

**PS301: HUMAN ANATOMY, PHYSIOLOGY AND PATHOPHYSIOLOGY- II
(Theory)**

B. Pharm. II Year I Sem**L T P C****3 1 0 4**

Scope: This course provides a comprehensive understanding of human anatomy, physiology, homeostasis, and the pathophysiology of major diseases relevant to pharmacy practice.

Course Objectives:

- To apply anatomy and physiology concepts in pharmacy practice.
- To describe the pathophysiology of major diseases affecting organ systems.
- To explain normal physiological processes and homeostasis.
- To understand the structure and functions of human organ systems.

Course Outcomes: Upon completion of this course the student should be able to

CO 1. Explain the anatomy, physiology, and functional organization of the nervous system.

CO 2. Differentiate the physiology and pathophysiology of the peripheral and central nervous systems.

CO 3. Summarize the anatomy, physiology, and disorders of the urinary system and special senses.

CO 4. Describe the endocrine and reproductive systems and their associated disorders.

CO 5. Discuss the pathophysiology of neoplasms, infectious diseases, mutagenicity, teratogenicity, and sexually transmitted diseases.

UNIT-I**08 Hours**

Nervous system: Organization of nervous system, neuron, neuroglia, classification and properties of nerve fibre, nerve electrophysiology, synapse, neurotransmitters and their receptors and neurohumoral transmission including ion channel opening, signal transduction, second messengers.

UNIT-II**10 Hours****a) Peripheral nervous system:**

Classification of peripheral nervous system: Structure and functions of sympathetic and parasympathetic nervous system. Origin and functions of spinal and cranial nerves.

b) Diseases of Peripheral and Central Nervous System:

Pathophysiology in brief about neurodegenerative diseases (Alzheimer's disease, Parkinson's disease), traumatic injuries (spinal cord injury, brain injury), infections (meningitis, encephalitis), vascular disorders (stroke), demyelinating diseases (multiple sclerosis), and mental health conditions (depression and schizophrenia). Pathophysiology in brief about epilepsy and migraine. Pathophysiology in brief about peripheral neuropathies.

UNIT III**10 Hours****a) Urinary system:**

Anatomy of urinary tract, kidney and nephrons, functions of kidney and urinary tract, physiology of urine formation, micturition reflex and role of kidneys in acid base balance, renin- angiotensin axis

b) Pathophysiology in brief about glomerulonephritis, acute and chronic renal failure, renal calculi.

Special Senses: Anatomy and physiology of eye, ear, nose, tongue and skin

Definitions and pathophysiology in brief about - myopia, hypermetropia, loss of accommodation, glaucoma, cataract, vertigo, hearing impairment, otitis.

UNIT-IV

10 Hours

a) Endocrine system:

Classification of hormones, mechanism of hormone action, structure and functions of pituitary gland, thyroid gland, parathyroid gland, adrenal gland, pancreas, pineal gland, thymus. Pathophysiology in brief about diabetes, thyroid disorders, pituitary disorders, adrenal disorders.

b) Reproductive system:

Anatomy of male and female reproductive system, functions of male and female reproductive system, sex hormones, physiology of menstruation, fertilization, spermatogenesis, oogenesis, pregnancy and parturition.

Diseases of sex hormones: PCOD, menstrual disorders, male and female infertility.

UNIT-V

7 Hours

Pathophysiology in brief about:

a) Neoplasms: Classification, etiology and pathogenesis of cancer

b) An overview of mutagenicity and teratogenicity

c) Infectious diseases: Meningitis, typhoid, malaria, leprosy, tuberculosis, dengue chikungunya, COVID-19, amoebiasis, septicaemia.

d) Sexually transmitted diseases: AIDS, chlamydia, syphilis, gonorrhea.

Text Books (Latest Edition)

1. Ross and Wilson Anatomy and Physiology in Health and Illness by Kathleen J.W. Wilson, Churchill Livingstone, New York.
2. Principles of Anatomy and Physiology by Tortora, Grabowski. Palmetto, GA, U.S.A.
3. Essential of Medical Physiology, Sembulingam and Prema Sembulingam, Jaypee Publications.
4. Textbook of pathology by Harsh Mohan – Jaypee publisher.

Reference Books (Latest Edition):

1. Human Physiology (vol 1 and 2) by Dr. C. C. Chatterjee, Academic Publishers Kolkata
2. Textbook of Medical Physiology- Arthur C, Guyton and John. E. Hall. Miamisburg, OH. U.S.A.
3. Pathophysiology - Concepts of Altered Health Science By Carol Mattson Porth (Lippincott Williams &Wilkins)
4. Roger Walker and Cate Whittlesea, Clinical Pharmacy and Therapeutics, Churchill Churchill Livingstone (Elsevier) Publication.

PC302: PHYSICAL PHARMACEUTICS – I (Theory)**B. Pharm. II Year I Sem****L T P C****3 1 0 4**

Scope: This course provides the fundamental physicochemical principles governing pharmaceutical systems and understanding of **micromeritics, powder properties, complexation, protein binding, and crystalline structures** for the rational design of pharmaceutical dosage forms.

Course Objectives

- To acquire knowledge of the physical and physicochemical principles underlying pharmaceutical dosage forms and formulations.
- To apply physicochemical concepts in the design, development, evaluation, and optimization of pharmaceutical formulations.
- To develop practical laboratory skills for the characterization, analysis, and stability assessment of pharmaceutical products.
- To enhance analytical, critical thinking, and problem-solving abilities required for formulation research and pharmaceutical product development.

Course Outcomes: Upon the completion of the course, the student shall be able to

- CO 1.** Understand the physicochemical properties of drug molecules and their role in the design and development of pharmaceutical dosage forms.
- CO 2.** Explain the principles of drug solubility, dissolution, diffusion, solution behaviour, and distribution law, and apply these concepts to the design and optimization of pharmaceutical dosage forms.
- CO 3.** Analyze micromeritics, particle characterization, and powder properties to evaluate their influence on pharmaceutical formulation, manufacturing processes, and product performance.
- CO 4.** Describe the principles of complexation, protein binding, and crystalline structures, and evaluate their influence on drug action, stability, and pharmaceutical applications.
- CO 5.** Demonstrate the application of pH, buffers, isotonicity, and colligative properties in the design and development of stable, safe, and effective pharmaceutical dosage form.

UNIT - I**10 Hours**

States of Matter and Properties of Matter: State of matter, changes in the state of matter, latent heats, vapour pressure, sublimation critical point, eutectic mixtures, gases, aerosols– inhalers, relative humidity, liquid complexes, liquid crystals, glassy states, solid-crystalline, amorphous and polymorphism.

Physicochemical Properties of Drug Molecules: Refractive index, optical rotation, dielectric constant, dipole moment, dissociation constant, determinations and applications.

UNIT - II**10 Hours**

Solubility of Drugs: Solubility expressions, mechanisms of solute solvent interactions, ideal solubility parameters, solvation and association, quantitative approach to the factors influencing solubility of drugs.

Solubility Enhancements Techniques: Dissolution, diffusion principles in biological systems. Solubility of gas in liquids, solubility of liquids in liquids, (binary solutions, ideal solutions) Raoult's law, real solutions, azeotropic mixtures, fractional distillation. Partially miscible liquids, critical solution temperature (CST) and applications. Distribution law, its limitations and applications.

UNIT – III**10 Hours**

Micromeritics: Particle size and distribution, average particle size, number and weight distribution, particle number, methods for determining particle size by (different methods), counting and separation method, particle shape, specific surface, methods for determining surface area, permeability, adsorption, derived properties of powders, porosity, packing arrangement, densities, bulkiness and flow properties

UNIT - IV**08 Hours**

Complexation and Protein Binding: Introduction, classification of complexation, applications, methods of analysis, protein binding, complexation and drug action, crystalline structures.

UNIT – V**07 Hours**

pH, Buffers and Isotonic Solutions: Sorensen's pH scale, pH determination (electrometric and calorimetric), applications of buffers, buffer equation, buffer capacity, buffers in pharmaceutical and biological systems, buffered isotonic solutions. Isotonicity, colligative properties and determination of tonicity of a system.

Text Books (Latest Edition)

1. Physical Pharmacy by Alfred Martin.
2. Tutorial Pharmacy by Cooper and Gunn.
3. Manavalan et. al, Physical Pharmaceutics, Pharma Med Press

Reference Books (Latest Edition)

1. Pharmaceutical Calculations by Stocklosam J., Lea and Febiger, Philadelphia.
2. Pharmaceutical Dosage Forms: Tablets, by Lieberman HA. and Lachman C., Marcel Dekker Inc.
3. Pharmaceutical Dosage Forms: Disperse Systems, by Lieberman H.A. and Lachman C., Marcel Dekker Inc.
4. Experimental Pharmaceutics by Eugene Parrott.

BS303: PHARMACEUTICAL MICROBIOLOGY (Theory)**B. Pharm. II Year I Sem**

L	T	P	C
3	1	0	4

Scope: Pharmaceutical Microbiology equips students with the knowledge and skills to identify, control and apply microorganisms in pharmaceutical manufacturing, quality assurance, sterilization, microbiological testing, cell culture and regulatory practices.

Course Objectives

- To understand the fundamentals of microbiology including microbial growth, cultivation, preservation, microscopy, bacterial identification, sterilization and validation.
- To learn fungal and viral microbiology, chemical control of microbes and sterility testing of pharmaceutical products as per the regulatory standards.
- To illustrate aseptic processing, environmental control and microbiological assays.
- To learn about tissue culture and its applications in research and Pharmaceutical Industry.

