Programme Outcomes (POs) for Degree Pharmacy	
PO1	**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; and manufacturing practices.
PO2	**Planning Abilities**: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.
PO3	**Problem analysis:** Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.
PO4	**Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.
PO5	**Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well-being.
PO6	**Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).
PO7	**Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.
PO8	**Communication**: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.
PO9	**The Pharmacist and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.
PO10	**Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO11	**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Program Specific Outcomes (PSOs) for Degree Pharmacy	
PSO 1.	Apply the knowledge of basic science, life sciences and fundamental process involved in pharmaceuticals.
PSO 2.	Impart theoretical & Practical knowledge among students in the various fields of pharmaceutical sciences viz., Pharmaceutics, Pharmaceutical Chemistry, Pharmacology and Pharmacognosy.
PSO 3.	Imbibe research culture amongst the students and make them competent enough to fulfill the needs of Pharmaceutical Industry.
PSO 4.	Upgrade practical skills of the students through industrial training and visits to accustom students' of working and culture of Pharmaceutical Industry.
PSO 5.	Promote the development of communication skills, leadership qualities, ethics and regulatory aspects of Pharmacy profession among the students.

Year	Semester	Course with code	Course outcome number	Course Outcome: Upon completion of the course, the learner shall be able to:
FIRST YEAR B. PHARMACY	Semester- I	Human Anatomy and Physiology I	101.1	Outline different levels of organization of human body.
			101.2	Explain the gross morphology, structure and functions of various organs of the human body.
			101.3	Describe the various homeostatic mechanisms and their imbalances.
			101.4	Identify the various tissues and organs of different systems of human body.
			101.5	Perform the various experiments related to special senses and nervous system.
		Pharmaceutical Analysis I	102.1	Understand the principles of volumetric and electro chemical analysis
			102.2	Carryout various volumetric and electrochemical titrations
			102.3	Develop analytical skills
			102.4	Outline the ionization, acidity, basicity and pKa of organic compounds.
			102.5	Describe the Redox titrations
		Pharmaceutics I	103.1	Summarize the history of profession of pharmacy
			103.2	Explain the basics of different dosage forms
			103.3	Interpret pharmaceutical calculations and pharmaceutical incompatibilities
			103.4	Relate the professional way of handling the prescription
			103.5	Outline the Preparation of various conventional dosage forms
		Pharmaceutical Inorganic Chemistry	104.1	Summarize importance of inorganic compounds in pharmacy
			104.2	Interpret the sources of impurities and methods to determine the impurities in inorganic drugs and pharmaceuticals
			104.3	Understand the medicinal and pharmaceutical importance of inorganic compounds
			104.4	Explain measurements, calculations along with methods for buffers
			104.5	Describe pharmaceutical aspects of radiopharmaceuticals.
		Communication skills	105.1	Understand the behavioral needs for a Pharmacist to function effectively in the areas of pharmaceutical operation
			105.2	Communicate effectively (Verbal and Non Verbal)
			105.3	Learn effective management of the team as a team player
			105.4	Develop interview skills.
			105.5	Inculcate the body language and personality development
		Remedial Biology	106BT.1	Know the classification and salient features of five kingdoms of life.
			106BT.2	Understand the basic components of anatomy.
			106BT.3	Describe physiology of different systems of plants
			106BT.4	Know the basic components of anatomy of animals with special reference to human body
			106BT.5	Explain physiology of different systems of animals with special reference to humans.

