Course Learning Outcomes (CLO's)

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Vision

To be a leading provider of pharmaceutical education and research, creating a positive impact on society.

Mission

To create an environment where students learn to think critically and develop the skills necessary to become successful professionals in the pharmaceutical industry.

Objectives

1. *To create a learning environment that encourages creative and critical thinking, collaboration, and the application of knowledge and skills to real-world settings.*
2. *To promote a culture of learning and professional development that enables our students to be successful in their future careers.*
3. *To develop partnerships with industry and healthcare organizations to ensure our students have access to the latest developments in pharmacy practice, science, and research.*
4. *To promote the highest standards of professionalism among our students and faculty.*
5. *To engage in community outreach initiatives to serve the healthcare needs of our local and global community.*

Programme Learning Outcomes (PLO's)

- ***Pharmacy Knowledge****: Knowledge of pharmacy profession, including biological sciences, pharmaceutical sciences, behavioral, social, and administrative pharmacy sciences, and manufacturing processes.*
- ***Planning Abilities:*** *Ability to develop pharmaceutical care plans, therapeutic regimens, and medication therapy management plans.*
- ***Problem Analysis:*** *Ability to analyze drug-related problems and provide appropriate therapeutic interventions.*
- ***Modern Tool Usage:*** *Ability to use modern technology to access and analyze drug information, develop patient profiles, and create patient-specific medication records.*
- ***Leadership Skills:*** *Skills necessary to guide and lead others in patient care, problem solving, and decision making.*
- ***Professional Identity:*** *Knowledge of the pharmacist's role in health care and the importance of professional development.*
- ***Pharmaceutical Ethics:*** *Ability to recognize ethical considerations in the practice of pharmacy, including patient safety, informed consent, and drug diversion.*
- ***Communication:*** *Ability to effectively communicate with patients, health care professionals, and other stakeholders.*
- ***The Pharmacist and Society:*** *Knowledge of the pharmacist's role in public health, patient education, and health promotion.*
- ***Environment and Sustainability:*** *Knowledge of environmental health, sustainability, and the role of the pharmacist in promoting a healthy environment.*
- ***Life-long Learning:*** *Ability to critically evaluate scientific literature, participate in continuing education activities, and develop professional competencies.*

Course Learning Outcomes (CLO's)

1st Semester

1) Subject and Code: BP101T- Human Anatomy and Physiology I - Theory

Learning Outcomes:

1. Demonstrate an understanding of the structure and function of the human body at a cellular and tissue level of organization.
2. Analyze and evaluate the different systems of the human body, including the integumentary, skeletal, lymphatic, and cardiovascular systems.
3. Apply knowledge of human anatomy and physiology to real-life situations, such as understanding how certain diseases or injuries affect the body.

Knowledge and Understanding:

1. Explain the organization of the human body at the cellular and tissue levels, including the different types of cells and tissues.
2. Describe the structure and function of the integumentary, skeletal, lymphatic, and cardiovascular systems.
3. Discuss the role of the peripheral nervous system and special senses in maintaining homeostasis within the body.

Skills:

1. Use critical thinking to analyze and evaluate complex biological concepts related to human anatomy and physiology.
2. Conduct research and analyze scientific literature to deepen understanding of the subject matter.
3. Communicate effectively using scientific terminology to explain human anatomy and physiology concepts to others.

Values:

1. Develop an appreciation for the complexity and interconnectedness of the human body and its various systems.
2. Understand the importance of research in advancing knowledge and improving human health.
3. Cultivate an awareness of the ethical implications of medical research and healthcare practices.

2) Subject and Code: BP202T- Pharmaceutical Analysis I – Theory

Learning Outcomes:

1. Evaluate the various pharmaceutical analysis techniques for different types of compounds.
2. Analyze errors and uncertainties in pharmaceutical analysis.
3. Formulate suitable analytical methods for acid-base, non-aqueous, precipitation, complexometric and electrochemical titrations.

Knowledge and Understanding:

1. Understand the principles of different analytical techniques used in pharmaceutical analysis.
2. Comprehend the sources of errors and uncertainties in pharmaceutical analysis.
3. Recognize the characteristics and limitations of different analytical methods.

Skills:

1. Develop analytical skills to choose the appropriate analytical techniques for a given compound.
2. Acquire the ability to analyze data and interpret results accurately.
3. Enhance problem-solving skills by designing analytical methods for complex pharmaceutical compounds.

Values:

1. Foster a commitment to accuracy and precision in pharmaceutical analysis.
2. Encourage a sense of responsibility to adhere to ethical practices in pharmaceutical analysis.
3. Promote a respect for the importance of reliable data in the pharmaceutical industry.

3) Subject and Code: BP103T Pharmaceutics I – Theory

Learning Outcomes:

1. Analyze the historical background and development of the pharmacy profession and its impact on modern pharmacy.
2. Develop a comprehensive understanding of different dosage forms and their appropriate usage.
3. Formulate suitable prescriptions and posology of different pharmaceuticals.

Knowledge and Understanding:

1. Understand the evolution of pharmacy and its role in healthcare.
2. Comprehend the principles behind different dosage forms, their preparation, and their applications.
3. Recognize the importance of pharmaceutical calculations and their significance in the pharmacy profession.

Skills:

1. Develop the ability to prepare and dispense various dosage forms according to their requirements.
2. Acquire the skills to calculate pharmaceutical doses accurately and perform pharmaceutical conversions.
3. Enhance problem-solving skills by analyzing and resolving pharmaceutical incompatibilities.

Values:

1. Foster a commitment to providing safe and effective dosage forms for patients.
2. Encourage a sense of responsibility to adhere to ethical and legal practices in pharmacy.
3. Promote a respect for the importance of continuous learning and professional development in the field of pharmacy.

4) Subject and Code: BP104T Pharmaceutical Inorganic Chemistry – Theory

Learning Outcomes:

1. Analyze impurities in pharmaceutical substances and their impact on the quality of the final product.
2. Develop an understanding of the general methods of preparation for different pharmaceuticals.
3. Formulate the appropriate application of acids, bases, and buffers in different pharmaceutical preparations.

Knowledge and Understanding:

1. Understand the nature and sources of impurities in pharmaceutical substances and their impact on health.
2. Comprehend the principles and techniques of general methods of preparation for different pharmaceuticals.
3. Recognize the characteristics and applications of acids, bases, and buffers in pharmaceutical chemistry.

Skills:

1. Develop the skills to identify and control impurities in pharmaceutical substances.
2. Acquire the ability to prepare and evaluate different pharmaceuticals using general methods of preparation.
3. Enhance problem-solving skills by designing appropriate pharmaceutical preparations using acids, bases, and buffers.

Values:

1. Foster a commitment to producing high-quality and safe pharmaceutical substances for patients.
2. Encourage a sense of responsibility to adhere to ethical and legal practices in pharmaceutical chemistry.
3. Promote a respect for the importance of research and development in the field of pharmaceutical chemistry.

5) Subject and Code: BP105T Communication Skills – Theory

Learning Outcomes:

1. Evaluate the importance of communication skills in professional and personal settings.
2. Identify and overcome barriers to effective communication.
3. Analyze different communication perspectives and how they impact communication effectiveness.

Knowledge and Understanding:

1. Understand the elements of communication and their role in effective communication.
2. Comprehend the various communication styles and their impact on communication outcomes.
3. Recognize the importance of listening skills, effective written communication, and interview skills.

Skills:

1. Develop the skills to communicate effectively using different communication styles and elements.
2. Acquire the ability to listen actively and respond appropriately to different communication situations.
3. Enhance presentation and interview skills through effective writing and effective delivery.

Values:

1. Foster a commitment to active listening and effective communication for better understanding and relationship building.
2. Encourage a sense of responsibility to communicate ethically and with empathy and respect for diverse perspectives.
3. Promote a respect for continuous learning and improvement of communication skills for personal and professional growth.

