SRK FOUNDATION
VIJAYAWADA

VIJAYA INSTITUTE OF PHARMACEUTICAL SCIENCES FOR WOMEN

Permitted by Govt. of A.P; Approved by AICTE, New Delhi
Pharmacy Council of India, New Delhi & Affiliated to JNTU Kakinada
ISO 9001:2015 Certified Institution

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Program: Bachelor of Pharmacy

Duration: 4 years

Programme Outcomes (PO):

PO Nos.	Program Objective	Program Outcome
PO1	**Pharmacy Knowledge**	Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.
PO2	**Planning Abilities**	Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.
PO3	**Problem analysis**	Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.
PO4	**Modern tool usage**	Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations
PO5	**Leadership skills**	Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.
PO6	**Professional Identity**	Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).
PO7	**Pharmaceutical Ethics**	Honor personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.
PO8	**Communication**	Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

PO9	**The Pharmacist and society**	Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.
PO10	**Environment and sustainability**	Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO11	**Life-long learning**	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis

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SEMESTER – I

COURSE OBJECTIVES & OUTCOMES

BP101T. HUMAN ANATOMY AND PHYSIOLOGY-I (Theory)

OBJECTIVE:

1. To study the structure and functions of various systems of human body.
2. Learn the basic anatomical terminology.
3. Locate and identify tissues and organs of various systems.

OUTCOMES:

Upon completion of the course student will be able to

1. Get knowledge on different cells and tissues involved in the formation of organs and their different functions in human body.
2. Get knowledge on different parts, composition and its functions of bone, skeletal system and joints.
3. Get knowledge on cellular composition and non-cellular compositions of Blood and how it is involved in oxygen and carbon dioxide transport, maintenance of B.P, defence immunity and excretion.
4. Have knowledge on parts and functions of nervous system and special senses, their coordination in regulation of homeostatic mechanisms and imbalances.
5. Have knowledge on external and internal characters of Heart and blood vessels maintain BP, transport gases, nutrients and waste products. Their function is essential to sustain life.

BP107P. HUMAN ANATOMY AND PHYSIOLOGY-I (Practical)

Upon completion of the course student will be able to

1. Get knowledge on instruments used in experimental Human Anatomy & Physiology and learn to operate and use them.
2. Know differences like structural composition and functional nature of different living cells and tissues using reference slides.
3. Know location, structural features of skeletal system in the body.
4. Know principles and procedures involved in haematology and hemocytometry.
5. Learn to perform WBC, RBC and PLT using haemocytometer.
6. Gain knowledge about haematological parameters and its physiological importance to diagnose disease in the body.

BP102T. PHARMACEUTICAL ANALYSIS -I (Theory)

OBJECTIVE: The main objective of the course is to study the fundamental principles of volumetric, electrochemical analysis of drugs and carry out the estimation of different category drugs and their application in Quality control of pharmaceuticals.

OUTCOMES:

Upon completion of the course student will be able to

1. Discuss the fundamentals of volumetric analysis and illustrate the sources of errors in analytical techniques methods to minimize them, use different methods to express concentration.
2. Employ different theories (Indicator theory, Law of mass action, Henderson Hassel Bach equation) in acid base titration and distinguish from Non aqueous titration.
3. Demonstrate adequate knowledge on basic principles and techniques in complexometric and precipitation titrations. Understand and explain the difference between precipitation and gravimetric analysis.
4. Clarify different terms and principles of Oxidation and reduction reactions.
5. Well acquainted with principles of electro chemical methods of analysis.

BP108P. PHARMACEUTICAL ANALYSIS (Practical)

Upon completion of the course student will be able to

1. Perform limit tests for chlorides, sulphates, Iron, Arsenic.
2. Generalize the apparatus and glassware used in analytical chemistry.
3. Prepare and standardize primary and secondary standard solutions of various Normality and Molarity.
4. Articulate the principle, Reaction conditions and factor calculation for data analysis for various volumetric methods of analysis and application of pharmacopoeial purity.
5. Determine the normality by Electrochemical methods of analysis.

BP103T. PHARMACEUTICS- I (Theory)

OBJECTIVE: This course is designed to impart a fundamental knowledge on the preparatory pharmacy with arts and science of preparing the different conventional dosage forms.

OUTCOMES:

Upon completion of the course student will be able to

1. Know the history of profession of pharmacy, basic knowledge on various pharmacopoeias and career in pharmacy. Understand the professional way of handling the prescription, factors influencing the dose of drug and dose calculations.
2. Understand the basics regarding formulation of powders & solubility enhancement techniques for liquid dosage forms and will be thorough in doing pharmaceutical calculations.
3. Understand about the preparation of various conventional dosage forms like monophasic and biphasic liquid dosage forms.
4. Know the preparation of suppositories and understand various pharmaceutical incompatibilities.

5. Understand the preparation of various semisolid dosage forms and their evaluations.

BP109P. PHARMACEUTICS- I (Practical)

Upon completion of the course student will be able to

1. Gain skill in the operation of common pharmaceutical measuring, weighing and compounding devices.
2. Perform dispensing of mixtures, solutions, emulsions, creams and ointments
3. Perform dispensing of powders, pastes, lotions, liniments, inhalations and paints.
4. Identify incompatibilities in prescription and dispensing of such prescriptions.
5. Perform dispensing procedures involving pharmaceutical calculations.
6. Perform dosage calculations for pediatric and geriatric patients.
7. Dispense the prescriptions involving adjustment of tonicity.

BP104T. PHARMACEUTICAL INORGANIC CHEMISTRY (Theory)

OBJECTIVE: This subject deals with the monographs of inorganic drugs and pharmaceuticals.

OUTCOMES:

Upon completion of the course student will be able to

1. Understand the history of pharmacopoeia, sources and types of impurities and describe the official methods of control like limit tests.
2. Acquires knowledge on acids, bases, buffers, buffered isotonic solutions, methods of adjusting isotonicity and major extra and intra cellular electrolytes and know the monographs of dental products.
3. Classify the gastrointestinal agents and described the methods of preparation, properties, storage, assay and uses with marketed formulations of inorganic compounds in gastrointestinal agents.
4. Classify the miscellaneous compounds and know the monographs of inorganic compounds in each category.
5. To understand the radioactivity and study of different radioisotopes, storage, precautions and applications of radioactive substances.

BP110P. PHARMACEUTICAL INORGANIC CHEMISTRY (Practical)

Upon completion of the course student will be able to

1. Identify impurities from pharmaceutical substances
2. Apply the skills of qualitative analysis of unknown samples
3. Compute, quantitate and record purity of inorganic pharmaceuticals
4. Develop mathematical approach to calculate quantitative parameters for synthesized compounds.

BP105T. COMMUNICATION SKILLS (Theory)

OBJECTIVE: This course will prepare the young pharmacy student to interact effectively with doctors, nurses, dentists, physiotherapists and other health workers. At the end of this course the student will get the soft skills set to work cohesively with the team as a team player and will add value to the pharmaceutical business.