Course Outcomes: Upon completion of this course, the student shall be able to

- CO 1.** Acquire knowledge of morphology, cultivation, preservation of microorganisms and microscopy.
- CO 2.** Identify the bacteria by staining techniques and biochemical tests and illustrate the importance of sterilization in pharmaceutical industry.
- CO 3.** Describe microbiology of fungi and viruses, disinfectants, their evaluation and sterility testing of pharmaceutical products.
- CO 4.** Apprehend the concepts of aseptic area, microbiological assays and standardization of pharmaceuticals.
- CO 5.** Understand pharmaceutical microbial spoilage, cell culture technology and its applications in pharmaceutical industry.

UNIT – I**10 Hours****Fundamentals of Microbiology and Bacterial Biology:**

Introduction, history of microbiology, its branches, scope and its importance. Introduction to Prokaryotes and Eukaryotes. Study of ultra-structure and morphological classification of bacteria, nutritional requirements, raw materials used for culture media and physical parameters for growth, growth curve, isolation and preservation methods for pure cultures, cultivation of anaerobes, quantitative measurement of bacterial growth (total and viable count). Study of different types of phase contrast microscopy, dark field microscopy and electron microscopy.

UNIT – II**9 Hours**

- a) Bacterial Identification:** Identification of bacteria using staining techniques (simple, Gram's and Acid fast staining) and biochemical tests (IMViC).
- b) Sterilization and Sterility Assurance:** Study of principle, procedure, merits, demerits and applications of physical, chemical and mechanical methods of sterilization. Equipments employed in large scale sterilization. Evaluation of the efficiency of sterilization methods and sterility indicators.

UNIT – III**9 Hours**

- a) Fungal and Viral Microbiology:** Study of morphology, classification, reproduction/replication and cultivation of fungi and viruses.

- b) **Chemical methods of Microbial Control:** Classification and mode of action of disinfectants. Factors influencing disinfection action, antiseptics and their evaluation for bacteriostatic and bactericidal actions.
- c) **Sterility Testing:** Sterility testing of pharmaceutical products (solids, liquids, ophthalmic and other sterile products) according to IP, BP and USP.

UNIT – IV**9 Hours**

- a) **Aseptic Area Design and Environmental Control:** Designing of aseptic area, laminar flow equipments, study of different sources of contamination in an aseptic area, methods of prevention and clean area classification.
- b) **Microbiological Assays and Antimicrobial Evaluation:** Principles and methods of different microbiological assays. Methods for standardization of antibiotics, vitamins and amino acids. Assessment of a new antibiotic and testing of antimicrobial activity of a new compound. General aspects-environmental cleanliness.

UNIT – V**08 Hours****a) Microbial Spoilage and Preservation of Pharmaceutical Products**

Types of spoilage, factors affecting the microbial spoilage of pharmaceutical products, sources and types of microbial contaminants, assessment of microbial contamination and spoilage. Preservation of pharmaceutical products using antimicrobial agents, evaluation of microbial stability of formulations.

b) Animal Cell Culture and its Applications

Growth of animal cells in culture, general procedure for cell culture, Primary, established and transformed cell cultures. Application of cell cultures in pharmaceutical industry and research.

Text Books (Latest Edition)

1. W.B. Hugo and A.D. Russel: Pharmaceutical Microbiology, Blackwell Scientific Publications, Oxford London.
2. Prescott and Dunn, Industrial Microbiology, CBS Publishers and Distributors, Delhi.
3. Pelczar, Chan Kreig, Microbiology, Tata McGraw Hill.
4. Kokare, C. R. Pharmaceutical Microbiology.
5. Cooper and Gunn's: Tutorial Pharmacy, CBS Publisher and Distribution.

Reference Books (Latest edition)

1. I.P., B.P., U.S.P.
2. Alcamo, I. Edward. Fundamentals of Microbiology. Jones and Bartlett Publishers.
3. Tortora GJ, Funke BR, Case CL, Bair WB, Weber d. Microbiology: An Introduction Pearson Education.
4. Bergeys Manual of Systematic Bacteriology, Williams and Wilkins- A Waverly Company.
5. R. Ananthanarayan, C. K. Jayaram Paniker, and Sonal Saxena. Ananthanarayan and Paniker's Textbook of Microbiology. Universities Press (India) Pvt. Ltd., Hyderabad.

PC304: PHARMACEUTICAL ENGINEERING (Theory)**B. Pharm. II Year I Sem**

L T P C
3 1 0 4

Scope: This syllabus encompasses the fundamental principles, mechanisms and industrial applications of essential unit operations. It also covers fluid dynamics, particle size management, heat and mass transfer processes, and mechanical separation techniques required to process and formulate pharmaceutical products.

Course Objectives

- To introduce the foundational theories and principles governing vital pharmaceutical engineering operations such as fluid flow and heat transfer.
- To explain the mechanisms, equipment construction, and working principles involved in physical processing techniques like size reduction, size separation, and mixing.
- To provide comprehensive knowledge of thermodynamic and mass transfer processes, specifically focusing on crystallization, evaporation, drying, and distillation.
- To impart an understanding of mechanical separation methods, including the theories, factors, and industrial equipment used in filtration and centrifugation.

Course Outcomes: Upon successful completion of this course, the student shall be able to

- CO 1.** Explain the dynamics of fluid flow and evaluate the principles and equipment used for the size reduction and separation of pharmaceutical powders.
- CO 2.** Differentiate between solid, liquid, and semisolid mixing mechanisms, and describe the theory and operational mechanics of various crystallizers.
- CO 3.** Analyse the laws of heat transfer and apply these principles to evaluate the construction and working of different industrial evaporators and heat exchangers.
- CO 4.** Illustrate the mechanisms of drying and distillation, and assess the merits and applications of specific dryers and distillation setups in drug manufacturing.
- CO 5.** Select appropriate filtration and centrifugation equipment by evaluating theoretical principles, filter media, and operational requirements for separating pharmaceutical mixtures.

UNIT – I**10 Hours**

Flow of fluids: Types of manometers, Reynolds number and its significance, Bernoulli's theorem and its applications, energy losses, orifice meter, venturimeter, pitot tube and rotometer.

Size Reduction: Objectives, mechanisms and laws governing size reduction, factors affecting size reduction, principles, construction, working, uses, merits and demerits of hammer mill, ball mill, fluid energy mill, edge runner mill and end runner mill.

Size Separation: Objectives, applications and mechanism of size separation, official standards of powders, sieves, size separation principles, construction, working, uses, merits and demerits of sieve shaker, cyclone separator, air separator, bag filter and elutriation tank.

UNIT – II**10 Hours**

Mixing: Objectives, applications and factors affecting mixing, difference between solid and liquid mixing, mechanism of solid mixing, liquids mixing and semisolids mixing. Principles, construction, working, uses,

merits and demerits of double cone blender, twin shell blender, ribbon blender, sigma blade mixer, planetary mixers and silverson emulsifier,

Crystallization: Objectives, applications, and theory of crystallization. Solubility curves, principles, construction, working, uses, merits and demerits of agitated batch crystallizer, Swenson Walker crystallizer, krystal crystallizer, vacuum crystallizer.

UNIT – III

10 Hours

Evaporation: Objectives, applications and factors influencing evaporation, differences between evaporation and other heat process. principles, construction, working, uses, merits and demerits of steam jacketed kettle, horizontal tube evaporator, climbing film evaporator, forced circulation evaporator, multiple effect evaporator.

Heat Transfer: Objectives, applications and heat transfer mechanisms. Fourier's law, heat transfer by conduction, convection and radiation. Heat interchangers and heat exchangers.

UNIT – IV

08 Hours

Drying: Objectives, applications and mechanism of drying process, measurements and applications of equilibrium moisture content, rate of drying curve. principles, construction, working, uses, merits and demerits of tray dryer, drum dryer spray dryer, fluidized bed dryer, vacuum dryer, freeze dryer.

Distillation: Objectives, applications and types of distillation. Principles, construction, working, uses, merits and demerits of (lab scale and industrial scale) simple distillation, preparation of purified water and water for injection BP by distillation, flash distillation, fractional distillation, distillation under reduced pressure, steam distillation.

UNIT - V

07 Hours

Filtration: Objectives, applications, theories and factors influencing filtration, filter aids, filter medias. Principle, construction, working, uses, merits and demerits of plate and frame filter, filter leaf, rotary drum filter, meta filter and cartridge filter, membrane filters and seitz filter. HEPA filters for controlled pollution.

Centrifugation: Objectives, principle and applications of centrifugation, principles, construction, working, uses, merits and demerits of perforated basket centrifuge, non-perforated basket centrifuge, semi continuous centrifuge and super centrifuge.

Text Books (Latest Edition)

1. Introduction to Chemical Engineering – Walter L Badger and Julius Banchero.
2. Solid Phase Extraction, Principles, Techniques and Applications by Nigel J.K. Simpson.
3. Unit Operations of Chemical Engineering – Warren L McCabe, Julian C. Smith and Peter Harriott.
4. Pharmaceutical Engineering DK Tripathi, Pharma Med Press
5. Pharmaceutical Engineering Principles and Practices – C.V.S Subrahmanyam et al.,

Reference Books (Latest Edition)

1. Remington: The Science and Practice of Pharmacy.
2. Theory and Practice of Industrial Pharmacy by Lachmann.
3. Physical Pharmaceutics- C.V.S Subrahmanyam et al.,
4. Cooper and Gunn's Tutorial Pharmacy, S.J. Carter.
5. Derle, Essentials of Pharmaceutical Engineering (Unit Operations), Pharma Med Press.

PS305: PHARMACOGNOSY (Theory)**B. Pharm. II Year I Sem**

L	T	P	C
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Scope: This course provides fundamental knowledge of pharmacognosy, including the identification, cultivation, evaluation, and therapeutic applications of drugs obtained from natural sources. It also introduces plant tissue culture, traditional systems of medicine, and the role of natural products in modern healthcare.

