



Mewar University B. Pharmacy

PROGRAMME OUTCOMES

- **PO1-Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioural, 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, analyse, 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 fulfilment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well being.
- **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:** Honour 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.

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- **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 on-going basis.

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PSO

PROGRAM SPECIFIC OUTCOMES

- **PSO1** : Work in different divisions of pharmaceutical industry like manufacturing, quality control, quality assurance, sales, marketing and regulatory divisions.
- **PSO2** : Explore opportunities as pharmacists in community and hospital pharmacy settings.
- **PSO3** : Join different government organizations as drug analyst, chemist and drug inspectors for better management and control of pharmaceutical activities

Course Outcomes

Course Outcomes

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Course: HUMAN ANATOMY AND PHYSIOLOGY-I (BP101T)

CO-1: Identify and describe the structural organization of the human body at the macroscopic and microscopic levels, including the study of various body systems, organs, and tissues, to establish a foundation in human anatomy.

CO-2: Explain and analyze the physiological processes and functions of the human body, including cell physiology, homeostasis, and the functioning of major body systems, to understand the normal functioning of the human body.

CO-3: Recognize and correlate the anatomical structures with their respective physiological functions, to understand the interrelationships between structure and function in the human body.

CO-4: Apply the knowledge of human anatomy and physiology to interpret and analyze clinical scenarios, to understand the basis of health and disease and provide a foundation for further study in healthcare disciplines.

CO-5: Demonstrate effective communication and teamwork skills in the context of human anatomy and physiology, including the ability to convey complex anatomical and physiological concepts and collaborate with peers in laboratory activities and case discussions.

Course: PHARMACEUTICAL ANALYSIS (BP102T)

CO-1: Recognize and describe the fundamental principles and concepts of pharmaceutical analysis, including the study of analytical techniques, instrumentation, and quality control parameters, to establish a foundation in the field of pharmaceutical analysis.

CO-2: Analyze and evaluate the various analytical techniques used in pharmaceutical analysis, such as spectroscopy, chromatography, and titration, to understand their principles, applications, and limitations in the analysis of pharmaceutical substances and products.

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CO-3: Identify and describe the quality control parameters and methods used in the analysis of pharmaceutical substances and products, including assay determination, impurity profiling, and dissolution testing, to ensure the safety, efficacy, and quality of pharmaceutical preparations.

CO-4: Apply knowledge of pharmaceutical analysis techniques and methods to perform accurate and precise analysis of pharmaceutical substances and products, and interpret and evaluate the obtained analytical data.

CO-5: Analyze and interpret scientific literature and research findings related to pharmaceutical analysis, to critically evaluate emerging trends, technologies, and regulatory requirements in the field, and contribute to the development of improved analytical methods and quality control practices in the pharmaceutical industry.

Course: PHARMACEUTICS- I (BP103T)

CO-1: Describe the fundamental principles and concepts of pharmaceutics and their application in the formulation and development of pharmaceutical dosage forms.

CO-2: Identify and select suitable excipients, drug substances, and delivery systems for the preparation of different pharmaceutical dosage forms, considering their physicochemical properties and stability requirements.

CO-3: Apply theoretical knowledge and practical skills to prepare and evaluate various solid, liquid, and semi-solid pharmaceutical dosage forms, ensuring their safety, efficacy, and stability.

CO-4: Analyze the factors influencing drug absorption, distribution, metabolism, and elimination, and understand their implications in the design and optimization of drug delivery systems.

CO-5: Evaluate and apply appropriate quality control measures and regulatory guidelines for the manufacturing and packaging of pharmaceutical dosage forms, ensuring compliance with industry standards and regulations.

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Course: PHARMACEUTICAL INORGANIC CHEMISTRY (BP104T)

CO-1: Understand the fundamental principles and concepts of inorganic chemistry and their applications in pharmaceutical sciences.

CO-2: Identify and classify different inorganic compounds and their pharmaceutical significance, including their therapeutic uses and toxicological aspects.

CO-3: Explain the role of inorganic elements and compounds in drug stability, solubility, and bioavailability, and their interactions with biological systems.

CO-4: Analyze and interpret the chemical reactions and transformations involving inorganic compounds used in pharmaceutical formulations, such as complexation, precipitation, and redox reactions.

CO-5: Apply knowledge of pharmaceutical inorganic chemistry to solve problems related to drug formulation, drug delivery systems, and the development of new therapeutic agents.

Course: COMMUNICATION SKILLS (BP105T)

CO-1: Demonstrate effective verbal and non-verbal communication skills in professional settings, such as patient counseling, interprofessional collaboration, and healthcare team interactions.

CO-2: Use appropriate communication techniques to gather and convey accurate and relevant information in written forms, including professional reports, documentation, and scientific writing in the field of pharmacy.

CO-3: Apply active listening and questioning skills to understand the needs and concerns of patients, healthcare professionals, and other stakeholders in order to provide appropriate pharmaceutical care.

CO-4: Utilize effective communication strategies to educate patients and the public about safe and rational medication use, adherence to treatment regimens, and the prevention of medication errors.

CO-5: Recognize and navigate cultural, social, and ethical considerations in communication, promoting inclusivity, empathy, and respect in diverse healthcare settings.

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Course: REMEDIAL BIOLOGY (BP106RBT)

CO-1: Identify and explain the basic concepts and principles of biology, including cell structure and function, genetics, and the principles of evolution.

CO-2: Recognize and describe the structure and function of major organ systems in the human body, and understand their interrelationships and significance in health and disease.

CO-3: Analyze and interpret biological phenomena, such as cellular processes, enzyme kinetics, and metabolic pathways, to understand the underlying mechanisms and their relevance to pharmaceutical sciences.

CO-4: Apply knowledge of biology to understand and evaluate the pharmacological actions, mechanisms of drug action, and therapeutic uses of drugs in different disease conditions.

CO-5: Demonstrate an understanding of the ethical implications and regulatory aspects related to biological research and the use of biological agents in the field of pharmacy.

Course: PHARMACEUTICAL ORGANIC CHEMISTRY –II (BP301T)

CO-1: Describe the fundamental principles and concepts of organic chemistry as they apply to pharmaceutical sciences, including reaction mechanisms and stereochemistry.

CO-2: Classify and explain the structural features, properties, and medicinal importance of different classes of organic compounds, including drugs and pharmaceutical intermediates.

CO-3: Apply knowledge of organic chemistry to analyze and predict the chemical reactions involved in the synthesis and modification of pharmaceutical compounds and intermediates.

CO-4: Understand the principles of drug design and molecular modeling, and utilize organic chemistry concepts to design and synthesize new pharmaceutical agents with improved therapeutic properties.

CO-5: Evaluate the chemical stability, reactivity, and metabolic fate of pharmaceutical compounds, and apply appropriate strategies for the formulation, drug delivery, and optimization of pharmaceutical products.

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Course: PHYSICAL PHARMACEUTICS - I (BP302T)

CO-1: Understand the fundamental principles of physical pharmacy and their application in the formulation and development of pharmaceutical dosage forms.

CO-2: Analyze the physicochemical properties of drugs and excipients, including solubility, dissolution, partitioning, and stability, and their influence on drug formulation and delivery.

CO-3: Apply knowledge of physicochemical principles to design and optimize drug delivery systems, such as solid dosage forms, liquids, and emulsions, ensuring appropriate drug release and bioavailability.

