Course outcomes (COs) for all Programmes (UG and PG) offered by the institution

Program Name	Course code	Course Name	Year of Introduction	Course Outcomes
	BP101T	HUMAN ANATOMY AND PHYSIOLOGY- I (Theory)	2020-21	Upon completion of this course the student should 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 various experiments related to special senses and nervous system. 5. Appreciate coordinated working pattern of different organs of each system
	BP102T	PHARMACEUTICAL ANALYSIS (Theory)	2020-21	Upon completion of the course a student shall be able to understand 1.The principles of volumetric and electrochemical analysis. 2.Carry out various volumetric and electrochemical titrations. 3.Develop analytical skills.

	BP103T	PHARMACEUTICS- I (Theory)	2020-21	Upon completion of this course the student should 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.reparation of various conventional dosage forms
	BP104T	PHARMACEUTICAL INORGANIC CHEMISTRY (Theory)	2020-21	Upon completion of course student shall be able to 1.Know the sources of impurities and methods to determine the impurities in drugs and pharmaceuticals 2.Understand the medicinal and pharmaceutical importance of inorganic compounds
B. Pharm Semester I	BP105T	COMMUNICATION SKILLS (Theory)	2020-21	Upon completion of the course the student shall be able to 1. Understand the behavioral 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
	BP106RBT	REMEDIAL BIOLOGY (Theory)	2020-21	Upon completion of the 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 (Theory)	2020-21	Upon completion of the 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
BP107P	HUMAN ANATOMY AND PHYSIOLOGY (Practical)	2020-21	Upon completion of this course the student should 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 various experiments related to special senses and nervous system. 5. Appreciate coordinated working pattern of different organs of each system
BP108P	PHARMACEUTICAL ANALYSIS (Practical)	2020-21	Upon completion of the course a student shall be able to understand 1.The principles of volumetric and electrochemical analysis. 2.Carry out various volumetric and electrochemical titrations. 3.Develop analytical skills.
BP109P	PHARMACEUTICS I (Practical)	2020-21	Upon completion of this course the student should 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.reparation of various conventional dosage forms

