PROGRAM OUTCOMES

B. PHARM./ M. PHARM.

1. **Pharmacy Knowledge**: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; andmanufacturing practices.
2. **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.
3. **Problem analysis:** Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.
4. **Modern tool usage**: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of thelimitations.
5. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsiblecitizens or leadership roles when appropriate to facilitate improvement in health and well-being.
6. **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).
7. **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.
8. **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.
9. **The Pharmacist and society**: Apply reasoning informed by the contextual knowledge toassess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.
10. **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.
11. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

PROGRAMME SPECIFIC OUTCOMES (B. PHARM.)

PSO1: To pursue excellence in pharmaceutical education.

PSO2: To contribute significantly towards quality research in the field of pharmacy.

PSO3: To make pharmaceutical education more relevant with contemporary needs in order to keeppace with the knowledge and information explosion.

PSO4: To enhance students employability skills.

PSO5: To develop a professionally competent, ethically sound and skilled pharmacist.

PROGRAMME SPECIFIC OUTCOMES (M. PHARM.)

PSO1: Apply skills to do specialized research in the core and applied areas of pharmaceutical sciences.

PSO2: Interpret data of pharmaceutical research in drug discovery as per the needs of pharmaceutical industries.

PSO3: Develop an ability to visualize and work on multidisciplinary tasks in the areas of pharmaceuticals and its allied field.

PSO4: Analyze, criticize, organize, improvise and manage documents, data and information related to pharmaceutical drug development process.

PSO5: To create a talent pool by involving students in research projects and to make students undertake research projects under faculty guidance for publication and to foster ambitious desire among students to undertake higher studies and career growth.

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Pune District Education Association's
Seth Govind Raghunath Sable College of Pharmacy, Saswad, Dist-Pune

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Course Outcome - [B Pharmacy - 2025-26]

COURSE CODE	NAME OF THE SUBJECT	COURSE OUTCOME
BP101T	Human Anatomy and Physiology I– Theory	CO1. Explain the gross morphology, structure, and functions of various organs of the human body CO2. Describe the various homeostatic mechanisms and their imbalances. CO3. Identifies the various tissues and organs of different systems of the human body. CO4. Perform various experiments related to special senses and the nervous system. CO5. Appreciate the coordinated working pattern of different organs of each system
BP102T	Pharmaceutical Analysis I – Theory	CO1. Explain the various methods of expressing concentration and requirement of primary standards. CO2. Describe the preparation and standardization of different reagents used in volumetric analysis. CO3. Discuss validation of results achieved in analytical measurements. CO4. Explain the principle of acid base, nonaqueous and precipitation titration with examples. CO5. Describe the principle of complexometric and gravimetric estimation with examples. CO6. Discuss the principle of various redox titration and diazotisation titration with examples. CO7. Explain the principle of conductometry , polarography and potentiometry.
BP103T	Pharmaceutics I – Theory	CO1. Know the history of profession of pharmacy CO2. Understand the basics of different dosage forms, pharmaceutical incompatibilities and pharmaceutical calculations CO3. Understand the professional way of handling the prescription CO4. Preparation of various conventional dosage forms
BP104T	Pharmaceutical	CO1. Well-acquainted with the principles of limit

	Inorganic Chemistry – Theory	tests. CO2. Knowledge about the sources of impurities and methods to determine the impurities in inorganic drugs and pharmaceuticals CO3. Familiar with different classes of inorganic pharmaceuticals and their analysis CO4. Understand the medicinal and pharmaceutical importance of inorganic compounds
BP105T	Communication skills – Theory *	CO1. Employ effective communication techniques including verbal and nonverbal communication CO2. To acquaint and familiarize the students with soft skills to present ideas effectively and efficiently. CO3. To equip the students with social skills with an emphasis on active learning. CO4. To revise and reinforce the learning of soft skills to enhance employability skills and Interpersonal skills. CO5. To build self-confidence and enhance leadership qualities with stress management and Time management skills
BP106RBT	Remedial Biology – Theory*	CO1. Know the classification and salient features of five kingdoms of life. CO2. Explain the basic components of anatomy & physiology of plant CO3. Know the basic components of anatomy & physiology animal with special reference to human
BP106RMT	Remedial Mathematics – Theory*	CO1. Apply mathematical concepts and principles to perform computations for Pharmaceutical Sciences. CO2. Create, use and analyze mathematical representations and mathematical relationships. CO3. Communicate mathematical knowledge and understanding to help in the field of Clinical Pharmacy. CO4. Perform abstract mathematical reasoning.
BP107P	Human Anatomy and Physiology – Practical	CO1. Explain the gross morphology, structure, and functions of various organs of the human body CO2. Describe the various homeostatic mechanisms and their imbalances CO3. Identify the various tissues and organs of

		different systems of human body CO4. Perform the hematological tests like blood cell counts, hemoglobin estimation, bleeding/clotting time etc and record blood pressure, heart rate, pulse and respiratory volume.
BP108P	Pharmaceutical Analysis I – Practical	CO1. To get acquaint to basic apparatus and instruments and their calibration CO2. Understand concepts of various volumetric analysis. CO3. Understand concept of various electrochemical titrations CO4. To develop analytical skills in data interpretation and calculations
BP109P	Pharmaceutics I – Practical	CO1. Understand formulation and evaluation of Pharmaceutical solution CO2. Understand formulation and evaluation of Pharmaceutical dispersed system CO3. Understand formulation and evaluation of pharmaceutical powders CO4. Understand formulation and evaluation of semisolid dosage form
BP110P	Pharmaceutical Inorganic Chemistry – Practical	CO1. Know the source of impurities and determine the impurities in organic compounds. CO 2: Know the identification test for a few organic compounds. CO3. To test the impurities of a few organic compounds. CO4. To know the preparation of inorganic pharmaceuticals.
BP111P	Communication skills – Practical*	CO1. To develop Linguistic Competence and enhance the skill of using English for day to day communication. CO2. To familiarize the students with various components of Language. CO3. To acquire Language skills and to develop competence in using English Language. CO4. To develop interest among the students to interact in English for exposure to speaking English. CO4. To acquire grammatical knowledge and to develop skills around human communication. CO6. To enhance communication skills and