6) Subject and Code: BP106RBT Remedial Biology

Learning Outcomes:

1. Explain the fundamental concepts and principles of biology related to living organisms.
2. Analyze the structure and function of the different organ systems in plants and animals.
3. Evaluate the importance of cellular processes in the growth and development of organisms.

Knowledge and Understanding:

1. Understand the living world and its diversity, including the classification of organisms and their characteristics.
2. Comprehend the structure and function of different organs and organ systems in plants and animals, including body fluids and circulation, digestion and absorption, breathing and respiration, excretory products and their elimination, neural control and coordination, chemical coordination and regulation, human reproduction, and plant mineral nutrition.
3. Recognize the role of cellular processes in plant growth and development, including photosynthesis, plant respiration, and the function of cells and tissues.

Skills:

1. Develop the skills to apply knowledge of biology concepts and principles to analyze different biological systems.
2. Acquire the ability to analyze and interpret experimental data related to biological systems.
3. Enhance the ability to conduct research and make informed decisions related to biology.

Values:

1. Foster an appreciation for the diversity of living organisms and their importance in the ecosystem.
2. Encourage ethical and responsible use of biology knowledge and principles for the benefit of society.
3. Promote a respect for continuous learning and improvement of biological knowledge and skills for personal and societal growth.

2nd Semester – 1st Year

7) Subject and Code: BP201T Human Anatomy and Physiology II – Theory

Learning Outcomes:

1. Evaluate the structure and function of the different organ systems in the human body.
2. Analyze the interdependence and coordination of the organ systems for the maintenance of homeostasis.
3. Synthesize the concepts of human anatomy and physiology to understand the mechanisms of health and disease.

Knowledge and Understanding:

1. Understand the structure and function of the nervous, digestive, respiratory, urinary, endocrine, reproductive systems in the human body.
2. Comprehend the principles of energy balance and its regulation.
3. Recognize the basic principles of genetics and their role in human health and disease.

Skills:

1. Develop the ability to analyze and interpret the functions of organ systems and their interdependence.
2. Acquire the skills to apply knowledge of human anatomy and physiology to analyze different physiological and pathological conditions.
3. Enhance the ability to conduct research and communicate scientific findings related to human anatomy and physiology.

Values:

1. Foster an appreciation for the complexity and interconnectedness of the human body and its organ systems.
2. Encourage ethical and responsible use of knowledge related to human anatomy and physiology for the benefit of individuals and society.
3. Promote a respect for continuous learning and advancement in the field of human anatomy and physiology for the improvement of healthcare and human well-being.

8) Subject and Code: BP202T Pharmaceutical Organic Chemistry I – Theory

Learning Outcomes:

1. Describe the classification, nomenclature, and isomerism of organic compounds.
2. Explain the properties and reactions of alkanes, alkenes, alkyl halides, alcohols, carbonyl compounds (aldehydes and ketones), and carboxylic acids.
3. Apply knowledge of organic chemistry to solve problems related to the properties and reactions of organic compounds.

Knowledge and Understanding:

1. Understanding the classification and nomenclature of organic compounds and the concept of isomerism.
2. Knowledge of the properties, structure, and reactivity of alkanes, alkenes, alkyl halides, alcohols, carbonyl compounds (aldehydes and ketones), and carboxylic acids.
3. Understanding the mechanism of various reactions of organic compounds.

Skills:

1. Ability to apply knowledge of organic chemistry to solve problems related to the properties and reactions of organic compounds.
2. Ability to identify and differentiate between different types of organic compounds based on their properties and structures.
3. Ability to perform basic laboratory techniques related to organic chemistry.

Values:

1. Appreciation for the importance of organic compounds in our daily lives and their applications in various fields.
2. Respect for the environment and the impact of organic compounds on it.
3. Responsibility towards handling organic compounds safely and following ethical practices in their use.

9) Subject and Code: BP203T Biochemistry - Theory

Learning Outcomes:

1. Identify the different types of biomolecules and their functions in biological systems
2. Analyze the metabolic pathways involved in carbohydrate, lipid, and amino acid metabolism
3. Evaluate the mechanisms involved in genetic information transfer and the role of enzymes in these processes

Knowledge and Understanding:

1. Understanding the structure and function of biomolecules including proteins, carbohydrates, lipids, and nucleic acids
2. Knowledge of metabolic pathways and their regulation including carbohydrate and lipid metabolism, amino acid metabolism, and biological oxidation
3. Understanding the role of enzymes in biochemical reactions and their classification based on their mode of action and specificity

Skills:

1. Analyzing and interpreting data from experiments related to biochemical reactions and metabolic pathways
2. Applying biochemical principles to solve problems related to the functioning of biological systems
3. Designing experiments to investigate biochemical processes and their regulation

Values:

1. Appreciation for the complexity and diversity of biological systems at the molecular level
2. Commitment to ethical practices in scientific research and experimentation
3. Awareness of the applications of biochemistry in various fields such as medicine, biotechnology, and agriculture

10) Subject and Code: BP204T Pathophysiology - Theory

Learning outcomes:

1. Evaluate the basic mechanisms of inflammation and repair and analyze the process of cell injury and adaptation.
2. Differentiate between various diseases affecting cardiovascular, respiratory, renal, endocrine, nervous, gastrointestinal, and skeletal systems.
3. Apply the principles of cancer and infectious diseases to diagnose and treat them.

Knowledge and understanding:

1. Understand the basic principles of cell injury and adaptation and the mechanism involved in inflammation and repair.
2. Comprehend the diseases affecting various systems including cardiovascular, respiratory, renal, endocrine, nervous, gastrointestinal, and skeletal.
3. Understand the principles of cancer and infectious diseases, and their diagnosis and treatment.

Skills:

1. Analyze and interpret the basic mechanisms of inflammation and repair and the process of cell injury and adaptation.
2. Apply the principles of pathophysiology to diagnose and treat various diseases affecting different systems.
3. Develop critical thinking skills to assess and evaluate the impact of pathophysiological changes on the human body.

Values:

1. Develop an appreciation for the importance of preventing and treating various diseases affecting different systems.
2. Promote empathy and compassion for patients suffering from pathophysiological changes.
3. Foster a sense of responsibility and accountability in healthcare professionals towards promoting good health and preventing diseases.

11) Subject and Code: BP205T Computer Applications in Pharmacy – Theory

Learning outcomes:

1. Apply the knowledge of number systems in solving problems related to computer applications in pharmacy.
2. Understand the concepts of information systems and software, and analyze their importance in pharmacy practices.
3. Evaluate the applications of computers and web technologies in pharmacy research and development.

Knowledge and understanding:

1. Understanding the basics of number systems, such as binary, decimal and hexadecimal systems.
2. Understanding the role of information systems and software in pharmacy practices.
3. Knowledge of bioinformatics and its applications in drug discovery.

Skills:

1. Use of computer software for data analysis and management in pharmacy research.
2. Use of web technologies to retrieve information related to pharmaceutical research.
3. Use of bioinformatics tools for analysis of molecular structures and drug development.

Values:

1. Appreciate the importance of computer applications in pharmacy research and development.
2. Develop an ethical approach towards handling sensitive information related to drug development.
3. Foster a culture of continuous learning and updating of skills in the field of computer applications in pharmacy.