Year	Semester	Course with code	Course outcome number	Course Outcome: Upon completion of the course, the learner shall be able to:
FIRST YEAR B. PHARMACY	Semester-I	**Remedial Mathematics**	106MT.1	Know the theory and their application in Pharmacy
			106MT.2	Solve the different types of problems by applying theory
			106MT.3	Appreciate the important application of mathematics in Pharmacy
			106MT.4	Apply Analytical Geometry and calculus
			106MT.5	Use of mathematics in solving Chemical kinetics and Pharmacokinetics equations
		Human Anatomy and Physiology – Practical	107.1	Determine formed elements of blood and correlate the results with clinical conditions
			107.2	Identify locations of bone in human skeleton with their importance
			107.3	Describe body tissue and organs based on structure and organization of cells
			107.4	Compare the common diagnostic and biochemical test performed in clinical conditions and its Use in diagnosis and prognosis of diseases.
		Pharmaceutical Analysis Lab- I	108.1	Apply the concept of volumetric analysis by assay & standardization.
			108.2	Experiment with given samples for volumetric, gravimetric and solvent extraction methods.
			108.3	Utilize Pharmacopoeial monographs to evaluate pharmaceutical samples.
			108.4	Demonstrate electroanalytical methods.
		Pharmaceutics-I Practical	109.1	Relate prescription and commonly used Latin terms in pharmacy practice
			109.2	Outline roles of active and inactive ingredient required for formulation.
			109.3	Describe compounding, labeling and dispensing of extemporaneous preparations.
			109.4	Summarize patient counseling and patient education methods
		Pharmaceutical Inorganic Chemistry – Practical	110.1	Identify impurities by limit tests for inorganic ions.
			110.2	Relate identification test for inorganic substances
			110.3	Perform test for purity
			110.4	Illustrate Preparation of inorganic pharmaceuticals
		Communication skills –Practical	111.1	Understand basic communication skills.
			111.2	Relate pronunciation consonants, nouns and vowel sounds
			111.3	Illustrate advanced learning
			111.4	Summarize Interview handling and e-communication Skills
		Remedial Biology – Practical	112.1	Understand techniques of experimental biology.
			112.2	Explain structure of cell and its components.
			112.3	Determine blood group, blood pressure and tidal volume.
			112.4	Study structure and function of parts of plants and frog using suitable techniques.

Year	Semester	Course with code	Course outcome number	Course Outcome: Upon completion of the course, the learner shall be able to:
FIRST YEAR B. PHARMACY	Semester- II	**Human Anatomy and Physiology II (Theory)**	201.1	Explain the gross morphology, structure and functions of various organs of the human body.
			201.2	Summarize processes and part of organs in digestive system and their function.
			201.3	Relate the anatomy and physiology of urinary system.
			201.4	Outline role of hormones in the human body.
			201.5	Illustrate the different components of reproductive and nervous system.
			201.6	Explain physiological processes and mechanism for respiration.
		Pharmaceutical Organic Chemistry I – Theory	202.1	Identify type of isomerism and IUPAC nomenclature of the organic compounds.
			202.2	Explain the name reactions and its orientations.
			202.3	Predict reactivity and stability of organic compounds.
			202.4	Illustrate the uses of organic compounds.
			202.5	Outline identification or confirmatory tests of organic compounds.
		Biochemistry – Theory	203.1	Define basics of biochemistry.
			203.2	Explain the metabolism of nutrient molecules.
			203.3	Outline the concept of biological oxidation.
			203.4	Summarize the nucleic acid metabolism and genetic information transfer.
			203.5	Understand the biochemical role of enzymes in drugs and therapeutics.
		Pathophysiology – Theory	204.1	Outline basic concepts and mechanisms of cell injury and adaptation; inflammation and tissue repair.
			204.2	Illustrate pathophysiology's of different organ systems of the body.
			204.3	Analyse complications associated with pathologies of different organ systems.
			204.4	Enlist different diagnostic tests used for diagnosis of pathologies.
			204.5	Appraise role of drugs in alleviation of various pathologies.
			204.6	Explain generation of neoplasm and the etiologic factors responsible for it.
		Computer Applications in Pharmacy	205.1	Outline basic concepts and application of computers in pharmacy
			205.2	Explain role of databases
			205.3	Discuss use of computers in Hospital and Clinical Pharmacy
			205.4	Summarize data analysis in Preclinical development
			205.5	Extend role of databases in Bioinformatics