		speaking skills with life skills and life values
BP112RBP	Remedial Biology – Practical*	CO1. Demonstrate fundamental laboratory techniques, including the proper use of a microscope, section-cutting techniques, mounting and staining procedures, and the preparation of permanent slides. CO2. Manipulate experimental conditions to study cells and their inclusions, including the use of staining techniques and microscopic observation. CO3. Articulate mastery in microscopic studies and the identification of tissues pertinent to stem, root, leaf, seed, fruit, and flower and demonstrate proficiency in using microscopy to analyze and interpret cellular structures. CO4. Reach a level of naturalization where practical skills, including the identification of bones and the determination of blood group, blood pressure, and tidal volume, become automatic and integrated and also demonstrate the ability to apply these skills in a physiological context.
BP201T	Human Anatomy and Physiology II – Theory	CO1. Describe the anatomy and physiology of digestive system and respiratory system with detailed understanding of the process of digestion, absorption, and respiration. CO2. Explain the structure and functions of urinary system and the role of nephrons in urine formation and regulation of body fluids CO3. Understand the structure, hormonal control, and functions of endocrine glands, including the pituitary, thyroid, parathyroid, adrenal, pancreatic, and gonadal hormones. CO4. Explain the anatomy and physiology of male and female reproductive systems, including the menstrual cycle, spermatogenesis, and fertilization process. CO5. Describe the regulation of body temperature, metabolism, and the physiological mechanisms involved in homeostasis. CO6. Correlate physiological processes with clinical conditions (e.g., diabetes, hypothyroidism, infertility, renal failure, etc.) and understand the pathophysiological basis of major disorders related to the covered systems.
BP202T	Pharmaceutical Organic	CO1. Write the structure, name the reaction and

	Chemistry I –Theory	the type of isomerism of the organic compound. CO2. Know intermediates formed in reactions and important physical properties of organic compounds. CO3. Write the reaction, name the reaction, mechanism and orientation of reactions. CO4. Prepare small organic compounds. CO5. Account for reactivity/stability of compounds.
BP203T	Biochemistry – Theory	CO1. Understand the catalytic role of enzymes and importance of enzymes in biochemical processes. CO2. Understand the metabolism of nutrient molecules in physiological and pathological conditions. CO3. Understand the genetic organization of the mammalian genome and functions of DNA in the synthesis of RNAs and proteins. CO4. To discuss the metabolism of nucleic acids, lipids and amino acids. CO5. Explain the concept of free energy and energy rich compounds.
BP204T	Pathophysiology – Theory	CO1. Describe Basic principles of Cell injury Adaptation and explain the concept of inflammation and repair CO2. Describe the etiology and pathogenesis of various disorders pertaining to CVS, respiratory and renal system CO3. classification, etiology and pathogenesis of cancer pertaining to Hematological, endocrine ,GI and nervous system CO4. Classify and explain the etiology and pathogenesis of cancer. CO5. Describe the etiology and pathogenesis of disorders related to bones and joints CO6. Describe the etiology and pathogenesis of Meningitis, Typhoid, Leprosy, Tuberculosis CO7. Describe the etiology and pathogenesis of UTI CO8. Describe the etiology and pathogenesis of AIDS, Syphilis, and Gonorrhea.
BP205T	Computer Applications in Pharmacy –Theory *	CO1. Explain the applications of computers in Pharmacy. CO2. Analyse the different types of databases. CO3. Create databases using MS Access, SQL.

		CO4. Explain bioinformatics and their impact in vaccine discovery CO5. Identify the role of computers for data analysis in the field of preclinical development
BP206T	Environmental sciences – Theory *	CO1. Know basics of environment like ecology, ecosystem, food chain, food web and ecological pyramids CO2. Know the different natural sources and their conservation to save the environment CO3. Know the current problems of the environment and how to solve them. CO4. Aware about hazards of disposal wastes from hospitals and pharmaceutical industries & role of individual in conservation of natural resources
BP207P	Human Anatomy and Physiology II – Practical	CO1. Understand human anatomy using specimen models CO2. Demonstrate experiments on special senses CO3. Demonstrate experimental functions on physiological systems CO4. To evaluate the knowledge through oral assessment
BP208P	Pharmaceutical Organic Chemistry I– Practical	CO1. Perform correct use of various equipment & Safety measures in Pharmaceutical Chemistry laboratory. CO2. Know different simple laboratory techniques for characterization and purification of organic compounds. CO3. Identify/confirm the identification of organic compounds. CO4. Synthesize different organic compounds and know reaction & Mechanism. CO5. Communicate effectively the observations and results of an experiment.
BP209P	Biochemistry – Practical	CO1. Describe Qualitative analysis of Carbohydrates. CO2. Identification tests for amino acids & proteins. CO3. Qualitative analysis of urine for abnormal constituents & determination of Blood sample, Blood creatinine. CO4. Determination of serum total cholesterol. CO5. Preparation of buffer solution and