12) Subject and Code: BP206T Environmental Sciences - Theory

Learning Outcomes:

1. Analyze the impact of human activities on the environment and suggest ways to mitigate them
2. Demonstrate a comprehensive understanding of natural resources and their management
3. Evaluate the impact of various forms of pollution and suggest ways to control or prevent them

Knowledge and Understanding:

1. The multidisciplinary nature of environmental studies and the interrelatedness of environmental components
2. The concept of natural resources, their types, and associated problems such as depletion and degradation
3. The various forms of environmental pollution, their sources, and effects on human health and the environment

Skills:

1. Ability to conduct research and analyze data related to environmental issues
2. Ability to design and implement effective solutions to environmental problems
3. Ability to communicate environmental concepts and issues effectively

Values:

1. Awareness and appreciation of the natural environment and its value
2. Responsible and ethical behavior towards the environment
3. Commitment to sustainable development and conservation of natural resources

3rd Semester – 2nd Year

13) Subject and Code: BP301T Pharmaceutical Organic Chemistry II - Theory

Learning Outcomes:

1. Analyze the structures and properties of various organic compounds, including benzene and its derivatives, through the application of relevant theories and concepts.
2. Evaluate the reactions and synthesis of polynuclear hydrocarbons and cyclo alkanes, and develop strategies for designing new organic molecules.
3. Apply the principles of pharmaceutical organic chemistry to identify, isolate, and purify biologically active compounds from natural sources.

Knowledge and Understanding:

1. Understanding of the electronic and steric effects of substituents on benzene and its derivatives, including phenols and aromatic amines.
2. Knowledge of the reactions and synthesis of aromatic acids and their importance in the pharmaceutical industry.
3. Understanding of the properties of fats and oils, and their relevance to human nutrition and health.

Skills:

1. Ability to apply spectroscopic and analytical techniques to characterize organic compounds, including NMR, IR, and UV-visible spectroscopy.
2. Skill in designing and executing multi-step organic synthesis, and in applying appropriate purification techniques.
3. Ability to critically evaluate scientific literature and communicate research findings effectively in written and oral formats.

Values:

1. Appreciation for the importance of organic chemistry in drug discovery and development, and the impact of pharmaceuticals on human health.
2. Commitment to ethical and sustainable practices in the production and use of organic chemicals.
3. Recognition of the role of scientific inquiry in advancing knowledge and improving quality of life.

14) Subject and Code: BP302T Physical Pharmaceutics I - Theory

Learning Outcomes:

1. Evaluate the physicochemical properties of drug molecules to understand their behavior in dosage forms.
2. Apply knowledge of surface and interfacial phenomena to drug delivery systems to enhance efficacy.
3. Analyze the impact of pH, buffers, and isotonic solutions on drug stability and performance.

Knowledge and Understanding:

1. Understanding of the solubility of drugs and the states and properties of matter.
2. Knowledge of physicochemical properties of drug molecules, including complexation and protein binding.
3. Familiarity with pH, buffers, and isotonic solutions and their role in pharmaceutical formulations.

Skills:

1. Ability to perform physicochemical characterization of drug molecules.
2. Skill in applying surface and interfacial phenomena to drug delivery systems.
3. Capability to formulate isotonic solutions and buffers for pharmaceutical use.

Values:

1. Attention to detail in understanding the properties of drugs and their impact on pharmaceutical formulations.
2. Commitment to developing drug delivery systems that optimize efficacy and safety.
3. Dedication to ethical and responsible use of pharmaceuticals.

15) Subject and Code: BP303T Pharmaceutical Microbiology– Theory

Learning Outcomes:

1. Demonstrate knowledge and understanding of the principles and importance of microbiology in the pharmaceutical industry.
2. Analyze and evaluate different sterilization and disinfection techniques used in the pharmaceutical industry.
3. Apply and interpret microbiological testing and assessment methods for pharmaceutical products.

Knowledge and Understanding:

1. Different types of microorganisms, their ultra-structure, classification, and nutritional requirements for growth.
2. Different sterilization and disinfection techniques, their principles, and their application in the pharmaceutical industry.
3. Microbiological testing and assessment methods for the evaluation of microbial contamination and spoilage, sterility testing of products, and antimicrobial agents used for preservation.

Skills:

1. Apply microbiological techniques to culture, isolate, and identify microorganisms using different staining techniques and biochemical tests.
2. Evaluate and compare the efficiency of different sterilization and disinfection methods.
3. Conduct microbiological testing and assessment of pharmaceutical products and interpret the results.

Values:

1. Appreciation for the role of microbiology in ensuring the safety and efficacy of pharmaceutical products.
2. Commitment to quality and accuracy in the application of microbiological techniques and testing methods.
3. Respect for the principles of sterility, disinfection, and preservation in the pharmaceutical industry.

16) Subject and Code: BP304T Pharmaceutical Engineering – Theory

Learning Outcomes:

1. Evaluate the different unit operations involved in pharmaceutical engineering for the design and optimization of manufacturing processes.
2. Apply the principles of engineering to develop pharmaceutical products and manufacturing systems.
3. Analyze the factors that influence the quality and efficiency of pharmaceutical manufacturing processes.

Knowledge and Understanding:

1. Understanding of the principles and applications of various unit operations, such as size reduction, heat transfer, distillation, and mixing, in pharmaceutical engineering.
2. Knowledge of the properties and behavior of fluids, solids, and gases under different process conditions and their impact on manufacturing processes.
3. Knowledge of materials used for pharmaceutical plant construction, including their properties, strengths, and weaknesses.

Skills:

1. Apply engineering principles to design and optimize pharmaceutical manufacturing processes, including scale-up and process validation.
2. Use appropriate techniques for the sizing and selection of equipment used in pharmaceutical manufacturing processes.
3. Evaluate and troubleshoot problems that occur during pharmaceutical manufacturing processes and implement corrective actions.

Values:

1. Appreciate the importance of safety and quality in pharmaceutical manufacturing processes.
2. Emphasize the need for responsible and ethical conduct in pharmaceutical engineering practices.
3. Recognize the role of teamwork and collaboration in developing successful pharmaceutical manufacturing processes.

4th Semester – 2nd Year

17) Subject and Code: BP401T Pharmaceutical Organic Chemistry III - Theory

Learning Outcomes:

1. Analyze the different types of stereo and optical isomerism, and apply the principles of stereochemistry in predicting the reactivity and properties of drug molecules.
2. Evaluate the methods used for the synthesis of heterocyclic compounds and understand the importance of these compounds in drug discovery.
3. Formulate strategies to design and synthesize novel molecules using various reactions of synthetic importance.

Knowledge and Understanding:

1. The principles of stereochemistry and its importance in the design of biologically active molecules.
2. The various methods of synthesis of heterocyclic compounds and their importance in medicinal chemistry.
3. The different types of reactions of synthetic importance and their application in the synthesis of complex molecules.

Skills:

1. Analytical skills in predicting the properties and reactivity of drug molecules based on stereochemistry.
2. Synthetic skills in designing and synthesizing novel molecules using various reactions of synthetic importance.
3. Critical thinking skills in evaluating the methods used for the synthesis of heterocyclic compounds and their importance in drug discovery.

Values:

1. Creativity in designing new molecules with improved properties for the benefit of patients and society.
2. Ethical and responsible conduct in the synthesis and testing of drug molecules.
3. Continuous learning and improvement to keep up with the ever-evolving field of medicinal chemistry.

18) Subject and Code: BP402T Medicinal Chemistry I - Theory

Learning Outcomes:

1. Analyze and evaluate the history and development of medicinal chemistry to understand its importance in the pharmaceutical industry.
2. Explain the physiological and chemical properties of drugs and how they relate to biological action for the design of new drugs.
3. Critically evaluate different classes of drugs acting on the autonomic and central nervous system to predict their therapeutic potential and side effects.

Knowledge and Understanding:

1. Understanding the historical development and significance of medicinal chemistry in drug discovery.
2. Knowledge of the chemical and biological properties of drugs, including metabolism and structure-activity relationships.
3. Knowledge of the different classes of drugs acting on the autonomic and central nervous systems and their mechanism of action, therapeutic potential, and side effects.

Skills:

1. Ability to evaluate and interpret research in medicinal chemistry and pharmacology to design new drugs.
2. Ability to analyze and interpret the mechanism of action of different classes of drugs and predict their therapeutic potential and side effects.
3. Ability to design and evaluate different synthetic pathways for the production of drugs.