OUTCOMES:

Upon completion of the course student will be able to

1. Understand and apply knowledge of human communication and language processes as they occur across various contexts, e.g., interpersonal, intrapersonal, small group, organizational, media, gender, family, intercultural communication, technologically mediated communication.
2. Find, use, and evaluate primary academic writing associated with the communication discipline
3. Develop knowledge, skills, and job-ready skills in Pharmaceutical industry that facilitate their ability to work collaboratively with others.
4. Enhance communication competencies such as managing conflict, understanding small group processes, active listening, appropriate self-disclosure, and other work place norms.
5. Learn interview skills.

BP111P. COMMUNICATION SKILLS (Practical)

Upon completion of the course student will be able to

1. Use contextual expressions in English and sounds in English language
2. Improve communication skills develop the knowledge of letters and sounds in English language
3. Improve listening skills
4. Improve and use the language skills
5. Improve Writing Skills
6. Apply listening, reading and writing skills while facing Interviews
7. Make use of the various group discussions conducted in regular lab sessions. Apply the skills of making presentations in real life

BP106RBT. REMEDIAL BIOLOGY (Theory)

OBJECTIVE: To learn and understand the components of living world, structure and functional system of plant and animal kingdom.

OUTCOMES:

Upon completion of the course student will be able to

1. Know the anatomical Principles followed by scientists for classification of five kingdom animals and its salient features.
2. Get knowledge on different parts of plants and its morphological and anatomical characters and its importance.
3. Know the basic components of human anatomy & physiology of prescribed systems.

4. Know the basic components in plant anatomy & physiology.
5. Know the plant growth and its regulation.
6. Know the basic structural and functional organization of living organism.

BP112RBP. REMEDIAL BIOLOGY (Practical)

Upon completion of the course student will be able to

1. Get knowledge on instruments used in experimental biology and its operation.
2. Know the Principles and procedures involved in staining techniques for the preparation of slide.
3. Grasp knowledge on different cellular composition and its importance in living organism.
4. Getting knowledge about morphological features and modified morphological features and its importance of different parts of plant.
5. Know about anatomical features and physiological features with reference to human by simulator model.
6. Grasp knowledge on different cellular composition of different parts of plant.
7. Get an overview on different types of blood grouping and its importance.
8. Know comparison of various respiratory physiological parameters and its importance for diagnosis of disease.

BP106RMT. REMEDIAL MATHEMATICS (Theory)

OBJECTIVE:

This is an introductory course in mathematics. This subject deals with the introduction to Partial fraction, Logarithm, matrices and Determinant, Analytical geometry, Calculus, differential equation and Laplace transform.

OUTCOMES:

Upon completion of the course student will be able to

1. Know Basic mathematical operations
2. Know trigonometry mostly used in any sciences.
3. Draw lines, finding the equations for the purpose of relational study
4. Know Basic calculus which is used in analytical study of their life sciences applications
5. Know Some advanced calculations in Research or Project works
6. Enrich analytical skills in research study

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SEMESTER – II

BP201T. HUMAN ANATOMY AND PHYSIOLOGY-II (Theory)

OBJECTIVE: This subject is designed to impart fundamental knowledge on the structure and functions of the various systems of the human body. It also helps in understanding both homeostatic mechanisms. The subject provides the basic knowledge required to understand the various disciplines of pharmacy.

OUTCOMES:

Upon completion of the course student will be able to

1. Get knowledge on parts of Brain and neurons their involvement in sensory and motor functions including pain presumption, sleep wake cycle, cognitive skills, memory, behaviour, governance, Chemical Mediators like Acetyl choline, Serotonin, Dopamine, Noradrenaline, glutamic acid, Gaba involvement in transmission of impulse and disorders due to their changes.
2. Get knowledge on the digestion in various parts of GIT, enzymes and secretions involved – their functions.
3. Get knowledge on external and internal characters of respiratory system and external and internal respiration exchanging of gases, need for oxygen for metabolism of nutrients and generation of energy and is essential for life process, parts of urinary system and how urine is formed and various mechanisms involved in formation of urine.
4. Know external and internal characters of various endocrine glands and their functions like Growth, reproduction and metabolism depend on hormonal activity. Their imbalance leads to disorders and some of them cannot be rectified.
5. Get knowledge about parts of reproductive system and concept of male & female hormones, Characters, sex cell maturity, reproductive period, copulation and pregnancy, parturition, concept of pregnancy, menopause and their care.

BP207P. HUMAN ANATOMY AND PHYSIOLOGY-II (Practical)

Upon completion of the course student will be able to

1. Get knowledge on instruments used in experimental Physiology its operation.
2. Know differences like structural composition and functional nature of different living cells and tissues in skin and its role.
3. Know differences like structural composition and functional nature of different living cells and tissues in skin and its role.
4. Describe principles and procedures involved in sensory performances in the body.
5. Get knowledge on instrumental techniques used in experimental body temperature recording.
6. Know mechanisms involved in homeostasis for protection of body.

BP202T. PHARMACEUTICAL ORGANIC CHEMISTRY –I (Theory)

OBJECTIVE: The main objective of this course is to study the classification and nomenclature of simple organic compounds, structural isomerism, Important physical properties, reactions and methods of preparation of these compounds. It also emphasizes on mechanisms and orientation of reactions.

OUTCOMES:

Upon completion of the course student will be able to

1. Familiar with structure, nomenclature and isomerism of organic compounds.
2. Understand preparations, reactions, properties, orientation of reactions.
3. Understand nucleophilic substitutions, reactivity and stability of various organic compounds. It also account for various qualitative test for the identification of compounds.
4. Acknowledge the mechanisms for named reactions and structure, uses of pharmaceutically active compounds
5. Know brief information on preparation, properties, identification test for compounds.

BP208P. PHARMACEUTICAL ORGANIC CHEMISTRY –I (Practical)

Upon completion of the course student will be able to

1. Perform functional group analysis for organic compounds, melting point & boiling point determination.
2. Prepare suitable solid derivatives from organic compounds.
3. Perform molecular models.

BP203T. BIOCHEMISTRY (Theory)

OBJECTIVE: Biochemistry deals with complete understanding of the molecular levels of the chemical process associated with living cells. The scope of the subject is providing biochemical facts and the principles to understand metabolism of nutrient molecules in physiological and pathological conditions. It is also emphasizing on genetic organization of mammalian genome and hetero & autocatalytic functions of DNA.

OUTCOMES:

Upon completion of the course student will be able to

1. Understand the biological role of carbohydrates, lipids, nucleic acids, amino acids and proteins.
2. Know the concepts of carbohydrate metabolism, electron transport chain and oxidative phosphorylation.
3. Understand the Catabolism of lipids and amino acids and their related disorders
4. Gain knowledge on metabolism of nucleic acids and genetic information transfer
5. Have cognizance of enzyme kinetics, regulation of enzymes, therapeutic and diagnostic applications of enzymes

BP209P. BIOCHEMISTRY (Practical)

Upon completion of the course student will be able to

1. Perform qualitative analysis of carbohydrates and identification tests for proteins
2. Perform quantitative analysis of reducing sugars and proteins, and qualitative analysis of urine for abnormal constituents.
3. Determine blood creatinine and blood sugar
4. Determine serum total cholesterol
5. Analyse enzymatic hydrolysis of starch and can determine Salivary amylase activity
6. Determine the effect of temperature on salivary amylase activity and effect of substrate concentration on salivary amylase activity

BP204T. PATHOPHYSIOLOGY (THEORY)

OBJECTIVE: Pathophysiology is the study of causes of diseases and reactions of the body to such disease producing causes. This course is designed to impart a thorough knowledge of the relevant aspects of pathology of various conditions with reference to its pharmacological applications, and understanding of basic pathophysiological mechanisms. Hence it will not only help to study the syllabus of pathology, but also to get baseline knowledge required to practice medicine safely, confidently, rationally and effectively.