	BP110P	PHARMACEUTICAL INORGANIC CHEMISTRY (Practical)	2020-21	Upon completion of course student shall be able to 1.Know the sources of impurities and methods to determine the impurities in drugs and pharmaceuticals 2.Understand the medicinal and pharmaceutical importance of inorganic compounds
	BP111P	COMMUNICATION SKILLS (Practical)	2020-21	Upon completion of the course the student shall be able to 1. Understand the behavioral 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
	BP112RBP	REMEDIAL BIOLOGY (Practical)	2020-21	Upon completion of the 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
B. Pharm Semester II	BP 201T	HUMAN ANATOMY AND PHYSIOLOGY-II (Theory)	2020-21	Upon completion of this course the student should 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, haemoglobin 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.
	BP202T	PHARMACEUTICAL ORGANIC CHEMISTRY – I (Theory)	2020-21	Upon completion of the 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 compounds
	BP203 T	BIOCHEMISTRY (Theory)	2020-21	Upon completion of course the students shall able to 1.Understand the catalytic role of enzymes and importance of enzyme in biochemical process. 2.Understand the metabolism of nutrient molecules in physiological and pathological conditions. 3.Understand the genetic organization of mammalian genome and functions of DNA in the synthesis of RNAs and proteins.
	BP 204T	PATHOPHYSIOLOGY (THEORY)	2020-21	Upon completion of the subject, student shall be able to – 1. Describe the etiology and pathogenesis of the selected diseasestates; 2. Name the signs and symptoms of the diseases
	BP205 T	COMPUTER APPLICATIONS IN PHARMACY (Theory)	2020-21	Upon completion of the 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
	BP 206 T	ENVIRONMENTAL SCIENCES (Theory)	2020-21	Upon completion of the course the student shall be able to: 1. Create the 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 learner 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.
	BP 207 P	HUMAN ANATOMY AND PHYSIOLOGY (Practical)	2020-21	Upon completion of this course the student should 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, haemoglobin 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.
	BP208P	PHARMACEUTICAL ORGANIC CHEMISTRY – I (Practical)	2020-21	Upon completion of the 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 compounds
	BP 209 P	BIOCHEMISTRY (Practical)	2020-21	Upon completion of course the students shall able to 1.Understand the catalytic role of enzymes and importance of enzyme in biochemical process. 2.Understand the metabolism of nutrient molecules in physiological and pathological conditions. 3.Understand the genetic organization of mammalian genome and functions of DNA in the synthesis of RNAs and proteins.
	BP210P	COMPUTER APPLICATIONS IN PHARMACY (Practical)	2020-21	Upon completion of the 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
B. Pharm Semester III	BP301T	PHARMACEUTICAL ORGANIC CHEMISTRY –II (Theory)	2020-21	Upon completion of the 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. Prepare small organic compounds
	BP302T	PHYSICAL PHARMACEUTICS-I (Theory)	2020-21	Upon the completion of the course student shall be able to 1. Investigate and apply various theories, laws and equations related to different states of matter 2. Distinguish the principles of complexation/ protein binding & to use them for calculations of drug release and stability constant. 3. Demonstrate use of physicochemical properties of drugs in the formulation development and evaluation of dosage forms.
	BP 303 T	PHARMACEUTICAL MICROBIOLOGY (Theory)	2020-21	Upon completion of the subject student shall be able to; 1. Understand methods of identification, cultivation and preservation of various Microorganisms 2. To understand the importance and implementation of sterlization in pharmaceutical processing and industry 3. Learn sterility testing of pharmaceutical products. 4. Carried out microbiological standardization of Pharmaceuticals. 5. Understand the cell culture technology and its applications in pharmaceutical industries.
	BP 304 T	PHARMACEUTICAL ENGINEERING (Theory)	2020-21	Upon completion of the course student shall be able: 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.
	BP305P	PHARMACEUTICAL ORGANIC CHEMISTRY - II (Practical)	2020-21	Upon completion of the 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. Prepare small organic compounds
	BP306P	PHYSICAL PHARMACEUTICS – I (Practical)	2020-21	Upon the completion of the course student shall be able to 1. Investigate and apply various theories, laws and equations related to different states of matter 2. Distinguish the principles of complexation/ protein binding & to use them for calculations of drug release and stability constant. 3. Demonstrate use of physicochemical properties of drugs in the formulation development and evaluation of dosage forms.
	BP 307P	PHARMACEUTICAL MICROBIOLOGY (Practical)	2020-21	Upon completion of the subject student shall be able to; 1. Understand methods of identification, cultivation and preservation of various Microorganisms 2. To understand the importance and implementation of sterlization in pharmaceutical processing and industry 3. Learn sterility testing of pharmaceutical products. 4. Carried out microbiological standardization of Pharmaceuticals.

				5. Understand the cell culture technology and its applications in pharmaceutical industries.
	BP308 P	PHARMACEUTICAL ENGINEERING (PRACTICAL)	2020-21	Upon completion of the course student shall be able: 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.
B. Pharm Semester IV	BP401T	PHARMACEUTICAL ORGANIC CHEMISTRY – III (Theory)	2020-21	Upon completion of the 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 stereo chemical reactions. 3. Know the medicinal uses and other applications of organic compounds
	BP402T	MEDICINAL CHEMISTRY – I (Theory)	2020-21	Upon completion of the 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 Structural Activity Relationship (SAR) of different class of drugs. 4. Write the chemical synthesis of some drugs.