Values:

1. Appreciation for the importance of medicinal chemistry in drug discovery and development.
2. Ethical and responsible conduct of research in the pharmaceutical industry.
3. Valuing collaboration and teamwork in drug discovery and development.

19) Subject and Code: BP403T Physical Pharmaceutics II - Theory

Learning Outcomes:

1. Evaluate the characteristics of colloidal dispersions and apply appropriate methods for their preparation.
2. Analyze the importance of drug stability and identify the factors that can affect it.
3. Evaluate the properties of different types of dispersions and their impact on drug delivery.

Knowledge and Understanding:

1. Understanding the characteristics of colloidal dispersions, including their preparation methods and application in pharmaceutical formulations.
2. Knowledge of rheology and its role in drug formulation and drug delivery.
3. Understanding drug stability and factors that can affect it, such as chemical degradation, temperature, and humidity.

Skills:

1. Ability to apply appropriate methods for the preparation of colloidal dispersions.
2. Ability to evaluate the physical and chemical stability of drugs and develop appropriate formulation strategies.
3. Ability to analyze the rheological properties of pharmaceutical formulations and adjust them for optimal drug delivery.

Values:

1. Attention to detail and accuracy in the preparation of pharmaceutical formulations.
2. Commitment to ensuring the safety and efficacy of drugs through careful evaluation of stability and formulation strategies.
3. Ethical responsibility to provide quality pharmaceutical formulations that meet regulatory standards and patient needs.

20) Subject and Code: BP404T Pharmacology I – Theory

Learning outcomes:

1. Demonstrate an understanding of the general principles of pharmacology and the mechanism of drug action.
2. Analyze and evaluate the pharmacological effects of drugs acting on the peripheral and central nervous system.
3. Develop critical thinking and problem-solving skills in identifying the appropriate use of drugs for treating various diseases.

Knowledge and understanding:

1. Knowledge of general pharmacology principles, including pharmacokinetics and pharmacodynamics.
2. Understanding the mechanism of drug action on the peripheral and central nervous system.
3. Knowledge of the therapeutic and adverse effects of drugs used for treating different diseases.

Skills:

1. Ability to analyze and evaluate the pharmacological effects of drugs acting on the peripheral and central nervous system.
2. Critical thinking and problem-solving skills in identifying the appropriate use of drugs for treating various diseases.
3. Effective communication skills in explaining the pharmacological effects of drugs to healthcare professionals and patients.

Values:

1. Appreciation for the importance of pharmacology in healthcare and the role of healthcare professionals in ensuring the safe and effective use of drugs.
2. Respect for patient autonomy and the right to informed consent in the use of drugs.
3. Ethical values in ensuring the appropriate use of drugs and avoiding drug misuse or abuse.

21) Subject and Code: BP405T - Pharmacognosy and Phytochemistry I - Theory

Learning Outcomes:

1. Explain the classification and quality control of drugs of natural origin.
2. Analyze the cultivation, collection, processing, and storage of drugs of natural origin.
3. Evaluate the role of pharmacognosy in various systems of medicine.

Knowledge and Understanding:

1. Understand the importance of quality control measures in drugs of natural origin.
2. Understand the different methods involved in the cultivation, collection, processing, and storage of drugs of natural origin.
3. Understand the role of pharmacognosy in various systems of medicine.

Skills:

1. Apply quality control methods for drugs of natural origin.
2. Evaluate the various methods of cultivation, collection, processing, and storage of drugs of natural origin.
3. Analyze the significance of pharmacognosy in various systems of medicine.

Values:

1. Appreciate the significance of quality control measures in the production of drugs of natural origin.
2. Emphasize the importance of sustainable and ethical practices in the cultivation and collection of medicinal plants.
3. Recognize the value of traditional medicine systems and the role of pharmacognosy in supporting their continued use.

5th Semester – 3rd Year

22) Subject and Code: BP501T Medicinal Chemistry II – Theory

Learning Outcomes:

1. Analyze the molecular structure and the mechanism of action of different classes of medicinal agents.
2. Evaluate the therapeutic applications, side effects and toxicity of different drugs for the treatment of specific diseases.
3. Apply problem-solving and critical thinking skills to design new and effective drugs for various medical conditions.

Knowledge and Understanding:

1. Understand the chemical structures and properties of different classes of drugs including anti-histaminic agents, anti-neoplastic agents, anti-anginal agents, vasodilators, diuretics, anti-arrhythmic drugs, and more.
2. Understand the mechanism of action of drugs and their interactions with biological targets.
3. Understand the pharmacokinetics, pharmacodynamics, and toxicological aspects of different drugs.

Skills:

1. Ability to evaluate and compare the efficacy and safety of different drugs for the treatment of specific medical conditions.
2. Ability to design and synthesize new drugs based on the structure-activity relationships of existing drugs.
3. Ability to critically analyze scientific literature and extract relevant information about drug development and discovery.

Values:

1. Appreciation for the importance of ethical considerations in the development and marketing of drugs.
2. Recognition of the significance of evidence-based medicine in the treatment of diseases.
3. Commitment to lifelong learning and continuous professional development in the field of medicinal chemistry.

23) Subject and Code: BP502T Industrial Pharmacy– Theory

Learning Outcomes:

1. Demonstrate an understanding of the principles and practices of preformulation studies in industrial pharmacy.
2. Analyze and evaluate the development and manufacturing processes of different pharmaceutical dosage forms such as tablets, capsules, pellets, and liquid orals.
3. Apply critical thinking skills to assess the quality control measures of parenteral products, ophthalmic preparations, and pharmaceutical aerosols.

Knowledge and Understanding:

1. Understand the physical and chemical properties of different packaging materials used in industrial pharmacy.
2. Evaluate the importance of formulation design and development in the production of safe and effective pharmaceutical products.
3. Identify the different excipients and active ingredients used in the manufacturing of various pharmaceutical dosage forms.

Skills:

1. Develop and design preformulation studies for various pharmaceutical products.
2. Apply scientific reasoning to identify and solve problems in the manufacturing processes of different dosage forms.
3. Demonstrate proficiency in quality control procedures to ensure the safety and efficacy of pharmaceutical products.

Values:

1. Appreciate the importance of ethical and responsible manufacturing practices in industrial pharmacy.
2. Demonstrate a commitment to continuous learning and development of knowledge and skills in the field of industrial pharmacy.
3. Understand the significance of teamwork and collaboration in the development and production of safe and effective pharmaceutical products.

24) Subject and Code: BP503T Pharmacology II – Theory

Learning Outcomes:

1. Demonstrate an understanding of the pharmacological mechanisms of drugs acting on the cardiovascular and urinary systems.
2. Analyze and evaluate the effects of autocoids and related drugs on the body's physiological processes.
3. Apply critical thinking skills to assess the pharmacology of drugs acting on the endocrine system and their therapeutic applications.

Knowledge and Understanding:

1. Understand the physiological and pathological processes of the cardiovascular, urinary, and endocrine systems.
2. Evaluate the pharmacological properties and mechanisms of drugs used in the treatment of cardiovascular, urinary, and endocrine disorders.
3. Identify the various bioassay techniques used to evaluate the potency and efficacy of different drugs.

Skills:

1. Develop and design experimental protocols for conducting bioassays.
2. Apply pharmacological principles to analyze and interpret experimental data obtained from bioassays.
3. Demonstrate proficiency in the use of pharmacological terminology and concepts to communicate scientific findings effectively.

Values:

1. Appreciate the importance of ethical and responsible conduct in the use of animals in bioassay experiments.
2. Demonstrate a commitment to maintaining and updating knowledge and skills in the field of pharmacology.
3. Understand the significance of collaboration and teamwork in the development and evaluation of effective pharmacological therapies.