OUTCOMES:

Upon completion of the course student will be able to

1. Describe abnormal physiologic processes associated with common disease processes
2. Explore the most common etiologist and predisposing factors associated with human disease.
3. Identify the mechanisms that cause alterations in hormone secretion
4. Identify the classification of tumors and stages of cancer spread. Explain the difference between benign and malignant neoplasms
5. Describe the structure and function of cells and tissues, Cellular adaptations that result from environmental stresses.
6. Explain age-related differences in physiologic and patho physiologic processes and their clinical manifestations.

BP205T. COMPUTER APPLICATIONS IN PHARMACY (Theory)

OBJECTIVE:

This subject deals with the introduction Database, Database Management system, computer application in clinical studies and use of databases.

OUTCOMES:

Upon completion of the course student will be able to

1. Know various types of application of computers in pharmacy.
2. Know the various types of databases.
3. Know the various applications of databases in pharmacy
4. Familiar with overview of the computers and MS-office

5. Familiar with internet, WWW, browsing, HTML & e-mails.
6. Familiar with Database management

BP210P. COMPUTER APPLICATIONS IN PHARMACY (Practical)

Upon completion of the course student will be able to

1. Use MS Word, MS Access for designing questionnaire, form to record patient information, creating patient database, mailing labels, invoice table, and generate reports.
2. Create HTML web page, Export Tables, Queries, Forms and Reports to web pages and XML Pages
3. Know the various types of application of computers in pharmacy.
4. Know various types of databases and its applications in Pharmacy
5. Store the drug information in the database and how to retrieve the information of a drug

BP206T. ENVIRONMENTAL SCIENCES (Theory)

OBJECTIVE: Environmental Sciences is the scientific study of the environmental system and the status of its inherent or induced changes on organisms. It includes not only the study of physical and biological characters of the environment but also the social and cultural factors and the impact of man on environment.

OUTCOMES:

Upon completion of the course student will be able to

1. Understand basics of environment like ecology, ecosystem, food chain, food web and ecological pyramids.
2. Know the different natural sources and their conservation to save the environment.
3. Know the current problems of environment and how to solve them, Role of individual in conservation of environment and natural resources.
4. Understand the different factors of environmental pollution and measures to minimize it.
5. Aware about hazards of disposal wastes from hospitals and pharmaceutical industries.
6. Know the Disaster management in natural calamities.

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SEMESTER – III

BP301T. PHARMACEUTICAL ORGANIC CHEMISTRY –II (Theory)

OBJECTIVE: This subject deals with general methods of preparation and reactions of some organic compounds. Reactivity of organic compounds are also studied here. The syllabus emphasizes on mechanisms and orientation of reactions. Chemistry of fats and oils are also included in the syllabus.

OUTCOMES:

Upon completion of the course student will be able to

1. Brief information of orbital structure, resonance and reactions of benzene. It also includes detailed information on electrophilic substitution reactions.
2. Acquire knowledge on methods of preparations, reactions, acidity and test for the determination of phenols and amines.
3. Emphasise on rancidity of oils to determine the best oils.
4. Acknowledge synthesis, reactions of polynuclear hydrocarbons
5. Familiar with synthesis, reactions of cycloalkanes and it accounts for Bayer's strain & Mohr's theories.

BP305P. PHARMACEUTICAL ORGANIC CHEMISTRY –II (Practical)

Upon completion of the course student will be able to

1. Perform Recrystallisation & Steam distillation
2. Determine Acid value, Saponification value, Iodine value, as a result they can have knowledge on rancidity of oils and able to determine best oil.
3. Know preparation and synthesis of various pharmaceutically active organic compounds.

BP302T. PHYSICAL PHARMACEUTICS-I (Theory)

OBJECTIVE: Makes an attempt to understand properties of interfaces and to prepare the Buffers needed for pharmaceutical and sterile preparations with the complete knowledge of properties of states of matter. To attain the knowledge in types of solutions and formation of complexes and to classify the types of solutions and he applications and importance of solubility in Pharmaceutical preparations

OUTCOMES:

Upon completion of the course student will be able to

1. Understand and describe the principles, energetics of adsorption at liquid interfaces, to apply the electrical properties of interfaces and parameters relevance to pharmacy
2. Describe the relationship between activity co efficient and the buffer equations knowing the factors influencing the pH of the solution and Calculate solution's tonicity and tonicity adjustments
3. Illustrate the utility of super critical fluids and to appreciate the differences in the strength of the inter molecular forces and types of states of matter
4. Define saturated solution, solubility and unsaturated solutions with complete knowledge on partial miscibility
5. Classify the complexes and determining the methods of analysis of complexes

BP306P. PHYSICAL PHARMACEUTICS-I (Practical)

Upon completion of the course student will be able to

1. Determine the Surface tension of given liquids by drop count and drop weight method
2. Determine the HLB Number of Surfactants by Saponification method with the determination of freundlich and langmuir constants by using activated charcoal
3. Demonstrate the calibration of pH and determine the pH by half neutralization method
4. Determine the critical solution temperature by phenol water system
5. Determine the solubility of drug at room temperature with partition coefficient of benzoic acid and Iodine in different Solvent media
6. Determine the stability constant and donor acceptor ratio of PABA CAFFEINE and Cupric chloride Glycine

BP303T. PHARMACEUTICAL MICROBIOLOGY (Theory)

OBJECTIVE: The main objective of this course includes the study of different types of microorganisms and the role of scientists involved in the development of microbiology field. The study of growth pattern and environmental factors affecting the growth of microorganisms, replication, transcription and translation of the DNA and some important diseases caused by microorganisms.

OUTCOMES:

Upon completion of the course student will be able to

1. Acquire the knowledge about the different characteristic of prokaryotic, eukaryotic organism, the methods of identification, cultivation and preservation of organisms.
2. Describe the importance and implementation of sterilization and staining methods
3. Define the disinfectant, antiseptic, bacteriostatic, bactericidal and their factors influencing, evaluation methods. Describe the sterility testing of pharmaceutical products.
4. Demonstrate the design of aseptic area, laminar chamber and microbiological standardization of pharmaceuticals

5. Understand the microbial spoilage, contamination and their assessment. Cell culture technology and their application

BP307P. PHARMACEUTICAL MICROBIOLOGY (Practical)

Upon completion of the course student will be able to

1. Understand the different equipments and processing used in experimental microbiology
2. Determine the sterilization of glassware, preparation, sterilization of media, sub culturing of bacteria and fungus. Nutrient stabs and slants preparations
3. Perform the methods of Simple, Gram's staining and acid fast staining
4. Isolate the pure culture of micro-organisms by multiple streak plate technique
5. Determine the Microbiological assay of antibiotics by cup plate method, Motility determination by Hanging drop method
6. Analyse the sterility testing of pharmaceuticals, Bacteriological analysis of water and biochemical test.