Year	Semester	Course with code	Course outcome number	Course Outcome: Upon completion of the course, the learner shall be able to:
SECOND YEAR B. PHARMACY	Semester- II	**Environmental sciences**	206.1	Describe basics of the environment and its allied problems
			206.2	Show the awareness about environmental problems among learners
			206.3	Outline skills to help the concerned individuals in identifying and solving environmental problems.
			206.4	Demonstrate an attitude of concern for the environment.
			206.5	Plan to attain harmony with Nature.
		Human Anatomy and Physiology II (Practical)	207.1	Illustrate the anatomy of systems of the human body using specimen, models, charts, etc.
			207.2	Demonstrate the function of nervous system and total blood count by cell analyzer.
			207.3	Perform recording of body temperature and BMI.
			207.4	Outline different types of taste, permanent slides of vital organs, tidal volume and vital capacity.
		Pharmaceutical Organic Chemistry I – (Practical)	208.1	Explain systematic qualitative analysis of unknown organic compounds.
			208.2	Illustrate physical constant determinations of organic compounds.
			208.3	Summarize solid derivative preparation of organic compounds.
			208.4	Demonstrate the construction of molecular models.
		Biochemistry – (Practical)	209.1	Outline the various qualitative tests of biomolecules.
			209.2	Summarize the various quantitative analyses of biomolecules.
			209.3	Demonstrate the preparation of buffer solution and measurement of pH
			209.4	Relate the effect of temperature and substrate salivary amylase activity.
		Computer Applications in Pharmacy (Practical)	210.1	Summarize MS Access.
			210.2	Explain HTML web page.
			210.3	Outline MS WORD.
			210.4	Illustrate Web and XML pages.

Year	Semester	Course with code	Course outcome number	Course Outcome: Upon completion of the course, the learner shall be able to:
SECOND YEAR B. PHARMACY	Semester- III	**Pharmaceutical Organic Chemistry-II**	301.1	Summarize the organic chemistry aspects of some important organic compounds in pharmaceuticals.
			301.2	Illustrate the reactivity, orientation and stability of organic reactions.
			301.3	Describe the chemistry of fats, oils and cycloalkanes.
			301.4	Summarize the chemistry and uses of polynuclear organic compounds.
			301.5	Cite structure and uses of important organic compound
		Physical Pharmaceutics-I	302.1	Predict solubility of drug and factors affecting the solubility.
			302.2	Describe the various state of matter and their properties along with the physicochemical properties of drug molecules.
			302.3	Express surface and interfacial phenomenon.
			302.4	Discuss pharmaceutical complexation and protein binding.
			302.5	Outline pH and buffers with concepts related to it.
		Pharmaceutical Microbiology	303.1	Understand methods of identification, cultivation and preservation of various microorganisms.
			303.2	Summarize importance and implementation of sterilization in pharmaceutical processing and industry
			303.3	Illustrate sterility testing of pharmaceutical products.
			303.4	Appraise microbiological standardization of Pharmaceuticals.
			303.5	Explain the cell culture technology and its applications in pharmaceutical industries.
		Pharmaceutical Engineering	304.1	Explain basics of unit operations in pharmaceutical industries.
			304.2	Elaborate fluid flow and its measurement along with size reduction and separation.
			304.3	Illustrate heat transfer, evaporation and distillation as unit operations.
			304.4	Summarize process of drying, mixing, filtration and centrifugation.
			304.5	Identify the materials of construction and corrosion.
		Pharmaceutical Organic Chemistry-II (Practical)	305.1	Summarize the preparation, purification and quantification of important organic compounds
			305.2	Finding the Acid value, saponification value and Iodine value
			305.3	Infer the theoretical and percentage yields of the products obtained by synthesis.
			305.4	Complete the synthesis of various organic compounds by different chemical reactions.

