MAR DIOSCORUS COLLEGE OF PHARMACY
(Owned & Managed by the Charitable & Educational Society of the Thiruvananthapuram Orthodox Diocese Reg. No. 977/91)
Hermongiri Vidyapeetam, Alathara, Sreekariyam
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COURSE OBJECTIVES

PROGRAMME: B. PHARM

Sl. No	Name of the Course	Course Objectives
	SEMESTER 1	
1.	**BP101T** **Human Anatomy and Physiology-I**	Upon completion of this course the student shall be able to 1. Explain the gross morphology, structure and functions of various organs of the human body. 2. Describe the various homeostatic mechanisms and their imbalances. 3. Identify the various tissues and organs of different systems of the human body. 4. Appreciate coordinated working pattern of different organs of each system 5. Appreciate the coordinated working pattern of different organs of each system.
2.	**BP102T** **Pharmaceutical Analysis- I**	Upon completion of this course the student shall be able to 1. Understand the principles of volumetric and electro chemical analysis 2. Carryout various volumetric and electrochemical titrations 3. Develop analytical skills
3.	**BP103T** **Pharmaceutics-I**	Upon completion of this course the student shall be able to 1. Know the history of profession of pharmacy 2. Understand the basics of different dosage forms, pharmaceutical incompatibilities and pharmaceutical calculations 3. Understand the professional way of handling the prescription 4. Preparation of various conventional dosage forms

4.	**BP104T Pharmaceutical Inorganic Chemistry**	Upon completion of this course the student shall be able to 1. Understand sources of impurities and perform official limit tests in pharmaceuticals. 2. Apply principles of acids, bases, buffers, electrolytes, and isotonic solutions in pharmaceutical systems. 3. Identify preparation, properties, and uses of inorganic pharmaceutical agents. 4. Perform limit, identification, purity tests, and preparation of inorganic pharmaceuticals. 5. Understand fundamentals and applications of radiopharmaceuticals and radiation safety.
5.	**BP105T Communication Skills**	Upon completion of this course the student shall be able to 1.Understand the behavioural needs for a Pharmacist to function effectively in the areas of pharmaceutical operation 2.Communicate effectively (Verbal and Non-Verbal) 3.Effectively manage the team as a team player 4.Develop interview skills 5.Develop Leadership qualities and essentials
6.	**BP106RBT Remedial Biology**	Upon completion of this course the student shall be able to 1. Know the classification and salient features of five kingdoms of life 2. Understand the basic components of anatomy & physiology of plant 3. Know understand the basic components of anatomy & physiology animal with special reference to human
	BP106RMT Remedial Mathematics	Upon completion of this course the student shall be able to 1. Know the theory and their application in Pharmacy 2. Solve the different types of problems by applying theory 3. Appreciate the important application of mathematics in Pharmacy
7.	**BP107P Human Anatomy and Physiology-I**	Upon completion of this course the student shall be able to 1. To perform the hematological tests like blood cell counts, hemoglobin estimation, bleeding/ clotting time etc. 2. Record blood pressure, heart rate, pulse and respiratory volume. 3. Identify various tissues of our body. 4. Identify and explain the characteristics features of the bones of axial and appendicular skeleton.

8.	**BP108P** **Pharmaceutical Analysis-I**	Upon completion of this course the student shall be able to 1. Understand the principles of volumetric and electro chemical analysis 2. Carryout various volumetric and electrochemical titrations 3. Develop analytical skills
9.	**BP109P** **Pharmaceutics-I**	Upon completion of this course the student shall be able to 1. Know the history of profession of pharmacy 2. Understand the basics of different dosage forms, pharmaceutical incompatibilities and pharmaceutical calculations 3. Understand the professional way of handling the prescription 4. Preparation of various conventional dosage forms
10.	**BP110P** **Pharmaceutical Inorganic Chemistry**	Upon completion of this course the student shall be able to 1. Perform pharmacopoeial limit tests for inorganic impurities. 2. Identify inorganic pharmaceutical substances. 3. Assess purity and quality of inorganic pharmaceuticals. 4. Prepare selected inorganic pharmaceutical compounds. 5. Practice safe and accurate pharmaceutical laboratory techniques.
11.	**BP111P** **Communication Skills**	Upon completion of this course the student shall be able to 1. Demonstrate effective basic verbal communication in everyday and professional interactions. 2. Apply appropriate questioning skills and conversational etiquette in group discussions. 3. Exhibit confidence and clarity while interacting in English using correct do's and don'ts.

12.	**BP112RBP** **Remedial Biology**	Upon completion of this course the student shall be able to 1. Know the classification and salient features of five kingdoms of life 2. Understand the basic components of anatomy & physiology of plant 3. Know understand the basic components of anatomy & physiology animal with special reference to human
SEMESTER II		
13.	**BP201T** **Human anatomy and Physiology-II**	Upon completion of this course the student shall be able to 1. Explain the gross morphology, structure and functions of various organs of the human body. 2. Describe the various homeostatic mechanisms and their imbalances. 3. Identify the various tissues and organs of different systems of human body. 4. Perform the hematological tests like blood cell counts, hemoglobin estimation, bleeding/ clotting time etc. and also record blood pressure, heart rate, pulse and respiratory volume. 5. Appreciate coordinated working pattern of different organs of each system 6. Appreciate the interlinked mechanisms in the maintenance of normal functioning (homeostasis) of human body.
14.	**BP202T** **Pharmaceutical Organic Chemistry-I**	Upon completion of this course the student shall be able to 1. Write the structure, name and the type of isomerism of the organic compound 2. Write the reaction, name the reaction and orientation of reactions 3. Account for reactivity/stability of compounds, 4. Identify/confirm the identification of organic compound