CO-4: Evaluate and apply various pharmaceutical techniques and processes, such as particle size analysis, rheology, and drug-excipient compatibility studies, to ensure the quality and performance of pharmaceutical products.

CO-5: Interpret and analyze data obtained from various physical and chemical characterization techniques used in pharmaceutical sciences, such as spectroscopy, microscopy, and thermal analysis, to assess the physicochemical properties of drugs and dosage forms.

Course: PHARMACEUTICAL MICROBIOLOGY (BP303T)

CO-1: Analyze the fundamental principles of microbiology and their relevance to the field of pharmacy, including the classification, structure, and function of microorganisms.

CO-2: Identify and characterize different types of microorganisms, such as bacteria, viruses, fungi, and parasites, and understand their significance in pharmaceutical microbiology and public health.

CO-3: Apply aseptic techniques and laboratory methods to isolate, cultivate, and identify microorganisms commonly encountered in pharmaceutical settings, ensuring product safety and quality.

CO-4: Evaluate the antimicrobial activity of various pharmaceutical agents and understand the principles of antibiotic susceptibility testing and antimicrobial resistance.

CO-5: Apply knowledge of pharmaceutical microbiology to develop and implement effective strategies for the prevention and control of microbial contamination in pharmaceutical products, as well as to ensure compliance with regulatory guidelines and industry standards

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Course: PHARMACEUTICAL ENGINEERING (BP304T)

CO-1: Understand the basic principles of pharmaceutical engineering and their application in the design, development, and manufacturing of pharmaceutical products.

CO-2: Apply knowledge of engineering principles, such as fluid flow, heat transfer, mass transfer, and unit operations, to analyze and optimize pharmaceutical processes and equipment.

CO-3: Evaluate and select appropriate equipment and technologies for pharmaceutical manufacturing, such as reactors, mixers, granulators, and sterilization systems, considering factors such as efficiency, scalability, and safety.

CO-4: Design and optimize pharmaceutical processes to ensure the efficient and cost-effective production of pharmaceutical products, while maintaining quality, safety, and regulatory compliance.

CO-5: Apply principles of quality management and validation in pharmaceutical engineering, including the development of standard operating procedures, process validation, and documentation practices, to ensure consistent product quality and regulatory compliance.

Course: MEDICINAL CHEMISTRY II (BP501T)

CO-1: Identify the principles of medicinal chemistry and their application in the design and development of therapeutic agents, including drug-receptor interactions, structure-activity relationships (SAR), and molecular modeling techniques.

CO-2: Analyze and evaluate the chemical and biological properties of drugs and drug candidates, including their pharmacokinetics, pharmacodynamics, and metabolism, to understand their therapeutic potential and limitations.

CO-3: Apply knowledge of synthetic organic chemistry and medicinal chemistry principles to design and synthesize novel compounds with improved drug-like properties and selectivity towards specific targets.

CO-4: Utilize structure-activity relationships (SAR) and computer-aided drug design (CADD) tools to optimize the activity, selectivity, and pharmacokinetic properties of drug candidates, and predict their ADME (absorption, distribution, metabolism, and excretion) profiles.

CO-5: Critically evaluate the scientific literature and drug discovery strategies in medicinal chemistry, and understand the challenges and opportunities in the development of new therapeutic agents for various disease conditions.

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Course: INDUSTRIAL PHARMACY – I (BP502T)

CO-1: Understand the fundamental concepts and principles of industrial pharmacy, including pharmaceutical manufacturing processes, quality control, and regulatory requirements.

CO-2: Analyze and apply knowledge of unit operations involved in pharmaceutical manufacturing, such as mixing, granulation, drying, and compression, to ensure the efficient and cost-effective production of pharmaceutical products.

CO-3: Evaluate and implement quality control measures and analytical techniques to ensure the quality, purity, and stability of pharmaceutical products, following regulatory guidelines and industry standards.

CO-4: Apply knowledge of formulation development and optimization techniques to design and develop pharmaceutical dosage forms, considering factors such as drug solubility, bioavailability, and patient acceptability.

CO-5: Understand and apply principles of good manufacturing practices (GMP), quality assurance, and validation in pharmaceutical manufacturing, ensuring compliance with regulatory requirements and maintaining product safety and efficacy.

Course: PHARMACOLOGY-II (BP503T)

CO-1: Understand the mechanism of action, pharmacokinetics, and pharmacodynamics of commonly used drug classes in the treatment of various diseases and conditions.

CO-2: Analyze and evaluate the therapeutic uses, adverse effects, and interactions of drugs in different patient populations, considering factors such as age, gender, genetics, and comorbidities.

CO-3: Apply knowledge of pharmacology to rational drug selection and therapeutic decision-making, considering the efficacy, safety, and cost-effectiveness of different treatment options.

CO-4: Interpret and analyze preclinical and clinical data related to drug efficacy and safety, and understand the principles of clinical trials and evidence-based medicine.

CO-5: Understand the principles of rational drug design and drug discovery, and evaluate emerging trends and developments in pharmacology, such as personalized medicine and targeted therapies.

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Course: PHARMACOGNOSY AND PHYTOCHEMISTRY II (BP504T)

CO-1: Understand the principles and concepts of pharmacognosy and phytochemistry, including the identification, extraction, and isolation of bioactive compounds from medicinal plants.

CO-2: Identify and classify different types of natural products, such as alkaloids, glycosides, terpenoids, and phenolic compounds, and understand their pharmacological activities and therapeutic potential.

CO-3: Apply various extraction, isolation, and purification techniques to obtain pure and bioactive compounds from medicinal plants, and analyze their chemical structures using spectroscopic methods.

CO-4: Evaluate the quality, safety, and efficacy of herbal medicines and natural products using pharmacognostic and phytochemical assays, and understand the principles of standardization and quality control in herbal medicine production.

CO-5: Analyze and interpret scientific literature and research findings related to pharmacognosy and phytochemistry, and understand the significance of natural products in drug discovery, drug development, and complementary medicine.

Course: PHARMACEUTICAL JURISPRUDENCE (BP505T)

CO-1: Understand the legal framework governing the pharmaceutical industry, including relevant national and international laws, regulations, and guidelines.

CO-2: Analyze and apply legal principles and ethical considerations in pharmaceutical practice, such as professional codes of conduct, patient rights, and confidentiality.

CO-3: Demonstrate knowledge of intellectual property laws and regulations related to pharmaceuticals, including patents, trademarks, and copyrights, and their impact on drug development, marketing, and generic substitution.

CO-4: Understand and comply with regulatory requirements for the manufacturing, labeling, packaging, and advertising of pharmaceutical products, ensuring adherence to safety, efficacy, and quality standards.

CO-5: Evaluate and respond to legal and ethical challenges in pharmacy practice, such as medication errors, adverse events, and conflicts of interest, and understand the role of pharmacists in promoting patient safety and public health.

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Course: INSTRUMENTAL METHODS OF ANALYSIS (BP701T)

CO-1: Understand the principles and working mechanisms of various instrumental techniques used in chemical analysis, including spectroscopy, chromatography, electrochemistry, and mass spectrometry.

CO-2: Analyze and interpret experimental data obtained from different instrumental methods of analysis, and use it to identify and quantify chemical compounds in complex matrices.

CO-3: Apply knowledge of instrumental methods to solve analytical problems and optimize analytical conditions, considering factors such as sensitivity, selectivity, and accuracy.

CO-4: Evaluate and select appropriate instrumental methods for specific analytical tasks, considering the nature of the sample, the analyte of interest, and the desired analytical outcome.