BP304T. PHARMACEUTICAL ENGINEERING (Theory)

OBJECTIVE: This course is designed to impart a fundamental knowledge on the art and science of various unit operations used in pharmaceutical industry.

OUTCOMES:

Upon completion of the course student will be able to

1. Understand fluid flow concepts – Reynold's number, viscosity, measurements of flow and pressure, theories and mechanisms involved in size reduction and size separation.
2. Understand evaporation process, theory of evaporation- and Evaporators used in pharmaceutical industry, principles and theory of Heat flow transfer through Conductions, Convection and Radiation mechanisms and various distillation equipment's.
3. Understand procurement of information regarding drying, Moisture content, types of dryers -their construction, working and applications and able to understand the concept of mixing mechanisms of solid-solid, solid-liquid & liquid-liquid and about various mixing equipment's.
4. Understand theory and equipment's of filtration and centrifugation used in laboratory as well as in industrial scale.
5. Understand various types of materials used for plant construction and to appreciate preventive methods used for corrosion.

BP308P. PHARMACEUTICAL ENGINEERING (Practical)

Upon completion of the course student will be able to

1. Carryout particle size reduction by Ballmill and calculate efficiency, critical speed and optimum speed of Ball mill. Determine Reynold's number at different heads (low, medium, high) by using Reynold's apparatus. Handle sieve shaker apparatus and perform size separation for the given powders.
2. Determine various factors effecting on Rate of evaporation like surface area, viscosity and temperature. Demonstrate the simple distillation apparatus.
3. Determine moisture content and loss on drying.

4. Effect of temperature on Rate of drying.
5. Determine the Mixing index for solid-solid mixing.
6. Construction of drying curves (for calcium carbonate and starch).
7. Determination of humidity of air – i) From wet and dry bulb temperatures –use of Dew point method.
8. Study various factors effecting on rate of filtration like Surface area, Concentration and Thickness/ viscosity. Effect of Centrifugal force. Able to understand the effect of Filter aids on the rate of filtration

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SEMESTER – IV

BP401T. PHARMACEUTICAL ORGANIC CHEMISTRY –III (Theory)

OBJECTIVE: This subject imparts knowledge on stereo-chemical aspects of organic compounds and organic reactions, important named reactions, chemistry of important hetero cyclic compounds. It also emphasizes on medicinal and other uses of organic compounds.

OUTCOMES:

Upon completion of the course student will be able to

1. Acquire knowledge on Stereo-chemical aspects, dextrose and laevorotatory isomers.
2. Know detailed information on conformational isomers, stereo-selective and stereo-specific reactions
3. Familiar with synthesis, reactions, relative aromaticity of various heterocyclic compounds
4. Know synthesis, reactions and uses of heterocyclic compounds.
5. Brief information on mechanisms of various naming reactions.

BP402T. MEDICINAL CHEMISTRY – I (Theory)

OBJECTIVE: This subject is designed to impart fundamental knowledge on the structure, chemistry and therapeutic value of drugs. The subject emphasizes on structure activity relationships of drugs, importance of physicochemical properties and metabolism of drugs. The syllabus also emphasizes on chemical synthesis of important drugs under each class.

OUTCOMES:

Upon completion of the course student will be able to

1. Familiar with physic-chemical properties of drugs which influences biological action and drug metabolism pathways.
2. Familiar with chemistry along with pharmacological action of sympathomimetic drugs.
3. Know detailed information of metabolic pathways, therapeutic uses, mechanism of parasympathomimetic drugs.
4. Acknowledge mechanism of various drugs and SAR of drugs acting on CNS.
5. Get knowledge on chemistry and pharmacological actions of narcotics and anti-inflammatory drugs.

BP406P. MEDICINAL CHEMISTRY – I (Practical)

Upon completion of the course student will be able to

1. Prepare and synthesize various pharmaceutically active organic compounds.
2. Perform assay of drugs in order to determine the percentage purity.
3. Determine the partition coefficient of two drugs.

BP403T. PHYSICAL PHARMACEUTICS-II (Theory)

OBJECTIVE: The course deals with the various physical and physicochemical properties, and principals involved in dosage forms/formulations. Theory and practical components of the subject help the student to get a better insight into various areas of formulation research and development, and stability studies of pharmaceutical dosage forms.

OUTCOMES:

Upon completion of the course student will be able to

1. Annotate the principles of characteristics of powdered particles, classify and execute the different methods of particle size and its derived properties
2. Describe the settling and sedimentation theory and calculate sedimentation rates, define emulsions and its theories with formulation and stability
3. Define the concepts of colloids and its phases and types with the application of its properties like optical, kinetic and electrical
4. Demonstrate the concepts and factors influencing the viscosity of liquid and explain the Rheology of fluids
5. Calculate the expiration date of different dosage forms and describe the accelerated stability studies

BP407P. PHYSICAL PHARMACEUTICS-II (Practical)

Upon completion of the course student will be able to

1. Determine the Particle size and its distribution by using Optical microscopy and sieving methods
2. Determine and report the derived properties of powder and angle of repose
3. Explain and determine the Methods of sedimentation volume by using the different suspending agents and concentration of same suspending agents.
4. Demonstrate the concepts of viscosity and determine the viscosity of liquids and semi solids by using ostwald's viscometer and Brookfield viscometer
5. Determine the reaction rate constants by first and second order reactions by using graphical and substitution methods
6. Calculate the expiration date of different dosage forms and describe the accelerated stability studies

BP404T. PHARMACOLOGY-I (Theory)

OBJECTIVE: The main purpose of the subject is to understand what drugs do to the living organisms and how their effects can be applied to therapeutics. The subject covers the information about the drugs like, mechanism of action, physiological and biochemical effects (pharmacodynamics) as well as absorption, distribution, metabolism and excretion (pharmacokinetics) along with the adverse effects, clinical uses, interactions, doses, contraindications and routes of administration of different classes of drugs.

OUTCOMES:

Upon completion of the course student will be able to

1. Know basics of pharmacology like history, scope, general principles & Pharmacokinetics.
2. Know basic concepts of Pharmacology, mechanism of action of drugs, Receptors, drug discovery, preclinical & clinical trials.
3. Describe the basics of physiology and neurotransmitters and their roles. To gain knowledge on the drugs acting on ANS and muscle relaxants.
4. Understand the role of neurotransmitters in the CNS and pharmacology of various classes of drugs acting on CNS.
5. Impart knowledge on pathophysiology of various disease conditions of the CNS and pharmacology of drugs.