15.	**BP 203T** **Biochemistry**	Upon completion of this course the student shall be able to 1. Understand the structure, function, and biochemical roles of biomolecules such as carbohydrates, lipids, proteins, nucleic acids, and enzymes. 2. Explain bioenergetics and metabolic pathways of carbohydrates, lipids, and proteins, including their regulation. 3. Describe the digestion, absorption, and metabolism of nutrients and their significance in normal physiology. 4. Understand the importance of vitamins, coenzymes, and hormones in biochemical processes. 5. Explain nucleic acid metabolism and protein synthesis and their relevance to human health and disease. 6. Understand biochemical aspects of clinical conditions such as diabetes, jaundice, and metabolic disorders. 7. Apply biochemical knowledge to pharmaceutical and clinical sciences, including the role of biomarkers and biochemical investigations.
16.	**BP 204T** **Pathophysiology**	Upon completion of this course the student shall be able to 1. Describe the etiology and pathogenesis of the selected disease states; 2. Name the signs and symptoms of the diseases; and 3. Mention the complications of the diseases
17.	**BP205T** **Computer Applications in Pharmacy**	Upon completion of this course the student shall be able to 1. Know the various types of application of computers in pharmacy 2. Know the various types of databases 3. Know the various applications of databases in pharmacy
18.	**BP206T** **Environmental Sciences**	Upon completion of this course the student shall be able to 1. Create awareness about environmental problems among learners. 2. Impart basic knowledge about the environment and its allied problems. 3. Develop an attitude of concern for the environment. 4. Motivate learners to participate in environment protection and environment improvement. 5. Acquire skills to help the concerned individuals in identifying and solving environmental problems. 6. Strive to attain harmony with nature.

19.	**BP207P** **Human anatomy and Physiology-II**	Upon completion of this course the student shall be able to 1. Explain the gross morphology, structure and functions of various organs of the human body. 2. Describe the various homeostatic mechanisms and their imbalances. 3. Identify the various tissues and organs of different systems of human body. 4. Perform the hematological tests like blood cell counts, hemoglobin estimation, bleeding/ clotting time etc. and also record blood pressure, heart rate, pulse and respiratory volume. 5. Appreciate coordinated working pattern of different organs of each system 6. Appreciate the interlinked mechanisms in the maintenance of normal functioning (homeostasis) of human body.
20.	**BP208P** **Pharmaceutical Organic Chemistry-I**	Upon completion of this course the student shall be able to 1. To develop skills in the systematic qualitative analysis of unknown organic compounds using preliminary tests and elemental analysis. 2. To enable students to perform Lassaigne's test for the detection of nitrogen, sulphur, and halogens in organic compounds. 3. To train students in conducting solubility tests and using them for the classification of organic compounds. 4. To impart knowledge and practical ability in identifying functional groups such as phenols, amines, acids, alcohols, aldehydes, ketones, esters, carbohydrates, nitro compounds, and anilides. 5. To familiarize students with the determination of melting point and boiling point and their use in compound identification.

21.	**BP209P** **Biochemistry**	Upon completion of this course the student shall be able to 1. Perform qualitative analysis of carbohydrates, proteins, and lipids and identify them using standard biochemical tests. 2. Carry out quantitative estimations of biomolecules such as glucose, urea, creatinine, cholesterol, or proteins using appropriate biochemical methods. 3. Understand the principles and applications of common clinical biochemical tests used in diagnostic laboratories. 4. Perform enzyme assays and study factors affecting enzyme activity. 5. Handle laboratory instruments and reagents properly and follow standard laboratory safety and good laboratory practices. 6. Interpret experimental results and correlate them with clinical significance.
22.	**BP210P** **Computer Applications in Pharmacy**	Upon completion of this course the student shall be able to 1. Know the various types of application of computers in pharmacy 2. Know the various types of databases 3. Know the various applications of databases in pharmacy
SEMESTER- III		
23.	**BP301T** **Pharmaceutical Organic Chemistry-I**	Upon completion of this course the student shall be able to 1. To provide fundamental understanding of the structure, aromaticity ,resonance and reactivity of benzene and its derivatives. 2. To impart knowledge on electrophilic substitution reactions of aromatic compounds and influence of substituents on reactivity and orientation. 3. To familiarize the students with chemistry, properties and application of phenols, aromatic amines and some industrially important organic compounds.

24.	**BP302T** **Physical Pharmaceutics-I**	Upon completion of this course the student shall be able to 1. To provide a thorough understanding of drug solubility principles. 2. To explain the states of matter and physicochemical properties of drug molecules. 3. To develop knowledge of micromeritic properties of powders. 4. To introduce the principles of complexation and protein binding. 5. To impart practical and theoretical knowledge of pH, buffer systems, and isotonic solutions.
25.	**BP303T** **Pharmaceutical Microbiology**	Upon completion of this course the student shall be able to 1. Understand methods of identification, cultivation and preservation of various microorganisms 2. Importance of sterilization in microbiology and pharmaceutical industry 3. Learn sterility testing of pharmaceutical products. 4. Microbiological standardization of Pharmaceuticals. 5. Understand the cell culture technology and its applications in pharmaceutical industries
26.	**BP304T** **Pharmaceutical Engineering**	Upon completion of this course the student shall be able to 1. To know various unit operations used in Pharmaceutical industries. 2. To understand the material handling techniques. 3. To perform various processes involved in pharmaceutical manufacturing process. 4. To carry out various test to prevent environmental pollution. 5. To appreciate and comprehend significance of plant lay out design for optimum use of resources. 6. 6. To appreciate the various preventive methods used for corrosion control in Pharmaceutical industries.
27.	**BP305P** **Pharmaceutical organic chemistry-II**	Upon completion of this course the student shall be able to 1. To familiarize students with the synthesis of organic compounds 2. To develop practical skills in analysing the oils. 3. To enhance analytical and interpretative skills of mechanism of reactions. 4. To provide hands-on experience in recrystallization of organic compounds.

28.	**BP306P Physical Pharmaceutics-I**	Upon completion of this course the student shall be able to 1. To familiarize students with experimental methods for determining solubility, pKa, and partition coefficient of drugs. 2. To develop practical skills in evaluating micromeritic properties. 3. To enable students to apply physicochemical principles 4. To provide hands-on experience in studying drug–drug and metal–ligand complexes, including determination of stability constants and donor–acceptor ratios. 5. To enhance analytical and interpretative skills for generating, analyzing, and correlating experimental data with theoretical concepts relevant to pharmaceutical formulation and drug delivery systems.
29.	**BP307P** **Pharmaceutical Microbiology**	Upon completion of this course the student shall be able to 1. To familiarize students with the operation and applications of basic microbiology laboratory equipment. 2. To develop skills in sterilization techniques and preparation of culture media. 3. To enable students to culture, isolate, and maintain pure bacterial and fungal cultures. 4. To train students in staining, motility testing, and biochemical identification of microorganisms. 5. To impart practical knowledge in microbiological assays, and sterility testing relevant to pharmaceuticals.
30.	**BP308P** **Pharmaceutical Engineering**	Upon completion of this course the student shall be able to 1. To know various unit operations used in Pharmaceutical industries. 2. To understand the material handling techniques. 3. To perform various processes involved in pharmaceutical manufacturing process. 4. To carry out various test to prevent environmental pollution. 5. To appreciate and comprehend significance of plant lay out design for optimum use of resources. 6. To appreciate the various preventive methods used for corrosion control in Pharmaceutical industries.