Year	Semester	Course with code	Course outcome number	Course Outcome: Upon completion of the course, the learner shall be able to:
SECOND YEAR B. PHARMACY	Semester- III	**Physical Pharmaceutics-I (Practical)**	306.1	Predict physical parameters of drug as well as excipients like solubility, Pka, partition coefficient, HLB, surface tension and critical micelle concentration.
			306.2	Understand complex and adsorption isotherm
			306.3	Determination of stability constants using different methods.
			306.4	Predict solubility of partially miscible solvents by using CST method.
		Pharmaceutical Microbiology (Practical)	307.1	Carry out sterilization glassware's, equipment's and isolation and preservation of microorganisms.
			307.2	Interpret microorganisms on the basis of morphology and staining techniques.
			307.3	Plan and evaluate potability or drinking water along with determination of coliforms.
			307.4	Summarize sterility testing of pharmaceuticals.
		Pharmaceutical Engineering (Practical)	308.1	Illustrate energy requirements for optimizing the pharmaceutical unit processes.
			308.2	Discuss equipment's used in the manufacturing of pharmaceuticals.
			308.3	Determine moisture content, drying curves, humidity and crystallization with suitable method.
			308.4	Perform experiments related to unit operations

Year	Semester	Course with code	Course outcome number	Course Outcome: Upon completion of the course, the learner shall be able to:
SECOND YEAR B. PHARMACY	Semester- IV	Pharmaceutical Organic Chemistry III	401.1	Summarize the organic chemistry of stereoisomers and heteroyclic compounds.
			401.2	Find the appropriate nomenclature to heterocylic and sterioisomers.
			401.3	Illustrate synthesis and reactions of optical and geometrical isomers.
			401.4	Outline the preparation and reactions of heterocyclic compounds
			401.5	Demonstrate reactions of synthetic importance
		Medicinal Chemistry-I	402.1	Explain the medicinal chemistry of important classes of various drugs.
			402.2	Outline the drug metabolism and physicochemical properties of drugs.
			402.3	Summarize the medicinal chemistry of ANS and cholinergic neurotransmitter drugs.
			402.4	Demonstrate the medicinal chemistry of drugs acting on CNS
			402.5	Relate the structural features of drugs with their biological action.
		Physical Pharmaceutics-II	403.1	Understand concept, preparation and properties of colloidal dispersion.
			403.2	Explain flow behaviors of dispersion and deformation of solids.
			403.3	Discuss concept and properties of coarse dispersion as well as pharmaceutical powders.
			403.4	Demonstrate use of physicochemical properties in the formulation development and evaluation of dosage forms
			403.5	Know the stability of drug by its physicochemical kinetic study.
		Pharmacology I	404.1	Understand the fundamental concepts of pharmacodynamics and pharmacokinetics
			404.2	Describe the mechanism of actions of different categories of drugs and their pharmacological effects on various organ systems.
			404.3	Apply the basic pharmacological knowledge in understanding the adverse effects and drug interactions
			404.4	Outline the process of drug discovery and clinical development
			404.5	Explain the pharmacology of drugs acting of peripheral and central nervous system.
		Pharmacognosy and Phytochemistry-I	405.1	Recite and classify drugs of natural origin with quality control aspects.
			405.2	Summarize the techniques in the cultivation and production of crude drugs.
			405.3	Illustrate plant tissue culture techniques with modern applications.
			405.4	Contrast various systems of medicines with respect to pharmacognosy.
			405.5	Memorize all primary metabolites with their pharmaceutical importance

Year	Semester	Course with code	Course outcome number	Course Outcome: Upon completion of the course, the learner shall be able to:
SECOND YEAR B. PHARMACY	Semester- IV	**Medicinal Chemistry-I (Practical)**	406.1	Plan synthesis and an assay of important drugs and intermediates.
			406.2	Select facile synthetic routes and synthesize drugs and intermediates.
			406.3	Analyze concentration of drugs in the given sample.
			406.4	Make use of the physicochemical properties and find partition coefficient drugs.
		Physical Pharmaceutics-II (Practical)	407.1	Explain measurement of micromeritic properties of drugs, excipients and dosage forms.
			407.2	Understand viscosity and sedimentation behavior.
			407.3	Judge kinetics of chemical reactions.
			407.4	Perform accelerated stability study for drug and formulation.
		Pharmacology-I (Practical)	408.1	Understand basic experimental pharmacology with animal handling.
			408.2	Outline commonly used instruments, animals and laboratory techniques used in experimental pharmacology along with the regulatory requirements.
			408.3	Describe the pharmacology of various drugs using simulated experiments acting on hepatic enzymes, ciliary motility and eye of animals.
			408.4	Demonstrate activity of drugs using simulated experiments acting on the peripheral and central nervous system of animals.
		Pharmacognosy and Phytochemistry-I (Practical)	409.1	Identify and evaluate crude drugs by chemical tests and leaf constant methods.
			409.2	Use various methods for standardization of herbal drugs.
			409.3	Relate important extraction techniques for extraction of herbal drugs.
			409.4	Memorize various index and tests for evaluation of crude drugs.