Course Objectives:

- To explain the fundamentals, scope, sources, history, and classification of crude drugs used in pharmacognosy.
- To apply the principles of cultivation, collection, processing, evaluation, quality control, storage, and quantitative microscopy for crude drugs of natural origin.
- To analyze the biological sources, chemistry, identification, evaluation, classification, and therapeutic uses of primary and secondary metabolites of natural origin.
- To analyze the significance of pharmacognosy in traditional systems of medicine and apply the principles and techniques of plant tissue culture, including its pharmaceutical applications and edible vaccines.

Course Outcomes: Upon completion of the course, the student shall be able to

- CO 1.** Explain the history, scope, sources, organization, and classification of drugs used in pharmacognosy.
- CO 2.** Apply the principles of cultivation, collection, processing, storage, quality evaluation, and quantitative microscopy to crude drugs of natural origin.
- CO 3.** Analyze the biological sources, chemistry, identification tests, evaluation, and therapeutic uses of primary and secondary metabolites.
- CO 4.** Analyze the role and significance of pharmacognosy in traditional systems of medicine and the medicinal importance of important plant products and natural substances.
- CO 5.** Explain and apply the principles, techniques, applications, and pharmaceutical significance of plant tissue culture, including the concept of edible vaccines.

UNIT - I**09 Hours**

Introduction to Pharmacognosy: Definition, history, scope and development of pharmacognosy

- Sources of drugs – Plants, animals, marine & tissue culture.
- Organized drugs, unorganized drugs (dried latex, dried juices, dried extracts, gums and mucilages, oleoresins and oleo-gum resins).
- Classification of drugs: Alphabetical, morphological, taxonomical, chemical, pharmacological, chemo classification of drugs.

UNIT – II**10 Hours****a) Cultivation, Collection, Processing and Storage of Drugs of Natural Origin**

Cultivation and collection of drugs of natural origin. Factors influencing cultivation of medicinal plants. Plant hormones and their applications. Polyploidy, mutation and hybridization with reference to medicinal plants.

- b) Quality Control of Drugs of Natural Origin:** Adulteration of drugs of natural origin. Evaluation by organoleptic, microscopic, physical, chemical and biological methods and properties. Quantitative microscopy of crude drugs including lycopodium spore method, leaf constants, camera lucida and diagrams of microscopic objects to scale with camera lucida.

UNIT – III**10 Hours****a) Introduction to Primary Metabolites and Secondary Metabolites**

General introduction, detailed study with respect to chemistry, sources, preparation, evaluation, preservation, storage, therapeutic used and commercial utility as pharmaceutical aids and/or medicines for the following primary metabolites and secondary metabolites

- b) Primary Metabolites:** Study of biological source, chemical nature and uses of drugs of natural origin containing following drugs.

Carbohydrates: Acacia, agar, tragacanth, honey.

Proteins and Enzymes: Gelatin, casein, proteolytic enzymes (papain, bromelain, serratiopeptidase, urokinase, streptokinase, pepsin).

Lipids (Waxes, fats, fixed oils): Castor oil, chaulmoogra oil, wool fat, bees wax

c) Secondary Metabolites

Definition, classification, properties and test for identification of alkaloids, glycosides, flavonoids, tannins, volatile oils and resins

UNIT - IV**08 Hours****Pharmacognosy in Various Systems of Medicine**

Role of pharmacognosy in allopathy and traditional systems of medicine namely, ayurveda, traditional Chinese medicine system, unani, siddha, homeopathy and naturopathy.

Plant Products: Fibers - cotton, jute, hemp, hallucinogens, teratogens, natural allergens, natural pesticides.

UNIT - V**08 Hours**

Plant Tissue Culture: Historical development of plant tissue culture, types of cultures, nutritional requirements, growth and their maintenance. Applications of plant tissue culture in pharmacognosy. Edible vaccines.

Text Books (Latest Edition)

1. W.C. Evans, Trease and Evans Pharmacognosy, W.B. Saunders & Co., London.
2. Tyler, V.E., Brady, L.R. and Robbers, J.E., Pharmacognosy, Lea and Febiger, Philadelphia.
3. Text Book of Pharmacognosy by T.E. Wallis
4. Mohammad Ali. Pharmacognosy and Phytochemistry, CBS Publishers & Distribution, New Delhi.
5. Text book of Pharmacognosy by C.K. Kokate, Purohit, Gokhale, Nirali Prakashan, New Delhi.

Reference Books (Latest Edition)

1. Herbal Drug Industry by R.D. Choudhary, Eastern Publisher, New Delhi.
2. Essentials of Pharmacognosy, Dr.SH.Ansari, Birla publications, New Delhi.
3. Anatomy of Crude Drugs by M.A. Iyengar
4. SL Deore, Pharmacognosy and Phytochemistry – I, Pharma Med Press.

PS306: HUMAN ANATOMY, PHYSIOLOGY AND PATHOPHYSIOLOGY - II (Practical)

B. Pharm. II Year I Sem

Scope: The course provides practical knowledge of human anatomy, physiology, and pathophysiology through experiments, demonstrations, models, clinical reports, and case studies.

Course Objectives

- To provide practical understanding of the structure and functions of major human organ systems through demonstrations and laboratory exercises.
- To develop skills in performing and interpreting basic physiological experiments and clinical examinations.
- To correlate normal physiological functions with pathological alterations using diagnostic reports and case studies.
- To enhance observation, analytical thinking, and communication skills required for healthcare and pharmaceutical practice.

Course Outcomes

- CO 1.** Perform basic physiological experiments and accurately record observations.
- CO 2.** Demonstrate understanding of the functions of major organ systems using charts, models, and simulations.
- CO 3.** Interpret common clinical diagnostic reports including LFT, KFT, and lipid profile.
- CO 4.** Relate physiological mechanisms to disease conditions and pathological changes.
- CO 5.** Apply practical knowledge of anatomy and physiology in pharmaceutical and healthcare settings.

List of Experiments

1. Practical HAP allows the verification of physiological processes discussed in theory classes through experiments on living tissues, simulated animal models, charts, and models with the help of human volunteers.
2. Learning through charts and models – Nervous system
3. To demonstrate the general neurological examination and calculation of GCS score
4. To record body temperature and demonstrate the reflex activity
5. Understanding EEG as a diagnostic tool
6. Learning through charts, models and open-source digital applications – Special senses:
 - To demonstrate the function of olfactory nerve
 - To examine the different types of taste
 - To demonstrate the visual acuity
 - To demonstrate the reflex activity
7. Learning through charts and models – Urinary system
8. Learning through charts and models – Endocrine system
9. Learning through charts and models – Reproductive system
10. Learning through charts and models – Pregnancy diagnosis rate (BMR)
11. Study of family planning devices and pregnancy diagnostic test
12. Understanding the significance of liver function tests with the help of a clinical diagnostic report

13. Understanding the significance of kidney function tests with the help of a clinical diagnostic Report.
14. Understanding the significance of lipid profile tests with the help of a clinical diagnostic report.
15. Students may undertake case studies of some of the diseases prescribed in the theory syllabus above.

Recommended Books (Latest Edition):

1. Textbook of Human Histology by Inderbir Singh, Jaypee Brothers Medical Publishers, New Delhi.
2. Textbook of Practical Physiology by C.L. Ghai, Jaypee.
3. Human Physiology (Vol I and II) by Dr. C.C. Chatterjee, Academic Publishers Kolkata.
4. Practical workbook of Human Physiology by K. Srinageswari and Rajeev Sharma, Jaypee Brothers Medical Publishers, New Delhi.

PC307: PHYSICAL PHARMACEUTICS – I (Practical)**B. Pharm. II Year I Sem**

L	T	P	C
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Scope: It equips students with practical skills in solubility, partition coefficient, particle characterization, flow properties, density measurements, and complexation studies relevant to pharmaceutical formulation and quality control.

Course Objectives

- To understand and apply the physicochemical principles governing the solubility, ionization, and partitioning behavior of drug molecules.
- To determine key physicochemical parameters such as solubility, pKa, partition coefficient, density, porosity, particle size, and flow properties using standard experimental methods.
- To evaluate complex formation, critical solution temperature, and stability constants through appropriate analytical techniques.
- To develop practical laboratory skills in performing experiments, analyzing data, interpreting results.

Course Outcomes: Upon the completion of the course, the student shall be able to

- CO 1.** Perform experiments to determine the physicochemical properties of drugs and pharmaceutical materials.
- CO 2.** Evaluate solubility, pKa, partition coefficient, particle size, density, porosity, and flow properties using standard laboratory techniques.
- CO 3.** Determine the critical solution temperature (CST) method and interpret the results.
- CO 4.** Analyze stability constants and drug–complex interactions using solubility and pH titration methods.
- CO 5.** Interpret experimental data to support the formulation, development, and quality assessment of pharmaceutical dosage forms.

List of Experiments

1. Determination the solubility of drug at room temperature at different pH conditions.
2. Determination of pKa value by Half Neutralization/ Henderson Hasselbalch equation.
3. Determination of partition coefficient of benzoic acid in benzene and water.
4. Determination of partition coefficient of Iodine in CCl₄ and water.
5. Determination of % composition of NaCl in a solution using phenol-water system by CST method.
6. Determination of particle size, particle size distribution using sieving method.
7. Determination of particle size, particle size distribution using microscopic method.
8. Determination of bulk density, true density and porosity.
9. Determine the angle of repose and influence of lubricant on angle of repose.
10. Determination of stability constant and donor acceptor ratio of PABA-Caffeine complex by solubility method.
11. Determination of stability constant and donor acceptor ratio of Cupric-Glycine complex by pH titration method.

Recommended Books (Latest Edition)

1. Laboratory Manual of Physical Pharmaceutics, CVS. Subramanyam, JS. Thimma
2. Physical Pharmacy Practical Text, Mohanta Guru Prasad. Pharma Med Press
3. Experimental Pharmaceutics by Eugene, Parott.
4. Elementary Pharmaceutical Calculations, DK Tripathi, Pharma Med Press.