	BP 403 T	PHYSICAL PHARMACEUTICS-II (Theory)	2020-21	Upon the completion of the course student shall be able to 1. Relate various physicochemical properties of drug and excipient molecules in designing the dosage forms 2. Distinguish the principles of chemical kinetics & to use them for stability testing and determination of expiry date of formulations 3. Demonstrate the behavior and mechanism of drugs and excipients in the formulation development and evaluation of dosage forms.
	BP 404 T	PHARMACOLOGY-I (Theory)	2020-21	Upon completion of the subject, student shall be able to – 1. Understand the pharmacological actions of different categories of drugs. 2. Explain the mechanism of 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 effects of drugs on animal by simulated experiments. 5. Appreciate correlation of pharmacology with other bio medical sciences.
	BP 405 T	PHARMACOGNOSY AND PHYTOCHEMISTRY I (Theory)	2020-21	Upon completion of the course, the student shall be able 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. know the evaluation techniques for the herbal drugs 4. to carry out the microscopic and morphological evaluation of crude drugs
	BP406P	MEDICINAL CHEMISTRY – I (Practical)	2020-21	Upon completion of the 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 Structural Activity Relationship (SAR) of different class of drugs. 4. Write the chemical synthesis of some drugs.
	BP 407P	PHYSICAL PHARMACEUTICS- II (Practical)	2020-21	Upon the completion of the course student shall be able to 1. Relate various physicochemical properties of drug and excipient molecules in designing the dosage forms 2. Distinguish the principles of chemical kinetics & to use them for stability testing and determination of expiry date of formulations 3. Demonstrate the behavior and mechanism of drugs and excipients in the formulation development and evaluation of dosage forms.
	P 408 P	PHARMACOLOGY-I (Practical)	2020-21	Upon completion of the subject, student shall be able to – 1. Understand the pharmacological actions of different categories of drugs. 2. Explain the mechanism of 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 effects of drugs on animal by simulated experiments. 5. Appreciate correlation of pharmacology with other bio medical sciences.
	BP409 P	PHARMACOGNOSY AND PHYTOCHEMISTRY I (Practical	2020-21	Upon completion of the course, the student shall be able 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. know the evaluation techniques for the herbal drugs 4. to carry out the microscopic and morphological evaluation of crude drugs
B. Pharm Semester V	BP501T	MEDICINAL CHEMISTRY – II (Theory)	2020-21	Upon completion of the 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 Structural Activity Relationship of different class of drugs 4. Study the chemical synthesis of selected drugs
	BP 502 T	Industrial Pharmacy I (Theory)	2020-21	Upon completion of the course the student shall be able to 1. Illustrate various pharmaceutical dosage forms and their manufacturing techniques. 2. describe various factors to be considered in development of pharmaceutical dosage forms 3. Formulate solid, liquid and semisolid dosage forms and evaluate them for their quality
	BP503T	PHARMACOLOGY-II (Theory)	2020-21	Upon completion of this course the student should 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

	BP504 T	PHARMACOGNOSY AND PHYTOCHEMISTRY-II (Theory)	2020-21	Upon completion of the course, the student shall be able 1. To know the modern extraction techniques, characterization and identification of the herbal drugs and phytoconstituents 2. To understand the production of of Phytoconstituents /herbal formulation. 3. To understand the metabolic pathways in formation of secondary metabolites and application of biogenetic studies. 4. To carryout isolation and identification of phytoconstituents
	BP 505 T	PHARMACEUTICAL JURISPRUDENCE (Theory)	2020-21	Upon completion of the course, the student shall be able to understand: 1. The Pharmaceutical legislations and their implications in the development and marketing of pharmaceuticals. 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
	BP 506 P	Industrial Pharmacy I (Practical)	2020-21	Upon completion of the course the student shall be able to 1. Illustrate various pharmaceutical dosage forms and their manufacturing techniques. 2. describe various factors to be considered in development of pharmaceutical dosage forms 3. Formulate solid, liquid and semisolid dosage forms and evaluate them for their quality
	BP 507 P	PHARMACOLOGY-II (Practical)	2020-21	Upon completion of this course the student should 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
	BP 508 P	PHARMACOGNOSY AND PHYTOCHEMISTRY II (Practical)	2020-21	Upon completion of the course, the student shall be able 1. To know the modern extraction techniques, characterization and identification of the herbal drugs and phytoconstituents 2. To understand the production of of Phytoconstituents /herbal formulation. 3. To understand the metabolic pathways in formation of secondary metabolites and application of biogenetic studies. 4. To carryout isolation and identification of phytoconstituents
B. Pharm Semester VI	BP601T	MEDICINAL CHEMISTRY – III (Theory)	2020-21	Upon completion of the course student shall be able to 1 Understand the importance of drug design and different techniques of drug design. 2 Understand the chemistry of drugs with respect to their biological activity. 3 Know the metabolism, adverse effects and therapeutic value of drugs. 4 Know the importance of SAR of drugs.
	BP602 T	PHARMACOLOGY-III (Theory)	2020-21	Upon completion of this course the student should 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 and appreciate correlation of pharmacology with related medical sciences.
	BP 603 T	HERBAL DRUG TECHNOLOGY (Theory)	2020-21	Upon completion of this course the student should 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 .
	BP 604 T	BIOPHARMACEUTICS AND PHARMACOKINETICS (Theory)	2020-21	Upon completion of the course student shall be able to: 1.Understand the basic concepts in biopharmaceutics and pharmacokinetics and their significance. 2.Use plasma drug concentration-time data to calculate the pharmacokinetic parameters to describe the kinetics of drug absorption, distribution, metabolism, excretion, elimination. 3.Understand the concepts of bioavailability and bioequivalence of drug products and their significance. 4.Understand the concept of dissolution and application of in vitro in vivo correlation in drug product development
	BP 605 T	PHARMACEUTICAL BIOTECHNOLOGY(Theory)	2020-21	Upon completion of the subject 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
	BP 606T	PHARMACEUTICAL QUALITY ASSURANCE (Theory)	2020-21	Upon completion of the course student shall be able to: 1. Understand the cGMP aspects in a pharmaceutical industry 2. Appreciate the importance of documentation 3. Understand the scope of quality certifications applicable to pharmaceutical industries 4. Understand the responsibilities of QA & QC departments
	BP607P	MEDICINAL CHEMISTRY-III (Practical)	2020-21	Upon completion of the course student shall be able to 1 Understand the importance of drug design and different techniques of drug design. 2 Understand the chemistry of drugs with respect to their biological activity. 3 Know the metabolism, adverse effects and therapeutic value of drugs. 4 Know the importance of SAR of drugs.
	BP 608 P	PHARMACOLOGY-III (Practical)	2020-21	Upon completion of this course the student should 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 and appreciate correlation of pharmacology with related medical sciences.
	BP 609 P	HERBAL DRUG TECHNOLOGY (Practical)	2020-21	Upon completion of this course the student should 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
B. Pharm Semester VII	4.7.1 T	STERILE PRODUCTS	2020-21	1.Describe the General requirements, routes of administration, significance of tonicity adjustment and sterility and Pre-formulation of sterile products 2.Describe various packaging materials used, types, choice of containers, official quality control tests and methods of evaluation. 3.Describe the GMP and design and layout of Parenteral Production Facility, environmental control zones, heating ventilation air conditioning (HVAC), HEPA filter and laminar area flow systems. 4.Explain Classification and formulation of SVP, types and selection of vehicles and added substance, processing, manufacturing and Quality control of SVPs along with Special types of SVPs and Pilot plant scale up. 5.Explain Large Volume Parenterals (LVPs), Types, concept of formulation, influence of physiological factors, processing, manufacturing and Quality control of LVPs, along with Parenteral Nutrition, intravenous admixture and Peritoneal dialysis fluid and Pilot plant scale up. 6.Explain General requirements, formulation, types and evaluation of ophthalmic products. 7.Describe Blood Products and Surgical Dressings
	4.7.2 T	PHARMACEUTICAL ANALYSIS -V	2020-21	1.Explain the different types of instrumental analytical techniques available for quality control of APIs & formulations.