SEMESTER- IV		
31.	**BP 401T** **Pharmaceutical Organic Chemistry-III**	Upon completion of this course the student shall be able to 1. Understand the methods of preparation and properties of organic compounds. 2. Explain the stereochemical aspects of organic compounds and stereochemical reactions. 3. Know the medicinal uses and other applications of organic compounds.

32.	**BP402T** **Medicinal Chemistry- I**	Upon completion of this course the student shall be able to 1. Understand the physicochemical properties of drugs affecting biological action. 2. Co-relate the structural activity relationship of medicinal compounds with their pharmacological action. 3. Understand the chemistry of various medicinal compounds under different classifications. 4. Learn the method of synthesis of selected classes of drugs considering relevant chemical principles.
33.	**BP403T** **Physical Pharmaceutics II**	Upon completion of this course the student shall be able to 1. Apply the principles of kinetics and stability to predict, evaluate, and enhance the shelf life and quality of pharmaceutical products. 2. Analyze and apply Rheological and mechanical principles to optimize formulation, processing, and performance of pharmaceutical and other material systems. 3. Understand the principles of Emulsions and Suspensions in formulation, stability, and rheological properties of suspensions and emulsions and their significance in product design, processing, and performance. 4. Provide students with a fundamental understanding of Surface and interfacial phenomena and their critical role in pharmaceutical sciences and product development. 5. Know the importance of Colloidal systems in drug delivery, stability, and product performance.

34.	**BP404T** **Pharmacology I**	Upon completion of this course the student shall be able to 1. Understand the pharmacological actions of different categories of drugs 2. Explain the mechanism of drug action at organ system/sub cellular/ macromolecular levels. 3. Apply the basic pharmacological knowledge in the prevention and treatment of various diseases. 4. Observe the effect of drugs on animals by simulated experiments 5. Appreciate correlation of pharmacology with other bio medical sciences

35.	**BP405T Pharmacognosy and Phytochemistry-I**	Upon completion of this course the student shall be able to 1. To know the techniques in the cultivation and production of crude drugs 2. To know the crude drugs, their uses and chemical nature 3. To know the evaluation techniques for the herbal drugs 4. To carry out the microscopic and morphological evaluation of crude drugs
36.	**BP406P Medicinal Chemistry-I**	Upon completion of this course the student shall be able to 1. To impart practical knowledge on the synthesis of important pharmaceutical intermediates and drug molecules such as heterocyclic compounds, esters, barbiturates, and anticonvulsants using standard laboratory techniques. 2. To develop skills in performing qualitative and quantitative analysis of drugs through titrimetric, non-aqueous, and spectrophotometric assay methods as per pharmacopoeial standards. 3. To enable students to understand reaction mechanisms, purification methods, and yield calculations involved in organic synthesis of medicinal compounds. 4. To train students in physicochemical evaluation of drugs, including determination of partition coefficient to assess lipophilicity and drug absorption characteristics. 5. To cultivate good laboratory practices, analytical accuracy, and safe handling of chemicals and instruments for effective pharmaceutical experimentation and quality control.

37.	**BP407P Physical Pharmaceutics-II**	Upon completion of this course the student shall be able to 1.To determine the Surface tension of liquids by different methods. 2: To understand the concept of HLB number & Critical micellar concentration of surfactants. 3. To understand the concepts of Rheology and the ability to determine viscosity using Viscometers. 4: To analyze the settling behaviour in suspensions 5: To understand the principles of Chemical kinetics & to determine reaction rate constant of First order and Second

38.	**BP408P Pharmacology-I**	Upon completion of this course the student shall be able to 1. Understand the pharmacological actions of different categories of drugs 2. Explain the mechanism of drug action at organ system/sub cellular/ macromolecular levels. 3. Apply the basic pharmacological knowledge in the prevention and treatment of various diseases. 4. Observe the effect of drugs on animals by simulated experiments 5. Appreciate correlation of pharmacology with other bio medical sciences

39.	**BP409P Pharmacognosy And Phytochemistry-I**	Upon completion of this course the student shall be able to 1. To identify and analyze crude drugs using chemical and microscopic evaluation techniques. 2. To determine quantitative microscopic parameters such as stomatal number, stomatal index, vein islet number, vein termination number, and palisade ratio. 3. To perform micrometric measurements of starch grains, calcium oxalate crystals, and fibers using an eyepiece micrometer. 4. To evaluate physicochemical constants of crude drugs including ash values, extractive values, moisture content, swelling index, and foaming index. 5. To develop practical skills for quality control and standardization of herbal drugs as per pharmacognostical standards
SEMESTER- V		
40.	**BP501T Medicinal Chemistry-II**	Upon completion of this course the student shall be able to 1. Understand the chemistry of drugs with respect to their pharmacological activity. 2. Understand the drug metabolic pathways, adverse effect and therapeutic value of drugs. 3. Know the structure activity relationship of different class of drugs. 4. Study the chemical synthesis of selected drugs.