CO-5: Analyze and comply with quality assurance and quality control principles in instrumental analysis, including calibration, validation, and documentation practices, to ensure reliable and accurate analytical results.

Course: INDUSTRIAL PHARMACY-II (BP702T)

CO-1: Identify the principles and practices of industrial pharmacy, including pharmaceutical formulation development, process optimization, and scale-up techniques.

CO-2: Apply knowledge of pharmaceutical excipients, drug delivery systems, and formulation techniques to design and develop stable and effective pharmaceutical products.

CO-3: Analyze and optimize pharmaceutical manufacturing processes, considering factors such as efficiency, cost-effectiveness, and regulatory compliance.

CO-4: Evaluate and implement quality control measures and testing methods to ensure the quality, purity, and stability of pharmaceutical products throughout the manufacturing process.

CO-5: Analyze and comply with regulatory requirements and good manufacturing practices (GMP) in the pharmaceutical industry, ensuring the production of safe and effective pharmaceutical products.

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Course: PHARMACY PRACTICE (BP703T)

CO-1: Analyze the role and responsibilities of a pharmacist in various healthcare settings, including community pharmacies, hospitals, and clinical settings.

CO-2: Apply knowledge of pharmacotherapy, medication management, and patient counseling to provide safe and effective pharmaceutical care to patients.

CO-3: Develop effective communication and interpersonal skills to interact with patients, healthcare professionals, and other stakeholders in a professional and ethical manner.

CO-4: Utilize pharmaceutical knowledge and evidence-based practice to make informed decisions regarding medication selection, dosing, and monitoring for optimal patient outcomes.

CO-5: Analyze and apply legal and ethical principles in pharmacy practice, including patient confidentiality, informed consent, and professional liability, ensuring compliance with regulatory guidelines and professional standards.

Course: NOVEL DRUG DELIVERY SYSTEM (BP704T)

CO-1: Analyze the principles and concepts of novel drug delivery systems, including their advantages, limitations, and applications in pharmaceutical sciences.

CO-2: Analyze and evaluate different types of novel drug delivery systems, such as nanoparticles, liposomes, micelles, and implants, and their potential for enhancing drug efficacy, safety, and targeted delivery.

CO-3: Apply knowledge of drug physicochemical properties, drug release kinetics, and formulation strategies to design and develop novel drug delivery systems with improved drug solubility, stability, and bioavailability.

CO-4: Evaluate the biocompatibility, safety, and regulatory considerations associated with novel drug delivery systems, and understand the importance of quality control and quality assurance in their development and manufacturing.

CO-5: Critically analyze and interpret research literature and scientific advancements in the field of novel drug delivery systems, and explore emerging trends and future directions for drug delivery technology.

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Course: HUMAN ANATOMY AND PHYSIOLOGY II (BP201T)

CO-1: Analyze the structure and function of the major organ systems of the human body, including the cardiovascular, respiratory, digestive, urinary, and reproductive systems.

CO-2: Describe the physiological processes involved in circulation, respiration, digestion, excretion, and reproduction, and understand the interrelationships between different organ systems.

CO-3: Analyze and interpret physiological mechanisms and feedback systems involved in maintaining homeostasis, such as blood pressure regulation, acid-base balance, and hormone regulation.

CO-4: Apply knowledge of human anatomy and physiology to understand the pathophysiology of various diseases and conditions, and their impact on organ function and overall health.

CO-5: Analyze the ethical considerations and implications of human anatomy and physiology in healthcare practice, research, and patient care.

Course: PHARMACEUTICAL ORGANIC CHEMISTRY – I (BP202T)

CO-1: Analyze the fundamental principles and concepts of organic chemistry as they apply to pharmaceutical sciences, including reaction mechanisms, functional group transformations, and stereochemistry.

CO-2: Classify and explain the structure, properties, and reactivity of different classes of organic compounds, including drugs and pharmaceutical intermediates, and understand their relationship to drug activity and selectivity.

CO-3: Apply knowledge of organic chemistry to analyze and predict the chemical reactions involved in the synthesis and modification of pharmaceutical compounds and intermediates.

CO-4: Utilize organic chemistry principles to design and synthesize novel compounds with desired pharmacological properties, considering factors such as drug solubility, stability, and bioavailability.

CO-5: Evaluate the chemical stability, reactivity, and metabolic fate of pharmaceutical compounds, and apply appropriate strategies for the formulation, drug delivery, and optimization of pharmaceutical products.

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Course: BIOCHEMISTRY (BP203T)

CO-1: Analyze the fundamental principles and concepts of biochemistry, including the structure and function of biological macromolecules, such as proteins, carbohydrates, lipids, and nucleic acids.

CO-2: Describe the major metabolic pathways and their regulation in the human body, including glycolysis, Krebs cycle, oxidative phosphorylation, and biosynthesis of macromolecules.

CO-3: Analyze and interpret biochemical data and laboratory techniques used in the study of biological systems, including spectroscopy, chromatography, and enzyme kinetics.

CO-4: Apply knowledge of biochemistry to understand the biochemical basis of human diseases and disorders, and the role of biomarkers in diagnosis and treatment.

CO-5: Analyze the ethical considerations and implications of biochemistry in healthcare practice, research, and biomedical advancements.

Course: PATHOPHYSIOLOGY (BP204T)

CO-1: Analyze the principles and concepts of pathophysiology, including the mechanisms of disease development and progression at the cellular, tissue, and organ levels.

CO-2: Analyze and interpret the pathophysiological processes underlying common diseases and disorders, including their etiology, risk factors, and clinical manifestations.

CO-3: Apply knowledge of pathophysiology to understand the interrelationships between different body systems and their contribution to the pathogenesis of diseases.

CO-4: Evaluate and interpret diagnostic tests, laboratory findings, and imaging studies to identify and assess the extent of pathological changes associated with various diseases and conditions.

CO-5: Analyze the impact of pathophysiology on patient management and treatment strategies, including pharmacological interventions, lifestyle modifications, and therapeutic approaches for optimal patient care.

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Course: COMPUTER APPLICATIONS IN PHARMACY (BP205T)

CO-1: Analyze the basic principles and concepts of computer applications in the field of pharmacy, including the role of information technology in pharmaceutical practice, research, and management.

CO-2: Apply computer skills and knowledge to effectively utilize pharmacy software and databases for tasks such as medication management, drug information retrieval, and patient record keeping.

CO-3: Analyze and interpret pharmaceutical data using spreadsheet software and statistical tools, and present the results in a clear and meaningful manner.

CO-4: Utilize computer-based modeling and simulation techniques to predict drug behavior, optimize dosage regimens, and assess drug-drug interactions.

CO-5: Analyze the ethical considerations and implications of computer applications in pharmacy, including patient confidentiality, data security, and compliance with regulatory guidelines and industry standards.

Course: ENVIRONMENTAL SCIENCES (BP206T)

CO-1: Analyze the principles and concepts of environmental sciences, including the interrelationships between organisms and their environment, ecosystems, and natural resources.

CO-2: Analyze and evaluate the impact of human activities on the environment, including pollution, climate change, deforestation, and resource depletion.

CO-3: Apply knowledge of environmental sciences to assess and mitigate environmental hazards and risks, and propose sustainable solutions for environmental conservation and management.

CO-4: Evaluate and interpret environmental data using scientific methods and tools, and communicate the findings effectively through written reports and presentations.

CO-5: Analyze the ethical considerations and implications of environmental sciences, including the promotion of environmental justice, sustainability, and responsible stewardship of natural resources.

