balance sheet, purchase, keeping and pricing of stocks, treatment of cheques, bill of exchange, promissory notes and hundies, documentary bills.

### **Unit-v**

#### **Pharmaceutical Marketing:**

Principles of sales promotion, advertising, and ethics of Sales, merchandising, Window display and literature detailing. Functions, wholesale, retail, and mail order business ,market research.:

#### **BOOKS RECOMMENDED:**

1. Shukla, S. M., Advanced Accountancy, Mahershwari Sahitya Bhawan, Agra.
2. Gupta, R. L., Advanced Accountancy, Vol. I and II, Sultanchand & Company, New Delhi.
3. Kotler, P., Marketing Management, Prentice Hall of India Limited.
4. Stanton, W. J., Fundamentals of Marketing Tata McGraw Hill Limited, New Delhi.
5. Buskir K. and Richard H., Principles of Marketing – The Management View, Hold Rinehard and Winston Incorporated, New York.
6. Sherlekar, S. R., Marketing Management, Himalaya Publishing House, New Delhi.
7. Mote,V. L., Paul, S. and Gupta, G. S., Managerial Economics Concepts and Cases, Tata McGraw Hill Limited, New Delhi.

## **Pharmaceutical Analysis - II (BPH 602)**

### **UNIT-I**

**Chromatography:** Paper Chromatography TLC, GLC, HPTLC and HPLC.

### **UNIT-II**

**Ultraviolet/Visible Molecular Absorption Spectroscopy** Electromagnetic radiation – its properties and absorption by molecules, factors affecting absorption of radiation by molecules, Beer's Law and its deviations, instrumentation, sample handling techniques and pharmaceutical applications.

**Atomic Absorption Spectroscopy,**

### **UNIT-III**

**Infrared Spectrometry** Theory of Absorption of Infrared Radiation by molecules, Infrared sources and Transducers, Instrumentation, Fourier Transform Infrared Spectroscopy, sample handling techniques and applications.

### **UNIT-IV**

**Nuclear Magnetic Resonance Spectroscopy** Magnetic properties of nuclei, Origin of NMR spectrum, Environmental effects on NMR spectra, NMR spectrometers instrumentation and sample handling, applications of Proton NMR, Brief introduction to application of NMR to other nuclei.

### **UNIT-V**

**Molecular Mass Spectroscopy** Origin of mass spectra, Ion sources, Mass Spectrometers – instrumentation and applications.

**Flame Photometry. X- Ray Diffraction**

1. Practicals are related to theory section.
2. Analysis of drugs and raw materials using official pharmacopoeial methods based on modern instrumental techniques

### **LIST OF PRACTICALS:**

1. Determination of solvent cut off value of different solvents.
2. Study of effect of various solvents on spectral features of any drug.
3. Perform the quantitative spectrophotometric estimation of drug by single point method.
4. Perform the quantitative spectrophotometric estimation of drug by calibration curve method.
5. Perform the quantitative spectrophotometric estimation of drug by standard absorptivity method.
6. Simultaneous quantitative spectrophotometric estimation of two drugs

- by simultaneous equation method.
7. Simultaneous quantitative spectrophotometric estimation of two drugs by dual wavelength method.
  8. Simultaneous quantitative spectrophotometric estimation of two drugs by derivative spectroscopy.
  9. To determine the tablet content of norfloxacin by hydrotrophy.
  10. Interpretation of given IR spectra.
  11. Quantitative estimation of alprazolam (Any drug) by RP-HPLC.
  12. Simultaneous quantitative estimation of torsemide and spironolactone (Combination of two drugs) by RP-HPLC.
  13. Acid and alkaline stress degradation study of any drug.
  14. Photo and thermal stress degradation study of any drug.
  15. Oxidative stress degradation study of any drug.

### **Books Recommended**

1. R. M. Silverstein, G. C. Bassler and T. C. Morrill, Spectrometric Identification of Organic Compounds, John Wiley, New York.
2. Jag Mohan, Organic Spectroscopy - Principles and Applications, Narosa.
3. D. Rendell, Fluorescence and Phosphorescence AOCL, Wiley.
4. D. A. Skoog, E. J. Holler and T. A. Nieman, Principles of Instrumental Analysis, Harcourt Asia Pte Ltd.
5. G. D. Christian, Analytical Chemistry, Wiley.
6. P. S. Kalsi, Spectroscopy of Organic Compounds, New Age Publicati

**PHARMACEUTICAL CHEMISTRY – VII  
(MEDICINAL CHEMISTRY-II)  
(BPH603)**

**UNIT- I**

Classification and mode of action, uses, structure activity relationship including physicochemical, steric aspects and recent advances in research of the following categories of drugs:

**Drug Acting on CNS**

- General Anesthetics
- Hypnotics and Sedatives
- Antiscizure agents
- Opioid Analgesics
- Antiparkinsonian and Spasmolytic agents
- Hallucinogens, Stimulants, and related drugs of Abuse.
- Psychopharmacological Agents:.,
- Anxiolytics.