41.	**BP502T** **Formulative Pharmacy**	Upon completion of this course the student shall be able to 1. Know the various pharmaceutical dosage forms and their man 2. ufacturing techniques. 3. Know various considerations in development of pharmaceutical dosage forms 4. Formulate solid, liquid and semisolid dosage forms and evaluate them for their quality
42.	**BP503T** **Pharmacology II**	Upon completion of this course the student shall be able to 1. Understand the mechanism of drug action and its relevance in the treatment of different diseases 2. Demonstrate isolation of different organs/tissues from the laboratory animals by simulated experiments 3. Demonstrate the various receptor actions using isolated tissue preparation 4. Appreciate correlation of pharmacology with related medical sciences
43.	**BP504T** **Pharmacognosy and Phytochemistry-II**	Upon completion of this course the student shall be able to 1. To know basic metabolic pathways and formation of different secondary metabolites 2. To know various medicinally important secondary metabolites 3. To know the modern extraction techniques, characterization and identification of the herbal drugs and phytoconstituents 4. To carryout isolation and identification of phytoconstituents
44.	**BP505T** **Pharmaceutical Jurisprudence**	Upon completion of this course the student shall be able to 1. The Pharmaceutical legislations and their implications in the development and marketing 2. Various Indian pharmaceutical Acts and Laws 3. The regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals 4. The code of ethics during the pharmaceutical practice
45.	**BP506P** **Formulative Pharmacy**	1. Know the various pharmaceutical dosage forms and their manufacturing techniques. 2. Know various considerations in development of pharmaceutical dosage forms 3. Formulate solid, liquid and semisolid dosage forms and evaluate them for their quality

46.	**BP507P** **Pharmacology II**	Upon completion of this course the student shall be able to 1. Understand the mechanism of drug action and its relevance in the treatment of different diseases 2. Demonstrate isolation of different organs/tissues from the laboratory animals by simulated experiments 3. Demonstrate the various receptor actions using isolated tissue preparation 4. Appreciate correlation of pharmacology with related medical sciences
47.	**BP508P** **Pharmacognosy and Phytochemistry-III**	Upon completion of this course the student shall be able to 1. To identify crude drugs by morphology, histology, and powder analysis. 2. To isolate and detect active principles from natural sources. 3. To separate phytoconstituents using paper chromatography and TLC. 4. To extract volatile oils and analyze them by TLC. 5. To analyze crude drugs by chemical tests for major constituents
SEMESTER-VI		
48.	**BP601T** **Medicinal Chemistry-III**	Upon completion of this course the student shall be able to 1. Understand the principles and importance of rational drug design and apply modern techniques such as QSAR, prodrug approach, combinatorial chemistry, and computer-aided drug design (CADD). 2. Explain the chemical structure, nomenclature, and synthesis of important drugs and pharmaceutical intermediates, correlating structural features with their properties. 3. Interpret the relationship between chemical structure and biological activity (SAR) to predict drug action and optimize therapeutic efficacy. 4. Describe the mechanism of action, metabolism, pharmacological effects, adverse effects, and therapeutic uses of drugs belonging to different classes. 5. Integrate knowledge of drug chemistry, SAR, metabolism, and pharmacology to evaluate and select appropriate drug candidates for therapeutic applications.

49.	**BP602T Pharmacology-III**	Upon completion of this course the student shall be able to 1. Understand the mechanism of drug action and its relevance in the treatment of different infectious diseases 2. Comprehend the principles of toxicology and treatment of various poisonings 3. Appreciate correlation of pharmacology with related medical sciences.
50.	**BP603T Herbal Drug Technology**	Upon completion of this course the student shall be able to 1. Understand raw material as source of herbal drugs from cultivation to herbal drug product 2. Know the WHO and ICH guidelines for evaluation of herbal drugs 3. Know the herbal cosmetics, natural sweeteners, nutraceuticals 4. Appreciate patenting of herbal drugs, GMP . 5. To understand the preparation and development of herbal formulation 6. To understand the herbal drug interactions
51.	**BP604T Biopharmaceutics and Pharmacokinetics**	Upon completion of this course the student shall be able to 1. Understand the basic concepts in biopharmaceutics and pharmacokinetics. 2. Use plasma data and derive the pharmacokinetic parameters to describe the process of drug absorption, distribution, metabolism and elimination. 3. Critically evaluate biopharmaceutic studies involving drug product equivalency 4. Design and evaluate dosage regimens of the drugs using pharmacokinetic and biopharmaceutic parameters. 5. Detect potential clinical pharmacokinetic problems and apply basic pharmacokinetic principles to solve them
52.	**BP605T Pharmaceutical Biotechnology**	Upon completion of this course the student shall be able to 1. Understanding the importance of Immobilized enzymes in Pharmaceutical Industries 2. Genetic engineering applications in relation to production of pharmaceuticals 3. Importance of Monoclonal antibodies in Industries 4. Appreciate the use of microorganisms in fermentation technology

53.	**BP606T** **Quality Assurance**	Upon completion of this course the student shall be able to 1. Understand the CGMP aspects in a pharmaceutical industry appreciate the importance of documentation 2. Understand the scope of quality certifications applicable to pharmaceutical industries 3. Understand the responsibilities of QA & QC departments
54.	**BP607P** **Medicinal Chemistry-III**	Upon completion of this course the student shall be able to 1. Understand and perform the synthesis of selected drugs and pharmaceutical intermediates using appropriate organic reactions and purification techniques. 2. Apply pharmacopoeial and analytical methods for the assay of drugs to determine their identity, purity, and strength. 3. Demonstrate the use of modern synthetic approaches such as microwave irradiation techniques for efficient and rapid preparation of medicinal compounds. 4. Draw chemical structures, reactions, and molecular representations accurately using ChemDraw® software for scientific documentation and reporting. 5. Determine and interpret physicochemical properties of drugs such as logP, clogP, molar refractivity, molecular weight, and hydrogen bond donors/acceptors using drug design software and Evaluate drug-likeness and suitability of compounds for oral bioavailability using computational tools and Lipinski's Rule of Five to support rational drug design.
55.	**BP608P** **Pharmacology-III**	Upon completion of this course the student shall be able to 1. To familiarize students with basic experimental pharmacology techniques and commonly used laboratory instruments. 2. To study the pharmacological actions of drugs using suitable animal models and experimental methods. 3. To understand the evaluation of drugs for analgesic, anti-inflammatory, anticonvulsant, anxiolytic, and muscle relaxant activities. 4. To develop skills in observation, recording, and interpretation of experimental data obtained from pharmacological studies. 5. To correlate theoretical pharmacology concepts with practical experiments for better understanding of drug actions and therapeutic uses.