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Course: PHARMACEUTICAL ORGANIC CHEMISTRY III (BP401T)

CO-1: Analyze the advanced principles and concepts of organic chemistry as they apply to pharmaceutical sciences, including advanced reaction mechanisms, synthesis strategies, and retrosynthetic analysis.

CO-2: Analyze and evaluate complex organic reactions and synthesis pathways involved in the preparation of pharmaceutical compounds, including multi-step synthesis and stereochemical control.

CO-3: Apply knowledge of advanced organic chemistry to predict and explain the reactivity and behavior of pharmaceutical compounds under different reaction conditions and in biological systems.

CO-4: Design and propose synthetic routes for the synthesis of novel pharmaceutical compounds, considering factors such as regioselectivity, stereoselectivity, and functional group transformations.

CO-5: Evaluate the impact of structural modifications on the physicochemical properties, biological activity, and pharmacokinetic profile of pharmaceutical compounds, and apply structure-activity relationship (SAR) principles for rational drug design.

Course: MEDICINAL CHEMISTRY – I (BP402T)

CO-1: Analyze the fundamental principles and concepts of medicinal chemistry, including drug discovery and development, drug-receptor interactions, and structure-activity relationships (SAR).

CO-2: Analyze and evaluate the chemical and physical properties of drug molecules, including drug solubility, stability, and bioavailability.

CO-3: Apply knowledge of medicinal chemistry to design and synthesize novel drug compounds with desired pharmacological properties, considering factors such as potency, selectivity, and safety.

CO-4: Evaluate the mechanisms of action and pharmacokinetics of drugs, and understand the relationship between drug structure and therapeutic activity.

CO-5: Analyze the ethical considerations and regulatory aspects of medicinal chemistry, including drug safety, intellectual property rights, and the approval process for new drugs.

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Course: PHYSICAL PHARMACEUTICS-II (BP403T)

CO-1 Analyze the principles and concepts of physical pharmacy as they relate to the formulation and design of pharmaceutical dosage forms.

CO-2: Analyze and evaluate the physicochemical properties of drugs and excipients, including solubility, partition coefficients, and drug-excipient compatibility.

CO-3: Apply knowledge of pharmaceutical kinetics and drug release mechanisms to design and optimize controlled-release dosage forms, such as sustained-release tablets and transdermal patches.

CO-4: Evaluate the various pharmaceutical dosage forms, including tablets, capsules, creams, and ointments, and understand the factors affecting their formulation, stability, and performance.

CO-5: Analyze the principles and techniques of pharmaceutical analysis and quality control, including methods for assay, purity, and dissolution testing of pharmaceutical dosage forms.

Course: PHARMACOLOGY-I (BP404T)

CO-1: Analyze the fundamental principles and concepts of pharmacology, including drug classification, pharmacokinetics, and pharmacodynamics.

CO-2: Analyze and evaluate the mechanisms of action of different drug classes, including their interactions with receptors, enzymes, and cellular signaling pathways.

CO-3: Apply knowledge of pharmacology to understand the therapeutic uses, adverse effects, and drug interactions of commonly prescribed medications.

CO-4: Evaluate and interpret preclinical and clinical data, including drug efficacy and safety profiles, to make informed decisions regarding drug selection and dosage regimens.

CO-5: Analyze the ethical considerations and implications of pharmacology in healthcare practice, including the responsible use of medications, patient counseling, and adherence to regulatory guidelines.

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Course: PHARMACOGNOSY AND PHYTOCHEMISTRY I (BP405T)

CO-1: Analyze the principles and concepts of pharmacognosy and phytochemistry, including the sources, identification, and classification of medicinal plants and natural products.

CO-2: Analyze and evaluate the chemical constituents present in medicinal plants, including alkaloids, flavonoids, terpenoids, and phenolic compounds, and their pharmacological activities.

CO-3: Apply knowledge of pharmacognosy and phytochemistry to isolate, purify, and characterize bioactive compounds from natural sources.

CO-4: Evaluate and interpret the biological and pharmacological properties of natural products, including their therapeutic uses, mechanisms of action, and potential drug interactions.

CO-5: Analyze the ethical considerations and sustainability issues related to the use of medicinal plants and natural products in healthcare practice, research, and drug development.

Course: MEDICINAL CHEMISTRY – III (BP601T)

CO-1: Analyze advanced principles and concepts of medicinal chemistry, including drug design strategies, structure-activity relationships (SAR), and optimization of drug properties.

CO-2: Analyze and evaluate the chemical synthesis and modifications of drug molecules to enhance their potency, selectivity, and pharmacokinetic properties.

CO-3: Apply knowledge of medicinal chemistry to design and synthesize novel drug candidates with improved therapeutic efficacy and reduced toxicity.

CO-4: Evaluate the mechanisms of action and pharmacological profiles of advanced drug compounds, including their interaction with biological targets and signaling pathways.

CO-5: Analyze the ethical considerations and regulatory aspects of medicinal chemistry, including drug safety, intellectual property rights, and the approval process for advanced drug candidates.

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Course: PHARMACOLOGY-III (BP602T)

CO-1: Analyze advanced principles and concepts of pharmacology, including drug metabolism, pharmacogenetics, and pharmacokinetic-pharmacodynamic modeling.

CO-2: Analyze and evaluate the mechanisms of drug toxicity, including adverse drug reactions, drug-drug interactions, and idiosyncratic reactions.

CO-3: Apply knowledge of pharmacology to understand the pharmacotherapy of complex diseases and conditions, including the use of combination therapies and personalized medicine approaches.

CO-4: Evaluate and interpret preclinical and clinical data, including drug efficacy and safety profiles, to make informed decisions regarding drug selection, dose adjustment, and therapeutic monitoring.

CO-5: Analyze the ethical considerations and implications of pharmacology in healthcare practice, including the responsible use of medications, patient counseling, and adherence to regulatory guidelines.

Course: HERBAL DRUG TECHNOLOGY (BP603T)

CO-1: Analyze the principles and concepts of herbal drug technology, including the identification, collection, and cultivation of medicinal plants.

CO-2: Analyze and evaluate the phytochemical constituents present in herbal drugs, including alkaloids, flavonoids, terpenoids, and phenolic compounds, and their pharmacological activities.

CO-3: Apply knowledge of herbal drug technology to extract, isolate, and purify bioactive compounds from medicinal plants using appropriate extraction techniques.

CO-4: Evaluate and interpret the formulation and development of herbal dosage forms, including teas, tinctures, extracts, and herbal-based preparations.

CO-5: Analyze the quality control and standardization methods used in herbal drug technology, including chromatographic techniques, spectroscopic methods, and microbial analysis for ensuring product safety and efficacy.

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Course: BIOPHARMACEUTICS AND PHARMACOKINETICS (BP604T)

CO-1 Analyze the principles and concepts of biopharmaceutics and pharmacokinetics, including drug absorption, distribution, metabolism, and elimination.

CO-2: Analyze and evaluate the factors influencing drug bioavailability, including drug formulation, drug solubility, and physiological barriers.

CO-3: Apply knowledge of biopharmaceutics and pharmacokinetics to predict and interpret drug concentration-time profiles, and calculate pharmacokinetic parameters such as clearance, volume of distribution, and half-life.

CO-4: Evaluate and interpret the impact of pharmacokinetics on drug response and dosing regimens, including individual variability, drug-drug interactions, and therapeutic drug monitoring.