BP408P. PHARMACOLOGY-I (Practical)

Upon completion of the course student will be able to

1. Study of commonly used instruments in experimental pharmacology. Introduction to CPCSEA guidelines and OECD guidelines.
2. Know introduction to animal physiology with their biochemical reference values in various animal species.
3. Study of various routes of drug administration, anaesthetics agents used to anesthetize laboratory animals and techniques of Euthanasia
4. Study of physiological salt solutions, drug solution and use in various animal experiments.
5. Study of methods for collection of blood, body fluids and urine from experimental animals.

BP405T. PHARMACOGNOSY AND PHYTOCHEMISTRY I (Theory)

OBJECTIVE:

1. Study the medicinal uses of various naturally occurring drugs
2. Cultivation, collection, processing, storage and evaluation of crude drugs

OUTCOMES:

Upon completion of the course student will be able to

1. Familiar with Sources of Crude drugs, and their Quality control methods
2. Demonstrate the concepts and factors influencing Cultivation, Collection and Processing of Crude drugs
3. Explain the concepts of Plant Tissue Culture and its applications in Pharmacy
4. Acknowledge Alternative systems of Medicine
5. Get knowledge on Primary and Secondary metabolites

BP409P. PHARMACOGNOSY AND PHYTOCHEMISTRY I (Practical)

Upon completion of the course student will be able to

1. Perform Analysis of Crude drugs
2. Determine the Leaf Constants
3. Determine the Physical Parameters of Crude drugs

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SEMESTER - V

BP501T. MEDICINAL CHEMISTRY – II (Theory)

OBJECTIVE: This subject is designed to impart fundamental knowledge on the structure, chemistry and therapeutic value of drugs. The subject emphasizes on structure activity relationships of drugs, importance of physicochemical properties and metabolism of drugs. The syllabus also emphasizes on chemical synthesis of important drugs under each class.

OUTCOMES:

Upon completion of the course student will be able to

1. Understand the structure, MOA, SAR, synthesis, uses, and properties of Anti-histaminic agents.
2. Understand the structure, MOA, SAR, synthesis, uses, and properties of Gastric proton pump inhibitors.
3. Understand the structure, MOA, SAR, synthesis, uses, and properties of Antineoplastic agents.
4. Understand the structure, MOA and uses of Antibiotics and Plant products
5. Understand the structure, MOA, SAR, synthesis, uses, and properties of Anti-anginal (Calcium channel blockers, Diuretic and Antihypertensive agents)
6. Understand the structure, MOA, SAR, synthesis, uses, and properties of Anti-arrhythmic drugs (Anti-hyperlipidaemic agents, Coagulant & Anticoagulants and Drugs used in congestive heart failure)
7. Understand the structure, MOA, SAR, synthesis, uses, and properties of Drugs acting on endocrine system (Sex hormones, Drugs for erectile dysfunction, Oral contraceptives, Corticosteroids, Thyroid and Anti-thyroid drugs)
8. Understand the structure, MOA, SAR, synthesis, uses, and properties of Anti-diabetic agents.
9. Understand the structure, MOA, SAR, synthesis, uses, and properties of Local anaesthetics.

BP502T. INDUSTRIAL PHARMACY-I (Theory)

OBJECTIVE: Course enables the student to understand and appreciate the influence of pharmaceutical additives and various pharmaceutical dosage forms on the performance of the drug product.

OUTCOMES:

Upon completion of the course student will be able to

1. Learn about the science behind performing a Preformulation study before formulating a novel drug delivery system.
2. Understand the advanced drug delivery systems and their applications.
3. Understand the process of developing a formulation that is both safe and efficient for a patient.
4. Know very well about orally administered solid dosage forms (Tablets, capsules and pellets) and liquid dosage forms (syrups, elixirs, suspensions and emulsions) with standard protocols.
5. Know very well about novel drug delivery systems like parenteral, ophthalmic preparations and pharmaceutical aerosols with standard protocols.
6. Understand about basics and legal aspects of cosmeticology and various formulations like dentifrices, lipsticks, nail polish and baby products etc.
7. Understand how to select a suitable packaging option for the formulated dosage form to store it for extended periods.
8. Know about the standard stability testing procedures for formulated dosage forms for better storage conditions.

BP506P. INDUSTRIAL PHARMACY-I (Practical)

Upon completion of the course student will be able to

1. Perform pre-formulation studies for any selected API
2. Formulate and evaluate tablets using various granulation techniques like (wet, dry and direct compression) with selected APIs
3. Coat the formulated tablets with appropriate coating solutions.
4. Formulate and dispense hard gelatin capsules with selected APIs.
5. Formulate some parenteral formulations like calcium gluconate and ascorbic acid injection
6. Perform quality control tests for the selected marketed tablets
7. Formulate ophthalmic preparations like eye ointments and eye drops
8. Formulate and dispense creams like cold cream and vanishing cream
9. Perform quality control tests for various packaging materials according to IP.

BP503T. PHARMACOLOGY-II (Theory)

OBJECTIVE: This subject is intended to impart the fundamental knowledge on various aspects (classification, mechanism of action, therapeutic effects, clinical uses, side effects and contraindications) of drugs acting on different systems of body and in addition,emphasis on the basic concepts of bioassay.

OUTCOMES:

Upon completion of the course student will be able to

1. Familiarize with the pathophysiology of cardiovascular system and drugs acting on cardiovascular system.
2. Understand the pathophysiology of disease of Hematopoietic system and drugs acting on it.
3. Explain the pharmacology and rational use of drugs used for the treatment various endocrine disorders.
4. Have basic knowledge of autocoids.
5. Describe the principles, applications and types of bioassay, Evaluate the potency of unknown compound with reference to standard

BP507P. PHARMACOLOGY-II (Practical)

Upon completion of the course student will be able to

1. Know principles of bioassay, its types including advantages and disadvantages
2. Determine the potency of a substance on isolated tissues.
3. Explain the effect of drugs either alone or in combination on isolated frog's rectus abdominus muscle and frog's heart
4. Explain and perform matching point, bracketing and interpolation bioassay to find unknown concentration of Acetylcholine.
5. Demonstrate and discuss recording of effects of CNS acting drugs in rats/mice using Actophotometer and anti-epileptic activity using Convulsiometer with the help of software.

BP504T. PHARMACOGNOSY AND PHYTOCHEMISTRY II (Theory)

OBJECTIVE: The main purpose of subject is to impart the students the knowledge of how the secondary metabolites are produced in the crude drugs, how to isolate and identify and produce them industrially. Also, this subject involves the study of producing the plants and phytochemicals through plant tissue culture, drug interactions and basic principles of traditional system of medicine.