56.	**BP609P** **Herbal Drug Technology**	Upon completion of this course the student shall be able to 1. To perform preliminary phytochemical screening for identification of active constituents in crude drugs. 2. To evaluate quality and purity of crude drugs by determining ash values, moisture content, and extractive values. 3. To estimate alcohol content and physicochemical parameters of herbal preparations and fixed oils. 4. To prepare and standardize herbal formulations and cosmetics for quality and stability. 5. To study and analyze pharmacopoeial monographs of herbal drugs as per official standards
SEMESTER-VII		
57.	**BP701T** **Instrumental Methods of Analysis**	Upon completion of this course the student shall be able to 1. Understand the interaction of matter with electromagnetic radiations and its applications in drug analysis 2. Understand the chromatographic separation and analysis of drugs. 3. Perform quantitative & qualitative analysis of drugs using various analytical instruments.
58.	**BP702T** **Industrial Pharmacy**	Upon completion of this course the student shall be able to 1. Know the process of pilot plan and scale up of pharmaceutical dosage forms. 2. Understand the process of technology transfer from lab scale to commercial batch 3. Know different laws and Acts that regulate pharmaceutical industry in India and US. 4. Understand the approval process and regulatory requirements for drug products.

59.	**BP703T** **Pharmacy Practice**	Upon completion of this course the student shall be able to 1. Know various drug distribution methods in a hospital. 2. Appreciate the pharmacy stores management and inventory control. 3. Monitor drug therapy of patient through medication chart review and clinical review. 4. Obtain medication history interview and counsel the patients. 5. Identify drug related problems. 6. Detect and assess adverse drug reactions. 7. Interpret selected laboratory results (as monitoring parameters in therapeutics) of specific disease states. 8. Know pharmaceutical care services. 9. Do patient counseling in community pharmacy . 10. Appreciate the concept of rational drug therapy
60.	**BP704T** **Novel Drug Delivery System**	Upon completion of this course the student shall be able to 1. To understand various approaches for development of novel drug delivery systems. 2. To understand the criteria for selection of drugs and polymers for the development of Novel drug delivery systems, their formulation and evaluation
61.	**BP705P** **Instrumental Methods of Analysis**	Upon completion of this course the student shall be able to 1. Understand the interaction of matter with electromagnetic radiations and its applications in drug analysis 2. Understand the chromatographic separation and analysis of drugs. 3. Perform quantitative & qualitative analysis of drugs using various analytical instruments.
SEMESTER-VIII		

63.	**BP801T** **Biostatistics and Research Methodology**	Upon completion of this course the student shall be able to 1. To enable students to understand the principles of selecting appropriate research problems in pharmaceutical sciences. 2. To impart knowledge on methods of data collection, organization, and management for research purposes. 3. To develop skills in applying statistical tools for data analysis and interpretation. 4. To familiarize students with modern computational methods and software used in research. 5. To cultivate the ability to design, conduct, and present research projects in a systematic and ethical manner.
64.	**BP802T** **Social and Preventive Pharmacy**	Upon completion of this course the student shall be able to 1. Acquire high consciousness/realization of current issues related to health and pharmaceutical problems within the country and worldwide. 2. Have a critical way of thinking based on current health care development. 3. Evaluate alternative ways of solving problems related to health and pharmaceutical issues
65.	**BP803ET** **Pharmaceutical Marketing**	The course aim is to provide an understanding of marketing concepts and techniques and the application of the same in the pharmaceutical industry.
66.	**BP804ET** **Pharmaceutical Regulatory Science**	Upon completion of this course the student shall be able to 1. Know about the process of drug discovery and development 2. Know the regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals 3. Know the regulatory approval process and their registration in Indian and international markets

67.	**BP805ET** **Pharmacovigilance**	Upon completion of this course the student shall be able to 1. Why drug safety monitoring is important? 2. History and development of pharmacovigilance. 3. National and international scenario of pharmacovigilance. 4. Dictionaries, coding and terminologies used in pharmacovigilance. 5. Detection of new adverse drug reactions and their assessment. 6. International standards for classification of diseases and drugs. 7. Adverse drug reaction reporting systems and communication in pharmacovigilance. 8. Methods to generate safety data during pre clinical, clinical and post approval phases of drugs' life cycle. 9. Drug safety evaluation in paediatrics, geriatrics, pregnancy and lactation. 10. Pharmacovigilance Program of India (PvPI). 11. ICH guidelines for ICSR, PSUR, expedited reporting, pharmacovigilance planning. 12. CIOMS requirements for ADR reporting. 13. Writing case narratives of adverse events and their quality.
68.	**BP806ET** **Quality Control and Standardization of Herbals**	Upon completion of this course the student shall be able to 1. Know WHO guidelines for quality control of herbal drugs 2. Know Quality assurance in herbal drug industry 3. Know the regulatory approval process and their registration in Indian and international markets 4. Appreciate EU and ICH guidelines for quality control of herbal drugs.
69.	**BP807ET** **Computer Aided Drug Design**	Upon completion of this course the student shall be able to 1. Design and discovery of lead molecules 2. The role of drug design in drug discovery process 3. The concept of QSAR and docking 4. Various strategies to develop new drug like molecules. 5. The design of new drug molecules using molecular modelling software

70.	**BP808ET** **Cell and Molecular Biology**	Upon completion of this course the student shall be able to 1. Summarize cell and molecular biology history. Summarize cellular functioning and composition. 2. Describe the chemical foundations of cell biology. 3. Summarize the DNA properties of cell biology. 4. Describe protein structure and function. 5. Describe cellular membrane structure and function.
71.	**BP809ET** **Cosmetic Science**	Upon completion of this course the student shall be able to 1. To know the cosmetic principles to address the needs pf cosmetic industry 2. To understand formulation science and analytical techniques required to scientifically design and develop cosmetic products 3. To explain the scientific and technical aspects, high standards of practice and professional ethics within the cosmetic and toiletries industry
72.	**BP810ET** **Experimental Pharmacology**	Upon completion of this course the student shall be able to 1. Appreciate the applications of various commonly used laboratory animals. 2. Appreciate and demonstrate the various screening methods used in preclinical research 3. Appreciate and demonstrate the importance of biostatistics and research methodology 4. Design and execute a research hypothesis independently
73.	**BP811ET** **Advanced Instrumentation Techniques**	Upon completion of this course the student shall be able to 1. Understand the advanced instruments used and its applications in drug analysis 2. Understand the chromatographic separation and analysis of drugs. 3. Understand the calibration of various analytical instruments know analysis of drugs using various analytical instruments.