				2.Adopt various sampling techniques employed in analysis of solid, semisolid and liquid dosage forms while working in industry 3.Explain the principles, instrumentation and applications of UV-VIS, Flourimetry, Atomic absorption, atomic emission spectroscopies, Flame photometry, Phosphorimetry and Nepheloturbidimetry.
	4.7.3 T	MEDICINAL CHEMISTRY-III	2020-21	Know the general aspects of design of the drugs, history, classification, nomenclature, structure activity relationship (SAR), mechanism of action, therapeutic uses, adverse effects and recent developments in the antibiotics, anti-infective agents and antineoplastic agents.
	4.7.4 T	PHARMACOLOGY- IV	2020-21	1.Classification, mechanism of action, antibacterial spectrum, resistance, therapeutic uses, adverse effects and contraindications of various antibiotics. 2.Various endocrine hormones, its types, receptors involved and mechanisms involved. 3.Biosynthesis, Mechanism of action, Pharmacology and regulation of Thyroid, antithyroid drugs and Parathyroid hormones. 4.Biosynthesis, Secretion, Mechanism of action, Pharmacology of insulin and glucagon and Pharmacotherapy of Diabetes Mellitus. 5.Pharmacology of Androgens, Estrogens, Progestin and oral contraceptives.
	4.7.5 T	NATURAL DRUG TECHNOLOGY	2020-21	1.Explain variousguidelines issued by WHO in relation with cultivation, collection, storage etc.