25) Subject and Code: BP504T Pharmacognosy and Phytochemistry II– Theory

Learning Outcomes:

1. Demonstrate an understanding of the metabolic pathways in higher plants and the methods used to determine them.
2. Analyze and evaluate the pharmacological properties and therapeutic applications of alkaloids, phenylpropanoids, flavonoids, steroids, cardiac glycosides, triterpenoids, volatile oils, tannins, resins, glycosides, iridoids, terpenoids, and naphthoquinones.
3. Apply critical thinking skills to evaluate the safety and efficacy of natural products and their potential use in drug discovery.

Knowledge and Understanding:

1. Understand the chemical and biochemical properties of the different classes of phytochemicals found in plants.
2. Evaluate the methods used for isolation, identification, and purification of plant metabolites.
3. Identify the different chemical and biological tests used for the qualitative and quantitative analysis of plant metabolites.

Skills:

1. Develop and design experiments to isolate, identify, and quantify phytochemicals from plant sources.
2. Apply pharmacological and biochemical principles to evaluate the therapeutic potential of plant metabolites.
3. Demonstrate proficiency in the use of scientific tools and techniques for the analysis of plant metabolites.

Values:

1. Appreciate the importance of sustainable and ethical sourcing of plant materials for the development of natural products.
2. Demonstrate a commitment to the responsible and safe use of natural products in drug discovery and development.
3. Understand the significance of interdisciplinary collaboration in the field of pharmacognosy and phytochemistry.

26) Subject and Code: BP505T Pharmaceutical Jurisprudence – Theory

Learning Outcomes:

1. Understand the legal framework regulating the manufacture, distribution, and sale of drugs and cosmetics in India.
2. Analyze and evaluate the provisions of various pharmaceutical legislations and their impact on the pharmaceutical industry.
3. Apply critical thinking skills to evaluate the ethical and legal implications of pharmaceutical practices and policies.

Knowledge and Understanding:

1. Understand the Drugs and Cosmetics Act, 1940 and its rules 1945, the Pharmacy Act –1948, the Narcotic Drugs and Psychotropic Substances Act-1985 and Rules, and the Salient Features of Drugs and Magic Remedies Act and its rules.
2. Understand the role and functions of the National Pharmaceutical Pricing Authority.
3. Understand the principles and practices of pharmaceutical ethics, intellectual property rights, and the right to information.

Skills:

1. Analyze and interpret legal and ethical issues related to pharmaceuticals and their impact on society and the environment.
2. Demonstrate proficiency in the interpretation and application of pharmaceutical legislations, codes of ethics, and regulations.
3. Develop strategies for effective compliance with pharmaceutical laws, regulations, and ethical guidelines.

Values:

1. Appreciate the importance of upholding ethical standards and promoting responsible behavior in the pharmaceutical industry.
2. Demonstrate a commitment to promoting public health and safety through responsible pharmaceutical practices.
3. Recognize the need for transparency, accountability, and fairness in the pharmaceutical industry.

6th Semester – 3rd Year

27) Subject and Code: BP601T - Medicinal Chemistry III - Theory

Learning Outcomes:

1. Analyze the chemical structures and properties of different classes of antibiotics, antimalarials, anti-tubercular agents, and anti-infective agents for designing effective drugs.
2. Evaluate the different modes of action of antiviral and antifungal agents, and their potential for drug development.
3. Apply the principles of drug design to develop new and improved therapeutic agents.

Knowledge and Understanding:

1. Knowledge of the chemical structures, properties, and mechanisms of action of antibiotics, antimalarials, anti-tubercular agents, anti-infective agents, antiviral agents, and antifungal agents.
2. Understanding of the principles and techniques of drug design and combinatorial chemistry.
3. Knowledge of the structure-activity relationships (SAR) and pharmacokinetic properties of drugs.

Skills:

1. Ability to analyze and interpret the structure and properties of different classes of drugs.
2. Ability to design and develop new and effective therapeutic agents using drug design principles.
3. Ability to evaluate and compare the potential of different drugs for therapeutic use.

Values:

1. Appreciation for the importance of developing new and effective drugs to treat diseases and improve public health.
2. Commitment to ethical and responsible use of drugs in clinical practice.
3. Appreciation for the need to continuously improve and innovate drug discovery and development processes.

28) Subject and Code: BP602T Pharmacology III – Theory

Learning Outcomes:

1. Analyze the pharmacological properties of drugs acting on the respiratory system and gastrointestinal tract.
2. Evaluate the principles of chemotherapy and its use in treating diseases.
3. Apply the concepts of immunopharmacology and toxicology to the assessment and treatment of diseases.

Knowledge and Understanding:

1. Understanding of the pharmacology of drugs that act on the respiratory system, gastrointestinal tract, and immune system.
2. Knowledge of the principles of chemotherapy and the different drugs used in its application.
3. Understanding the effects of drugs and toxins on the human body and the principles of toxicology.

Skills:

1. Analytical skills in assessing the pharmacological properties of drugs and their effects on different body systems.
2. Critical thinking skills in evaluating the principles of chemotherapy and the best ways to use different drugs in treatment.
3. Communication skills in conveying complex pharmacological concepts and toxicological principles to patients and healthcare professionals.

Values:

1. Ethical conduct in the evaluation and administration of drugs to patients.
2. Appreciation for the value of scientific research in developing new drugs and treatments.
3. Commitment to providing safe and effective treatment options to patients.

29) Subject and Code: BP603T Herbal Drug Technology – Theory

Learning Outcomes:

1. Demonstrate an understanding of the role of herbs as raw materials and the importance of biodynamic agriculture in herbal drug technology.
2. Evaluate the potential of Indian Systems of Medicine and Nutraceuticals in the development of herbal drugs and their interactions with other drugs and food.
3. Analyze the regulatory and patenting requirements of herbal drugs and the regulatory issues that affect the herbal industry.

Knowledge and Understanding:

1. Knowledge of the process of sourcing and using herbs as raw materials in the production of herbal drugs and the principles of biodynamic agriculture.
2. Understanding of Indian Systems of Medicine and Nutraceuticals and their relevance to the development of herbal drugs, including knowledge of their interactions with other drugs and food.
3. Knowledge of the regulatory and patenting requirements of herbal drugs, and understanding of the regulatory issues affecting the herbal industry and Schedule T.

Skills:

1. Analytical skills to evaluate the potential of Indian Systems of Medicine and Nutraceuticals in the development of herbal drugs and their interactions with other drugs and food.
2. Research skills to evaluate the regulatory and patenting requirements of herbal drugs and the regulatory issues affecting the herbal industry.
3. Communication skills to effectively communicate the potential of herbal drugs to a variety of stakeholders, including regulators and the public.

Values:

1. Appreciation for the potential of natural products, such as herbs, in the development of drugs.
2. Respect for the principles of biodynamic agriculture and the sustainability of natural resources.
3. Commitment to upholding ethical and regulatory standards in the development and use of herbal drugs.

30) Subject and Code: BP604T - Biopharmaceutics and Pharmacokinetics – Theory

Learning Outcomes:

1. Understand the principles of biopharmaceutics and its application in drug delivery.
2. Describe the factors that affect drug absorption and elimination.
3. Analyze the concepts of bioavailability and bioequivalence and their importance in drug development.

Knowledge and Understanding:

1. Knowledge of the basic principles of biopharmaceutics and its role in drug delivery.
2. Understanding of the factors that influence drug absorption, distribution, metabolism, and excretion.
3. Knowledge of the concepts of bioavailability and bioequivalence and their relevance in clinical practice and drug development.

Skills:

1. Ability to design and interpret pharmacokinetic studies.
2. Analytical skills to evaluate the pharmacokinetic parameters of a drug.
3. Proficiency in performing pharmacokinetic calculations.