		measurement of pH CO6. Determination of salivary amylase activity Study the effect of temperature & effect of substrate concentration on salivary amylase activity.
BP210P	Computer Applications in Pharmacy – Practical*	CO1. Design a questionnaire using a word processing package to gather information about a particular disease. CO2. Create a database in MS Access to store the patient information with the required fields Using access CO3. Design a form in MS Access to view, add, delete and modify the patient record in the database.
BP301T	Pharmaceutical Organic Chemistry II –Theory	CO1. Understand various molecular representations and their interconversions. CO2. Write the structure, name the reaction and the type of isomerism of the organic compound. CO3. Account for reactivity/stability of compounds. CO4. Write the reaction, name the reaction, mechanism and orientation of reactions. CO5. Prepare small organic compounds .
BP302T	Physical Pharmaceutics I – Theory	CO1. Ability to apply the knowledge of solubility, diffusion and distribution in pharmaceutical preparations. CO2. Investigate and apply various theories, laws and equations related to different states of matter. CO3. Demonstrate use of physicochemical properties of drugs in the formulation development and evaluation of dosage forms. CO4. Apply the concept of interfacial phenomena in pharmaceutical preparations. CO6. Distinguish the principles of complexation/ protein binding & to use them for calculations of drug release and stability constant CO7. Understand the importance of pH, buffers and tonicity in pharmaceutical and biological systems.
BP303T	Pharmaceutical Microbiology – Theory	CO1. Understand methods of identification, cultivation and preservation of various Microorganisms

		CO2. To understand the importance and implementation of sterilization in pharmaceutical processing and industry CO3. Learn sterility testing of pharmaceutical products. CO4. Carried out microbiological standardization of Pharmaceuticals. CO5. Understand the cell culture technology and its applications in pharmaceutical industries.
BP304T	Pharmaceutical Engineering – Theory	CO1. To know various unit operations used in Pharmaceutical industries. CO2. To understand the material handling techniques. CO3. To perform various processes involved in the pharmaceutical manufacturing process. CO4. To carry out various tests to prevent environmental pollution. CO5. To appreciate and comprehend significance of plant lay out design for optimum use of resources. CO6. To appreciate the various preventive methods used for corrosion control in Pharmaceutical industries.
BP305P	Pharmaceutical Organic Chemistry II – Practical	CO1. Know different simple laboratory techniques for purification of organic compounds. CO2. Identify the mixture of organic compounds. CO3. Synthesize different organic compounds and know reaction & Mechanism. CO4. Communicate effectively the observations and results of an experiment.
BP306P	Physical Pharmaceutics I – Practical	CO1. Determine physicochemical properties of drugs in the formulation development and evaluation of dosage forms. CO2. Determine and apply the concept of interfacial phenomena in pharmaceutical preparations. CO3. Distinguish the principles of complexation/ protein binding & to use them for calculations of drug release and stability constant. CO4. Determination of thermodynamic parameters using solubility studies.
BP307P	Pharmaceutical Microbiology –	CO1. To recall different techniques of sterilization.

	Practical	CO2. To demonstrate various staining methods - simple, gram staining and acid fast staining. CO3. To interpret the results of microbial testing. CO4. To demonstrate Staining methods and culture methods. CO5. Microbiological assay of antibiotics. CO6. To demonstrate sterility testing. CO7. To demonstrate the bacteriological analysis of water. CO8. To demonstrate a biochemical test.
BP 308P	Pharmaceutical Engineering –Practical	CO1. To understand the basic principles involved in unit operations such as size reduction, size separation, distillation and drying. CO2. To demonstrate and explain about the construction, working and applications of pharmaceutical equipment such as colloid mill, planetary mixer, fluidized bed dryer and freeze dryer. CO3. To experiment with the process variables of filtration, evaporation and infer the same. CO4. To determine radiation constant of brass, iron, unpainted and painted glass. CO5. To determine overall heat transfer coefficient by heat exchanger and calculate the efficiency of steam distillation. CO6. To estimate moisture content, loss on drying and construct drying curves for calcium carbonate and starch
BP401T	Pharmaceutical Organic Chemistry III– Theory	CO1. Know the structures with numbering of heterocyclic compounds, chemistry, methods of preparation and chemical reactions of five, six membered and fused heterocyclic rings. CO2. Understand the methods of preparation and properties of organic compounds. CO3. Explain the stereochemical aspects of organic compounds and stereo chemical reactions. CO4. Know the medicinal uses and other applications of organic compounds.
BP402T	Medicinal Chemistry I – Theory	CO1. Understand the chemistry of drugs with respect to their pharmacological activity. CO2. Understand the drug metabolic pathways, adverse effects and therapeutic value of Drugs. CO3. Know the Structural Activity Relationship

		(SAR) of different classes of drugs. CO4. Write the chemical synthesis of some drugs.
BP403T	Physical Pharmaceutics II – Theory	CO1. Relate various physicochemical properties of drug and excipient molecules in designing the dosage forms CO2. Apply the concept of rheology and deformation in pharmaceutical formulation CO3. Distinguish the principles of chemical kinetics & to use them for stability testing and determination of expiry date of formulations CO4. Investigate and apply micromeritic in pharmaceutical dosage forms .
BP404T	Pharmacology I – Theory	CO1. Understand the pharmacological actions of different categories of drugs CO2. Explain the mechanism of drug action at organ system/sub cellular/ macromolecular levels. CO3. Apply the basic pharmacological knowledge in the prevention and treatment of various diseases. CO4. Observe the effect of drugs on animals by simulated experiments CO5. Appreciate correlation of pharmacology with other bio medical sciences
BP405T	Pharmacognosy and Phytochemistry I– Theory	CO1. To know the techniques in the cultivation and production of crude drugs CO2. To know the crude drugs, their uses and chemical nature CO3. To know the evaluation techniques for the herbal drugs CO4. To carry out the microscopic and morphological evaluation of crude drugs
BP406P	Medicinal Chemistry I – Practical	CO1. Upon completion of the course students shall be able to Synthesize, recrystallize organic compounds. CO2. To understand reaction mechanisms involved in synthesis of medicinally important organic compounds. CO3. Know different purification methods of organic compounds. CO4. To know the partition coefficient of organic compounds. CO5. To communicate effectively the observations