**UNIT -II**

**Drug Acting on GIT**

- Laxative
- Antidiarrhoeal
- Anti spasmodic
- Antiulcers Drugs.

**UNIT -III**

**Drug Acting on Hormonal System**

- Insulin and oral Hypoglycemic agents
- Adrenocorticoids
- Sex Hormones: Male sex Hormones, Female sex Hormones.
- Thyroid and Antithyroid agents

**UNIT -IV**

Principles of Drug Design (Theoretical Aspects). Scientific Aspects of Drug Discovery, Preclinical Development, Mechanism based Approaches (Computer Aided Drug Design and Molecular Modeling)

**UNIT - V**

Vitamins: Chemistry and Physiological function

**BOOKS RECOMMENDED:**

1. Foye, W.C., Principles of Medicinal Chemistry, Lea and Febiger, Philadelphia.
2. Wolff, M.E. Ed., Burger's Medicinal Chemistry, John Wiley and Sons, New York.
3. Hansch, C., Comprehensive Medicinal Chemistry, Pergamon Press, Oxford.
4. Delgado, J.N. and Remers, W.A.R, Wilson and Giswold's Text Book of Organic, Medicinal and Pharmaceutical Chemistry, J.Lippincott Co., Philadelphia.
5. Nogrady, T., Medicinal Chemistry-A Biochemical Approach, Oxford University Press, New York, Oxford.
6. Kar, A., Medicinal Chemistry, Willey Eastern Ltd., New Delhi.
7. Patrick, G., An Introduction to Medicinal Chemistry, Scientific Distributors, Mumbai.
8. Malone, Dyson and Purey, May's Chemistry of Synthetic Drugs.
9. Parimoo, P., Text Book of Medicinal Chemistry, CBS Publishers and Distributors, New Delhi.
10. Thomas, G., Introduction to Medicinal Chemistry, CBS Publishers and Distributors, New Delhi.

**LIST OF PRACTICALS:**

Organic spotting of binary mixtures of liquid + solid and liquid + liquid types along with identification of the type of mixture, micro-scale chemical separation, identification of the individual components, establishment of the identity of the separated components with the help of derivative preparation and TLC.

1. Synthesis and Characterization of Methylphenobarbital from Urea.
2. Synthesis and Characterization of Barbitol from Urea.
3. Synthesis and Characterization of Nikethamide from Nicotinic acid.
4. Synthesis and Characterization of Pantaprazol.
5. Synthesis and Characterization of Diclofenamide.
6. Synthesis and Characterization of Phenobarbitone.
7. Synthesis and Characterization of Phenothiazine.
8. Synthesis and Characterization of Furosemide from 2,4 dichloro-benzoic acid.
9. Synthesis and Characterization of Levodopa from Vanillin.
10. Synthesis and Characterization of Sulfalene from p-aminobenzene sulphonyl chloride.
11. Synthesis and Characterization of Thioridazine.
12. Synthesis and Characterization of Chlorpromazine.
13. Synthesis and Characterization of Parbanic acid.
14. Estimation of  $\text{Na}^+$ ,  $\text{K}^+$ ,  $\text{Ca}^{++}$  ions using flame photometry.
15. To perform the QSAR Analysis by Free Wilson Approach.

**PHARMACOGNOSY-IV (BPH 604)**

**UNIT- I**

**Plant Tissue Culture**

Historical development, nutritional requirements, growth and their maintenance, applications of plant tissue culture in Pharmacy and Pharmacognosy, and types of cultures related to cell suspension culture, callus culture, hairy root culture and protoplast culture

**UNIT -II**

**Standardization & quality evaluation of herbal drugs:** Identity, purity, assays. Macroscopic, Microscopic, Physicochemical, Phytochemical, Biological Evaluations of Herbal drugs.

**UNIT- III**

**Introduction, classification and study of different chromatographic methods**

TLC, Paper chromatography, Column chromatography, HPTLC, HPLC, GC, Ion exchange Chromatography, Size exclusion chromatography and their applications in evaluation of herbal drugs.

**UNIT- IV**

**Marine pharmacognosy**

An introduction of marine pharmacognosy and novel agents from marine sources like Cardiovascular active substances, cytotoxic, antimicrobial, antibiotic, anti-inflammatory, antispasmodic agents, marine toxin etc. Natural dyes, Immunomodulators and Adaptogens.

**UNIT -V**

**Herbal formulation development and standardization**

- a) Preparation, GMP and stability testing of Herbal extracts and formulations
- b) Role of Herbs in Cosmetics Hair care preparation - Henna, Amla, Hibiscus Skin Care preparation . Aloe vera, Turmeric, Sandal wood
- c) Neutraceuticals, Cosmeceuticals, Phytosiomies.