Year	Semester	Course with code	Course outcome number	Course Outcome: Upon completion of the course, the learner shall be able to:
THIRD YEAR B. PHARMACY	Semester- V	Medicinal Chemistry II – Theory	501.1	Explain the importance of medicinal chemistry of various drugs.
			501.2	Examine the medicinal chemistry of antihistaminics, antineoplastics and drugs acting on CVS.
			501.3	Analyze medicinal chemistry of antidiabetic, local ansthetics and drugs acting on Endocrine system.
			501.4	Conclude the therapeutic uses, metabolism, adverse effect and synthesis of drugs.
			501.5	Describe synthesis of some important drugs.
		Industrial Pharmacy I– Theory	502.1	Describe pharmaceutical dosage forms and their manufacturing techniques.
			502.2	Explain Preformulation and formulation aspects of various dosage forms
			502.3	Elaborate formulation aspects of solid and liquid dosage forms
			502.4	Understand the formulation and manufacturing of parenterals and aerosols
			502.5	Express the importance of Cosmetics and packaging in pharmaceuticals
		Pharmacology II – Theory	503.1	Understand the mechanism of drug action and its relevance in the treatment of different diseases.
			503.2	Illustrate the pharmacology of drugs acting on cardiovascular, endocrine and urinary system.
			503.3	Outline the physiological role of autacoids and the receptors on which they act.
			503.4	Describe the role of autacoids and related drugs in treatment of inflammation, gout and rheumatoid arthritis.
			503.5	Explain the basics of bioassay and its methods of various drugs.
		Pharmacognosy and Phytochemistry II– Theory	504.1	Appraise isolation, identification and analysis of Phytoconstituents.
			504.2	Discuss industrial production, estimation and utilization aspects Phytoconstituents.
			504.3	Recall the modern extraction techniques, characterization and identification of the herbal drugs and Phytoconstituents.
			504.4	Describe plant metabolic pathways with investigation techniques of pathways.
			504.5	Summarize Pharmacognosy of various classes of herbals drugs.
		Pharmaceutical Jurisprudence – Theory	505.1	Understand Pharmaceutical legislations and their implications in the development and marketing of pharmaceuticals.
			505.2	Highlight various Indian pharmaceutical Acts and Laws
			505.3	Summarize various regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals
			505.4	Comment on various code of ethics to be followed during the pharmaceutical practice.
			505.5	Annotate various drug abuse and penalties thereof.

Year	Semester	Course with code	Course outcome number	Course Outcome: Upon completion of the course, the learner shall be able to:
THIRD YEAR B. PHARMACY	Semester- V	Industrial PharmacyI – Practical	506.1	Make use of preformulation parameters for dosage form.
			506.2	Carryout preparation and evaluation of solid dosage forms.
			506.3	Formulate parenterals and cosmetics.
			506.4	Evaluate glass container as packaging material.
		Pharmacology II – Practical	507.1	Understand basics of *in-vitro* pharmacology and various drug-receptor actions.
			507.2	Demonstrate effect of drugs on cardiovascular, urinary, gastrointestinal system using simulated experiments.
			507.3	Determine pD2, pA2 and concentration of given sample.
			507.4	Evaluate anti-inflammatory and analgesic activity of drugs using simulated experiments.
		Pharmacognosy and Phytochemistry II – Practical	508.1	Demonstrate Pharmacognosy of certain crude drugs.
			508.2	Appraise certain herbal drugs for isolation and detection.
			508.3	Construct various chromatographic techniques for evaluation and separation.
			508.4	Experiment on isolation and evaluation of volatile oils.