				2.Understand & explain concept of health & pathogenesis, philosophical basis, diagnosis &treatment aspects of Ayurveda, Unani, Siddha &Homoepatic system of medicine; Understand & explain method of preparation of Ayurvedic dosage forms; significance of novel drug delivery of natural products; herbs used in cosmetic preparation & methods of their formulations. 3.Understand and explain the applications of plant tissue culture for Secondary metabolite production. 4.Explain in vitro screening methods and its applications for biological evaluation of natural products 5.Explain the approaches and potentials of herbal new drug delivery systems like liposomes, phytosomes, nanoparticles and vesicles 6.Understand & explain various physical, chemical, spectroscopic means & methods used in structural elucidation of natural products. He/she should be able to interpret data generated from above techniques.
	4.7.6 T	BIO-PHARMACEUTICS & PHARMACOKINETICS	2020-21	1.Understanding the concept of biopharmaceutics and its applications in formulation development. 2.Studying pharmacokinetic processes and their relevance in efficacy of dosage form. 3.Learning the concepts of bioavailability and bioequivalence studies. 4.Learning various compartmental models and non compartmental analysis methods.

				5.Understanding concept and mechanisms of dissolution and in vitro in vivo correlation
	4.7.7 T	PHARMACEUTICAL JURISPRUDENCE	2020-21	1.To understand Basic principles, purpose, dimensions of the laws, significance and relevance of Pharmaceutical laws in India □□To discuss the purpose of the Board □□To explain the definitions in the Act; □□To describe the qualifications for membership and the make-up of the Board □□To explain the rule-making authority discuss the responsibilities of the Board; □□To discuss inspections by the Board or its representative; □□To learn the various laws governing the manufacturing, sale, research & usage of drugs □□To understand significance of Schedule M and Schedule Y related Manufacturing & clinical trials. □□Identify potential fraud and abuse legal issues of narcotic &psychotropic substance. □□□To study quality & prices of essential medicine. □□□Learner knowledge about Patents, procedure for patent application and IPR.
	4.7.1 P	STERILE PRODUCTS	2020-21	1.Formulation development and Pharmacopoeial evaluation and labeling of SVPs, LVPs, and ophthalmic preparations 2.Expertise in sealing of ampoules 3.Describe use of ingredients in formulation and category of formulation

				4.Pharmacopoeial evaluation of packaging materials 5.Importance and validation of aseptic area 6.Evaluation of marketed preparations 7.Significance and Accelerated stability testing of marketed samples.
	4.7.2 P	PHARMACEUTICAL ANALYSIS - V	2020-21	1.Independently operate, calibrate various analytical instruments for the assay of various APIs and formulations as per Pharmacopoeial standards. □□Independently process, interpret the data obtained through experimentation and report the results as per regulatory requirements. □□Take appropriate safety measures while handling instruments, chemicals and apparatus.
	4.7.3 P	MEDICINAL CHEMISTRY-III	2020-21	1.Make correct use of various equipments and take safety measures while working in Medicinal Chemistry Laboratory. □□Synthesize medicinally important compounds and purify them using column chromatography. □□Characterize the synthesized compounds using IR and NMR spectra. □□Purify the solvents using fractional and vacuum distillation. □□Explain reaction mechanisms involved in synthesis of medicinally important compounds
	4.7.4 P	PHARMACOLOGY- IV	2020-21	1.Use of isolated tissue preparations for bioassay methods. □□Basic aspects to carryout Critical appraisal of marketed fixed dose combinations (FDC).

				□□Understanding Prescription auditing and standard treatment protocols.
	4.7.5 P	NATURAL DRUG TECHNOLOGY		1.Prepare, label & evaluate herbal/TSM formulations □□Evaluate marketed cosmetic & nutraceutical formulations □□Conduct preformulation parameters & understand underlying rationale □□Conduct in vitro assays for correlation with biological efficacy □□Able to handle various equipments as per SOPs & learn various demonstrations (of experiments). □□Listen carefully, raise logical query, draw information, understand rationale during Field visits & prepare brief report for evaluation.
B. Pharm Semester VIII	4.8.1T	ADVANCED DRUG DELIVERY SYSTEM	2020-21	1.Describe the Fundamental Concept of Modified Drug Release and Prerequisites of drug candidates, along with various approaches and classification 2.Describe Polymers with respect to introduction to polymers, classification, types, selection, application and examples. 3.Describe. Introduction, formulation, merits, demerits, application and evaluation of Novel Drug Delivery Systems 4.Explain Therapeutic Aerosols along with typical formulations from, metered dose, intranasal and topical applications, 5.Explain concept of microencapsulation, merits, demerits and application, Types of Microencapsulation and Evaluation of microcapsules