		and results of an experiment.
BP407P	Physical Pharmaceutics II – Practical	CO1. Determine particle size, size distribution, density, porosity, and flow properties of powders using different methods. CO2. Evaluate viscosity of liquids and semisolids using viscometers and study factors influencing rheology. CO3. Analyse sedimentation parameters and stability of suspensions, surfactants, and colloidal systems. CO4. Determine reaction kinetics, accelerated stability studies, and physicochemical properties affecting pharmaceutical formulations.
BP408P	Pharmacology I – Practical	CO1. Understand the Pharmacological absence of different categories of drugs CO2. Apply the basic pharmacological knowledge in the mention and treatment of various diseases. CO3. Observe the effect of drugs on animals by simulated experiments CO4. Appreciate correlation of pharmacology with other biomedical science.
BP409P	Pharmacognosy and Phytochemistry I – Practical	CO1. Analyze and identify crude drugs based chemical tests CO2. Evaluating various leaf constants. CO3. Experimenting the dimensions of starch grains. CO4. Plan and execute Lycopodium spore method of evaluation. CO5. Estimating dimensions of natural fibres. CO6. Assessing various physicochemical properties of crude drugs.
BP501T	Medicinal Chemistry II – Theory	CO1. State the history of development of different classes of Antihistamines, CVS active drugs, drug acting on endocrine system, and Antidiabetic agent CO2. Explain drug metabolism & its significance in drug discovery. CO3. Classification of various categories of therapeutic agents according to their chemical structure and mechanism of action. CO4. Recall the mechanism of action of drugs, side effects, therapeutic uses and adverse effects CO5. Explain the chemistry and structure activity

		relationship of therapeutic classes of drugs and recent developments
BP502T	Industrial Pharmacy– Theory	CO1. Know the various pharmaceutical dosage forms and their manufacturing techniques. CO2. Understand the concept of preformulation studies CO3. Gain hands on training for manufacturing of various pharmaceutical dosage forms like tablets, capsules, ointments, syrups, suspension, emulsion, parenterals, ophthalmics etc. CO4. Learn about the quality control of various pharmaceutical dosage forms. CO5. Learn about the usage, utility and application of aerosol products along with their advantages.
BP503T	Pharmacology II – Theory	CO1. Understand the mechanism of drug action and its relevance in the treatment of different diseases CO2. Demonstrate isolation of different organs/tissues from the laboratory animals by simulated experiments CO3. Demonstrate the various receptor actions using isolated tissue preparation CO4. Appreciate correlation of pharmacology with related medical sciences
BP504T	Pharmacognosy and Phytochemistry II–Theory	CO1. Understand the concept of Biosynthesis in formation of secondary metabolites and Radioactive tracer techniques used in plants for determining the Process of formation of secondary metabolites CO2. Study chemistry, classification and uses of secondary metabolites alinog with the medicinal plant associated with it. CO3. Know the modern techniques associated with extraction, characterization and identification of phytoconstituents CO4. Study different methods of isolation, separation and spectroscopically methods used for the structural elucidation of the phytoconstituents.
BP505T	Pharmaceutical Jurisprudence – Theory	CO1. Understand the history of Pharmaceutical legislation and conduct of the code of ethics regarding the pharmacy profession in India

		CO2. Study Pharmacy Act, Medicinal and Toilet Preparation Act, Narcotics and Psychotropic Substances Act, Features of Drugs and Magic Remedies Act, and Medical Termination of Pregnancy Act CO3. Study Prevention of Cruelty to Animals Act, National Pharmaceutical Pricing Authority and Right to Information Act. CO4. Study of Introduction to Intellectual Property Rights (IPR).
BP506P	Industrial Pharmacy – Practical	CO1. Perform pre-formulation evaluation of APIs and excipients. CO2. Prepare and evaluate tablets and capsules using industrial equipment. CO3. Carry out powder flow property tests and granulation techniques. CO4. Perform coating of tablets and evaluate coating parameters. CO5. Apply documentation, SOPs, GMP and safety practices in pharmaceutical labs.
BP507P	Pharmacology II – Practical	CO1. Understand the mechanism of action and its relevance in the treatment of different diseases. CO2. Demonstrate isolation of different organs/ tissues from the laboratory animals simulated experiments. CO3. Demonstrate the various receptor actions using isolated tissue preparations. CO4. Appreciate correlation of pharmacology with related medical science.
BP508P	Pharmacognosy and Phytochemistry II –Practical	CO1.Able to understand morphology, microscopy and powder characteristics of crude drugs CO2. Able to identify unorganized drugs by chemical methods CO3. Able to determine the quality of unorganized crude drugs CO4. Able to conduct extraction and estimation of different phytoconstituents.
BP601T	Medicinal Chemistry III – Theory	CO1. General aspects of drug design and history of drug development. CO2. To understand the classification, nomenclature, and chemistry of anti-infective agents and antineoplastic agents.

		CO3. Understand the Structure activity relationship (SAR), mechanism of action, therapeutic uses, adverse effects of anti-infective agents and antineoplastic agents. CO4. Know the recent developments and synthetic routes of anti-infective agents and antineoplastic agents. CO5. Understand the concept of quantitative structure activity relationship (QSAR) in drug design CO6. To demonstrate the synthesis of drug and its mechanism of action
BP602T	Pharmacology III – Theory	CO1. Pharmacological actions, pharmacokinetics', therapeutic uses, adverse effects, drug interactions, contraindications, dosages of Psychopharmacological drugs, General Anesthesia, Alcohols and alcoholism, Antiepileptic Drugs, Opioid Analgesics and antagonist, NSAID Rheumatoid Arthritis, Osteoarthritis and Gout CO2. Know about Gastrointestinal tract disorders: Respiratory tract disorders: Pharmacotherapy of Parkinson's disease and Alzheimer's disease CO3. Know various bioassay methods, Eddy's hot plate analgesiometer, actophotometer, Rotarod.
BP603T	Herbal Drug Technology – Theory	CO1. To understand raw material as source of herbal drugs from cultivation to herbal drug product CO2. To know the WHO and ICH guidelines for evaluation of herbal drugs CO3. To know the herbal cosmetics, natural sweeteners, nutraceuticals CO4. To understand patenting of herbal drugs, GMP.
BP604T	Biopharmaceutics and Pharmacokinetics –Theory	CO1. The basic concepts in bio pharmaceutics and pharmacokinetics. CO2. The critical evaluation of biopharmaceutic studies involving drug product equivalency CO3. Understand the concept of dissolution and application of in vitro in vivo correlation in drug product development.