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COURSE OBJECTIVES

PROGRAMME: PHARM.D

Sl. No.	Name of the Course	Course Objectives
	FIRST YEAR	
1.	**1.1 Human Anatomy and Physiology (Theory)**	Upon completion of this course the student shall be able to 1. Describe the structure and functions of various organs and systems in the human body and explain their physiological importance. 2. Explain the mechanisms of homeostasis and how different body systems coordinate to maintain internal balance. 3. Identify anatomical features and physiological processes through laboratory observations, models, and experiments. 4. Apply knowledge of anatomy and physiology to understand the basis of diseases, clinical conditions, and therapeutic interventions. 5. Demonstrate understanding of cellular, tissue, and organ-level organization and relate them to overall body functions.
2.	**1.1 HumanAnatomyand Physiology (Practical)**	Upon completion of this course the student shall be able to 1. To understand the normal structure of the human body at gross and microscopic levels and relate it to physiological functions. 2. To explain the basic physiological principles governing the functioning of various organ systems of the human body. 3. To correlate anatomical structures with their physiological roles in maintaining homeostasis. 4. To provide foundational knowledge of human body systems relevant to disease processes and drug therapy. 5. To prepare students for advanced pharmaceutical and clinical subjects by building a strong base in anatomy and physiology.

3.	**1.2 Pharmaceutics (Theory)**	Upon completion of this course the student shall be able to 1. To introduce the fundamental concepts of pharmaceutics. 2. To provide knowledge of the historical development of pharmacy and familiarize students with official pharmacopoeias, standards, and formularies used in pharmaceutical practice. 3. To develop an understanding of formulation principles of solid dosage forms. 4. To explain the formulation, evaluation, and stability of liquid dosage forms. 5. To impart knowledge on specialized dosage forms and pharmaceutical practices.
4.	**1.2 Pharmaceutics (Practical)**	Upon completion of this course the student shall be able to 1. To provide hands-on training in the preparation of pharmaceutical liquid dosage forms. 2. To develop practical skills in the formulation and evaluation of disperse systems. 3. To familiarize students with the compounding of semisolid and solid dosage forms. 4. To impart knowledge of formulation principles and excipient selection. 5. To identify, analyze, and minimize pharmaceutical incompatibilities (physical, chemical, and therapeutic)
5.	**1.3 Medicinal Biochemistry**	Upon completion of this course the student shall be able to 1. Understand the catalytic activity of enzymes and importance of isoenzymes in diagnosis of diseases 2. Know the metabolic process of biomolecules in health and illness. 3. Understand the genetic organization of mammalian genome , protein synthesis , replication , mutation and repair mechanism. 4. Know the biochemical principles of organ function tests of kidney,liver and endocrine gland. 5. Do the qualitative analysis and determination of biomolecules in the body fluids.
6.	**1.3 Medicinal Biochemistry (Practical)**	Upon completion of this course the student shall be able to 1. Develop proficiency in estimating blood glucose, serum creatinine, urea and cholesterol. 2. Perform qualitative analysis of carbohydrates, amino acids, and proteins in biological samples.

7.	**1.4 Pharmaceutical Organic Chemistry**	Upon completion of this course the student shall be able to 1. Apply IUPAC and common systems of nomenclature to correctly name and classify organic compounds belonging to various functional groups. 2. Explain the physical and chemical properties of organic compounds and relate these properties to their structure and behavior. 3. Describe and interpret the mechanisms of organic reactions including free radical, nucleophilic, and electrophilic substitution, addition, elimination, oxidation, and reduction reactions, along with factors affecting orientation, reactivity, and stability. 4. Understand and illustrate important named organic reactions with mechanisms and recognize their applications in the synthesis of medicinally important compounds. 5. Explain the methods of preparation, purity testing, principles of assay, and medicinal uses of selected organic compounds, correlating chemical structure with pharmaceutical importance.
8.	**1.4 Pharmaceutical Organic Chemistry (Practical)**	Upon completion of this course the student shall be able to 1. Understand and perform fundamental organic laboratory techniques involved in synthesis, purification, and isolation of organic compounds through reactions such as acetylation, benzoylation, bromination, nitration, oxidation, reduction, condensation, and hydrolysis. 2. Explain the principles and mechanisms of various organic reactions and correlate reaction conditions with product formation and yield. 3. Carry out systematic qualitative organic analysis to identify unknown compounds belonging to different functional groups through preliminary tests and preparation of suitable derivatives. 4. Develop skills in safe handling of chemicals, proper laboratory practices, and accurate recording of experimental observations and results. 5. Visualize and interpret molecular geometry, stereochemistry, and conformations of organic molecules using stereo models to understand three-dimensional structures and configuration.

9.	**1.5 Pharmaceutical Inorganic Chemistry**	Upon completion of this course the student shall be able to 1. To understand the chemistry of inorganic substances used as drugs and pharmaceuticals, including their properties and medicinal uses. 2. To master the principles and methods for conducting limit tests for various impurities (e.g., arsenic, lead, iron, heavy metals) in pharmaceuticals to ensure safety. 3. Identify pharmaceutical inorganic compounds through qualitative tests and understand the, official standards of purity (pharmacopoeial standards). 4. Study the therapeutic, diagnostic, and diagnostic uses of specific inorganic compounds (e.g., gastrointestinal agents, antimicrobial agents, essential electrolytes). 5. To understand proper storage conditions for various inorganic pharmaceuticals to ensure stability.
10.	**1.5 Pharmaceutical Inorganic Chemistry (Practical)**	Upon completion of this course the student shall be able to 1. To train students in performing limit tests for various impurities (chlorides, sulphates, iron, heavy metals, and arsenic) in inorganic compounds to ensure pharmaceutical purity. 2. To provide skills in the identification and quantitative analysis (assay) of various inorganic pharmaceuticals (e.g., boric acid, ferrous sulphate, sodium bicarbonate) using I.P. (Indian Pharmacopoeia) methods. 3. To teach the methods of preparing and purifying selected inorganic pharmaceuticals. 4. To familiarize students with testing for impurities and determining physical parameters like swelling properties, adsorption power, and acid-neutralizing capacity. 5. To gain proficiency in using laboratory equipment such as analytical balances, hot plates, water baths, and pH meters.