BS 308: PHARMACEUTICAL MICROBIOLOGY (Practical)**B. Pharm. II Year I Sem**

L	T	P	C
0	0	4	2

Scope: Pharmaceutical Microbiology practical develop hands-on skills in microbial handling, isolation, identification, staining, cultivation, preservation, sterilization, aseptic techniques, microbial assays, and quality control, preparing students for pharmaceutical manufacturing, testing, research, and regulatory compliance.

Course Objectives

- To familiarize students with microbiology laboratory practices and aseptic techniques.
- To develop skills in the preparation and sterilization of culture media and glassware.
- To train students in the isolation, staining, identification and enumeration of microorganisms.
- To develop practical skills in Pharmaceutical Microbiological testing and quality control of pharmaceutical products.

Course Outcomes: Upon completion of this course, the student shall be able to

- CO 1.** Demonstrate safe laboratory practices, identify microbiology laboratory equipment and prepare sterile culture media.
- CO 2.** Apply aseptic techniques to cultivate, subculture, isolate and enumerate microorganisms.
- CO 3.** Identify and differentiate microorganisms using staining techniques, biochemical and motility tests.
- CO 4.** Perform microbiological assays, sterility testing and bacteriological analysis of water using standard microbiological procedures.
- CO 5.** Apply microbiological techniques for the quality control and evaluation of pharmaceutical products.

List of Experiments

1. Introduction and study of different equipments and processing, e.g., B.O.D. incubator, laminar flow, aseptic hood, autoclave, hot air sterilizer, deep freezer, refrigerator and microscopes used in experimental microbiology.
2. Sterilization of glassware, preparation and sterilization of media.
3. Sub culturing of bacteria and fungus. Nutrient stabs and slants preparations.
4. Staining methods- Simple staining, gram staining and acid fast staining (Demonstration with practical).
5. Isolation of pure culture of micro-organisms by multiple streak plate technique and other techniques.
6. Microbiological assay of antibiotics by cup plate method and other methods
7. Motility determination by hanging drop method.
8. Sterility testing of pharmaceuticals.
9. Bacteriological analysis of water
10. Biochemical tests (IMViC reactions)
11. Revision practical class

Recommended Books (Latest Edition)

1. Jyostna, Manual of Practical Microbiology, Pharma Med Press.
2. Pharmaceutical Microbiology: A Laboratory Manual by Prasad G. Shyam and K. Srisailam.
3. Kokare, C. R. Pharmaceutical Microbiology: Experiments and Techniques. Nashik: Career Publications.
4. Experimental Microbiology Garg, FC.
5. Aneja KR. Experiments in Microbiology, Plant Pathology and Biotechnology.
6. Microbiology: A Laboratory Manual Coppuccino, James G Andamp, Sherman.

PC309: PHARMACEUTICAL ENGINEERING (Practical)**B. Pharm. II Year I Sem****L T P C****0 0 4 2**

Scope: This laboratory course provides hands-on training in pharmaceutical unit operations and process equipment used in formulation development and manufacturing. Students develop practical skills in various unit operations and evaluation of pharmaceutical machinery.

Course Objectives

- To understand the principles and applications of pharmaceutical unit operations and heat transfer processes through laboratory experiments.
- To develop practical skills in operating, evaluating and analysing pharmaceutical equipment used in manufacturing and quality control.
- To determine and interpret process parameters such as drying rate, moisture content, heat transfer coefficient, particle size distribution, filtration rate and blending efficiency.
- To correlate theoretical concepts with practical applications for efficient design, optimization, and scale-up of pharmaceutical manufacturing processes.

Course Outcomes: Upon successful completion of the course, the student shall be able to

- CO 1.** Perform experiments related to heat transfer, steam distillation, drying, humidity measurement and moisture analysis using standard laboratory techniques.
- CO 2.** Evaluate particle size distribution, size reduction efficiency, filtration, evaporation, crystallization, and blending processes by applying appropriate pharmaceutical engineering principles.
- CO 3.** Demonstrate the construction, working, principle, operation and pharmaceutical applications of major processing equipment such as rotary tablet machines, fluidized bed coaters, fluid energy mills, dehumidifiers, colloid mills, planetary mixers and freeze dryers.
- CO 4.** Analyse experimental data, calculate process parameters (e.g., heat transfer coefficient, drying characteristics, kick's, rittinger's and bond's constants, blending uniformity index) and interpret the results for pharmaceutical process optimization.
- CO 5.** Utilize laboratory knowledge to solve practical problems encountered in pharmaceutical manufacturing while following good laboratory practices (GLP) and safety procedures.

List of Experiments

1. Determination of radiation constant of brass, iron, unpainted and painted glass.
2. Steam distillation – To calculate the efficiency of steam distillation.
3. To determine the overall heat transfer coefficient by heat exchanger.
4. Construction of drying curves (for calcium carbonate and starch).
5. Determination of moisture content and loss on drying.
6. Determination of humidity of air– i) from wet and dry bulb temperatures–use of dew point method.
7. Description of construction working and application of pharmaceutical machinery such as rotary tablet machine, fluidized bed coater, fluid energy mill, dehumidifier.
8. Size analysis by sieving – To evaluate size distribution of tablet granulations – construction of various size frequency curves including arithmetic and logarithmic probability plots.
9. Size reduction: To verify the laws of size reduction using ball mill and determining kicks, rittinger's, bond's coefficients, power requirement and critical speed of ball mill.

10. Demonstration of colloid mill, planetary mixer, fluidized bed dryer, freeze dryer and such other major equipment.
11. Factors affecting rate of filtration and evaporation (surface area, concentration and thickness/viscosity).
12. To study the effect of time on the rate of crystallization.
13. To calculate the uniformity Index for given sample by using double cone blender.

Recommended Books (Latest edition)

1. Pharmaceutical Engineering: Practical Manual (Unit Operations), Sudhakara Reddy, Pharma Press.
2. Remington: The Science and Practice of Pharmacy.

PS401: MEDICINAL CHEMISTRY – I (Theory)**B. Pharm. II Year II Sem**

L	T	P	C
3	1	0	4

Scope: This course provides fundamental knowledge of medicinal chemistry, including physicochemical properties, drug metabolism, structure–activity relationships (SAR), synthesis, and the medicinal chemistry of drugs acting on the autonomic and central nervous systems.

Course Objectives

- To understand the fundamental principles of medicinal chemistry.
- To relate physicochemical properties and drug metabolism to biological activity.
- To analyze structure–activity relationships (SAR) of important drug classes.
- To learn the synthesis and therapeutic uses of selected drugs.

Course Outcomes: Upon completion of the course the student shall be able to

- CO 1.** Understand the fundamental principles of medicinal chemistry, physicochemical properties, bioisosterism, isomerism, structural modifications, and prodrug design in relation to biological activity.
- CO 2.** Learn the medicinal chemistry, SAR, mechanism of action, uses, and synthesis of selected adrenergic agonists and antagonists acting on the autonomic nervous system.
- CO 3.** Explain the medicinal chemistry, SAR, mechanism of action, uses, and synthesis of selected cholinergic agonists, cholinesterase inhibitors, reactivators, and cholinergic blocking agents.
- CO 4.** Discuss the medicinal chemistry, SAR, mechanism of action, uses, and synthesis of selected sedatives, hypnotics, antipsychotics, and anticonvulsants acting on the central nervous system.
- CO 5.** Describe the medicinal chemistry, SAR, mechanism of action, uses, and synthesis of selected general anesthetics, narcotic and non-narcotic analgesics, narcotic antagonists, and anti-inflammatory agents.

Study of the development of the following classes of drugs, Classification, mechanism of action, uses of drugs mentioned in the course, Structure activity relationship of selective class of drugs as specified in the course and synthesis of drugs superscripted (*).

UNIT – I**10 Hours****Introduction to Medicinal Chemistry**

History and development of medicinal chemistry. Physicochemical properties in relation to biological action (ionization, solubility, partition coefficient, hydrogen bonding) protein binding, chelation, bioisosterism, significance of isomerism in biological activity, structural modifications in drug discovery. Prodrugs: Basic concepts and application of prodrug design.

UNIT – II**10 Hours**

Drugs Acting on Autonomic Nervous System: Adrenergic Neurotransmitters: Biosynthesis and catabolism of catecholamine. Adrenergic receptors (Alpha and Beta) and their distribution.

Sympathomimetic Agents: SAR of Sympathomimetic agents

Direct Acting Agents: Norepinephrine, epinephrine, phenylephrine*, dopamine, methyl dopa, clonidine, dobutamine, isoproterenol, terbutaline, salbutamol*, bitolterol, naphazoline, oxymetazoline and xylometazoline.

Indirect Acting Agents: Hydroxyamphetamine, pseudoephedrine, propylhexedrine. Agents with mixed mechanism: Ephedrine, metaraminol.

Adrenergic Antagonists:

Alpha Adrenergic Blockers: Tolazoline*, phentolamine, phenoxybenzamine, prazosin, dihydroergotamine, methysergide.

Beta Adrenergic Blockers: SAR of beta blockers, propranolol*, metibranolol, atenolol, betazolol, bisoprolol, esmolol, metoprolol, labetalol, carvedilol.

UNIT – III

10 Hours

Cholinergic Neurotransmitters: Biosynthesis and catabolism of acetylcholine. Cholinergic receptors (Muscarinic and Nicotinic) and their distribution.

Parasympathomimetic Agents: SAR of Parasympathomimetic agents

Direct Acting Agents: Acetylcholine, carbachol*, bethanechol, methacholine, pilocarpine.

Indirect Acting/ Cholinesterase Inhibitors (Reversible and Irreversible): Physostigmine, neostigmine*, pyridostigmine, edrophonium chloride, tacrine hydrochloride, ambenonium chloride, isofluorophate, echothiophate iodide, parathion, malathion.

Cholinesterase Reactivator: Pralidoxime chloride.