				6.Explain Basic concept of optimization
	4.8.2 T	COSMETIC SCIENCE	2020-21	1.Understand the concepts of cosmetics; anatomy of skin v/s hair, general excipients used in cosmetics. 2.Explain formulation of cosmetics for skin, manufacturing, equipments & evaluation of creams like cold cream, vanishing cream etc. & powder cosmetics. 3.Explain formulation of cosmetics for hair, manufacturing & evaluation of hair shampoos, tonics etc. 4.Describe formulation of cosmetics for eyes, manufacturing & evaluation of eye mascara, shadow etc. 5.Understand formulation of manicure products like nail lacquer, remover etc. 6.Learn formulation, manufacture & evaluation of baby cosmetics like baby oils, Powders etc. 7.Explain the concept of cosmeceuticals, history, difference between cosmetics &cosmeceuticals & cosmeceuticals agents.
	4.8.3 T	PHARMACEUTICAL ANALYSIS -VI	2020-21	Explain principles, instrumentation of NMR & ESR spectroscopy, Mass Spectrometry and their applications in Pharmaceutical research, quality control of APIs & formulations.
	4.8.4 T	MEDICINAL CHEMISTRY-IV	2020-21	Know the general aspects of design of the drugs, history, classification, nomenclature, structure activity relationship (SAR), mechanism of action, therapeutic uses, adverse effects and recent developments in the antihistaminics, proton pump inhibitors, Serotonergic agents,

				Autacoids, NSAIDs, analgesics & antipyretics, Narcotic agents, Steroidal Drugs, Hormones, Insulin & Oral Anti-hyperglycemic drugs and Diagnostic agents.
	4.8.5 T	PHARMACOLOGY- V, (Including Biostatistics)	2020-21	1. Important aspect, classification, mechanism of drug-drug interaction and ADRs. 2.Basic aspects of drug safety and Pharmacovigilance in relation to monitoring and reporting of ADRs. 3.Functioning and role of hospital pharmacy and practice of rational drug therapy and methods of assessment of patient compliance and non-compliance. 4.Clinical trials, ethics and practice of Good Clinical Practice involved in clinical trials. 5.Process, working and personnel involved in clinical data management and their roles.
	4.8.6 T	NATURAL PRODUCTS: COMMERCE, INDUSTRY & REGULATIONS	2020-21	1.Understand & realize the significance of natural products in daily life.. 2.Realize the market potential of natural products & explore entrepreneurship skills to Grab these opportunities. 3.Understand & explain safe use of natural products, possible toxicities &interaction, Toxicities in most venerable group (elderly patients), need &significance of Pharmacovigilance systems; WHO guidelines in this regard.
	4.8.7 T	QUALITY ASSURANCE TECHNIQUES	2020-21	Explain significance of quality in Pharmaceutical manufacturing, Role of Regulatory Agencies in deciding Quality Standards, significance of validation in quality assurance.

				□□Follow cGMP, GLP and GDP while working in Pharmaceutical industry. □□Explain the concept of QbD
	4.8.1 P	ADVANCED DRUG DELIVERY SYSTEM	2020-21	1.Formulation development and evaluation of sustained release, transdermal, gastroretentive formulations 2.Micro encapsulation techniques 3.Evaluation of marketed preparations 4.Optimization studies using 2^3 factorial design
	4.8.2 P	COSMETIC SCIENCE	2020-21	1.State the correct use of various equipments in Pharmaceutics laboratory relevant to cosmetics. 2.Perform formulation, evaluation and labeling of cosmetics like moisturizing cream, vanishing cream etc. 3.Perform formulation, evaluation of eye cosmetics, nail lacquer &shampoo. 4.Perform formulation, evaluation &labeling of shaving cream, after shave & baby products. 5.Describe use of ingredients in formulation and category of formulation. Prepare labels as per regulatory requirements
	4.8.3 P	PHARMACEUTICAL ANALYSIS-VI	2020-21	1.Independently operate and calibrate various analytical instruments for the assay of various APIs and formulations as per Pharmacopoeial standards. □□Independently process, interpret the data obtained through experimentation and report the results as per regulatory requirements. □□Take appropriate safety measures while handling instruments, chemicals and Apparatus