Values:

1. Importance of precision and accuracy in the analysis of pharmacokinetic data.
2. Appreciation of the role of biopharmaceutics and pharmacokinetics in drug development and clinical practice.
3. Commitment to ethical conduct in pharmacokinetic research and drug development.

31) Subject and Code: BP605T Pharmaceutical Biotechnology – Theory

Learning Outcomes:

1. Understand the basic principles and methods of biotechnology in pharmaceutical sciences.
2. Analyze the production and applications of various enzymes, biosensors, and genetic engineering in the pharmaceutical industry.
3. Evaluate the different types of immunity, immunoglobulins, and blood products used in medicine.

Knowledge and Understanding:

1. Knowledge of the principles and methods of enzyme immobilization and the application of biosensors in the pharmaceutical industry.
2. Understanding of the use of microbes in industry, the production of enzymes and the basic principles of genetic engineering.
3. Knowledge of the structure and function of immunoglobulins and MHC, as well as the preparation of vaccines and other immune products.

Skills:

1. Analyzing and evaluating the applications of biotechnology in the pharmaceutical industry.
2. Synthesizing information on the production of enzymes and vaccines.
3. Applying methods of fermentation and biotransformation in the production of pharmaceuticals.

Values:

1. Respect for the use of biotechnology in the production of pharmaceuticals that improve human health.
2. Appreciation of the importance of quality control and product stability in the manufacturing process.
3. Commitment to ethical standards and regulatory requirements in the production of pharmaceuticals.

32) Subject and Code: BP606T Quality Assurance –Theory

Learning Outcomes:

1. Analyze the importance of quality assurance and quality management in the pharmaceutical industry.
2. Evaluate the effectiveness of different quality control measures in ensuring product safety and compliance with regulatory guidelines.
3. Develop a quality by design (QbD) approach to pharmaceutical manufacturing.

Knowledge and Understanding:

1. Knowledge of Total Quality Management (TQM) concepts and principles.
2. Understanding of the International Conference on Harmonisation (ICH) guidelines and their application in the pharmaceutical industry.
3. Knowledge of ISO 9000 and ISO 14000 quality management standards.

Skills:

1. Ability to assess and evaluate the quality of raw materials and equipment used in pharmaceutical manufacturing.
2. Skill in maintaining and organizing pharmaceutical industry documents in compliance with regulatory requirements.
3. Ability to perform calibration and validation activities for equipment used in pharmaceutical manufacturing.

Values:

1. A commitment to quality and safety in pharmaceutical manufacturing practices.
2. An appreciation for the importance of compliance with regulatory guidelines in the pharmaceutical industry.
3. A dedication to continuous improvement and the implementation of best practices in pharmaceutical manufacturing.

7th Semester – 4th Year

33) Subject and Code: BP701T - Instrumental Methods of Analysis - Theory

Learning Outcomes:

1. Explain the basic principles of different instrumental methods of analysis such as UV Visible spectroscopy, Fluorimetry, IR spectroscopy, Flame Photometry, Atomic absorption spectroscopy, Nepheloturbidometry, Introduction to chromatography, Adsorption and partition column chromatography, Thin layer chromatography, Paper chromatography, Electrophoresis, Gas chromatography, High performance liquid chromatography (HPLC), Ion exchange chromatography, Gel chromatography, and Affinity chromatography.
2. Compare and contrast the different instrumental methods of analysis in terms of their strengths, weaknesses, and applications in different fields.
3. Evaluate the importance of instrumental methods of analysis in various scientific and industrial applications.

Knowledge and Understanding:

1. Identify the different instrumental methods of analysis and their applications in different fields.
2. Explain the basic principles of the different instrumental methods of analysis.
3. Describe the strengths and weaknesses of different instrumental methods of analysis and their applications in different fields.

Skills:

1. Analyze and interpret the data obtained from instrumental methods of analysis.
2. Apply the appropriate instrumental method of analysis for a given problem.
3. Develop a methodology for a given analytical problem using the appropriate instrumental method of analysis.

Values:

1. Appreciate the importance of accuracy and precision in analytical chemistry.
2. Foster a sense of curiosity and inquiry towards the study of instrumental methods of analysis.
3. Promote a responsible and ethical approach towards the use of instrumental methods of analysis in various fields.

34) Subject and Code: BP702T - Industrial Pharmacy II – Theory

Learning Outcomes:

1. Apply pilot plant scale up techniques to manufacture pharmaceutical products.
2. Analyze technology development and transfer methods in the pharmaceutical industry.
3. Evaluate the importance of regulatory affairs and the role of regulatory requirements in drug approval.

Knowledge and Understanding:

1. Explain the process of pilot plant scale up techniques for manufacturing pharmaceutical products.
2. Discuss the principles and methods of technology development and transfer in the pharmaceutical industry.
3. Identify the regulatory requirements for drug approval and the role of quality management systems in meeting these requirements.

Skills:

1. Demonstrate the ability to apply pilot plant scale up techniques to manufacture pharmaceutical products.
2. Use analytical skills to evaluate technology development and transfer methods in the pharmaceutical industry.
3. Develop critical thinking skills to assess and evaluate the effectiveness of regulatory affairs and requirements in drug approval.

Values:

1. Appreciation for the importance of adhering to regulatory requirements to ensure the safety and efficacy of pharmaceutical products.
2. Ethical responsibility in the pharmaceutical industry to maintain quality management systems and adhere to regulatory requirements.
3. Commitment to ongoing learning and professional development to stay current with the latest regulatory and technological advancements in the industry.

35) Subject and Code: BP703T Pharmacy Practice - Theory

Learning Outcomes:

1. Evaluate the role of a pharmacist in different healthcare settings including hospitals and community pharmacies.
2. Analyze medication adherence and the factors that impact patient adherence to medication regimens.
3. Create an education and training program for hospital staff on medication safety and proper medication order communication skills.

Knowledge and Understanding:

1. Understand the organizational structure of hospitals and hospital pharmacies, including their formulary and therapeutic drug monitoring systems.
2. Acquire knowledge on adverse drug reactions and their management.
3. Articulate the principles of community pharmacy management, drug distribution systems in hospitals, and investigational use of drugs.

Skills:

1. Develop skills in counseling patients on medication adherence and identifying potential barriers to adherence.
2. Apply clinical pharmacy skills to interpret laboratory tests and make appropriate medication-related recommendations.
3. Allocate and manage inventory in a drug store and apply effective drug store management techniques.

Values:

1. Foster a patient-centered approach to healthcare and prioritize patient safety in all pharmacy-related activities.
2. Encourage a culture of continuous learning and professional development among hospital staff and community pharmacists.
3. Promote the ethical use of medications and the responsible stewardship of pharmaceutical resources.

36) Subject and Code: BP704T Novel Drug Delivery System – Theory

Learning Outcomes:

1. Demonstrate an understanding of the different types of drug delivery systems.
2. Analyze the advantages and disadvantages of different drug delivery systems.
3. Create a targeted drug delivery system design.

Knowledge and Understanding:

1. Define controlled drug delivery systems and their characteristics.
2. Describe the different types of polymers used in drug delivery systems.
3. Cite examples of different drug delivery systems and their applications.

Skills:

1. Apply knowledge of drug delivery systems to design a novel system for targeted drug delivery.
2. Analyze the suitability of different drug delivery systems for a particular drug.
3. Assemble components of drug delivery systems for experimentation.

Values:

1. Appreciate the importance of safe and effective drug delivery systems in patient care.
2. Cultivate attention to detail and accuracy when designing drug delivery systems.
3. Foster a commitment to ethical and responsible research in drug delivery systems development.

8th Semester – 4th Year

37) Subject and Code: BP801T Biostatistics and Research Methodology

Learning Outcomes:

1. Analyze and interpret statistical measures of central tendency to evaluate data sets.
2. Create and apply regression models to understand relationships between variables in research studies.
3. Evaluate and compare the appropriateness of parametric and non-parametric tests in statistical analysis.