CO-5: Analyze the application of biopharmaceutics and pharmacokinetics in drug development, dosage form design, and optimization of drug therapy for individual patients.

Course: PHARMACEUTICAL BIOTECHNOLOGY (BP605T)

CO-1: Analyze the principles and concepts of pharmaceutical biotechnology, including recombinant DNA technology, protein expression, and genetic engineering techniques.

CO-2: Analyze and evaluate the application of biotechnological tools and methods in the production of therapeutic proteins, vaccines, and other biopharmaceuticals.

CO-3: Apply knowledge of pharmaceutical biotechnology to design and optimize bioprocesses for the production, purification, and characterization of biopharmaceutical products.

CO-4: Evaluate and interpret the regulatory guidelines and quality control measures in the development and manufacturing of biotechnological products, including Good Manufacturing Practices (GMP) and validation procedures.

CO-5: Analyze the ethical considerations and implications of pharmaceutical biotechnology, including intellectual property rights, bioethics, and the impact of biotechnological advancements on healthcare and society.

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Mewar University B. Pharmacy

Co

Course: PHARMACEUTICAL QUALITY ASSURANCE (BP606T)

CO-1: Analyze the principles and concepts of pharmaceutical quality assurance, including quality management systems, regulatory requirements, and good manufacturing practices (GMP).

CO-2: Analyze and evaluate quality control methods and techniques used in pharmaceutical manufacturing, including analytical testing, stability studies, and process validation.

CO-3: Apply knowledge of quality assurance principles to establish and maintain quality systems in pharmaceutical manufacturing, including documentation control, deviation management, and change control.

CO-4: Evaluate and interpret regulatory guidelines and standards for pharmaceutical products, including those related to product quality, safety, and efficacy.

CO-5: Analyze the ethical considerations and implications of pharmaceutical quality assurance, including the responsibility for ensuring patient safety, product integrity, and compliance with regulatory requirements.

Course: BIOSTATISTICS AND RESEARCH METHODOLOGY (BP801T)

CO-1: Analyze the principles and concepts of biostatistics, including data collection, analysis, and interpretation in biomedical research.

CO-2: Analyze and evaluate different study designs and sampling techniques used in biomedical research, including observational studies and experimental trials.

CO-3: Apply statistical methods and tools to analyze and interpret data, including hypothesis testing, confidence intervals, regression analysis, and survival analysis.

CO-4: Design and conduct research studies in accordance with ethical principles and regulatory guidelines, including the selection of appropriate study populations, sample sizes, and data collection methods.

CO-5: Analyze the principles and techniques of research methodology, including literature review, study protocol development, data management, and research report writing.

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Course: SOCIAL AND PREVENTIVE PHARMACY (BP802T)

CO-1Analyze the principles and concepts of social and preventive pharmacy, including the role of pharmacists in public health promotion and disease prevention.

CO-2: Analyze and evaluate social determinants of health, including socioeconomic factors, cultural beliefs, and healthcare disparities, and their impact on medication use and health outcomes.

CO-3: Apply knowledge of social and preventive pharmacy to develop and implement health education and promotion programs, including medication adherence, lifestyle modifications, and vaccination campaigns.

CO-4: Evaluate and interpret epidemiological data and research studies to assess the effectiveness and impact of preventive interventions and public health policies.

CO-5: Analyze the ethical considerations and implications of social and preventive pharmacy, including patient advocacy, health equity, and the responsibility of pharmacists in promoting public health and improving healthcare outcomes.

Course: PHARMA MARKETING MANAGEMENT (BP803ET)

CO-1:Analyze the principles and concepts of pharmaceutical marketing management, including market analysis, product positioning, and marketing strategies in the pharmaceutical industry.

CO-2: Analyze and evaluate the marketing mix elements (product, price, place, and promotion) specific to the pharmaceutical sector, considering regulatory requirements, market segmentation, and customer needs.

CO-3: Apply knowledge of pharmaceutical marketing management to develop and implement marketing plans and campaigns for pharmaceutical products, including branding, product launch, and sales promotion strategies.

CO-4: Evaluate and interpret market research data and trends to make informed decisions regarding product development, market entry, and competitive positioning.

CO-5:Analyze the ethical considerations and regulatory guidelines in pharmaceutical marketing, including advertising regulations, pharmaceutical ethics, and the responsible promotion of pharmaceutical products.

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Co

Course: PHARMACEUTICAL REGULATORY SCIENCE (BP804ET)

CO-1: Analyze the principles and concepts of pharmaceutical regulatory science, including the regulatory framework and agencies involved in drug approval and post-marketing surveillance.

CO-2: Analyze and evaluate the regulatory requirements for the development, manufacturing, and marketing of pharmaceutical products, including documentation, quality control, and safety assessments.

CO-3: Apply knowledge of pharmaceutical regulatory science to prepare and submit regulatory dossiers, including applications for drug approval, clinical trial protocols, and post-marketing safety reports.

CO-4: Evaluate and interpret regulatory guidelines and policies related to pharmaceutical products, including those pertaining to labeling, advertising, and pharmacovigilance.

CO-5: Analyze the ethical considerations and implications of pharmaceutical regulatory science, including patient safety, data integrity, and the responsibility of regulatory professionals in ensuring the quality, efficacy, and safety of pharmaceutical products.

Course: PHARMACOVIGILANCE (BP805ET)

CO-1: Analyze the principles and concepts of pharmacovigilance, including the detection, assessment, understanding, and prevention of adverse drug reactions (ADRs).

CO-2: Analyze and evaluate the systems and processes involved in pharmacovigilance, including data collection, reporting, and signal detection of ADRs.

CO-3: Apply knowledge of pharmacovigilance to assess the risks and benefits of pharmaceutical products, including the evaluation of drug safety profiles and the implementation of risk management strategies.

CO-4: Evaluate and interpret regulatory guidelines and requirements for pharmacovigilance, including pharmacovigilance plans, periodic safety update reports, and post-marketing surveillance activities.

CO-5: Evaluate and interpret regulatory guidelines and requirements for the ethical considerations and implications of pharmacovigilance, including patient safety, transparency in reporting, and the role of healthcare professionals in promoting drug safety and monitoring the effectiveness of pharmacotherapy.

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Course: QUALITY CONTROL AND STANDARDIZATION OF HERBALS (BP806ET)

CO-1: Evaluate and interpret regulatory guidelines and requirements for the principles and concepts of quality control and standardization of herbal products, including the identification, authentication, and quality assessment of medicinal plants and herbal materials.

CO-2: Analyze and evaluate the various quality control parameters and analytical techniques used for the determination of active constituents, purity, and safety of herbal products.

CO-3: Apply knowledge of quality control and standardization methods to develop and validate analytical procedures for the quantitative and qualitative analysis of herbal products.

CO-4: Evaluate and interpret regulatory guidelines and standards for quality control and standardization of herbal products, including Good Manufacturing Practices (GMP) and specifications for herbal drugs.

CO-5: Evaluate and interpret regulatory guidelines and requirements for the ethical considerations and implications of quality control and standardization of herbal products, including the importance of ensuring product efficacy, safety, and consistency for consumer health and confidence.

Course: COMPUTER AIDED DRUG DESIGN (BP807ET)

CO-1: Evaluate and interpret regulatory guidelines and requirements for the principles and concepts of computer-aided drug design (CADD), including molecular modeling, virtual screening, and structure-based drug design.