OUTCOMES:

Upon completion of the course student will be able to

1. Learns about biogenetic studies and significance in drug discovery\
2. Know Chemistry, sources, commercial applications of alkaloid drugs, volatile oil drugs, terpenoids, flavonoids, tannins, steroids, glycosides, resins
3. Know Isolation, identification and analysis of phytoconstituents by HPLC etc.
4. Understand Industrial production, estimation, and utilization of phytoconstituents
5. Use modern methods in extraction, isolation, identification, and purification such as electrophoresis, spectroscopy, chromatography

BP508P. PHARMACOGNOSY AND PHYTOCHEMISTRY II (Practical)

Upon completion of the course student will be able to

1. Learn and exercise techniques of Morphology, histology, powder characteristic, extraction, and detection by TLC or chemical tests of alkaloidal, glycosidal, volatile oil containing crude drug
2. Learn and exercise techniques involving isolation and detection by TLC or chemical tests of active principles alkaloids, glycosides, steroids
3. Learn and exercise Separation of sugars by paper chromatography
4. Learn and exercise TLC of herbal extract
5. Learn and exercise Distillation of volatile oils and detection of phytoconstituents by TLC
6. Learn and exercise Analysis of crude drugs-resins and glycosides by chemical tests

BP505T. PHARMACEUTICAL JURISPRUDENCE (Theory)

OBJECTIVE:

1. To understand the pharmaceutical legislation and implications in the development and marketing of pharmaceuticals.

2. To know different pharmaceutical acts, laws and rules.

3. To know the regulatory and administrative authorities, agencies governing manufacture and sale of pharmaceuticals.

OUTCOMES:

Upon completion of the course student will be able to

1. Understand the Drugs and Cosmetics Act 1940 and its rules 1945.
2. Understand about various schedules in the Drugs and Cosmetics Act and will have knowledge on various administrative bodies like DTAB, CDR, DCC etc.
3. Know about pharmacy act 1948, Medicinal and Toilet Preparation Act 1955 and Narcotic Drugs and Psychotropic Substances Act 1985 and rules
4. Know about Drugs and Magic Remedies Act and its rules, Prevention of Cruelty to Animals Act 1960 and about National Pharmaceutical Pricing Authority.

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SEMESTER - VI

BP601T. MEDICINAL CHEMISTRY – III (Theory)

OBJECTIVE: This subject is designed to impart fundamental knowledge on the structure, chemistry and therapeutic value of drugs. The subject emphasis on modern techniques of rational drug design like quantitative structure activity relationship (QSAR), Prodrug concept, combinatorial chemistry and Computer aided drug design (CADD). The subject also emphasizes on the chemistry, mechanism of action, metabolism, adverse effects, Structure Activity Relationships (SAR), therapeutic uses and synthesis of important drugs.

OUTCOMES:

Upon completion of the course student will be able to

1. Understand the importance of drug design and different techniques of drug design.
2. Understand the chemistry of drugs with respect to their biological activity of Antibiotics, Antitubercular drugs, Urinary tract anti-infective agents, Antiviral agents, Antifungal agents, Anti-protozoal Agents, Sulphonamides and Sulfones
3. Know the metabolism, adverse effects and therapeutic value of drugs
4. Know the importance of SAR of drugs.
5. Understand combinatorial chemistry

BP607T. MEDICINAL CHEMISTRY – III (Practical)

Upon completion of the course student will be able to

1. Synthesize the following drugs and intermediates Sulphanilamide
   - 7-Hydroxy, 4-methyl coumarin
   - Chlorobutanol
   - Triphenyl imidazole
   - Tolbutamide
   - Hexamine
2. Perform the assay of following drugs
   - Isonicotinic acid hydrazide
   - Chloroquine
   - Metronidazole
   - Dapsone
   - Chlorpheniramine maleate
   - Benzyl penicillin
3. Prepare medicinally important compounds or intermediates by Microwave irradiation technique

4. Determine physicochemical properties such as logP, clogP, MR, Molecular weight, Hydrogen bond donors and acceptors for class of drugs course content using drug design software Drug likeliness screening

BP602T. PHARMACOLOGY-III (Theory)

OBJECTIVE: This subject is intended to impart the fundamental knowledge on various aspects (classification, mechanism of action, therapeutic effects, clinical uses, side effects and contraindications) of drugs acting on respiratory and gastrointestinal system, infectious diseases, immuno-pharmacology and in addition, emphasis on the principles of toxicology and chrono pharmacology.

OUTCOMES:

Upon completion of the course student will be able to

1. Know drugs used in respiratory disorders and GIT disorders
2. learn in detail about various infectious agents, mechanisms, sensitivity, and resistance of different anti-infective.
3. Gain knowledge about different antiviral drugs pharmacology. antitubercular, antileprotics, use of MDT, and drug resistance
4. Study in detail about cancer pathophysiology and pharmacology of different anticancer drugs, Immunosupressants
5. Explain about toxicological studies and chrono pharmacology.

BP608P. PHARMACOLOGY-III (Practical)

Upon completion of the course student will be able to

1. Do dose calculation in pharmacological experiments
2. Perform antiallergic activity by mast cell stabilization assay
3. Study of anti-ulcer activity of a drug using pylorus ligand (SHAY) rat model and NSAIDS induced ulcer model.
4. Study of effect of drugs on gastrointestinal motility
5. Perform effect of agonist and antagonists on guinea pig ileum
6. Estimate serum biochemical parameters by using semi- autoanalyzer
7. Study of effect of saline purgative on frog intestine
8. Perform Insulin hypoglycaemic effect in rabbit
9. Perform test for pyrogens (rabbit method)
10. Determine acute oral toxicity (LD50) of a drug from a given data
11. Determine acute skin irritation / corrosion of a test substance
12. Determine acute eye irritation / corrosion

BP 603 T. HERBAL DRUG TECHNOLOGY (Theory)

OBJECTIVE: The objective of the study is to make the student understand the herbal raw materials used in herbal medicine, preparation of Ayurvedic dosage forms, GAP, nutraceuticals, herb-drug interactions, cosmetic formulations, herbal formulations, WHO and ICH guide lines, Patenting and Regulatory requirements

OUTCOMES:

Upon completion of the course student will be able to

1. Learn about identification, authentication, processing of herbal raw material
2. Know Indian systems of medicine, Ayurvedic formulation preparation
3. Know good agricultural practices
4. Study Nutraceutical market
5. Know herbal drug interactions
6. Know herbal cosmetic formulation preparation, excipients used
7. Prepare herbal formulations like syrups, mixtures, tablets
8. Know WHO&ICH guide lines for the evaluation of herbal drugs
9. Know patenting and regulatory requirements for herbal drugs

BP609P. HERBAL DRUG TECHNOLOGY (Practical)

Upon completion of the course student will be able to

1. Perform preliminary phytochemical screening of crude drugs
2. Learn and exercise techniques of Determination of alcohol content of asava and arista
3. Learn and exercise techniques of Evaluation of excipients of natural origin
4. Learn and exercise Cosmetic formulation (Preparation of dosage forms creams, lotions, shampoos) using standardized plant extract and evaluation as per pharmacopeial requirement
5. Learn and exercise Therapeutic formulation (preparation of dosage forms syrups, mixtures, tablets) using standardized plant extract and evaluation as per pharmacopeial requirement
6. Learn and exercise Monographanalysis of herbal drugs from recent Pharmacopeiasto standardize the herbal extract for the evaluation of identity and purity
7. Learn and exercise Determination of total aldehyde content in herbal drugs or crude drugs to standardize the herbal extract for the evaluation of identity and purity
8. Learn and exercise Determination of total phenol content in herbal drugs or crudedrugs to standardize the herbal extract for the evaluation of identity and purity
9. Learn and exercise Determination of total alkaloid content in herbal drugs or crude drugs to standardize the herbal extract for the evaluation of identity and purity

BP604T. BIOPHARMACEUTICS AND PHARMACOKINETICS (Theory)

OBJECTIVE: The main objective of this course is to impart a fundamental knowledge on basic principles involved in Biopharmaceutics and Pharmacokinetics. It is necessary for dose calculations, dose adjustments to suit individual patient need.