Knowledge and Understanding:

1. Acquire knowledge of statistical measures of central tendency and how they are used in biostatistics.
2. Understand the principles of probability and how it applies in statistical analysis.
3. Develop a thorough understanding of regression modeling and its application in research studies.

Skills:

1. Apply statistical techniques, such as correlation and regression, to analyze research data.
2. Design and plan research methodologies using appropriate statistical tools.
3. Implement factorial design and response surface methodology in the design and analysis of experiments.

Values:

1. Appreciation for the role of statistical analysis in biostatistics and research methodology.
2. Respect for the ethical considerations involved in research studies and the importance of rigorous methodology.
3. Valuing the importance of accuracy and precision in data collection, analysis and interpretation.

38) Subject and Code: BP802T Social and Preventive Pharmacy

Learning Outcomes:

1. Discuss the concept of health and disease and its impact on society.
2. Analyze the role of social and health education in promoting public health.
3. Evaluate the effectiveness of national health programs in achieving their objectives.

Knowledge and Understanding:

1. Identify the principles of sociology and its relevance to health.
2. Explain the relationship between hygiene and health.
3. Describe the key components of preventive medicine.

Skills:

1. Apply critical thinking to assess the effectiveness of different health education strategies.
2. Conduct research to evaluate the outcomes of national health programs.
3. Design and implement preventive health measures in the community.

Values:

1. Appreciate the importance of promoting public health and disease prevention.
2. Value the role of healthcare professionals in advocating for social and preventive healthcare.
3. Respect cultural and social diversity in healthcare practices and policies.

39) Subject and Code: BP803ET Pharma Marketing Management

Learning Outcomes:

1. Analyze the different pharmaceutical marketing channels and evaluate their effectiveness in reaching the target audience.
2. Evaluate the impact of emerging marketing concepts on the pharmaceutical market and identify potential opportunities for growth.
3. Create a comprehensive pharmaceutical marketing plan, including product decision, promotion strategies, pricing, and sales channel allocation.

Knowledge and Understanding:

1. Understand the basic principles of marketing and how they apply to the pharmaceutical industry.
2. Acquire knowledge of the pharmaceutical market, including regulatory requirements and market segmentation.
3. Articulate the role of professional sales representatives (PSRs) in pharmaceutical marketing and their influence on healthcare providers and consumers.

Skills:

1. Allocate marketing resources to optimize product positioning and pricing.
2. Develop effective promotional strategies that comply with regulatory requirements and align with the target audience's needs.
3. Design and execute a marketing research plan to identify market trends and consumer needs.

Values:

1. Cultivate ethical and responsible marketing practices in the pharmaceutical industry.
2. Foster a customer-oriented mindset to better understand and meet the needs of patients and healthcare providers.
3. Develop a data-driven decision-making approach to pharmaceutical marketing to improve business performance and promote patient health.

40) Subject and Code: BP804ET - Pharmaceutical Regulatory Science

Learning Outcomes:

1. Explain the process of drug discovery and development, including the various stages involved, and the importance of regulatory compliance throughout the process.
2. Analyze the regulatory approval process and its impact on the pharmaceutical industry, including the role of regulatory authorities and agencies.
3. Evaluate the challenges and considerations involved in registering Indian drug products in overseas markets, including compliance with international regulations.

Knowledge and Understanding:

1. Describe the key regulatory concepts related to pharmaceutical products, including safety, efficacy, quality, and labeling.
2. Approximate the costs and timelines associated with different stages of drug development, from preclinical research to clinical trials and marketing authorization.
3. Compare and contrast the regulatory frameworks of different countries, including the United States, Europe, and India, and their impact on global pharmaceutical markets.

Skills:

1. Construct a regulatory blueprint for a hypothetical drug product, including compliance with relevant regulations, standards, and guidelines.
2. Design and implement a clinical trial protocol for a new drug product, including ethical considerations, data collection and analysis, and reporting requirements.
3. Formulate strategies for effective communication and collaboration with regulatory authorities, stakeholders, and the public, including crisis management and risk assessment.

Values:

1. Appreciate the importance of ethical and responsible conduct in pharmaceutical research and development, including patient safety, data integrity, and transparency.
2. Foster a culture of continuous learning and innovation in regulatory science, including knowledge sharing, critical thinking, and problem-solving.
3. Promote a global perspective and a commitment to diversity and inclusivity in pharmaceutical regulation, including awareness of cultural differences, regional needs, and social responsibility.

41) Subject and Code: BP805ET - Pharmacovigilance

Learning Outcomes:

1. Demonstrate the ability to establish a pharmacovigilance program.
2. Evaluate the safety data generated during pharmacovigilance methods.
3. Analyze and interpret pharmacogenomics of adverse drug reactions.

Knowledge and Understanding:

1. Understand basic terminologies used in pharmacovigilance and drug and disease classification.
2. Acquire knowledge of drug dictionaries and coding in pharmacovigilance, and information resources in pharmacovigilance.
3. Approximate the ICH Guidelines for Pharmacovigilance, CIOMS, and CDSCO (India) and their impact on pharmacovigilance.

Skills:

1. Allocate communication skills in pharmacovigilance.
2. Blueprint drug safety evaluation in special populations.
3. Adapt vaccine safety surveillance as per pharmacovigilance methods.

Values:

1. Cultivate ethical values related to pharmacovigilance, including patient safety and confidentiality.
2. Incorporate the value of accuracy and attention to detail in safety data generation and drug safety evaluation.
3. Foster the value of continuous learning and staying updated with the latest pharmacovigilance guidelines and practices.

42) Subject and Code: BP805ET - Pharmacovigilance

Learning Outcomes:

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Values:

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2. Incorporate the value of accuracy and attention to detail in safety data generation and drug safety evaluation.
3. Foster the value of continuous learning and staying updated with the latest pharmacovigilance guidelines and practices.

43) Subject and Code: BP806ET - Quality Control and Standardization of Herbals

Learning Outcomes:

1. Apply basic tests for drugs to evaluate the quality of herbal products, including physical, chemical, and biological tests.
2. Analyze the regulatory requirements for herbal medicines and the role of chemical and biological markers in the standardization of herbal products.
3. Evaluate the impact of WHO guidelines on current good manufacturing practices (cGMP) for Herbal Medicines and GACP for Medicinal Plants on the quality assurance in the herbal drug industry.

Knowledge and Understanding:

1. Define the basic concepts related to quality control of herbal drugs, including purity, identity, potency, and safety.
2. Explain the EU and ICH guidelines for quality control of herbal drugs, including the requirements for manufacturing, testing, and labeling of herbal products.
3. Cite the importance of chemical and biological markers in standardization of herbal products, including the use of chromatographic and spectroscopic techniques.

Skills:

1. Design and implement a quality control program for a herbal product, including the selection of appropriate tests and standards.
2. Use analytical techniques such as HPLC, TLC, and GC-MS for the identification and quantification of active ingredients in herbal products.
3. Apply the principles of GMP to ensure the safety and efficacy of herbal medicines, including documentation, validation, and quality audits.

Values:

1. Appreciate the importance of responsible and sustainable use of medicinal plants, including biodiversity conservation and cultural preservation.
2. Foster a culture of transparency and accountability in the herbal drug industry, including open communication and ethical business practices.
3. Promote the global harmonization of regulations and standards for herbal medicines, including respect for cultural diversity and local knowledge.

44) Subject and Code: BP807ET - Computer Aided Drug Design

Learning Outcomes:

1. Develop a comprehensive understanding of drug discovery and development process.
2. Apply quantitative structure-activity relationship (QSAR) to predict the activity of chemical compounds.
3. Create a virtual screening model to identify potential drug leads.

Knowledge and Understanding:

1. Knowledge of different lead discovery and analog-based drug design approaches.
2. Understanding of molecular modeling techniques and their role in drug design.
3. Familiarity with informatics and methods used in drug design.