BP605T	Pharmaceutical Biotechnology – Theory	The students should be able CO1. To define Biotechnology & its state its scope in pharmacy CO2. To know the basics of biotechnology techniques and the various systems used. CO3. To know the method of genetic engineering for production of rDNA products including monoclonal antibodies. CO4. To know the information about the application of genetic engineering in animals CO5. To know enzymes and their uses by immobilization. CO6. To illustrate use of Fermenter for production of fermentation products and information about their purification by downstream process.
BP606T	Quality Assurance –Theory	The students should be able to CO1. Understand the significance of quality in pharmaceutical manufacturing. CO2. Know current Good Manufacturing Practices CO3. Acquainted with various aspects of documentation, SOPs and relevant records. CO4. Understand the role of validation in assurance of quality in the pharmaceutical industry. CO5. Learn quality by design approach. CO6. Comprehend ICH guidelines in stability testing and QMS.
BP607P	Medicinal chemistry III – Practical	CO1. Upon completion of the course students shall be able to Synthesize, recrystallize and understand reaction mechanisms involved in synthesis of medicinally important organic compounds. CO2 Use microwave in synthesis of medicinal chemistry. CO3. Draw chemical structures using software CO4. Determine physicochemical properties of drugs using software CO5. Communicate effectively the observations and results of an experiment
BP608P	Pharmacology III – Practical	CO1. Understand and explain guidelines for animal experimentation.. CO2. Know the basic instruments used in animal experimentation and understand their working. (Sherrington's rotating drum, organ bath)

		CO3. Perform the experiments by using isolated tissue preparation and note the effect of various drugs on the tissue at various concentrations. CO4. Understand the computer simulation techniques.
BP609P	Herbal Drug Technology – Practical	CO1. To remember different preliminary phytochemical screening of crude drugs CO2. To evaluate the various herbal formulations CO3. To apply monographic analysis of herbal drugs as per pharmacopoeias CO4. To evaluate parameters such as aldehyde and phenol contents CO5. To assess the total alkaloid content
BP701T	Instrumental Methods of Analysis – Theory	CO1. Illustrate the interaction of matter with electromagnetic radiation CO2. Classify the chromatographic separation methods CO3. Design methods for performing quantitative and qualitative analysis of drugs using various analytical instruments.
BP702T	Industrial Pharmacy II– Theory	CO1. Explain pre-formulation studies and their importance in dosage form development. CO2. Describe various tablet manufacturing processes and evaluation parameters. CO3. Explain encapsulation, powder technology, and capsule evaluation. CO4. Describe equipment, principles, and processes involved in coating of tablets. CO5. Apply cGMP, validation, QC/QA principles in pharmaceutical manufacturing.
BP703T	Pharmacy Practice – Theory	CO1. Know various drug distribution methods in a hospital CO2. Appreciate the pharmacy stores management and inventory control CO3. Monitor drug therapy of patient through medication chart review and clinical review CO4. Obtain medication history interview and counsel the patients CO5. Identify drug related problems CO6. Detects and assess adverse drug reactions CO7. Interpret selected laboratory results (as monitoring parameters in therapeutics) of specific

		disease states CO8. Know pharmaceutical care services CO9. Do patient counseling in community pharmacy; CO10. Appreciate the concept of Rational drug therapy
BP704T	Novel Drug Delivery System – Theory	CO1. Explain the concepts, rationale, advantages, disadvantages, and approaches of controlled drug delivery systems. CO2. Describe microencapsulation techniques, mucosal, and implantable drug delivery systems with formulation considerations. CO3. Explain transdermal, gastroretentive, nasal, and pulmonary drug delivery systems with formulation strategies. CO4. Illustrate the concepts, advantages, disadvantages, and applications of targeted drug delivery systems including liposomes, niosomes, nanoparticles, and monoclonal antibodies. CO5. Discuss ocular and intrauterine drug delivery systems, barriers, formulation approaches, and clinical applications.
BP705P	Instrumental Methods of Analysis – Practical	CO1. Explain the different types of instrumental analytical techniques available for quality control of APIs & formulations CO2. Explain the different types of chromatographic techniques available for quality control of APIs & formulations CO3. Interpret the data obtained through experimentation and report the results as per regulatory requirements.
BP801T	Biostatistics and Research Methodology	CO1. Know the various statistical methods to solve different types of problems CO2. Operate various statistical software packages CO3. Appreciate the importance of Computer in hospital and Community Pharmacy CO4. Appreciate the statistical technique in solving the pharmaceutical problems
BP802T	Social and Preventive Pharmacy	CO1. To explain basic involved in healthcare & current healthcare development CO2. To revise general principles of prevention & control of specific diseases.