CO-2: Analyze and evaluate the methods and techniques used in CADD, including molecular docking, molecular dynamics simulations, and quantitative structure-activity relationship (QSAR) modeling.

CO-3: Apply knowledge of CADD tools and software to predict and optimize the binding affinity, selectivity, and ADMET properties of drug candidates.

CO-4: Evaluate and interpret computational data and simulations to guide the design and optimization of novel drug molecules, including lead identification and optimization.



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CO-5: Evaluate and interpret regulatory guidelines and requirements for the ethical considerations and limitations of CADD, including the need for experimental validation, intellectual property rights, and the integration of computational methods with experimental approaches in drug discovery and development.

Course: CELL AND MOLECULAR BIOLOGY (BP808ET)

CO-1: Analyze the fundamental principles and concepts of cell and molecular biology, including cell structure, function, and organization, as well as molecular processes within cells.

CO-2: Analyze and evaluate cellular processes, including cell signaling, gene expression, DNA replication, transcription, and translation.

CO-3: Apply knowledge of cell and molecular biology to understand the mechanisms of disease development, including genetic disorders, cancer, and infectious diseases.

CO-4: Evaluate and interpret experimental data and techniques used in cell and molecular biology, including microscopy, molecular cloning, PCR, gel electrophoresis, and protein analysis.

CO-5: Analyze the ethical considerations and implications of cell and molecular biology, including responsible conduct of research, genetic engineering, and the impact of biotechnological advancements on society and healthcare.

Course: COSMETIC SCIENCE (BP809ET)

CO-1: Analyze the principles and concepts of cosmetic science, including the formulation, production, and regulation of cosmetic products.

CO-2: Analyze and evaluate the ingredients used in cosmetic formulations, including their safety, efficacy, and compatibility with different skin types.

CO-3: Apply knowledge of cosmetic science to develop and optimize cosmetic formulations, considering factors such as stability, texture, sensory attributes, and desired effects.

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CO-4: Evaluate and interpret the regulatory guidelines and standards for cosmetic products, including labeling requirements, claims substantiation, and compliance with cosmetic regulations.

CO-5: Analyze the ethical considerations and implications of cosmetic science, including consumer safety, product testing, and the role of cosmetic scientists in promoting responsible and sustainable cosmetic practices.

Course: PHARMACOLOGICAL SCREENING METHODS (BP810ET)

CO-1: Analyze the principles and concepts of pharmacological screening methods, including in vitro, ex vivo, and in vivo assays used to evaluate the pharmacological activity of drugs and compounds.

CO-2: Analyze and evaluate different pharmacological screening techniques, including receptor binding assays, enzyme inhibition assays, cell-based assays, and animal models.

CO-3: Apply knowledge of pharmacological screening methods to design and conduct experiments for the evaluation of drug efficacy, potency, and mechanism of action.

CO-4: Evaluate and interpret experimental data and results obtained from pharmacological screening assays, including dose-response relationships, statistical analysis, and the identification of potential lead compounds.

CO-5: Evaluate the ethical considerations and implications of pharmacological screening methods, including animal welfare, research ethics, and the responsible use of experimental models in drug discovery and development.

Course: ADVANCED INSTRUMENTATION TECHNIQUES (BP811ET)

CO-1: Evaluate the principles and concepts of advanced instrumentation techniques used in pharmaceutical analysis and research.

CO-2: Analyze and evaluate the capabilities and limitations of various advanced instrumentation techniques, including spectroscopy (UV-Vis, IR, NMR), chromatography (HPLC, GC), mass spectrometry, and microscopy.

CO-3: Apply knowledge of advanced instrumentation techniques to design and perform experiments for the analysis and characterization of pharmaceutical compounds and formulations.

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CO-4: Evaluate and interpret instrumental data obtained from advanced techniques, including spectral interpretation, peak identification, quantification, and structural elucidation.

CO-5: Evaluate the ethical considerations and implications of using advanced instrumentation techniques in pharmaceutical analysis, including data integrity, calibration, validation, and compliance with regulatory requirements.

Course: DIETARY SUPPLEMENTS AND NUTRACEUTICALS (BP812ET)

CO-1: Evaluate the principles and concepts of dietary supplements and nutraceuticals, including their definition, classification, and regulatory framework.

CO-2: Analyze and evaluate the different types of dietary supplements and nutraceuticals, including vitamins, minerals, herbal supplements, and functional foods, as well as their sources, composition, and health benefits.

CO-3: Apply knowledge of dietary supplements and nutraceuticals to assess their safety, efficacy, and quality, including considerations of dosage, bioavailability, interactions, and adverse effects.

CO-4: Evaluate and interpret scientific research and clinical evidence related to dietary supplements and nutraceuticals, including their role in disease prevention, health promotion, and therapeutic applications.

CO-5: Evaluate the ethical considerations and implications of dietary supplements and nutraceuticals, including consumer education, product labeling, marketing claims, and the responsibility of healthcare professionals in providing evidence-based guidance to patients.

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PROGRAMME OUTCOMES

- **PO1-Applied Pharmacy Knowledge:** Possess knowledge of the core and fundamental principles associated with modern pharmaceutical technologies, biopharmaceutics, drug regulatory affairs, formulation and evaluation of novel drug delivery systems.
- **PO2-Research and development:** Utilize skills for the development of new drug delivery approaches for diverse type of active pharmaceutical ingredients. Demonstrate an understanding of the computer-aided processes required to conduct pharmaceutical research.
- **PO3-Problem analysis:** Develop ability for in depth analytical and critical thinking in order to identify, formulate and solve the issues related to pharmaceutical development, manufacturing and regulatory processes.
- **PO4-Modern tool usage:** Select modern formulation optimization technologies with application of statistical hypothesis testing during development and evaluation of nano formulations. Use in silico approaches for biopharmaceutical studies.
- **PO5-Communication:** Make effective documentation, report writing and presentations. Learn communication skills in order to execute the responsibilities successfully towards development of an expertise as per the needs of pharmaceutical industry and academia.
- **PO6- Professional identity:** Demonstrate typical professional, legal manners, conforming with all the guidelines of regulatory bodies. Contribute to the training of pharmacy students and the growth and success of pharmacy profession.
- **PO7- Leadership skills:** Demonstrate the ability to implement plans and organize tasks within deadlines in the areas of research and manufacturing. Able to apply skills related to management of resources.
- **PO8- Planning abilities:** Develop and apply skills for planning and executing activities related to formulation development, manufacturing and regulatory filings.
- **PO9- Pharmaceutical ethics:** Demonstrate a high degree of honesty and fairness. Apply ethical principles while making decisions and take accountability for the outcomes related to the decisions.

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- **PO10- Environmental sustainability:** Address the issues of environmental pollution, industrial waste, utilization of huge amount of water by applying skills to improve production processes and to ensure environmental sustainability.
- **PO11- Life-long learning:** Ability to involve in independent and continuous learning process as per the need and technological advancements. Use of feedback from other professionals and identification of learning requirements for life-long learning improvement. Understand the role of conferences, seminars and workshops for knowledge progression

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PROGRAM SPECIFIC OUTCOMES

PSD

- **PSO1** : Work in different divisions of pharmaceutical industry like manufacturing, quality control, quality assurance, analytical research, formulation research and regulatory affairs.
- **PSO2** : Become an entrepreneur in the areas of formulation research and development, pharmaceutical manufacturing, pharmaceutical consultancy services, drug sales and distribution.
- **PSO3** : Explore opportunities in different government and non-government organizations as drug analyst, academician, research scientist and drug inspector.