11.	**1.6** **Remedial Mathematics**	This is an introductory course in mathematics. This subjects deals with the introduction to matrices, determinants, trigonometry, analytical geometry, differential calculus, integral calculus, differential equations, laplace transform.
	1.6 **Remedial Biology (Theory)**	This is an introductory course in Biology, which gives detailed study of natural sources such as plant and animal origin. This subject has been introducing to the pharmacy course in order to make the student aware of various naturally occurring drugs and its history, sources, classification, distribution and the characters of the plants and animals. This subject gives basic foundation to Pharmacognosy.
12.	**1.6** **Remedial biology (Practical)**	This is an introductory course in Biology, which gives detailed study of natural sources such as plant and animal origin. This subject has been introduces to the pharmacy course in order to make the student aware of various naturally occurring drugs and its history, sources, classification, distribution and the characters of the plants and animals. This subject gives basic foundation to Pharmacognosy.
SECOND YEAR		
13.	**2.1** **Pathophysiology**	Upon completion of this course the student shall be able to 1. To describe the etiology & pathogenesis of the selected disease states 2. To name the signs and symptoms of the diseases 3. To mention the complications of the diseases

14.	**2.2 Pharmaceutical Microbiology (Theory)**	Upon completion of this course the student shall be able to 1. Understand fundamentals of microbiology, classification and growth of microorganisms 2. Explain cultivation, identification, sterilization and control of microorganisms 3. Apply principles of disinfectants, immunology and diagnostic tests 4. Analyze microbiological assays, culture
		sensitivity testing and standardization of vaccines and sera 5. Describe etiology, diagnosis, prevention and control of infectious diseases
15.	**2.2 Pharmaceutical Microbiology(Practical)**	Upon completion of this course the student shall be able to 1. Identify and operate common microbiological apparatus and follow aseptic techniques and laboratory safety practices. 2. Prepare culture media, perform sterilization of materials, and apply staining techniques for microscopic examination of microorganisms. 3. Determine microbial characteristics such as motility, count microorganisms, and isolate pure cultures using standard microbiological methods. 4. Identify microorganisms using biochemical tests and evaluate antimicrobial activity through sensitivity testing, MIC determination, and microbiological assays. 5. Perform sterility testing, diagnostic tests, and microbiological quality control procedures relevant to pharmaceutical products.
16.	**2.3 Pharmacognosy and Phytopharmaceutics (Theory)**	Upon completion of this course the student shall be able to 1. To know the techniques in the cultivation and production of crude drugs 2. To know the crude drugs, their uses and chemical nature 3. To know the evaluation techniques for the herbal drugs 4. To carry out the microscopic and morphological evaluation of crude drugs

17.	**2.3** **Pharmacognosy and Phytochemical Pharmaceutics (Practical)**	1. To identify crude drugs by morphology, histology, and powder analysis. 2. To isolate and detect active principles from natural sources. 3. To separate phytoconstituents using paper chromatography and TLC. 4. To extract volatile oils and analyze them by TLC. 5. To analyze crude drugs by chemical tests for major constituents
18.	**2.4** **Pharmacology I (Theory)**	Upon completion of this course the student shall be able to 1. Understand the pharmacological aspects of drugs falling under the above mentioned chapters. 2. Handle and carry out the animal experiments.
		3. Appreciate the importance of pharmacology subject as a basis of therapeutics. 4. Correlate and apply the knowledge therapeutically.
19.	**2.5** **Community Pharmacy**	Upon completion of this course the student shall be able to 1. Provide knowledge on the scope, roles, and responsibilities of community pharmacists in patient care and public health. 2. Familiarize students with the principles of community pharmacy management, including legal requirements, inventory control, record maintenance, and use of computer applications. 3. Enable students to understand and analyze prescriptions for legality, completeness, drug interactions, and medication-related problems. 4. Develop skills in patient counselling, medication adherence, and basic health screening services in community pharmacy practice. 5. Promote rational use of medicines, appropriate OTC medication use, management of minor ailments, and health education activities in the community.

20.	**2.6 Pharmacotherapeutics-1**	Upon completion of this course the student shall be able to 1. Describe the pathophysiology of selected disease states and the rationale for drug-therapy 2. Summarise the therapeutic approach to management of these diseases including reference to the latest available evidence 3. Discuss the controversies in drug therapy 4. Discuss the preparation of individualised therapeutic plans based on diagnosis 5. Identify the patient-specific parameters relevant in initiating drug therapy and monitoring therapy (including alternatives, time-course of clinical and laboratory indices of therapeutic response and adverse effects)
21.	**2.6 Pharmacotherapeutics -1 (Practical)**	Upon completion of this course the student shall be able to 1. Collect and document patient data 2. Analyze patient data using SOAP 3. Develop patient-centered pharmacotherapy plans 4. Present case effectively 5. Apply pharmacological knowledge

MAR DIOSCORUS COLLEGE OF PHARMACY
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COURSE OBJECTIVES

PROGRAMME: M.PHARM -PHARMACEUTICS

Sl. No.	Name of the Course	Course Objectives
	SEMESTER-1	
1.	**MPH101T** **Modern Pharmaceutical Analytical Techniques**	Upon completion of this course the student shall be able to 1. Chemicals and excipients analysis. 2. The analysis of various drugs in single and combination dosage forms 3. Theoretical and practical skills for handling of the instruments
2.	**MPH102T** **Drug Delivery System**	Upon completion of this course the student shall be able to 1. Understand the basic concepts of sustained and controlled drug release and learn the physicochemical and biological factors affecting these systems. 2. Understand the principles and fundamentals of rate-controlled drug delivery systems and their importance in maintaining controlled plasma drug levels 3. Understand formulation methods and evaluation techniques for gastro-retentive and buccal drug delivery systems. 4. Explain advanced approaches like ocular inserts, in-situ gels and liposomal delivery systems. 5. Understand skin anatomy and barriers affecting drug absorption and to learn various types of transdermal patches and delivery devices. 6. Apply knowledge in designing suitable delivery systems for proteins and other macromolecules in pharmaceutical applications 7. To understand the principles of vaccine delivery and immune responses and to study mucosal, oral, nasal, and transdermal vaccine strategies.