**LIST OF PRACTICAL:**

1. To perform chromatography of amino acids
2. To perform paper chromatography of sugars
3. To perform TLC of alkaloids
4. To perform TLC of extract of rauwolfi, datura
5. To perform TLC of volatile oils i.e. eucalyptus oil, menthe oil
6. To identify the presence of eugenol in clove oil by TLC
7. Determination of solvent extractive values (water/alcohol).
8. Determination of ash values.
9. Determination of volatile oils in crude drugs.
10. Determination of hemolytic activity.
11. Determination of foaming index and swelling index.
12. Determination of tannins.
13. Some experiments in plant tissue culture.
14. Phytochemical Evaluations of some crude drugs.

**BOOKS RECOMMENDED:**

1. Trease, G.E. and Evans, W.C., Pharmacognosy, Bailliere, Tindall, Eastbourne, U.K.
2. Tayler, V.E., Brady, L.R. and Robers, J.E., Pharmacognosy Lea and Febiger, Philadelphia
3. Kokate, C.K., Purohit, A.P. and Gokhale, S.B., Pharmacognosy Nirali Prakashan, Pune
4. C.R Atal and B.M. Kapoor, Cultivation & Utilization of Aromatic Plants, Council of Scientific Industrial Research (CSIR) New Delhi

**Pharmacology-III  
(BPH 605)**

**Unit - I**

**Pathophysiology of diseases of cardiovascular system and pharmacology of drugs used for their treatment**

- a) Cardiac Glycosides and CHF drugs
- b) Antiarrhythmic drugs
- c) Antianginal drugs, Anti Ischemic Drugs
- d) Antihypertensive drugs
- e) Drug Affecting Renin-Angiotensin System

**Unit - II**

**Pharmacology of drugs acting on hematopoietic system**

- a) Hematinics
- b) Drugs affecting coagulation, bleeding and thrombosis
- c) Plasma expanders
- d) Hypolipidaemic drugs

**Unit - III**

**Pharmacology of drugs acting on urinary system**

- a) Physiology of urine formation
- b) Diuretic and Anti Diuretic

**Unit -IV**

**Pathophysiology of diseases of endocrine system and pharmacology of drugs used for their treatment**

- a) Hypothalamic and pituitary hormones
- b) Thyroid hormones and antithyroid drugs
- c) Insulin, oral hypoglycemic agents and glucagons
- d) Corticosteroids
- e) Androgens and drugs for erectile dysfunction
- f) Estrogens, progestins and contraceptives
- g) Oxytocin and drugs acting on uterus
- h) Drugs affecting calcium balance

**Unit - IV**

**Vitamins and Mineral Pharmacological studies**



### List of Practicals

1. Determine the strength of given sample (acetyl choline/ histamine) by three point bioassay method using isolated organ preparation (rat ileum/ rat duodenum/ rat colon/ rat fundus/ guinea pig ileum).
2. Determine the strength of given sample (acetyl choline/ histamine) by four point bioassay method using isolated organ preparation (rat ileum/ rat duodenum/ rat colon/ rat fundus/ guinea pig ileum).
3. Record the concentration response curve of oxytocin using rat uterus preparation.
4. Determine the sympatholytic activity of given drug sample using isolated guinea pig ileum preparation.
5. Compare the diuretic/saluretic activity of different drugs in rats.
6. Determine the effect of anticoagulants by subaqueous tail bleeding time method in rodents.
7. Study the effect of oral hypoglycemic agents in diabetic rodents.
8. Study the effect of thyroid hormones on the tensile strength of connective tissues in rats.
9. Study the effect of growth hormone on the weight gain in female rats.

### BOOKS RECOMMENDED

1. Herfindal, E.T., Gourley, D.R., (eds.) (2000) Textbook of therapeutics Drug and disease management. 7th ed. Baltimore: Lippincott Williams and Wilkins
2. Hardmen, J.G., Limbird, L.E., Gilman A.,G., (eds.) (2001) Goodman and Gilman's The pharmacological basis of therapeutics. 10th ed. USA: The McGraw Hill Companies
3. Kumar, V., Abbas, A.K., Fausto, N., (eds.) (2004) Robbins and Cotran Pathologic basis of disease. 7th ed. Pennsylvania: Saunders
4. Barar, F.S.K., (2000) Essentials of therapeutics. New Delhi: S. Chand and Company (P) Ltd.
5. Satoskar, R.S., Bhandarkar, S.D., Rege, N.N., (2007) Pharmacology and Pharmacotherapeutics. 12th ed. Mumbai: Popular Prakashan
6. Seth, S.D., (ed.) (2005) Textbook of Pharmacology. 2nd ed. New Delhi. Elsevier
7. Tripathi, K.D. (1999) Essentials of medical pharmacology. 4th ed. New Delhi: Jaypee Brothers Medical Publishers (P) Ltd.
8. Rang, H.P., et al. (eds.) (2003) Pharmacology. 5th ed. Philadelphia: Elsevier
9. Katzung, B.G., (2004) Basic and clinical pharmacology. 9th ed. USA: The McGraw Hill Companies.