OUTCOMES:

Upon completion of the course student will be able to

1. Understand the concept of Biopharmaceutics, Pharmacokinetics and their applications– absorption mechanisms, factors, their application with examples and also acquire knowledge on the concept of drug distribution, protein binding – factors.

2. Acquire knowledge on the concept of elimination. Understand the concepts of bioavailability, bioequivalence, concepts, assessments, design, regulation, in vitro dissolution methods and in vitro-in vivo correlations.
3. Describe the different pharmacokinetic models. Evaluate and estimate drug changes in the body by using pharmacokinetic models.
4. Describe various multi compartment models and its significance.
5. Understand the concept of Linear and Non-Linear kinetics, mechanisms and method of assessments.

BP605T. PHARMACEUTICAL BIOTECHNOLOGY (Theory)

OBJECTIVE: The main objective of this course includes the study of different strains used for the preparation of pharmaceutical important products such as antibiotics, amino acids, vitamins, organic acids and study the complete information about the immunity like active, passive immunity, different types of cells involved in immune systems and immobilization of enzymes, and different blood products.

OUTCOMES:

Upon completion of the course student will be able to

1. Understand regarding the enzyme immobilization and their different methods, applications in pharma field and study of some important enzymes like penicillinase, hyaluronidase, amylase, protease, streptodornase
2. Describe the different types of pharmaceutical important products are prepared by r DNA technology like Human insulin, Intron, hepatitis vaccine and PCR.
3. Explain the Immunity like cell mediated and humoral immunity and different bacterial, viral vaccine products. Trained regarding methods of collection of blood products, plasma substitutes
4. Learn in detail about the Immune blotting techniques such as western blotting, southern blotting, ELISA, microbial transformation and steroidal transformation and their application in pharmaceutical field.
5. Acquire the knowledge in detail about the design of bioreactor, various methods of fermentation and production of penicillin vitamin B12 citric acid, glutamic acid and griseofulvin

BP606T PHARMACEUTICAL QUALITY ASSURANCE (Theory)

OBJECTIVE: This course deals with the various aspects of quality control and quality assurance aspects of pharmaceutical industries. It deals with the important aspects like cGMP, QC tests, documentation, quality certifications and regulatory.

OUTCOMES:

Upon completion of the course student will be able to

1. Learn about the Quality management systems, ICH guidelines, TQM, ISO, NABL
2. Understand the organisation personnel, premises, equipment, raw materials

3. Understand the process of Quality control of rubber, container closures, secondary packing materials
4. Know very well about study of complaints and documentation of pharmaceutical industry
5. Know about the evaluation and calibration of equipments, good warehousing practices

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SEMESTER – VII

PHR16411. PHARMACEUTICAL ANALYSIS -II (Theory)

OBJECTIVE:

1. To train students on calibration & validation of sophisticated instruments.
2. To give hands on training on these sophisticated instruments.
3. To train students on the application the aspects of these sophisticated instruments.
4. To give practice on solving spectral problems

OUTCOMES:

Upon completion of the course student will be able to

1. Learn about the determination of stability of drugs under development
2. Understand the advanced analytical methods for estimation of concentration of drug in plasma or biological fluids
3. Understand the process of estimation of concentration of specified impurities in pharmaceutical dosage forms
4. Know very well about UV-VISIBLE, NMR, IR, MASS, LC-MS, RAMAN, ESR, RIA, ELISA and Chromatography techniques
5. Understand how to select a suitable analytical method for qualitative and quantitative analysis of a chemical constituents

PHR16416. PHARMACEUTICAL ANALYSIS -II (Practical)

Upon completion of the course student will be able to

1. Learn about the determination of amino acids and sugars by using paper chromatography and TLC
2. Understand the advanced analytical methods like UV-Visible spectrophotometry for estimation of concentration of Paracetamol, Rifampicin, Riboflavin, Diclofenac
3. Understand the process of determination of λ max of paracetamol, Kmno4
4. Know very well about determination of concentration of glycerine by using Abbe's refractometer
5. Understand the working of HPLC, GC and Column chromatography

PHR16412. BIOPHARMACEUTICS & PHARMACOKINETICS (Theory)

OBJECTIVE: The main objective of this course is to impart a fundamental knowledge on basic principles involved in Biopharmaceutics and Pharmacokinetics. It is necessary for dose calculations, dose adjustments to suit individual patient need.

OUTCOMES:

Upon completion of the course student will be able to

1. Understand the concept of Biopharmaceutics, Pharmacokinetics and their applications– absorption mechanisms, factors, their application with examples.
2. Acquire knowledge on the concept of drug distribution, protein binding – factors.
3. Describe the different pharmacokinetic models. Evaluate and estimate drug changes in the body by using pharmacokinetic models.
4. Understand the concept of clearance. Linear and Non-Linear kinetics, mechanisms and method of assessments.
5. Learn about clinical pharmacokinetics and their significance, drug interactions – Adjustment of dose.

PHR16417. BIOPHARMACEUTICS & PHARMACOKINETICS (Practical)

Upon completion of the course student will be able to

1. Determine in vitro dissolution studies for various solid dosage forms like tablets, capsules etc
2. Determine in vitro diffusion studies for semisolid dosage forms like ointments, creams & gels
3. Estimate various pharmacokinetic parameters from the given plasma data
4. Estimate various pharmacokinetic parameters from the urinary excretion data
5. Determine in vitro & in vivo absorption studies

PHR16413. CHEMISTRY OF NATURAL PRODUCTS (Theory)

OBJECTIVE:

The objective of the study is to make the student understand the chemistry (classification, properties, structure elucidation, synthesis and uses) of carbohydrates, proteins, purines, lipids, terpenes, alkaloids, vitamins, steroids

OUTCOMES:

Upon completion of the course student will be able to

1. Learn about chemistry (Structural elucidation) of pharmaceutically important carbohydrates.
2. Learn structural analysis of proteins
3. Learn structure and synthesis of purine and xanthine derivatives (Structural elucidation), analysis of fats and oils
4. Learn chemistry of terpenes
5. Understand chemistry of alkaloids
6. Understand chemistry of vitamins and steroids

PHR16418. CHEMISTRY OF NATURAL PRODUCTS (Practical)

Upon completion of the course student will be able to

1. Learn and exercise Preparation of different alkaloidal testing reagents and identification by specific colour tests
2. Learn and exercise Chemical tests and TLC of alkaloids, steroidal and cardiac glycosides, flavonoids, tannins, steroids for identifying herbal extracts and natural products
3. Learn and exercise Extraction and isolation of natural products like caffeine, lactose, nicotine, piperine, lycopene, beta carotene
4. Learn and exercise Volatile oil production by steam distillation using Clevenger's apparatus (Peppermint oil from pudina leaves, eucalyptus oil from eucalyptus leaves)

PHR16414. HOSPITAL & COMMUNITY PHARMACY (Theory)

OBJECTIVE: In the changing scenario of pharmacy practice in India, for successful practice of Hospital Pharmacy, the students are required to learn various skills like drug distribution, drug information, and therapeutic drug monitoring for improved patient care. In community pharmacy, students will be learning various skills such as dispensing of drugs, responding to minor ailments by providing suitable safe medication, patient counselling for improved patient care in the community set up.