3.	**MPH103T** **Modern Pharmaceutics**	Upon completion of this course the student shall be able to 1. To understand the elements of preformulation studies. 2. Understand th**e** active Pharmaceutical Ingredients and Generic drug Product development 3. To understand Industrial Management and GMP Considerations 4. Understand Optimization Techniques & Pilot Plant Scale Up Techniques 5. Understand Stability Testing, sterilization process & packaging of dosage forms
4.	**MPH104T** **Regulatory Affairs**	Upon completion of this course the student shall be able to 1. The Concepts of innovator and generic drugs, drug development process 2. The Regulatory guidance's and guidelines for filing and approval process 3. Preparation of Dossiers and their submission to regulatory agencies in different countries. 4. Post approval regulatory requirements for actives and drug products 5. Submission of global documents in CTD/ eCTD formats 6. Clinical trials requirements for approvals for conducting clinical trials 7. Pharmacovigilence and process of monitoring in clinical trials.

5.	**MPH105P Pharmaceutics Practicals-I**	Upon completion of this course the student shall be able to 1. Demonstrate the ability to analyze pharmacopoeial compounds and their formulations using UV–Visible spectrophotometry, including construction and validation of calibration curves. 2. Perform simultaneous estimation of multicomponent formulations using UV spectrophotometric methods and interpret the analytical data accurately. 3. Estimate pharmaceutical compounds using specialized analytical techniques including fluorimetry (riboflavin/quinine sulphate) and flame photometry (sodium and potassium) 4. Evaluate in-vitro dissolution profiles of conventional and controlled/sustained release formulations, and interpret release kinetics. 5. Formulate and evaluate sustained release matrix tablets using suitable polymers and assess their physicochemical and dissolution characteristics. 6. Design and evaluate advanced drug delivery systems, including osmotically controlled DDS, floating (hydrodynamically balanced) DDS, mucoadhesive tablets, and transdermal patches. 7. Conduct preformulation studies to assess physicochemical properties of drug and excipients. 8. Apply mathematical models such as Heckel, Higuchi, and Korsmeyer–Peppas plots to analyse compression behaviour and drug release kinetics, and calculate similarity factors (f_2) for dissolution profile comparison.
SEMESTER-II		
6.	**MPH201T Molecular Pharmaceutics**	Upon completion of this course the student shall be able to 1. Understand the various approaches for development of novel drug delivery systems. 2. Acquire knowledge in Nanotechnology that contribute to the advancements in drug discovery and development. 3. Explain the particulate drug delivery systems and application of monoclonal antibodies. 4. Understand the pulmonary route drug delivery systems. 5. Gain Knowledge on Nucleic acid based therapeutic delivery system

7.	**MPH202T** **Advanced Biopharmaceutics and Pharmacokinetics**	Upon completion of this course the student shall be able to 1. Understand the basic concepts in biopharmaceutics and pharmacokinetics 2. Understand the use raw data and derive the pharmacokinetic models and parameters the best describe the process of drug absorption, distribution, metabolism and elimination. 3. Understand th**e** use raw data and derive the pharmacokinetic models and parameters the best describe the process of drug absorption, distribution, metabolism and elimination 4. Understand the design and evaluation of dosage regimens of the drugs using pharmacokinetic and biopharmaceutical parameters.. 5. Understand the potential clinical pharmacokinetic problems and application of basics of pharmacokinetics.
8.	**MPH203T** **Computer Aided Drug Delivery system**	Upon completion of this course the student shall be able to 1. History of Computers in Pharmaceutical Research and Development 2. Computational Modeling of Drug Disposition 3. Computers in Preclinical Development 4. Optimization Techniques in Pharmaceutical Formulation 5. Computers in Market Analysis 6. Computers in Clinical Development 7. Artificial Intelligence (AI) and Robotics 8. Computational fluid dynamics(CFD)

9.	**MPH204T** **Cosmetics and Cosmeceuticals**	Upon completion of this course the student shall be able to 1. Key ingredients used in cosmetics and cosmeceuticals. 2. Key building blocks for various formulations. 3. Current technologies in the market 4. Various key ingredients and basic science to develop cosmetics and cosmeceuticals 5. Scientific knowledge to develop cosmetics and cosmeceuticals with desired Safety, stability, and efficacy.

10.	**MPH205P** **Pharmaceutics Practicals- II**	Upon completion of this course the student shall be able to 1. Demonstrate proficiency in the preparation and evaluation of various pharmaceutical dosage forms 2. Apply scientific principles to study formulation variables and their impact on product performance 3. Perform in-vitro and in-vivo evaluation techniques and interpret the resulting data 4. Utilize advanced computational and statistical software for formulation and pharmacokinetic modelling 5. Work effectively in a laboratory environment with teamwork, ethical responsibility, and safety awareness
	SEMESTER-III	
11.	**MRM301T** **Research Methodology and Biostatistics**	Upon completion of this course the student shall be able to 1. To enable students to have a basic understanding for doing research work and writing reports
12.	**Journal Club**	Upon completion of this course the student shall be able to 1. To develop the ability to critically read and analyze scientific research articles from reputed national and international journals. 2. To enhance understanding of recent advances and emerging trends in pharmaceutics and pharmaceutical research. 3. To improve skills in interpreting experimental design, results, and statistical analysis reported in research publications. 4. To strengthen scientific communication skills through oral presentation, discussion, and constructive peer interaction. 5. To promote ethical awareness and research integrity by understanding proper citation practices and evaluation of published scientific work.

14.	**Research Work**	Upon completion of this course the student shall be able to 1. To enable students to identify a suitable research problem in the area of pharmaceutics through an extensive review of scientific literature. 2. To design and execute a systematic research plan involving formulation development, optimization, and evaluation using appropriate experimental and statistical tools. 3. To develop practical skills in advanced pharmaceutical techniques, instrumentation, and quality evaluation relevant to drug delivery systems. 4. To analyze, interpret, and validate experimental data using suitable statistical methods and software for drawing meaningful scientific conclusions. 5. To enhance scientific writing and presentation skills through preparation of a dissertation, research reports, and oral defense of the research work.