Year	Semester	Course with code	Course outcome number	Course Outcome: Upon completion of the course, the learner shall be able to:
THIRD YEAR B. PHARMACY	Semester- VI	**Medicinal Chemistry III – Theory**	601.1	Explain the medicinal chemistry of various classes of drugs.
			601.2	Examine the medicinal chemistry of antibiotics, antitubercular, Antiviral, Antifungal and Anti-protozoal agents.
			601.3	Assess the medicinal chemistry of Anti-infective agents, Anhelmintics and Sulpha drugs.
			601.4	Conclude the therapeutic uses, metabolism, adverse effect and synthesis of drugs.
			601.5	Appraise various approaches used in drug design including QSAR and combinatorial chemistry.
		Pharmacology III – Theory	602.1	Attain the knowledge about pharmacological aspects pertaining to digestive system.
			602.2	Adapt knowledge about the pharmacological aspects of treatment of various Respiratory disorders.
			602.3	Explain pharmacology of drugs used in chemotherapy.
			602.4	Outline the concepts of immunopharmacology.
			602.5	Elaborate on the principles of toxicology and chronopharmacology.
		Herbal Drug Technology	603.1	Understand herbal drugs as raw material of ayurveda and scientific study of cultivation of herbal drugs and farming.
			603.2	Contrast over various systems of traditional medicines with formulation aspects.
			603.3	Recognize nutraceutical potential of herbals industry.
			603.4	Explain herbal cosmetics, natural sweeteners, nutraceuticaland excipients.
			603.5	Appreciate patenting of herbal drugs, GMP requirements.
		Biopharmaceutics and Pharmacokinetics	604.1	Explain the basics of Biopharmaceutics and Pharmacokinetics.
			604.2	Apply the concept of metabolism, elimination, bioavailability
			604.3	Study bioequivalence in biopharmaceutics.
			604.4	Summarize the various pharmacokinetic parameters and its related calculations along with various models.
			604.5	Understand non- linear pharmacokinetics.
		Pharmaceutical Biotechnology	605.1	Understand the importance of enzymes immobilization in Pharmaceutical Industries
			605.2	Summarize genetic engineering applications in relation to production of pharmaceuticals
			605.3	Integrate immunological aspects in understanding immunology and production of MAbs and vaccines.
			605.4	Importance of immune-blotting and microbial genetics techniques in biopharmaceuticals.
			605.5	Appreciate the use of microorganisms in fermentation technology

Year	Semester	Course with code	Course outcome number	Course Outcome: Upon completion of the course, the learner shall be able to:
THIRD YEAR B. PHARMACY	Semester- VI	**Quality Assurance –Theory**	606.1	Explain the role and importance of quality assurance in pharmaceuticals.
			606.2	Appraise the importance of documentation in pharmaceuticals.
			606.3	Conclude the quality control, GLP and other quality aspects of pharmaceuticals.
			606.4	Recommend the quality certifications and ICH guidelines in pharmaceuticals.
			606.5	Support the system of calibration, validation of pharmaceuticals in the pharmaceutical industry.
		Medicinal Chemistry III – Practical	607.1	Simplify the computational, synthetic and green chemistry approaches of medicinal compounds.
			607.2	Choose appropriate methods to synthesize intermediates and drugs.
			607.3	Estimate purity of the synthesized or marketed drugs.
			607.4	Hand-on software for drawing structures and ADMET prediction.
		Pharmacology III – Practical	608.1	Outline basics of experimental techniques related to animals and humans.
			608.2	Describe the effect of drugs on gastrointestinal tract, mast cells and blood glucose level.
			608.3	Comprehend toxicological evaluation of drugs.
			608.4	Analyze the biostatistical methods used for parametric data and non-parametric data.
		Herbal Drug Technology – Practical	609.1	Evaluate residual contents of certain chemicals in crude drugs.
			609.2	Appraise certain herbal constituent's cosmetic formulations.
			609.3	Choose appropriate formulations methods for herbal drugs with evolution parameters..
			609.4	Summarize monograph analysis of herbal drugs.