	4.8.4 P	MEDICINAL CHEMISTRY-IV	2020-21	1.Make correct use of various equipments and take safety measures while working in Medicinal Chemistry Laboratory. □□Synthesize medicinally important compounds and purify them using column chromatography. □□Characterize the synthesized compounds using IR and NMR spectras. □□Purify the solvents using fractional and vacuum distillation. □□Explain reaction mechanisms involved in synthesis of medicinally important compounds.
	4.8.5 P	PHARMACOLOGY- V, (Including Biostatistics)	2020-21	1.Use of isolated tissue preparations for antagonistic bioassay methods. 2.Basic aspects to carryout neurobehavioral characterization. 3.Understanding various parametric and non-parametric tests used in biostatistics.
M. Pharm (Pharmaceutics) Semester I	MPAT101T	MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES (Theory)	2020-21	Upon completion of the course the student shall be able to 1.Analytical techniques for identification, characterization and quantification of drugs 2. Theoretical and practical skills of instrument handling and use. 3.Structural Elucidation of organic compounds using spectroscopic tools
	MPH 102T	DRUG DELIVERY SYSTEM (Theory)	2020-21	Upon completion of the course, student shall be able to understand 1.The various approaches for development of novel drug delivery systems. 2.The criteria for selection of drugs and polymers for the development of delivering system 3.The formulation and evaluation of Novel drug delivery systems.
	MPH 103T	MODERN PHARMACEUTICS	2020-21	Upon completion of the course, student shall be able to understand

				1.The elements of preformulation studies. 2.The Active Pharmaceutical Ingredients and Generic drug Product development 3.Industrial Management and GMP Considerations. 4.Optimization Techniques & Pilot Plant Scale Up Techniques 5.Stability Testing, sterilization process & packaging of dosage forms.
	MPH 104T	REGULATORY AFFAIRS	2020-21	Upon completion of the course, it is expected that the students will be able to understand 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.
M. Pharm (Pharmaceutics) Semester II	MPH 201T	MOLECULAR PHARMACEUTICS (NANO TECHNOLOGY & TARGETED DDS) (NTDS)	2020-21	Upon completion of the course student shall be able to understand 1.The various approaches for development of novel drug delivery systems. 2.The criteria for selection of drugs and polymers for the development of NTDS 3.The formulation and evaluation of novel drug delivery systems.

	MPH 202T	ADVANCED BIOPHARMACEUTICS & PHARMACOKINETICS	2020-21	Upon completion of this course it is expected that students will be able understand, 1.The basic concepts in biopharmaceutics and pharmacokinetics. 2.The use raw data and derive the pharmacokinetic models and parameters the best describe the process of drug absorption, distribution, metabolism and elimination. 3.The critical evaluation of biopharmaceutic studies involving drug product equivalency. 4.The design and evaluation of dosage regimens of the drugs using pharmacokinetic and biopharmaceutic parameters. 5.The potential clinical pharmacokinetic problems and application of basics of pharmacokinetic
	MPH 203T	COMPUTER AIDED DRUG DEVELOPMENT	2020-21	Upon completion of this course it is expected that students will be able to understand, 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)
	MPH 204T	COSMETICS AND COSMECEUTICALS	2020-21	Upon completion of the course, the students shall be able to understand 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.
M. Pharm (Pharmaceutical Chemistry) Semester I	MPAT101T	MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES (Theory)	2020-21	Upon completion of the course the student shall be able to 1.Analytical techniques for identification, characterization and quantification of drugs 2. Theoretical and practical skills of instrument handling and use. 3.Structural Elucidation of organic compounds using spectroscopic tools
	MPC 102T	ADVANCED ORGANIC CHEMISTRY - I	2020-21	Upon completion of course, the student shall be to understand 1.The principles and applications of reterosynthesis 2.The mechanism & applications of various named reactions 3.The concept of disconnection to develop synthetic routes for small target molecule. 4.The various catalysts used in organic reactions 5.The chemistry of heterocyclic compounds
	MPC 103T	ADVANCED MEDICINAL CHEMISTRY	2020-21	At completion of this course it is expected that students will be able to understand 1.Different stages of drug discovery 2.Role of medicinal chemistry in drug research 3.Different techniques for drug discovery

				4.Various strategies to design and develop new drug like molecules for biological targets 5.Peptidomimetics
	MPC 104T	CHEMISTRY OF NATURAL PRODUCTS	2020-21	At completion of this course it is expected that students will be able to understand – 1.Different types of natural compounds and their chemistry and medicinal importance 2.The importance of natural compounds as lead molecules for new drug discovery 3.The concept of rDNA technology tool for new drug discovery 4.General methods of structural elucidation of compounds of natural origin 5.Isolation, Purification and characterization of simple chemical constituents from natural source
M. Pharm (Pharmaceutical Chemistry) Semester II	MPC 201T	ADVANCED SPECTRAL ANALYSIS	2020-21	At completion of this course it is expected that students will be able to understand 1.Interpretation of the NMR, Mass and IR spectra of various organic compounds 2.Theoretical and practical skills of the hyphenated instruments 3.Identification of organic compounds
	MPC 202T	ADVANCED ORGANIC CHEMISTRY - II	2020-21	Upon completion of course, the student shall able to understand 1.The principles and applications of Green chemistry 2.The concept of peptide chemistry. 3.The various catalysts used in organic reactions 4.The concept of stereochemistry and asymmetric synthesis.