		CO3. To study various National health programs, its objectives, functioning & outcome. CO4. National & Social health programme from the healthcare for the elderly along with role of WHO in Indian National Programme
BP803ET	Pharmaceutical Marketing Management	CO1. The course aims to provide an understanding of marketing concepts and techniques CO2. The pharmaceutical industry and their applications.
BP804ET	Pharmaceutical Regulatory Science	CO1. New drugs, and drug products in regulated markets CO2. Understand the process of drug discovery and development CO3. Know the regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals CO4. Understand the regulatory approval process and their registration in Indian and international markets
BP805ET	Pharmacovigilance	CO1. At completion of this paper it is expected that students will be able to (know, do, and appreciate): CO2. Understand the importance of drug safety monitoring. CO3. Explain History, development, National and international scenario of pharmacovigilance & comprehend dictionaries, coding and terminologies used in pharmacovigilance CO4. Understand detection and assessment of new adverse drug reactions, Adverse drug reaction reporting systems and communication in pharmacovigilance, Pharmacovigilance Program of India (PvPI) requirement for ADR reporting in India ICH guidelines for ICSR, PSUR, expedited reporting, pharmacovigilance planning. CIOMS requirements for ADRreporting CO5. Comprehend methods of safety data during pre-clinical, clinical and post approval phases of drugs' lifecycle. CO6. Write case narratives of adverse events and their quality.

BP809ET	Cosmetic Science	CO1. Explain the basic concepts, classification, and ingredients used in cosmetic formulations. CO2. Describe the anatomy and physiology of the skin, hair, and oral cavity relevant to cosmetics. CO3. Formulate and evaluate skin-care, hair-care, and oral-care cosmetic products. CO4. Analyze raw materials and apply quality control parameters for various cosmetic formulations. CO5. Explain regulatory requirements, safety evaluation, and packaging standards of cosmetic products.
BP812ET	Dietary Supplements and Nutraceuticals	CO1. Understand the need of supplements by different groups of people to maintain a healthy life. CO2. Understand the outcome of deficiencies in dietary supplements. CO3. Recognize the components in dietary supplements and the application. CO4. Acquaint with the regulatory and commercial aspects of dietary supplements including health claims

Pune District Education Association's

Seth Govind Raghunath Sable College of Pharmacy, Saswad, Dist-Pune

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Course Outcome - [M. Pharmacy - 2025-26]

COURSE CODE	NAME OF THE SUBJECT	COURSE OUTCOME
MPAT101T	Modern Pharmaceutical Analytical Techniques	CO1. Understand Analytical techniques like UV–Vis, IR, NMR, and Mass spectrometry and chromatographic techniques for identification, characterization and quantification of drugs. CO2. Theoretical and practical skills of instrument handling and use. CO3. Structural Elucidation of organic compounds using data of spectroscopic tools such as UV, IR, NMR, and Mass.
MPH102T	Drug Delivery System	CO1. Understand novel drug delivery approaches, selection criteria for drugs and polymers CO2. Learn sustained release (SR) and controlled release (CR) formulations, drug delivery mechanisms. CO3. Analyze different rate-controlled, gastro-retentive, and buccal drug delivery systems. CO4. Study transdermal, ocular, and protein/peptide delivery systems, including formulation and evaluation. CO5. Explore vaccine delivery technologies, including mucosal and transdermal delivery.
MPH103T	Modern Pharmaceutics	CO1. Understand the concept and importance of preformulation parameters. CO2. Have knowledge of optimization techniques and their applications in pharmaceutical industries. CO3. Apply the statistical design in the development of different formulations. CO4. Know the scope and merits of validation and different types of validation. CO5. Understand the importance of industrial management principles and GMP Considerations. CO6. Know the compression and consolidation parameters for powders and granules in tablet development. CO7. Understand the importance of materials management and production management in pharmaceutical industries. CO8. To know about diffusion, dissolution and pharmacokinetic parameters.

MPH104T	Regulatory Affair	CO1. Discuss the concept of innovator and generic drugs, drug development process. CO2. Develop strategies for improving nasal absorption in the design of nasal drug delivery systems. CO3. Categorize the preparation of dossiers and their submission to regulatory agencies in different countries. CO4. Assess the post approval requirements for actives and drug products.
MPH105P	Pharmaceutics Practical I	CO1. Understand how to analyze and estimate the organic compounds and biological by spectroscopic, fluorimetry, flame photometry methods. CO2. Learn to separate the impurities or mixtures of organic compounds by using column chromatographic, HPLC, and gas chromatography methods. CO3. Formulation and Evaluation of Various Drug Delivery Systems. CO4. Pre-formulation studies of tablets and graphical analysis of data.
MPH201T	Molecular Pharmaceutics (Nano Tech and Targeted DDS)	CO1. Design drug delivery systems for targeting drugs to tumors and to the brain. CO2. Prepare and evaluate nanoparticles and liposomes as carriers for drug targeting. CO3. Select drugs and polymers in the design of microspheres and microcapsules for various applications. CO4. Formulate aquasomes, niosomes, phytosomes and electrosomes for various applications in drug targeting. CO5. Develop strategies for improving nasal absorption in the design of nasal drug delivery systems.
MPH202T	Advanced Biopharmaceutics & Pharmacokinetics	CO1. Understand the physiology of the GIT, mechanisms of drug absorption, pH-partition theory, dissolution processes, and the role of dosage forms in gastrointestinal absorption. CO2. Apply bio-pharmaceutics principles in drug product design considering formulation and physicochemical factors affecting bioavailability, and perform in vitro dissolution and release testing. CO3. Analyze basic pharmacokinetic models including compartment modelling, non-linear kinetics and drug interaction mechanisms such as protein binding and enzyme inhibition. CO4. Evaluate drug product performance *in-vivo* through bioavailability and bioequivalence studies, including design, statistical evaluation, and regulatory requirements. CO5. Interpret pharmacokinetics and