Cholinergic Blocking Agents: SAR of cholinolytic agents

Solanaceous Alkaloids and Analogues: Atropine sulphate, hyoscyaminesulphate, scopolamine hydrobromide, homatropine hydrobromide, ipratropium bromide*.

Synthetic Cholinergic Blocking Agents: Tropicamide, cyclopentolatehydrochloride, clidinium bromide, dicyclomine hydrochloride*, glycopyrrolate, methantheline bromide, propantheline bromide*, benztropine mesylate, orphenadrine citrate, biperidine hydrochloride, procyclidine hydrochloride*, tridihexethyl chloride, isopropamide iodide, ethopropazine hydrochloride.

UNIT – IV

08 Hours

Drugs Acting on Central Nervous System:

a) Sedatives and Hypnotics

Benzodiazepines: SAR of benzodiazepines, chlordiazepoxide, diazepam*, oxazepam, chlorazepate, lorazepam, alprazolam, zolpidem

Barbiturates: SAR of barbiturates, barbitol*, phenobarbital, mephobarbital, amobarbital, butobarbital, pentobarbital, secobarbital

Miscellaneous: Amides and Imides: Glutethimide.

Alcohol and their Carbamate Derivatives: Meprobamate, ethchlorvynol. Aldehyde and their derivatives: Triclofos sodium, paraldehyde.

b) Antipsychotics

Phenothiazines: SAR of phenothiazine's promazine hydrochloride, chlorpromazine hydrochloride*, trifluorpromazine, thioridazine hydrochloride, piperacetazine hydrochloride, prochlorperazine maleate, trifluoperazine hydrochloride.

Ring Analogues of Phenothiazines: Chlorprothixene, thiothixene, loxapine succinate, clozapine.

Fluorobutero-phenones: Haloperidol, droperidol, risperidone.

Beta Amino Ketones: Molindone hydrochloride.

Benzamides: Sulpieride.

c) **Anticonvulsants:** SAR of Anticonvulsants, mechanism of anticonvulsant action

Barbiturates: Phenobarbitone, methobarbital. Hydantoins: phenytoin, mephentermine, ethosuximide

Oxazolidine Diones: Trimethadione, paramethadione

Succinimides: Phensuximide, methsuximide, ethosuximide

Urea and Monoacylureas: Phenacetamide, carbamazepine benzodiazepines: clonazepam

Miscellaneous: Primidone, valproic acid, gabapentin, felbamate.

UNIT – V

07 Hours

Drugs Acting On Central Nervous System:

General Anesthetics:

Inhalation Anesthetics: Halothane*, methoxyflurane, enflurane, sevoflurane, isoflurane, desflurane.

Ultra Short Acting Barbiturates: Methohexital sodium*, thiamylal sodium, thiopental sodium.

Dissociative Anesthetics: Ketamine hydrochloride. *

Narcotic and Non-Narcotic Analgesics:

Morphine and related drugs: SAR of morphine analogues, morphine sulphate, codeine, meperidine hydrochloride, anileridine hydrochloride, diphenoxylate hydrochloride, loperamide hydrochloride, fentanyl citrate*, methadone hydrochloride*, propoxyphene hydrochloride, pentazocine, levorphanol tartrate.

Narcotic Antagonists: Nalorphine hydrochloride, levallorphan tartrate, naloxone hydrochloride.

Anti-inflammatory agents: Sodium salicylate, aspirin, mefenamic acid*, meclofenamate, indomethacin, sulindac, tolmetin, zomepirate, diclofenac, ketorolac, ibuprofen*, naproxen, piroxicam, phenacetin, acetaminophen, antipyrine, phenylbutazone.

Text Books (Latest Edition)

1. Wilson and Giswold's Organic Medicinal and Pharmaceutical Chemistry.
2. Foye's Principles of Medicinal Chemistry.
3. Introduction to Principles of Drug Design- Smith and Williams.
4. Organic Chemistry by I.L. Finar, Vol. II.
5. Rama Rao Nadendla, Medicinal Chemistry, Pharma Med Press.

Reference Books (Latest Edition)

1. Burger's Medicinal Chemistry, Vol I to IV.
2. Remington's Pharmaceutical Sciences.
3. Martindale's The Extra Pharmacopoeia.
4. The Organic Chemistry of Drug Synthesis by Lednicher, Vol. 1-5.
5. Indian Pharmacopoeia.

PC402: PHYSICAL PHARMACEUTICS – II (Theory)**B. Pharm. II Year II Sem**

L	T	P	C
3	1	0	4

Scope: Physical Pharmaceutics–II provides an understanding of drug stability, rheological properties, and the physicochemical behaviour of pharmaceutical systems. It includes dispersed systems, surface and interfacial phenomena, and colloidal dispersions relevant to pharmaceutical dosage forms.

Course Objectives

- To summarize the principles of reaction kinetics, drug degradation mechanisms, and stability testing methods used in determining the shelf life of pharmaceutical dosage forms.
- To explain the rheological behaviour of pharmaceutical systems and the mechanical properties of solids relevant to pharmaceutical formulation and processing.
- To discuss the formulation, evaluation, and stability aspects of coarse dispersions, including suspensions and emulsions.
- To describe surface and interfacial phenomena, colloidal dispersions, and their applications in the research, development, and optimization of pharmaceutical formulations.

Course Outcomes: Upon successful completion of the course, the student shall be able to

- CO 1.** Explain the principles of reaction kinetics, drug degradation pathways, and stability testing methods for predicting the shelf life and ensuring the quality of pharmaceutical dosage forms.
- CO 2.** Describe the rheological properties of pharmaceutical systems and explain the concepts of viscosity determination and deformation of solids relevant to pharmaceutical applications.
- CO 3.** Demonstrate the formulation and evaluation of pharmaceutical suspensions and emulsions and assess the factors influencing their physical stability.
- CO 4.** Apply the concepts of surface and interfacial phenomena, surface-active agents, and adsorption processes in the design and development of pharmaceutical formulations.
- CO 5.** Analyze the characteristics and properties of colloidal dispersions and interpret the effects of electrolytes and coacervation in pharmaceutical systems.

UNIT - I**10 Hours**

Drug Stability: Reaction kinetics: zero, pseudo-zero, first and second order, units of basic rate constants, determination of reaction order. Physical and chemical factors influencing the chemical degradation of pharmaceutical product: temperature, solvent, ionic strength, dielectric constant, specific and general acid base catalysis, simple numerical problems. Stabilization of medicinal agents against common reactions like hydrolysis and oxidation. Accelerated stability testing in expiration dating of pharmaceutical dosage forms. Photolytic degradation and its prevention.

UNIT - II**10 Hours**

- a) Rheology:** Newtonian systems, law of flow, kinematic viscosity, effect of temperature, non-newtonian systems, pseudoplastic, dilatants, plastic, thixotropy, thixotropy in formulation, determination of viscosity, capillary, falling sphere, rotational viscometers.
- b) Deformation of Solids:** Plastic and elastic deformation, Heckel equation, stress, strain, elastic modulus.

UNIT – III**10 Hours**

Coarse Dispersion: Suspension, interfacial properties of suspended particles, settling in suspensions, formulation and evaluation of suspensions. Emulsions and theories of emulsification, micro emulsion and multiple emulsions; physical stability of emulsions, preservation of emulsions, rheological properties of emulsions, phase equilibria. Formulation and evaluation of emulsions.

UNIT - IV**08 Hours**

Surface and Interfacial Phenomenon: Liquid interface, surface and interfacial tensions, surface free energy, measurement of surface and interfacial tensions, spreading coefficient, adsorption at liquid interfaces, surface active agents, HLB scale, solubilization and its methods, adsorption at solid interface.

UNIT – V**07 Hours**

Colloidal Dispersions: Classification of dispersed systems and their general characteristics, size and shapes of colloidal particles, classification of colloids and comparative account of their general properties. Optical, kinetic and electrical properties. Effect of electrolytes and coacervation.

Text Books (Latest Edition)

1. Physical Pharmacy and Pharmaceutical Sciences by Alfred Martin.
2. Physical Pharmaceutics by C.V.S. Ramasamy and R. Manavalan.
3. Physical Pharmaceutics–II by Vidyadhara et al., Pharma Med Press.

Reference Books (Latest Edition)

1. Experimental Pharmaceutics by Eugene L. Parrott.
2. Tutorial Pharmacy by Cooper and Gunn.
3. Pharmaceutical Calculations by Stocklosa M. J., Lea and Febiger, Philadelphia.
4. Pharmaceutical Dosage Forms: Tablets, Volumes 1–3, by Lieberman H.A. and Lachman C., Marcel Dekker Inc.
5. Pharmaceutical Dosage Forms: Disperse Systems, Volumes 1–3, by Lieberman H.A. and Lachman L., Marcel Dekker Inc.
6. Aulton's Pharmaceutics: The Design and Manufacture of Medicines by Aulton M.E. and Taylor K., Elsevier.

PC403: PHARMACOLOGY – I (Theory)**B. Pharm. II Year II Sem**

L	T	P	C
3	1	0	4

Scope: This course introduces the basic principles of pharmacology and drug actions. It covers drugs acting on the peripheral and central nervous systems with their mechanisms, therapeutic uses, and adverse effects. The course develops the knowledge required for the rational and safe use of medicines.

Course Objectives

- To explain the basic principles of pharmacology.
- To describe the pharmacology of drugs acting on major organ systems.
- To apply pharmacological principles for rational drug therapy.
- To correlate drug actions with their therapeutic applications.

Course Outcomes: Upon completion of this course the student shall be able to

CO 1: Explain the basic principles of pharmacology and drug actions.

CO 2: Describe the pharmacology of drugs acting on the peripheral nervous system.

CO 3: Explain the pharmacology of drugs acting on the autonomic nervous system.

CO 4: Discuss the pharmacology of drugs acting on the central nervous system.

CO 5: Explain the pharmacology of psychotherapeutic & neurodegenerative disorder drugs.