OUTCOMES:

Upon completion of the course student will be able to

1. Know about the organization of a hospital, pharmacy, drug store management, inventory control, about the therapeutic committee and its responsibilities.
2. Well versed about various drug distribution systems & would explain briefly the methods followed in dispensing drugs to outpatient & in-patient. Provide unbiased drug information to the doctors.
3. Know in detail about computerized service for drug information, medication errors, patient medication profile & drug interaction/ adverse drug reaction.
4. Learn in detail about roles and responsibilities of Community Pharmacy and pharmacist.
5. Understand communication skills and its importance in community pharmacies. Students would have understood about patients through counselling &provide health screening services to public
6. Identify symptoms of minor ailments and provide appropriate medication.

PHR16415. PHARMACEUTICAL JURISPRUDENCE (Theory)

OBJECTIVE:

1. To understand the pharmaceutical legislation and implications in the development and marketing of pharmaceuticals.

2. To know different pharmaceutical acts, laws and rules.

3. To know the regulatory and administrative authorities, agencies governing manufacture and sale of pharmaceuticals.

OUTCOMES:

Upon completion of the course student will be able to

1. Describe professional ethics
2. Define the various concepts of the pharmaceutical legislations in India.
3. Detail the Drug and Cosmetic act and rules.
4. Describe the various concepts of Drug policy, DPCO, Patent and Designing act.
5. Define the labelling requirements and packaging guidelines for Drugs and Cosmetics.
6. Identify the concepts of Dangerous Drugs Act, Pharmacy Act and Excise duties Act

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SEMESTER – VIII

PHR16421. BIOASSAYS & TOXICOLOGY (Theory)

OBJECTIVE: Bioassays are important in **toxicology**, which is the 'study of toxic substances and their effect on organisms and the environment', and are used in assessing acute and chronic **toxicity**.

OUTCOMES:

Upon completion of the course student will be able to

1. Get knowledge on bioassays and its applications, its importance and need for drug discovery.
2. Know the Principles and procedures involved in bioassays and their limitations of specific compounds.
3. Grasp knowledge on scope, principles, Applications and mechanisms and risk assessment involved in toxicology.
4. Getting an overview on acute, sub acute and chronic toxicity studies Carcinogenicity and chemical carcinogenesis in humans.
5. Have knowledge on toxic responses of essential organs, poisoning and its treatment strategies.
6. Knowledge about intoxication produced by various toxicants.

PHR16425. BIOASSAYS & TOXICOLOGY (Practical)

Upon completion of the course student will be able to

1. Get knowledge on biological standardization of unknown drugs, its importance and need for drug discovery.
2. Get knowledge on different types of known drugs and their effect on suitable tissues.
3. Know the Principles and procedures involved in bioassays and their limitations of specific compounds.
4. Find out the potency of unknown concentration present in biological sample using different methods of bioassays.
5. Perform acute and sub acute toxicity studies using suitable experimental animal model.
6. Have knowledge on toxic responses of essential organs due to administration of drugs.

PHR16422. CLINICAL PHARMACY, THERAPEUTICS & PHARMACO VIGILANCE (Theory)

Upon completion of the course student will be able to

1. Understand several concepts of essential drug list, Rational drug therapy, medication errors and patient drug compliance.

2. Understand the concept of Pharmacoeconomics, Pharmacoepidemiology, Therapeutic drug monitoring and Total Parental Nutrition.
3. Describe the Etiopathogenesis of selected diseases states and rationale for drug therapy
4. Discuss the various methods involved in the diagnosis of selected disease state
5. Interpret and analyse the selected laboratory results of specific disease states
6. Describe the therapeutic approach to manage the selected diseases
7. Understand different classification, mechanism and susceptibility of Adverse Drug Reaction
8. Helps to understand importance of Pharmacovigilance role in clinical practice.
9. Understand dictionaries, coding and terminologies used in pharmacovigilance

PHR16423. CONTROLLED RELEASE & NOVEL DRUG DELIVERY SYSTEMS (Theory)

Upon completion of the course student will be able to

1. Understand the process of developing a formulation that is both safe and efficient for a patient.
2. Know the various novel pharmaceutical dosage forms and their manufacturing techniques.
3. Understand the basic principles and process involved in designing a controlled release dosage form and their various evaluations.
4. Understand about various novel drug delivery systems like osmotic based, ion exchange, pH independent, diffusion controlled, dissolution controlled and altered density.
5. Understand about the basic science behind transdermal drug delivery system and its evaluations
6. Understand about basics of multi-particulate drug delivery systems including the designing and their evaluations
7. Understand about various targeted drug delivery systems like liposomes, nanoparticles, solid lipid nanoparticles and released erythrocytes with standard protocols.
8. Understand about the polymer science including different types, properties and their uses.
9. Understand about designing and evaluation of hydrogels.

PHR16424. QUALITY ASSURANCE, GMP, GLP (Theory)

OBJECTIVE:

1. To understand the role of quality assurance in pharmaceutical industry.

2. To know the cGMP requirements in various countries.

3. To understand the concept of Good Laboratory Practice.

OUTCOMES:

Upon completion of the course student will be able to

1. Understand the importance of quality in pharmaceutical products and are explored into importance of Good practices such as GMP, GLP etc.
2. Understand organization layout, personnel responsibilities, maintenance of hygiene and sanitation in the plant, environmental control and maintaining sterile areas.

3. Understand about the selection, purchase specifications of raw materials and equipments.
4. Understand various manufacturing documents like master formula, batch formula records, standard operating procedures, quality audits of manufacturing processes and in process quality control on various dosage forms.
5. Understand about the responsibilities of good laboratory practices maintaining protocols for non-clinical testing, how to maintain animal house, storing of data and records and audits of quality control facilities
6. Understand handling of returned goods, Complaints and recalls, evaluation complaints, recall procedures, related records and documents.

PHR16426. SEMINAR

Upon completion of the course student will be able to

1. Improve Oral and written communication skills.
2. Explore an appreciation of the self in relation to its larger diverse social and academic contexts.
3. Understand and discuss current, real-world issues

PHR16427. Project Work

Upon completion of the course student will be able to

1. Generate the topic for the project and Collect the information from the relevant sources
2. Assemble the information into a more realistic draft ethically and conclude the contents.
3. Prepare the presentation and explain outcome of their project along with further scope for research. This develops their oratory and leadership skills.

PHR16428. Comprehensive Viva voce

Upon completion of the course student will be able to

1. This will test the student's learning and understanding during the course of their programme.
2. In doing so, the main objective of this course is to prepare the students to face interview both at the academic and the industrial sector.