		pharmacodynamics in context of modified release and targeted drug delivery systems, and understand biotechnology based therapeutics.
MPH203T	Computer Aided Drug Development	CO1. Explain the Role of CADD in drug discovery. CO2. Understand the physicochemical Properties and the techniques involved in QSAR. CO3. Learn the concept of molecular and quantum mechanics. CO4. Learn the working with molecular modeling softwares to design new drug molecules. CO5. Understand *in-silico* virtual screening protocols. CO6. Explain pharmacophore concept and the techniques involved in modeling. CO7. Learn various structure based drug design methods (Denovo drug design, fragment based drug design). CO8. Elaborate homology modelling and its experimental procedures.
MPH204T	Cosmetic & Cosmeceuticals	CO1. Key ingredients used in cosmetics and cosmeceuticals. CO2. Key building blocks for various formulations. CO3. Various key ingredients and basic science to develop cosmetics and cosmeceuticals. CO4. Scientific knowledge to develop cosmetics and with desired Safety, stability, and efficacy.
MPH205P	Pharmaceutics Practical II	CO1. To design, formulate and evaluate microparticulate and nanoparticle formulations and to assess the effect of different process variables on their performance. CO2. To assess, analyze and correlate the in vitro and in vivo performance of developed pharmaceutical product as per the guidelines. CO3. To formulate and evaluate herbal and conventi cosmetics.
MPC102T	Advanced Organic Chemistry – I	CO1. Acquaint with basics of organic chemistry and fundamentals about Organic intermediates, reaction mechanisms and addition reactions of organic compounds. CO2. Understand importance and synthetic applications of important named reactions. CO3. Gain knowledge about role and applications of synthetic reagents and protecting groups in organic reactions. CO4. Explain the chemistry of heterocyclic compounds.

		CO5. Apply the knowledge of basic organic chemistry in synthesis of drugs. CO6. Understanding of all components of medicinal chemistry will help in developing critical thinking and evidence-based problem-solving ability.
MPC103T	Advanced Medicinal Chemistry	CO1. Learn the different stages of drug discovery & Role of medicinal chemistry in drug research. CO2. Learn different techniques for drug discovery. CO3. Understand various strategies to design and develop a new drug like molecules for biological targets. CO4. Explain drug receptor concept. CO5. Elaborate prodrug development and applications. CO6. Learn the structural activity relationship of the important class of drugs. CO7. Explain types of Enzyme inhibition and its application in medicine. CO8. Discuss peptidomimetics approach and applications.
MPC104T	Chemistry of Natural Products	CO1. Study different types of natural compounds and their chemistry and medicinal importance. CO2. Explain the importance of natural compounds as lead molecules for new drug discovery. CO3. Explain the concept of DNA & rDNA technology tool for new drug discovery. CO4. Isolation, Purification and characterization of simple chemical constituents from natural source.
MPC105P	Pharmaceutical Chemistry Practical I	CO1. To synthesize and characterize medicinally important compounds. CO2. To perform various named reactions synthesis. CO3. To analyze and estimate the organic compounds and biological by spectroscopic, fluorimetry, flame photometry methods. CO4. To separate the impurities or mixtures of organic compounds by using column chromatographic, HPLC, and gas chromatography methods.
MPC201T	Advanced Spectral Analysis	CO1. The students should be able to Understand various hyphenated analytical instrumental techniques for identification, characterization and quantification of drugs (UV, IR, NMR, Mass spectrometry, thermal and chromatographic techniques). CO2. Understand the instrumentation, theoretical and practical skills of instrument handling and its use. CO3. Interpret the NMR, Mass and IR spectra of various organic compounds.

		CO4. To elucidate the structure of organic compounds using this spectroscopic tools.
MPC202T	Advanced Organic Chemistry –II	CO1. Explain the principles and Applications of Green Chemistry. CO2. Explain the concept of peptide chemistry. CO3. Explain the various catalysts used in organic reactions. CO4. Explain the concept of stereochemistry and asymmetric synthesis.
MPC203T	Computer Aided Drug Design	CO1. Acquired expertise to utilize molecular modeling software in the design of novel drug-like molecules. CO2. Can apply various strategies to design &develop new drug like molecules using CADD and QSAR methods. CO3. Able to understand various strategies to design and develop new drug like molecules. CO4. Capable of carrying out molecular modeling and molecular docking studies. CO5. Possess knowledge of *in-silico* virtual screening protocols.
MPC204T	Pharmaceutical Process Chemistry	CO1. To develop synthetic routes that are safe, cost-effective, environmentally friendly, and efficient. CO2. To impart knowledge on the development and optimization of a synthetic route/s. CO3. The pilot plant procedure for the manufacture of Active Pharmaceutical Ingredients and new chemical entities for the drug development phase. CO4. To create and carry out work up and separation procedures and to predict the outcome of organic reactions using a basic understanding of the general reactivity of functional groups and mechanisms. CO5. The principles and applications of modern chemical instrumentation, experimental design, and data analysis.
MPC205P	Pharmaceutical Chemistry Practical II	CO1. To understand various approaches of synthesis of API. CO2. To interpret IR, NMR, and mass spectrum of organic compounds. CO3. To identify the organic compounds by IR, NMR and Mass analysis. CO4. To prepare different compounds by synthetic route. CO 5. To perform computer aided drug design software based practicals.