UNIT – I**10 Hours****General Pharmacology**

- Introduction to pharmacology- Definition, historical landmarks and scope of pharmacology, nature and source of drugs, essential drugs concept and routes of drug administration.
- Pharmacodynamics- Principles and mechanisms of drug action. Receptor theories and classification of receptors, regulation of receptors. drug receptors interactions signal transduction mechanisms, G-protein–coupled receptors, ion channel receptor, transmembrane enzyme linked receptors, transmembrane JAK-STAT binding receptor and receptors that regulate transcription factors, dose response relationship, therapeutic index, combined effects of drugs and factors modifying drug action.
- Pharmacokinetics- Membrane transport, absorption, distribution, metabolism and excretion of drugs. Enzyme induction, enzyme inhibition, kinetics of elimination.

UNIT – II**8 Hours****Adverse Drug Reactions and Drug Interactions**

- Agonists, antagonists (competitive and noncompetitive), spare receptors, addiction, tolerance, dependence, tachyphylaxis, idiosyncrasy, allergy.
- Adverse drug reactions.
- Drug interactions (pharmacokinetic and pharmacodynamic).
- Drug discovery and clinical evaluation of new drugs -Drug discovery phase, preclinical evaluation phase, clinical trial phase, phases of clinical trials and pharmacovigilance.

UNIT – III**10 Hours****Pharmacology of Peripheral Nervous System**

- a) Organization and function of ANS.
- b) Neurohumoral transmission, co-transmission and classification of neurotransmitters.
- c) Parasympathomimetics, parasympatholytics, sympathomimetics, sympatholytics.
- d) Neuromuscular blocking agents and skeletal muscle relaxants (peripheral).
- e) Local anesthetic agents.
- f) Drugs used in myasthenia gravis and glaucoma

UNIT – IV**10 Hours****Pharmacology of Central Nervous System – I**

- a) Neurohumoral transmission in the C.N.S. special emphasis on importance of various neurotransmitters like with GABA, glutamate, glycine, serotonin, dopamine.
- b) General anesthetics and pre-anesthetics.
- c) Sedatives, hypnotics and centrally acting muscle relaxants.
- d) Anti-epileptics
- e) Alcohols and disulfiram

UNIT – V**07 Hours****Pharmacology of Central Nervous System - II**

- a) Psychopharmacological agents: Antipsychotics, antidepressants, anti-anxiety agents, anti-manics and hallucinogens.
- b) Drugs used in parkinsons disease and alzheimer's disease.
- c) CNS stimulants and nootropics.
- d) Opioid analgesics and antagonists
- e) Drug addiction, drug abuse, tolerance and dependence.

Text Books (Latest Edition)

1. Tripathi, K. D. Essentials of Medical Pharmacology. Jaypee Brothers Medical Publishers (P) Ltd., New Delhi.
2. Rang, H. P. Dale, M. M. Ritter, J. M. and Flower, R. J. Rang and Dale's Pharmacology. Churchill Livingstone, Elsevier.
3. Katzung, B. G. Masters, S. B. and Trevor, A. J. Basic and Clinical Pharmacology. Tata McGraw-Hill.
4. Goodman and Gilman's. The Pharmacological Basis of Therapeutics.

Reference Books (Latest Edition)

1. Kenakin, Terry P. A Pharmacology Primer: Theory, Applications and Methods. Elsevier.
2. Seifert, Roland. Basic Knowledge of Pharmacology. Springer.
3. Marry Anne, K. K. Lloyd Yee, Y. Brian K. A. Robbin, L. C. Joseph G. B. Wayne A. K. and Bradley, R. W. Applied Therapeutics: The Clinical Use of Drugs. Lippincott Williams & Wilkins.

PS404: PHARMACOGNOSY AND PHYTOCHEMISTRY**B. Pharm. II Year II Sem****L T P C****3 1 0 4**

Scope: This course focuses on the biosynthesis, extraction, isolation, analysis, and commercial applications of secondary metabolites obtained from medicinal plants. It also covers modern extraction techniques and the preparation and standardization of AYUSH formulations.

Course Objectives

- To explain the biogenesis and biosynthetic pathways of secondary metabolites and the role of modern tools in natural product research.
- To apply appropriate extraction, isolation, identification, estimation, and evaluation techniques for important phytoconstituents.
- To analyze the chemistry, biological sources, therapeutic uses, and commercial significance of major classes of phytoconstituents.
- To evaluate conventional and modern extraction techniques and develop an understanding of the preparation and standardization of AYUSH formulations and their pharmaceutical applications.

Course Outcomes: Upon completion of the course, the student shall be able to

- CO 1.** Explain the biogenesis and biosynthetic pathways of secondary metabolites, including biogenetic studies using radioactive isotopes, pathway prediction tools, and genome-editing applications in pharmacognosy.
- CO 2.** Apply suitable extraction, isolation, identification, and estimation techniques for major phytoconstituents such as alkaloids, flavonoids, phenylpropanoids, steroids, cardiac glycosides, triterpenoids, and volatile oils.
- CO 3.** Analyze the chemistry, biological sources, therapeutic uses, evaluation, and commercial importance of tannins, resins, glycosides, iridoids, terpenoids, and naphthoquinones.
- CO 4.** Evaluate important phytoconstituents such as terpenoids, glycosides, alkaloids, and resins based on their identification, estimation, pharmaceutical applications, and commercial significance.
- CO 5.** Compare and evaluate conventional and modern extraction techniques and explain the preparation and standardization of AYUSH formulations for pharmaceutical applications.

UNIT – I**07 Hours****Metabolic Pathways and Biogenetic Studies**

- a) Brief study of basic metabolic pathways and formation of different secondary metabolites through these pathways- shikimic acid pathway, acetate pathways and amino acid pathway.
- b) Study of utilization of radioactive isotopes in the investigation of biogenetic studies. Pathway prediction tools, CRISPR/Cas9, genome editing.

UNIT – II**10 Hours**

- a) General introduction, general methods of extraction (maceration, percolation, chromatographic methods) and isolation of alkaloids, glycosides, flavanoids and volatile oils.
- b) Biological source, microscopical characters, composition, chemistry, analysis, therapeutic uses and commercial applications of the following secondary metabolites:

Alkaloids: Vinca, rauwolfia, belladonna, opium,

Phenylpropanoids and Flavonoids: Lignans, tea, ruta, ginkgo

Steroids, Cardiac Glycosides & Triterpenoids: Liquorice, dioscorea, digitalis

Volatile oils: Mentha, clove, cinnamon, fennel, coriander, lemon grass.

UNIT – III

10 Hours

General introduction, composition, chemistry & chemical classes, general methods of extraction & analysis, biological sources, therapeutic uses and commercial applications of following secondary metabolites

- a) **Tannins:** Catechu, pterocarpus
- b) **Resins:** Benzoin, guggul, ginger, asafoetida, myrrh, colophony, boswellia.
- c) **Glycosides:** Senna, aloes, bitter almond, digitalis, liquorice
- d) **Iridoids, Other terpenoids & Naphthaquinones:** Gentian, artemisia, taxus, carotenoids.

UNIT – IV

10 Hours

Isolation, Identification, Estimation of Phytoconstituents and Commercial Applications of the Following

- a) **Terpenoids:** Menthol, citral artemisin, and taxol
- b) **Glycosides:** Glycyrrhetic acid, rutin, sennoside and digoxin.
- c) **Alkaloids:** atropine, Quinine, reserpine and caffeine
- d) **Resins:** Podophyllotoxin and curcumin.

UNIT – V

08 Hours

- a) Preparation and standardization of Ayush formulations - Aristas and asawas, gutika, avaleha, ghrita, churna, bhasma and taila.
- b) Modern methods of extraction (super critical fluid extraction, counter-current extraction, microwave assisted extraction, ultra-sonication assisted extraction).

Text Books (Latest Edition)

1. W. C. Evans, Trease and Evans Pharmacognosy, W.B. Saunders & Co., London.
2. Mohammad Ali. Pharmacognosy and Phytochemistry, CBS Publishers & Distribution, New Delhi.
3. Text book of Pharmacognosy by C.K. Kokate, Purohit, Gokhale, Nirali Prakashan, New Delhi.
4. Herbal drug industry by R.D. Choudhary, Eastern Publisher, New Delhi.
5. Essentials of Pharmacognosy, Dr. SH. Ansari, Birla publications, New Delhi.

Reference Books (Latest Edition)

1. Herbal Cosmetics by H. Pande, Asia Pacific Business press, Inc, New Delhi.
2. A. N. Kalia, Textbook of Industrial Pharmacognosy, CBS Publishers, New Delhi.
3. R Endress, Plant cell Biotechnology, Springer-Verlag, Berlin.
4. Pharmacognosy & Pharmacobiotechnology. James Bobbers, Marilyn KS, VE Tylor.
5. The formulation and preparation of cosmetic, fragrances and flavours.
6. Remington's Pharmaceutical sciences.
7. Text Book of Biotechnology by Vyas and Dixit.
8. Text Book of Biotechnology by R. C. Dubey.
9. SL Deore, Pharmacognosy and Phytochemistry – II, Pharma Med Press.
10. Jalalpore, S.S. Patil, A.K. Text book of Pharmacognosy and Phytochemistry, Nirali prakashan.
- Kulkarni A. Vishaka, Pharmacognosy and Phytochemistry – II, Pharma Med Press.

PS405: Pharmaceutical Jurisprudence (Theory)**B.Pharm. II Year II Sem****L T P C****3 1 0 4**

Scope: This course introduces pharmaceutical laws and regulations in India. It covers drug legislation, regulatory authorities, and professional ethics. It develops knowledge for legal and ethical pharmacy practice.