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Course Outcomes

Co

Course: Modern Pharmaceutical Analytical Techniques (MQA101T)

CO-1 Apply advanced analytical techniques, such as chromatography, spectroscopy, and mass spectrometry, to analyze pharmaceutical substances and products accurately.

CO-2 Demonstrate proficiency in operating modern instruments and equipment, such as High-Performance Liquid Chromatography (HPLC), Fourier Transform Infrared Spectroscopy (FTIR), and Gas Chromatography (GC), for pharmaceutical analysis.

CO-3 Evaluate and interpret analytical data obtained from various techniques to ensure the quality, purity, and potency of pharmaceutical substances and products.

CO-4 Implement principles and practices of method development and validation in pharmaceutical analysis, ensuring reliable and reproducible results.

CO-5 Stay updated with emerging trends and advancements in modern pharmaceutical analytical techniques and their applications in drug discovery, development, and quality control.

Course Outcomes

Course: Quality Management System (MQA102T)

CO-1: Identify and explain the key principles and concepts of a quality management system (QMS) in the context of the pharmaceutical industry, including regulatory requirements and international standards.

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CO-2: Analyze the components and elements of a QMS, such as documentation, training, change control, risk management, and deviation management, to ensure compliance with quality standards and regulations in pharmaceutical manufacturing.

CO-3: Apply quality assurance principles and techniques to assess, control, and improve processes and procedures in pharmaceutical manufacturing, with a focus on maintaining product quality, safety, and efficacy.

CO-4: Evaluate the effectiveness of quality control measures, including sampling plans, analytical methods, and stability testing, to ensure the reliability and accuracy of analytical data for pharmaceutical products.

CO-5: Formulate strategies for continuous quality improvement, including the implementation of corrective and preventive actions, internal audits, and management reviews, to enhance the overall performance and compliance of a pharmaceutical quality management system.

Course outcomes

Course: Quality Control and Quality Assurance (MQA103T)

CO-1 Apply quality control principles and techniques to ensure the consistent quality of products or services in accordance with established standards and specifications.

CO-2 Develop and implement quality assurance systems and processes to monitor and improve product or service quality throughout the entire lifecycle.

CO-3 Utilize statistical tools and techniques for quality control, such as control charts, sampling plans, and process capability analysis.

CO-4 Identify and analyze quality issues and deviations, and implement corrective and preventive actions to address them effectively.

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CO-5 Comply with relevant quality standards and regulation

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Course outcomes

Course: Product Development and Technology Transfer (MQA104T)

CO-1: Identify and describe the key stages and processes involved in pharmaceutical product development, including research and development, formulation design, process optimization, and scale-up.

CO-2: Evaluate the regulatory requirements and guidelines for pharmaceutical product development and technology transfer, including documentation, validation, and regulatory submissions, to ensure compliance with industry standards.

CO-3: Analyze and apply scientific principles, experimental design, and statistical techniques to optimize formulation and manufacturing processes during product development, with a focus on achieving desired product attributes and ensuring product stability.

CO-4: Assess the risks and challenges associated with technology transfer in the pharmaceutical industry, including intellectual property considerations, process validation, and supply chain management, to facilitate successful and efficient transfer of technology from development to commercialization.

CO-5: Develop comprehensive strategies and plans for effective product development and technology transfer, incorporating considerations of quality, safety, regulatory compliance, and cost-effectiveness, to facilitate the successful launch and commercialization of pharmaceutical products.

Course outcomes

Course: Hazards and Safety Management (MQA201T)

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CO-1: Identify and classify the various hazards, including chemical, biological, physical, and ergonomic hazards, present in pharmaceutical manufacturing and laboratory environments, and understand their potential impact on safety.

CO-2: Analyze and evaluate the principles and practices of occupational health and safety management in the pharmaceutical industry, including hazard identification, risk assessment, and implementation of control measures to mitigate workplace hazards.

CO-3: Interpret and comply with relevant regulations, standards, and guidelines pertaining to occupational health and safety in pharmaceutical manufacturing, such as Good Manufacturing Practices (GMP), Good Laboratory Practices (GLP), and Occupational Safety and Health Administration (OSHA) guidelines.

CO-4: Develop and implement effective safety protocols and procedures in pharmaceutical manufacturing and laboratory settings, including emergency response plans, personal protective equipment (PPE) requirements, and safe handling of hazardous substances.

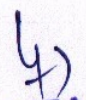
CO-5: Formulate strategies for continuous improvement of safety management systems in the pharmaceutical industry, including monitoring and auditing of safety performance, training and awareness programs, and fostering a culture of safety and accountability among personnel.

Course outcomes

Course: Pharmaceutical Validation (MQA202T)

CO-1: Identify and describe the regulatory requirements and guidelines for pharmaceutical validation, including validation plans, protocols, and reports, to ensure compliance with industry standards and regulatory expectations.

CO-2: Analyze and apply the principles and techniques of validation, such as process validation, analytical method validation, and cleaning validation, to demonstrate the consistency, reliability, and accuracy of pharmaceutical manufacturing processes.


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CO-3: Evaluate the different types of validation studies, including prospective, concurrent, and retrospective validation, and determine the appropriate validation approach based on the specific requirements of pharmaceutical products and processes.

CO-4: Interpret and analyze validation data and results, utilizing statistical tools and techniques, to ensure the robustness and reliability of pharmaceutical manufacturing processes and analytical methods.

CO-5: Develop validation protocols and execute validation studies in pharmaceutical manufacturing and quality control laboratories, ensuring the documentation of all activities and the effective communication of validation outcomes and recommendations.

Course outcomes

Course: Audits and Regulatory Compliance (MQA203T)

CO-1: Identify and explain the principles, objectives, and importance of audits and regulatory compliance in the pharmaceutical industry, including the roles and responsibilities of regulatory bodies and the impact of non-compliance.

CO-2: Evaluate the regulatory requirements and guidelines applicable to pharmaceutical manufacturing, quality control, and distribution, and understand the processes and procedures involved in regulatory inspections and audits.

CO-3: Analyze and interpret quality management systems and documentation, such as Standard Operating Procedures (SOPs), batch records, and validation reports, to ensure compliance with regulatory standards and guidelines.

CO-4: Develop and implement audit plans and protocols, including internal and external audits, to assess and evaluate compliance with regulatory requirements and identify areas for improvement.

CO-5: Formulate strategies and recommendations to address findings from audits and inspections, ensuring corrective and preventive actions are implemented to maintain regulatory compliance and improve overall quality performance in the pharmaceutical industry.

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Course outcomes

Course: Pharmaceutical Manufacturing Technology (MQA204T)

CO-1: Identify and describe the key principles and concepts of pharmaceutical manufacturing technology, including unit operations, process design, and equipment selection, to ensure efficient and effective production of pharmaceutical products.

CO-2: Evaluate the different manufacturing technologies used in the pharmaceutical industry, such as granulation, compression, coating, and sterilization, and understand their advantages, limitations, and regulatory considerations.

CO-3: Analyze and optimize pharmaceutical manufacturing processes, incorporating principles of quality by design (QbD), process analytical technology (PAT), and lean manufacturing, to enhance process efficiency, product quality, and regulatory compliance.

CO-4: Interpret and apply Good Manufacturing Practices (GMP) and other regulatory guidelines to ensure compliance with quality standards and regulations throughout the pharmaceutical manufacturing process, from raw material procurement to finished product packaging.