MPL102T	Advanced Pharmacology – I	CO1. Discuss the pathophysiology and pharmacotherapy of certain diseases. CO2. Explain the mechanism of drug actions at cellular and molecular level. CO3. Understand the adverse effects, contraindications and clinical uses of drugs used in treatment of diseases.
MPL 103T	Pharmacological and Toxicological Screening Methods–I	CO 1. Explain the various types of toxicity studies. CO2. Appreciate the importance of ethical and regulatory requirements for toxicity studies. CO3. Demonstrate the practical skills require conducting the preclinical toxicity studies.
MPL104T	Cellular and Molecular Pharmacology	CO1. Explain the receptor signal transduction processes. CO2. Explain the molecular pathways affected by drugs. CO3. Appreciate the applicability of molecular pharmacology and biomarkers in drug discovery process. CO4. Demonstrate molecular biology techniques as applicable for pharmacology.
MPL105P	Pharmacology Practical I	CO1. Perform fundamental pharmacological experiments using in vivo and in vitro models. CO2. Understand and apply ethical and regulatory requirements in handling lab animals. CO3. Demonstrate practical skills in drug administration, dose calculation, and data recording. CO4. Analyze experimental results, plot graphs, and interpret pharmacological data. CO5. Develop scientific reporting skills and effectively document experimental observations.
MPL201T	Advanced Pharmacology II	CO1. Explain the mechanism of drug actions at cellular and molecular level. CO2. Discuss the pathophysiology and pharmacotherapy of certain diseases. CO3. Understand the adverse effects, contraindications and clinical uses of drugs used in the treatment of diseases.
MPL 202T	Pharmacological and Toxicological Screening Methods–II	CO1. Explain the various types of toxicity studies. CO2. Appreciate the importance of ethical and regulatory requirements for toxicity studies. CO3. Demonstrate the practical skills require conducting the preclinical toxicity studies.
MPL203T	Principles of Drug Discovery	CO1. Explain the various stages of drug discovery. CO2. Appreciate the importance of the role of genomics, proteomics and bioinformatics in drug

		discovery. CO3. Explain various targets, biomarkers and in vitro screening techniques for drug discovery. CO4. Explain various lead seeking method and lead optimization. CO5. Appreciate the importance of the role of computer aided drug design in drug discovery.
MPL204T	Clinical Research and Pharmacovigilance	CO1. Explain the regulatory requirements for conducting clinical trials. CO2. Demonstrate the types of clinical trial designs. CO3. Explain the responsibilities of key players involved in clinical trials. CO4. Execute safety monitoring, reporting and close-out activities. CO5. Explain the principles of pharmacovigilance. CO6. Detect new adverse drug reactions and their assessment. CO7. Perform the adverse drug reaction reporting systems and communication in pharmacovigilance.
MPL205P	Pharmacology Practical II	CO1. Design and perform in-vitro pharmacological experiments using various isolated tissue preparation. CO2. Estimate the biological samples quantitatively using isolated tissue preparation and interpret to calculate the PD2 and PA2 values. CO3. Understand the OECD guidelines and perform acute toxicity studies for safety evaluation and able to interpret the pharmacokinetic profile of the given drug. CO4. Understand cardiovascular responses using proper experimental techniques, drug efficacy and able to design & conduct clinical trials and ADR monitoring. CO5. Understand the drug discovery process and able to develop a new through *In-silico* techniques.
MPG102T	Advanced Pharmacognosy–1	CO1. Advances in production and cultivation of drugs. CO2. Various Phyto-pharmaceuticals and their source utilization and its medicinal values. CO3. Various nutraceuticals and their health benefits. CO4. Detailed information about drugs of marine origin. CO5. Pharmacovigilance in pharmacognosy
MPG103T	Phytochemistry	CO1. Different classes of phytoconstituents and their biosynthetic pathways. CO2. General processes of extraction and properties of natural products. CO3. Phytochemical fingerprinting and structural elucidation of chemical compounds.

MPG104T	Industrial Pharmacognostical Technology	CO1. Study the requirements for setting up the herbal/natural drug industry. CO2. Study the guidelines for quality of herbal/natural medicines and regulatory issues. CO3. Study the patenting/IPR of herbals/natural drugs and trade of raw and finished materials
MPG105P	Pharmacognosy Practical I	CO1. Study quantitative and qualitative analysis of natural products using modern analytical instruments such as UV, GC, and HPLC. CO2. Study to develop and interpret chromatographic fingerprints of medicinal plant extracts (TLC/HPTLC) commonly used in the herbal drug industry. CO3. Conduct extraction techniques and preliminary phytochemical screening for identifying major classes of phytoconstituents. CO4. To impart skills in pharmacopoeial evaluation of crude oils and natural products, including monograph analysis. CO5. To develop competency in identification of bioactive constituents and formulation/standardization of herbal dosage forms.
MPG201T	Medicinal Plant Biotechnology	CO1. Know the process like genetic engineering in medicinal plants for higher yield of Phytopharmaceuticals. CO2. Study the biotechnological techniques for obtaining and improving the quality of natural products/medicinal plants.
MPG102T	Advanced Pharmacognosy – II	CO1. Study validation of herbal remedies. CO2. Study methods of detection of adulteration and evaluation techniques for the herbal drugs. CO3. Study methods of screening of herbals for various biological properties.
MPG203T	Indian system of medicine	CO1. Understand the basic principles of various Indian systems of medicine. CO2. Know the clinical research of traditional medicines. CO3. Study Good Manufacturing Practice of Indian systems of medicine and their formulations.
MPG204T	Herbal cosmetics	CO1. Understand the basic principles of various herbal/natural cosmetic preparations. CO2. Study current Good Manufacturing Practices of herbal/natural cosmetics as per the regulatory authorities.

MPG205P	Pharmacognosy Practical II	CO1. To develop practical skills in isolation, quantification, and analysis of biomolecules such as DNA, RNA, nucleic acids, phenolics, flavonoids, and alkaloids from herbal raw materials. CO2. To train students in plant tissue culture techniques, including callus and suspension culture establishment for cosmetic and therapeutic applications. CO3. To provide hands-on experience in quantitative estimation of active constituents and quality evaluation of volatile oils, herbal extracts, and dosage forms. CO4. To enable students to formulate and standardize herbal cosmetics. CO5. To impart proficiency in preparing, evaluating, and standardizing traditional and modern herbal formulations.
MRM 301T	Research Methodology and Biostatistics	CO1. Develop the ability to apply the methods while working on a research project work. CO2. Describe the appropriate statistical methods required for a particular research design. CO3. Choose the appropriate research design and develop appropriate research hypothesis for a research project. CO4. Develop an appropriate framework for research studies.