Course Objectives

- To understand the pharmaceutical legislations governing pharmacy practice in India.
- To study the provisions of major pharmaceutical Acts, Rules, and regulatory authorities.
- To understand the legal requirements for the manufacture, sale, and distribution of drugs.
- To develop professional and ethical responsibilities in pharmacy practice.

Course Outcomes: Upon successful completion of the course, the student shall be able to

- CO 1.** Explain the provisions of the Drugs and Cosmetics Act and Rules related to the import and manufacture of drugs.
- CO 2.** Apply legal requirements for drug sale, labeling, packaging, licensing, and regulatory administration.
- CO 3.** Describe the Pharmacy Act, Medicinal and Toilet Preparations Act, and their regulatory provisions.
- CO 4.** Explain the provisions of important pharmaceutical legislations, including the Narcotic Drugs and Psychotropic Substances Act, Drugs and Magic Remedies Act, and related laws.
- CO 5.** Apply professional ethics and legal principles in pharmacy practice and ensure compliance with pharmaceutical legislation.

UNIT – I**10 Hours**

Drugs and Cosmetics Act, 1940 and its Rules 1945: Objectives, definitions, legal definitions of schedules to the act and rules import of drugs – classes of drugs and cosmetics prohibited from import, Import under license or permit. Offences and penalties. Manufacture of drugs – Prohibition of manufacture and sale of certain drugs, conditions for grant of license and conditions of license for manufacture of drugs, manufacture of drugs for test, examination and analysis, manufacture of new drug, loan license and repacking license.

UNIT – II**10 Hours**

Drugs and Cosmetics Act, 1940 and its Rules 1945. Detailed study of Schedule G, H, M, N, P, T, U, V, X, Y, Part XII B, Sch F & DMR (OA) sale of drugs - wholesale, retail sale and restricted license. offences and penalties

Labeling & Packing of Drugs - general labeling requirements and specimen labels for drugs and cosmetics, list of permitted colors. offences and penalties.

Administration of The Act and Rules - Drugs Technical Advisory Board, Central drugs Laboratory, Drugs Consultative Committee, Government drug analysts, Licensing authorities, controlling authorities, Drugs Inspectors.

UNIT – III**10 Hours**

Pharmacy Act - 1948: Objectives, definitions, Pharmacy Council of India; its constitution and functions, education regulations, state and joint state pharmacy councils; its constitution and functions, registration of pharmacists, offences and penalties.

Medicinal and Toilet Preparation Act -1955: Objectives, Definitions, licensing, manufacture in bond and outside bond, export of alcoholic preparations, manufacture of ayurvedic, homeopathic, patent & proprietary preparations. offences and penalties.

Narcotic Drugs and Psychotropic Substances Act-1985 and Rules: Objectives, definitions, authorities and officers, constitution and functions of narcotic & Psychotropic consultative committee, national fund for controlling the drug abuse, prohibition, control and regulation, opium poppy cultivation and production of poppy straw, manufacture, sale and export of opium, offences and Penalties.

UNIT – IV

08 Hours

Study of Salient Features of Drugs and Magic Remedies Act and its Rules: Objectives, definitions, prohibition of certain advertisements, classes of exempted advertisements, offences and penalties.

Prevention of Cruelty to Animals Act 1960: Objectives, definitions, institutional animal ethics committee, breeding and stocking of animals, performance of experiments, transfer and acquisition of animals for experiment, records, power to suspend or revoke registration, offences and penalties

National Pharmaceutical Pricing Authority: Drugs Price Control Order (DPCO) 2013. Objectives, definitions, sale prices of bulk drugs, retail price of formulations, retail price and ceiling price of scheduled formulations, National List of Essential Medicines (NLEM).

UNIT – V

07 Hours

Pharmaceutical Legislations – A brief review, introduction, study of drugs enquiry committee, health survey and development committee, Hathi committee and Mudaliar committee

Code of Pharmaceutical Ethics - Definition, pharmacist in relation to his job, trade, medical profession and his profession, Pharmacist's oath.

Medical Termination of Pregnancy act

Right to Information Act

Introduction to Intellectual Property Rights (IPR).

Text Books (Latest Edition)

1. Suresh, B. Forensic Pharmacy.
2. Mithal, B. M. Textbook of Forensic Pharmacy.
3. Jain, N. K. A Textbook of Forensic Pharmacy.
4. Kokate, C. K. Textbook of Forensic Pharmacy. Pharma Med Press.

Reference Books (Latest Edition)

1. Mehra, M. L. Handbook of Drug Law.
2. Drugs and Cosmetics Act/Rules. Government of India Publications.
3. Medicinal and Toilet Preparations Act, 1955. Government of India Publications.
4. Narcotic Drugs and Psychotropic Substances Act. Government of India Publications.
5. Drugs and Magic Remedies Act. Government of India Publications.
6. Bare Acts of the said laws published by the Government.

PS406: MEDICINAL CHEMISTRY – I (Practical)**B. Pharm. II Year II Sem**

Scope: The practical course covers the **laboratory preparation of selected medicinal intermediates and heterocyclic compounds, pharmaceutical drug assays, and determination of partition coefficients.** It develops students' practical skills in synthesis, analytical techniques, calculation, interpretation of results, and good laboratory and safety practices.

Course Objectives

- To provide practical knowledge on the synthesis of important medicinal intermediates and heterocyclic compounds.
- To develop skills in performing pharmaceutical assays using standard analytical procedures.
- To understand the principles and experimental determination of physicochemical properties such as partition coefficient.
- To cultivate good laboratory practices (GLP), safety, documentation, and interpretation of experimental results.

Course Outcomes: Upon completion of the course the student shall be able to

CO 1. Prepare selected medicinal chemistry intermediates using appropriate laboratory techniques.

CO 2. Perform assay of pharmaceutical compounds and calculate percentage purity accurately.

CO 3. Determine and interpret the partition coefficient of drugs and relate it to drug properties.

CO 4. Maintain laboratory records and follow GLP and safety practices during practical work.

CO 5. Analyze experimental observations and present results with scientific justification.

List of Experiments**I. Preparation of drug intermediates**

1. 1,3-pyrazole
2. 1,3-oxazole
3. Benzimidazole
4. Benzotriazole
5. 2,3-diphenyl quinoxaline
6. Phenothiazine
7. Barbiturate

II. Assay of drugs

1. Chlorpromazine
2. Phenobarbitone
3. Atropine
4. Ibuprofen
5. Aspirin
6. Furosemide

III. Determination of Partition coefficient for any two drugs

Recommended Books: (Latest edition)

1. Text Book of Practical Organic Chemistry – A.I. Vogel.
2. Raghu Prasad et al., Advanced Medicinal Chemistry – A Laboratory Guide, Pharma Med Press.
3. Burger's Medicinal Chemistry, Vol I to IV.
4. Introduction to Principles of Drug Design – Smith and Williams.
5. Remington's Pharmaceutical Sciences.
6. Martindale's The Extra Pharmacopoeia.
7. Organic Chemistry by L. Finar, Vol. II.
8. The Organic Chemistry of Drug Synthesis by Lednicer, Vol. 1–5.
9. Indian Pharmacopoeia.

PC407: PHYSICAL PHARMACEUTICS – II (Practical)**B. Pharm. II Year II Sem**

L	T	P	C
0	0	4	2

Scope: Physical Pharmaceutics–II laboratory provides practical exposure to the physicochemical properties and stability of pharmaceutical systems. The course enables students to perform experiments related to surface phenomena, rheology, reaction kinetics, dispersed systems, and colloidal formulations.

Course Objectives

- To perform experiments involving surface and interfacial phenomena, adsorption, and surfactant characterization relevant to pharmaceutical systems.
- To determine rheological properties, sedimentation behaviour, and viscosity of pharmaceutical preparations using appropriate laboratory techniques.
- To determine reaction rate constants and evaluate accelerated stability studies for assessing the stability of pharmaceutical products.
- To prepare and evaluate colloidal dispersions and apply physicochemical principles in the characterization of pharmaceutical systems.

Course Outcomes: Upon successful completion of the course, the student shall be able to

- CO 1.** Perform experiments related to surface and interfacial phenomena, including the determination of surface tension, HLB values, adsorption constants, and critical micellar concentration of surfactants.
- CO 2.** Determine viscosity and evaluate the sedimentation behavior of pharmaceutical systems using appropriate laboratory techniques.
- CO 3.** Determine first- and second-order reaction rate constants and interpret the significance of reaction kinetics in pharmaceutical systems.
- CO 4.** Evaluate the stability characteristics of pharmaceutical dosage forms through accelerated stability studies.
- CO 5.** Apply physicochemical principles to the preparation and evaluation of colloidal dispersions and characterization of pharmaceutical systems.

List of Experiments:

1. Determination of surface tension of given liquids by drop count and drop weight method.
2. Determination of HLB number of a surfactant by saponification method.
3. Determination of Freundlich and Langmuir constants using activated char coal.
4. Determination of critical micellar concentration of surfactants.
5. Determination of viscosity of liquid using Ostwald's viscometer.
6. Determination of sedimentation volume with effect of different suspending agent.
7. Determination of sedimentation volume with effect of different concentration of single suspending agent.
8. Determination of viscosity of semisolid by using Brookfield viscometer.
9. Determination of reaction rate constant first order.
10. Determination of reaction rate constant second order.
11. Accelerated stability studies.
12. Preparation and evaluation of colloids.

Recommended Books (Latest Edition):

1. Physical Pharmacy and Pharmaceutical Sciences by Alfred Martin.
2. Experimental Pharmaceutics by Eugene L. Parrott.
3. Tutorial Pharmacy by Cooper and Gunn.
4. Physical Pharmacy Practical Text, by Guru Prasad Mohanta and Prabal Kumar Manna.
5. Physical Pharmaceutics by Ramasamy C, and Manavalan R.