	MPC 203T	COMPUTER AIDED DRUG DESIGN	2020-21	At completion of this course it is expected that students will be able to understand 1.Role of CADD in drug discovery 2.Different CADD techniques and their applications 3.Various strategies to design and develop new drug like molecules. 4.Working with molecular modeling software‟s to design new drug molecules 5.The in silico virtual screening protocols
	MPC 204T	PHARMACEUTICAL PROCESS CHEMISTRY	2020-21	At completion of this course it is expected that students will be able to understand 1.The strategies of scale up process of apis and intermediates 2.The various unit operations and various reactions in process chemistry
M. Pharm (Quality Assurance) Semester I	MPAT101T	MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES (Theory)	2020-21	Upon completion of the course the student shall be able to 1.Analytical techniques for identification, characterization and quantification of drugs 2. Theoretical and practical skills of instrument handling and use. 3.Structural Elucidation of organic compounds using spectroscopic tools
	MQA 102T	QUALITY MANAGEMENT SYSTEMS	2020-21	Upon completion of the course the student shall be able to 1.The importance of quality 2.Tools for quality improvement 3.Analysis of issues in quality 4.Quality evaluation of pharmaceuticals 5.Stability testing of drug and drug substances 6.Statistical approaches for quality

	MQA 103T	QUALITY CONTROL AND QUALITY ASSURANCE	2020-21	Upon completion of this course the student should be able to 1.Understand the cGMP aspects in a pharmaceutical industry 2.To appreciate the importance of documentation 3.To understand the scope of quality certifications applicable to Pharmaceutical industries 4.To understand the responsibilities of QA & QC departments.
	MQA 104T	PRODUCT DEVELOPMENT AND TECHNOLOGY TRANSFER	2020-21	Upon completion of this course the student should be able to 1.To understand the new product development process 2.To understand the necessary information to transfer technology from R&D to actual manufacturing by sorting out various information obtained during R&D 3.To elucidate necessary information to transfer technology of existing products between various manufacturing places
M. Pharm (Quality Assurance) Semester II	MQA 201T	HAZARDS AND SAFETY MANAGEMENT	2020-21	At completion of this course it is expected that students will be able to 1.Understand about environmental problems among learners. 2.Impart basic knowledge about the environment and its allied problems. 3.Develop an attitude of concern for the industry environment. 4.Ensure safety standards in pharmaceutical industry 5.Provide comprehensive knowledge on the safety management 6.Empower an ideas to clear mechanism and management in different kinds of hazard management system

				7.Teach the method of Hazard assessment, procedure, methodology for provide safe industrial atmosphere.
	MQA 202T	PHARMACEUTICAL VALIDATION	2020-21	At completion of this course, it is expected that students will be able to understand 1.The concepts of calibration, qualification and validation 2.The qualification of various equipments and instruments 3.Process validation of different dosage forms 4.Validation of analytical method for estimation of drugs 5.Cleaning validation of equipments employed in the manufacture of pharmaceuticals
	MPA 203T	AUDITS AND REGULATORY COMPLIANCE	2020-21	Upon completion of this course the student should be able to 1.To understand the importance of auditing 2.To understand the methodology of auditing 3.To carry out the audit process 4.To prepare the auditing report 5.To prepare the check list for auditing
	MQA 204T	PHARMACEUTICAL MANUFACTURING TECHNOLOGY	2020-21	At completion of this course it is expected that students will be able to Understand – 1.The common practice in the pharmaceutical industry developments, plant layout and production planning 2.Will be familiar with the principles and practices of aseptic process technology, non sterile manufacturing technology and packaging technology. 3.Have a better understanding of principles and implementation of Quality by design (QbD) and process analytical technology

				(PAT) in pharmaceutical manufacturing

Principal
S. N. D. College of Pharmacy
Babhulgaon, Tal. Yeola (Nasik)