CO-5: Develop and implement strategies for continuous improvement in pharmaceutical manufacturing technology, including process optimization, validation, and scale-up, to enhance productivity, quality, and cost-effectiveness in pharmaceutical production.

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Course Outcomes

Co

Course: Modern Pharmaceutical Analytical Techniques (MQA101T)

- CO-1** Apply advanced analytical techniques, such as chromatography, spectroscopy, and mass spectrometry, to analyze pharmaceutical substances and products accurately.
- CO-2** Demonstrate proficiency in operating modern instruments and equipment, such as High-Performance Liquid Chromatography (HPLC), Fourier Transform Infrared Spectroscopy (FTIR), and Gas Chromatography (GC), for pharmaceutical analysis.
- CO-3** Evaluate and interpret analytical data obtained from various techniques to ensure the quality, purity, and potency of pharmaceutical substances and products.
- CO-4** Implement principles and practices of method development and validation in pharmaceutical analysis, ensuring reliable and reproducible results.
- CO-5** Stay updated with emerging trends and advancements in modern pharmaceutical analytical techniques and their applications in drug discovery, development, and quality control.

Course Outcomes

Course: Drug Delivery System (MQA102T)

- CO-1** Vaccine delivery and different mode of application approach for clinical use.
- CO-2** Drug delivery system give a detailed information transporting a pharmaceutical compound in the body as needed to safely achieve its desired therapeutic effect.
- CO-3** They know the different types of Drug carrier used in the process of drug delivery which serves to improve the selectivity, effectiveness, and/or safety of drug administration.
- CO-4** Recent developments in protein and peptide for parenteral delivery approaches will give new dimension of drug deliver for antibiotics, insulin, etc.

Course Outcomes

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Co

Course: Modern Pharmaceutics (MQA103T)

- CO-1** To apply the knowledge on preformulation studies for the dosage form development.
- CO-2** To apply the knowledge of optimization techniques to formulation processing and development.
- CO-3** To use the knowledge of validation techniques as per internationally accepted guidelines.
- CO-4** To demonstrate the principles of cGMP and industrial management during planning of industrial Quality management.

Course Outcomes

Course: Regulatory Affair (MQA104T)

- CO-1** The Concepts of innovator and generic drugs, drug development process.
- CO-2** The Regulatory guidance's and guidelines for filing and approval process.
- CO-3** Preparation of Dossiers and their submission to regulatory agencies in different countries.
- CO-4** Post approval regulatory requirements for actives and drug products.
- CO-5** Submission of global documents in CTD/ eCTD formats.
- CO-6** Clinical trials requirements for approvals for conducting clinical trials.
- CO-7** Pharmacovigilance and process of monitoring in clinical trials.

Course Outcomes

Course: Molecular Pharmaceutics (Nano Tech and TargetedDDS) (MQA201T)

- CO-1** Molecular Pharmaceutics (Nano Tech and Targeted DDS).
- CO-2** Advanced Biopharmaceutics & Pharmacokinetics.

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Mewar University **Master of Pharmacy** **(Pharmaceutics)**

CO-3 Computer Aided Drug Delivery System.

CO-4 Cosmetic and Cosmeceuticals.

Course Outcomes

Course: Advanced Biopharmaceutics & Pharmacokinetics (MQA202T)

CO-1 The basic concepts in biopharmaceutics and pharmacokinetics.

CO-2 The use raw data and derive the pharmacokinetic models and parameters the best describe the process of drug absorption, distribution, metabolism and elimination.

CO-3 The critical evaluation of biopharmaceutic studies involving drug product equivalency.

CO-4 The potential clinical pharmacokinetic problems and application of basics of pharmacokinetic.

Course Outcomes

Course: Computer Aided Drug Delivery System (MQA203T)

CO-1 To Overview the concepts of computers in pharmaceutical research and development and QBD.

CO-2 To study the basic concepts of computational modeling of drug disposition and introduction to modeling techniques including drug absorption, solubility, permeation, ADME, Active transport.

CO-3 To gain the knowledge of computer aided formulation development and to know the optimization parameters and factorial design.

CO-4 To understand the aspects of biopharmaceutical characterization through computer aided techniques.

CO-5 To go through the advantages and disadvantages of artificial intelligence and robotics and to understand the basics of fluid dynamics and the challenges and opportunities.

Course Outcomes

Course: Cosmetic and Cosmeceuticals (MQA204T)

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CO-1 Know regulatory requirements relating to manufacture of cosmetics, import of cosmetics and misbranded and spurious cosmetics.

CO-2 Understand the biological aspects of structure of skin relating problems and structure of hair and hair growth cycle and common problems associated with oral cavity.

CO-3 Explain and understand building blocks for different product formulations of cosmetics and Cosmeceuticals.

CO-4 Understand and design the different cosmetical products addressing skin, hair and oral cavity.


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PROGRAMME OUTCOMES

- **PO1-Applied Pharmacy Knowledge:** Possess knowledge of the core and fundamental principles associated with modern pharmaceutical technologies, biopharmaceutics, drug regulatory affairs, formulation and evaluation of novel drug delivery systems.
- **PO2-Research and development:** Utilize skills for the development of new drug delivery approaches for diverse type of active pharmaceutical ingredients. Demonstrate an understanding of the computer-aided processes required to conduct pharmaceutical research.
- **PO3-Problem analysis:** Develop ability for in depth analytical and critical thinking in order to identify, formulate and solve the issues related to pharmaceutical development, manufacturing and regulatory processes.
- **PO4-Modern tool usage:** Select modern formulation optimization technologies with application of statistical hypothesis testing during development and evaluation of nano formulations. Use in silico approaches for biopharmaceutical studies.
- **PO5-Communication:** Make effective documentation, report writing and presentations. Learn communication skills in order to execute the responsibilities successfully towards development of an expertise as per the needs of pharmaceutical industry and academia.
- **PO6- Professional identity:** Demonstrate typical professional, legal manners, conforming with all the guidelines of regulatory bodies. Contribute to the training of pharmacy students and the growth and success of pharmacy profession.
- **PO7- Leadership skills:** Demonstrate the ability to implement plans and organize tasks within deadlines in the areas of research and manufacturing. Able to apply skills related to management of resources.
- **PO8- Planning abilities:** Develop and apply skills for planning and executing activities related to formulation development, manufacturing and regulatory filings.
- **PO9- Pharmaceutical ethics:** Demonstrate a high degree of honesty and fairness. Apply ethical principles while making decisions and take accountability for the outcomes related to the decisions.

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- **PO10- Environmental sustainability:** Address the issues of environmental pollution, industrial waste, utilization of huge amount of water by applying skills to improve production processes and to ensure environmental sustainability.
- **PO11- Life-long learning:** Ability to involve in independent and continuous learning process as per the need and technological advancements. Use of feedback from other professionals and identification of learning requirements for life-long learning improvement. Understand the role of conferences, seminars and workshops for knowledge progression

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Master of Pharmacy
(Pharmaceutics)
PROGRAM SPECIFIC OUTCOMES

- **PSO1** : Work in different divisions of pharmaceutical industry like manufacturing, quality control, quality assurance, analytical research, formulation research and regulatory affairs.
- **PSO2** : Become an entrepreneur in the areas of formulation research and development, pharmaceutical manufacturing, pharmaceutical consultancy services, drug sales and distribution.
- **PSO3** : Explore opportunities in different government and non-government organizations as drug analyst, academician, research scientist and drug inspector.

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