PC408: PHARMACOLOGY – I (Practical)**B. Pharm. II Year II Sem**

L	T	P	C
0	0	4	2

Scope: This course provides practical training in experimental pharmacology and laboratory techniques. It covers laboratory animal handling, drug administration, and pharmacological evaluation using simulated experiments. The course develops practical skills for preclinical pharmacology studies in accordance with CCSEA guidelines.

Course Objectives

- To demonstrate basic experimental pharmacology techniques and laboratory practices.
- To perform pharmacological experiments using simulated animal models.
- To evaluate the pharmacological effects of drugs using standard experimental methods.
- To apply CCSEA guidelines and ethical practices in experimental pharmacology.

Course Outcomes: Upon successful completion of this course, the student shall be able to

CO 1: Demonstrate laboratory instruments, animal handling and experimental pharmacology techniques.

CO 2: Perform drug administration and basic pharmacological evaluation using simulated models.

CO 3: Evaluate the effects of drugs on different physiological systems using standard experimental methods.

CO 4: Interpret the pharmacological activity of drugs using experimental animal models.

CO 5: Apply ethical principles and CCSEA guidelines in experimental pharmacology practices.

List of Experiments

1. Introduction to experimental pharmacology.
2. Commonly used instruments in experimental pharmacology.
3. Study of common laboratory animals.
4. Maintenance of laboratory animals as per CCSEA guidelines.
5. Common laboratory techniques. Blood withdrawal, serum and plasma separation, anesthetics and euthanasia used for animal studies.
6. Study of different routes of drugs administration in mice/rats.
7. Study of effect of hepatic microsomal enzyme inducers on the phenobarbitone sleeping time in mice.
8. Effect of drugs on ciliary motility of frog oesophagus
9. Effect of drugs on rabbit eye.
10. Effects of skeletal muscle relaxants using rota-rod apparatus.
11. Effect of drugs on locomotor activity using actophotometer.
12. Anticonvulsant effect of drugs by MES and PTZ method.
13. Study of stereotype and anti-catatonic activity of drugs on rats/mice.
14. Study of anxiolytic activity of drugs using rats/mice.
15. Study of local anesthetics by different methods

Note: All laboratory techniques and animal experiments are demonstrated by simulated experiments by software and videos

Recommended Books (Latest Edition)

1. Ghosh, M. N. Fundamentals of Experimental Pharmacology. Hilton & Company, Kolkata.
2. Kulkarni, S. K. Handbook of Experimental Pharmacology. Vallabh Prakashan.
3. Essentials of Experimental Pharmacology, General Concepts by Bothra Sunil

PS409: PHARMACOGNOSY AND PHYTOCHEMISTRY – I (Practical)**B. Pharm. II Year II Sem****L T P C**
0 0 4 2

Scope: This practical course provides hands-on training in the identification, evaluation, extraction, isolation, and analysis of crude drugs and their phytoconstituents. It develops practical skills in pharmacognostic techniques, chromatography, microscopy, and quality control of natural products.

Course Objectives

- To apply microscopic and quantitative evaluation techniques for the identification and assessment of crude drugs.
- To apply practical techniques for the extraction, isolation, identification, and analysis of phytoconstituents from medicinal plants.
- To analyze phytoconstituents using chromatographic techniques and physicochemical evaluation methods for quality control of natural products.
- To evaluate the quality and standardization of crude drugs, fixed oils, and traditional formulations using appropriate physicochemical and chemical methods.

Course Outcomes: Upon completion of the course, the student shall be able to

- CO 1.** Determine the quantitative microscopic parameters of crude drugs, including stomatal index, vein-islet number, palisade ratio, cell dimensions, and lycopodium spore count.
- CO 2.** Identify and isolate crude drugs and major phytoconstituents such as caffeine, diosgenin, atropine, and sennosides using morphological, histological, powder analysis, and practical isolation techniques.
- CO 3.** Apply paper chromatography and thin-layer chromatography (TLC) for the separation and identification of phytoconstituents.
- CO 4.** Analyze and evaluate the quality of crude drugs and fixed oils using appropriate physicochemical parameters and standard chemical tests.
- CO 5.** Determine and interpret the alcohol content of ayurvedic formulations such as asava and arista for quality assessment and standardization.

List of Experiments

1. Determination of stomatal number and index
2. Determination of vein islet number, vein islet termination and palisade ratio.
3. Determination of size of starch grains, calcium oxalate crystals by eye piece micrometer
4. Determination of length and width of phloem fibres of cinchona & cinnamon.
5. Determination of number of starch grains by lycopodium spore method
6. Morphology, histology and powder characteristics & extraction & detection of: Cinchona, cinnamon, senna, clove, ephedra, fennel and coriander.
7. Exercise involving isolation & detection of active principles
 - a. Caffeine - from tea dust.
 - b. Diosgenin from dioscorea.
 - c. Atropine from belladonna.
 - d. Sennosides from senna.
8. Separation of sugars by paper chromatography.
9. TLC of herbal extract.

10. Determination of acid value, ester value, saponification value and iodine lab of fixed oils mentioned in theory.
11. Determination of ash value
12. Analysis of crude drugs by chemical tests: (i) Tragacanth (ii) Acacia (iii) Agar (iv) Gelatin (v) starch (vi) Honey (vii) Castor oil (viii) Asafoetida (ix) Benzoin (x) Colophony (xi) Aloes (xii) Myrrh
13. Determination of alcohol content of asava and arista.

Recommended Books (Latest Edition)

1. Practical Pharmacognosy: C.K. Kokate, Purohit, Gokhale
2. Practical Pharmacognosy, T. E. Wallis, Pharmamed Press
3. Anatomy of Crude Drugs by M.A. Iyengar

VA400: GENDER SENSITISATION (8 HOURS)**B. Pharm. II Year II Sem**

L	T	P	C
1	0	0	0.5

Scope: This course introduces the concepts of gender equality and social inclusion. It covers gender issues, legal rights, and constitutional provisions. It develops values for equity, dignity, and responsible citizenship.

Course Objectives

- To understand the concepts of gender, equality, and social justice.
- To study gender issues and constitutional provisions for protecting rights.
- To create awareness of gender sensitization and women empowerment.
- To promote respect, inclusion, and ethical responsibility in society.

Course Outcomes: Upon successful completion of the course, the student shall be able to

CO 1. Explain the concepts of gender, equality, and gender sensitization.

CO 2. Describe the social, cultural, and legal issues related to gender.

CO 3. Explain constitutional provisions, laws, and policies promoting gender justice.

CO 4. Apply principles of gender equity and women empowerment in professional and social life.

CO 5. Demonstrate respect, inclusiveness, and ethical behaviour towards all individuals.

Unit – I

Understanding Gender Roles and Relations: Definition of Gender - Exploring Attitudes towards Gender - Transformation in Stereotypical Roles.

Unit – II

Socialization: Preparing for Womanhood - Growing up Male-Gender Roles and Just Relationships – Matrix - Missing Women-Sex Selection and its Consequences.

Unit – III

Gender & Labour and Gender-Based Violence: Housework- the Invisible Labor- “My Mother doesn’t Work.” “Share the Load.”-Unrecognized and Unaccounted work - Types of Gender-based Violence - Sexual Harassment - Domestic Violence.

Unit – IV

Gender and Culture: Gender Development Issues-Gender, Governance and Sustainable Development Goals (SDGs)

Unit - V

Gender and Electronic Media: Gender and Film - Gender and Advertisement- Electronic Media - Gender Sensitive Language.

Textbooks (Latest Edition)

“Towards a World of Equals: A Bilingual Textbook on Gender” written by A. Suneetha, Uma Bhrugubanda, Duggirala Vasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Tharu published by Telugu Akademi, Telangana Government.

VA401: Human Values and Professional Ethics**B. Pharm. II Year II Sem****L T P C****1 0 0 0.5**

Scope: This course introduces human values and professional ethics. It covers moral principles, ethical practices, and professional responsibilities. It develops ethical decision-making and responsible professional conduct.

Course Objectives

- To understand human values and ethical principles in personal and professional life.
- To study professional ethics and responsibilities in healthcare practice.
- To develop ethical decision-making and leadership qualities.
- To promote integrity, accountability, and social responsibility.

Course Outcomes: Upon successful completion of the course, the student shall be able to

CO 1. Explain the concepts of human values and professional ethics.

CO 2. Apply ethical principles in personal, academic, and professional practice.

CO 3. Demonstrate integrity, accountability, and social responsibility in decision-making.

CO 4. Analyze ethical issues and resolve professional dilemmas using ethical principles.

CO 5. Practice ethical and responsible behaviour in professional and community settings.

Unit – I

Human Values and Professional Ethics: Morals, Values, Ethics - Work Ethics - Service Learning - Respect For Others- Living Peacefully - Valuing Time.

Unit –II

Personality Development: Character- Self-Confidence - Empathy – Cooperation.

Unit –III

Two Models of Professionalism - Professional Etiquette - Engineering Ethics - Professional Codes and Code of Conduct of Institute of Engineers - Global issues in MNCs.

Unit –IV

Professional Responsibilities: Responsibility in Engineering and Engineering Standards - Ethical Standards Vs Professional Conduct - Zero Tolerance for Culpable Mistakes - Hazards and Risks.

Unit – V

Employee Rights: Respect for Authority - Conflicts of Interest - Professionals /Engineers as Managers, Advisors, Experts, Witnesses and Consultants - Moral Leadership Suggesting.

TEXTBOOKS (Latest Edition)

1. Gaur, R. R.; Sangal, R.; and Bagaria, G. P. Human Values and Professional Ethics. Excel Books.
2. George, S. B. Human Values and Professional Ethics. Vikas Publishing.

REFERENCE BOOKS (Latest Edition)

1. Chakraborty, S. K. and Chakraborty, D. Human Values and Ethics. Himalaya.
2. Govindarajan, M.; Natarajan, S.; and Senthil Kumar, V. S. Engineering Ethics (Includes Human Values). PHI Learning Pvt. Ltd., New Delhi – 110001.