Skills:

1. Ability to analyze and interpret molecular docking results.
2. Proficiency in using molecular modeling software for drug design.
3. Skill in designing and evaluating virtual screening models.

Values:

1. Value for ethical considerations in drug discovery and development.
2. Appreciation for the role of interdisciplinary collaboration in drug design.
3. Commitment to continuous learning and updating knowledge in the field of drug design.

45) Subject and Code: BP808ET - Cell and Molecular Biology

Learning Outcomes:

1. Describe the fundamental concepts and theories related to cell and molecular biology.
2. Analyze the differences between prokaryotic and eukaryotic cells and their importance in biological processes.
3. Evaluate the mechanisms involved in cellular reproduction and the flow of molecular information.

Knowledge and Understanding:

1. Knowledge of the history and development of cell and molecular biology and its significance in modern science.
2. Understanding of the properties of cells, cell membrane, DNA, RNA, and proteins.
3. Knowledge of the genetic processes involved in the cell cycle, mitosis and meiosis, cellular checkpoints, and cellular signaling pathways.

Skills:

1. Ability to identify and differentiate between different cell types and explain their functions and properties.
2. Capacity to analyze and interpret genetic information and data using molecular biology techniques.
3. Proficiency in performing laboratory techniques related to DNA and protein analysis and cellular processes.

Values:

1. Appreciation for the complexity and diversity of life at the cellular and molecular level.
2. Respect for ethical considerations related to genetic research and experimentation.
3. Recognition of the importance of scientific inquiry and discovery in improving human health and well-being.

46) Subject and Code: BP809ET - Cosmetic Science

Learning Outcomes:

1. Understand the principles of cosmetic science and formulation.
2. Analyze the properties and functions of cosmetic excipients.
3. Evaluate the role of herbs in cosmetic products.

Knowledge and Understanding:

1. Knowledge of cosmetic excipients and their functions in cosmetic formulations.
2. Understanding of the properties and functions of skin, hair, and the oral cavity.
3. Knowledge of the principles of formulation and building blocks of skin and hair care products.

Skills:

1. Ability to analyze the effectiveness of different cosmetic ingredients.
2. Ability to formulate and design cosmetic products using appropriate ingredients and techniques.
3. Ability to critically evaluate and test the quality of cosmetic products.

Values:

1. Commitment to ethical and sustainable cosmetic practices.
2. Respect for cultural diversity and differences in beauty standards.
3. Appreciation for the science and innovation behind cosmetic product development.

47) Subject and Code: BP810ET - Subject: Experimental Pharmacology

Learning Outcomes:

1. Evaluate the efficacy and safety of pharmacological interventions using preclinical animal models.
2. Analyze and interpret the experimental data obtained from preclinical screening models.
3. Design and execute experiments to investigate the efficacy and safety of potential drug candidates.

Knowledge and Understanding:

1. Understanding of laboratory animal ethics and welfare guidelines for conducting experiments.
2. Knowledge of various preclinical screening models used in drug discovery, including in vitro and in vivo models.
3. Understanding of research methodology and biostatistics, including hypothesis testing and statistical analysis of data.

Skills:

1. Ability to design and execute experiments to test the efficacy and safety of potential drug candidates.
2. Proficiency in handling laboratory animals and conducting experiments in accordance with ethical guidelines.
3. Analytical and critical thinking skills to analyze and interpret experimental data obtained from preclinical screening models.

Values:

1. Ethical conduct of research and respect for laboratory animal welfare.
2. Rigorous scientific inquiry and commitment to scientific integrity.
3. Value of evidence-based research in advancing pharmacological knowledge and improving patient outcomes.

48) Subject and Code: BP811ET - Advanced Instrumentation Techniques

Learning Outcomes:

1. Analyze and evaluate the principles of various advanced instrumentation techniques in chemistry and biology.
2. Apply theoretical knowledge to design and develop appropriate analytical strategies for solving complex problems in drug discovery and other related fields.
3. Critically evaluate and compare the performance of different advanced instrumentation techniques to choose the appropriate one for specific analytical applications.

Knowledge and Understanding:

1. In-depth understanding of Nuclear Magnetic Resonance spectroscopy, Mass Spectrometry, Thermal Methods of Analysis, X-Ray Diffraction Methods, Calibration and validation, Radio immune assay, Extraction techniques, and Hyphenated techniques.
2. Understanding of the physical principles and mechanisms underlying the operation of different instruments.
3. Understanding of the strengths and limitations of each technique in terms of sensitivity, specificity, and quantitative analysis.

Skills:

1. Ability to design and conduct experiments using advanced instrumentation techniques.
2. Ability to interpret complex data sets and apply statistical methods for data analysis and interpretation.
3. Ability to troubleshoot instrument-related problems and perform routine maintenance of instruments.

Values:

1. Respect for ethical and safety considerations when handling hazardous materials and equipment.
2. Appreciation for the importance of accuracy and precision in analytical measurements.
3. Commitment to continuous learning and staying up-to-date with the latest advancements in instrumentation techniques.

49) Subject and Code: BN803ET. Dietary Supplements and Nutraceuticals

Learning Outcomes:

1. Evaluate the role of functional foods, nutraceuticals and dietary supplements in preventing and curing health problems and diseases.
2. Analyze the chemical nature, medicinal uses, and health benefits of various nutraceuticals and phytochemicals.
3. Develop strategies for preventing chronic diseases using functional foods and nutraceuticals.

Knowledge and Understanding:

1. Understanding of functional foods, nutraceuticals and dietary supplements, and their classification and role in preventing and curing diseases.
2. Knowledge of various phytochemicals such as carotenoids, sulfides, polyphenolics, flavonoids, and phyto estrogens, and their occurrence, characteristic features, and medicinal benefits.
3. Knowledge of free radicals, dietary fibers and complex carbohydrates, antioxidants, and regulatory aspects related to dietary supplements and nutraceuticals.

Skills:

1. Analytical skills to evaluate the chemical nature, medicinal uses, and health benefits of nutraceuticals and phytochemicals.
2. Research skills to develop strategies for preventing chronic diseases using functional foods and nutraceuticals.
3. Problem-solving skills to identify the effects of processing, storage, and environmental factors on the potential of nutraceuticals.

Values:

1. Awareness of the importance of a balanced and healthy diet for preventing chronic diseases.
2. Respect for the role of nature in providing natural remedies for maintaining good health.
3. Ethical awareness of regulatory aspects related to dietary supplements and nutraceuticals, and the impact of adulteration on public health.

50) Subject and Code: BP813PW - Subject: Pharmaceutical Product Development

Learning Outcomes:

1. Evaluate the role of pharmaceutical excipients in the product development process.
2. Analyze the different optimization techniques used in pharmaceutical product development.
3. Demonstrate knowledge of regulatory considerations in the selection and quality control testing of packaging materials for pharmaceutical product development.

Knowledge and Understanding:

1. Knowledge of the regulations related to preformulation, formulation development, stability assessment, manufacturing, and quality control testing of different types of dosage forms.
2. Understanding of the different categories of pharmaceutical excipients such as solvents, surfactants, suspending and emulsifying agents, and their applications in pharmaceutical product development.
3. Understanding of optimization techniques like factorial designs and QbD, and their application in pharmaceutical product development.

Skills:

1. Ability to select and apply appropriate excipients in pharmaceutical formulations with specific industrial applications.
2. Capability to conduct quality control testing of packaging materials for pharmaceutical product development.
3. Proficiency in using optimization techniques to optimize the pharmaceutical product development process.

Values:

1. Appreciation of the importance of regulatory compliance in pharmaceutical product development.
2. Value the significance of excipients in pharmaceutical product development and their impact on the final product.
3. Emphasis on the need for quality control testing in pharmaceutical product development to ensure the safety and efficacy of the final product.