Year	Semester	Course with code	Course outcome number	Course Outcome: Upon completion of the course, the learner shall be able to:
FOURTH YEAR B. PHARMACY	Semester- VII	Instrumental Methods of Analysis - Theory	701.1	Outline the various instrumental methods for Analysis of pharmaceuticals.
			701.2	Adapt application of spectroscopic techniques.
			701.3	Explain the chromagraphic separation and analysis of analytes.
			701.4	Appraise the utility of fluorimetry and flame photometry.
			701.5	Solve numerical based on spectroscopy and chromatography.
		Industrial Pharmacy II- Theory	702.1	Design the process of pilot plant scale up for pharmaceutical dosage forms
			702.2	Elaborate technology transfer
			702.3	Discuss regulatory affairs and Indian regulatory requirements
			702.4	Summarize the approval process pertaining to drug product
			702.5	Understand quality management system and quality certifications
		Pharmacy Practice - Theory	703.1	Build the basic knowledge of hospital, clinical, and community pharmacy.
			703.2	Interpret the therapeutics, adverse drug reactions and clinical laboratory tests.
			703.3	Estimate budget and inventory system.
			703.4	Prioritize rational use of investigational and OTC medication.
			703.5	Appraise information services and patient related records.
		Novel Drug Delivery System- Theory	704.1	Express basic concenpts of novel drug delivery systems.
			704.2	Propose different NDDS for delivery of drugs through various routes.
			704.3	Explain concept of passive and active targeting and microencapsulation.
			704.4	Appraise concept of controlled drug delivery and applications of polymers in drug delivery.
			704.5	Discuss nanocarriers and monoclonal antibodies for drug delivery.
		Instrumental Method of Analysis -Practical	705.1	Estimate qualitative and quantitative analysis of Pharmaceuticals.
			705.2	Measure the pharmaceuticals by various spectroscopic techniques.
			705.3	Mark the separation, identification and quantification of pharmaceuticals by chromatographic techniques.
			705.4	Appraise the method of HPLC & GC.
		Practice School (Pharmaceutics Domain)	706.1	Describe recent advances in drug delivery.
			706.2	Understand concept of nanocarrier mediated drug delivery.
			706.3	Develop advanced delivery systems.
			706.4	Interpret data analysis using softwares for formulation.
			706.5	Command on data compilation, presentation and publication.

Year	Semester	Course with code	Course outcome number	Course Outcome: Upon completion of the course, the learner shall be able to:
FOURTH YEAR B. PHARMACY	Semester- VII	Practice School (Pharmaceutical Chemistry Domain)	707.1	Design and execute synthesis and characterization of organic compounds.
			707.2	Plan extraction of crude plant material.
			707.3	Develop synthetic reactions using a green chemistry approach.
			707.4	Support analysis of pharmaceuticals using modern instrumental methods. Compile and present the project report.
		Practice School (Pharmacology Domain)	708.1	Summarize concepts of research methodology, ethics in research, preclinical drug development, clinical trials, and pharmacovigilance.
			708.2	Prepare a research report using various data collection techniques and reference management software.
			708.3	Analyze the research report for any kind of plagiarism with the help of plagiarism detection software and paraphrase the contents of the research report if required.
			708.4	Illustrate the construction and working of different equipment available for carrying out preclinical animal studies in CVS, ANS, and CNS.
		Practice School (Pharmacognosy Domain)	709.1	Differentiate between various terms related to dietary supplements and nutraceuticals.
			709.2	Perform market survey and literature survey
			709.3	Prepare herbarium of herbal plant / raw material
			709.4	Use and apply the knowledge for formulation development and standardization.
			709.5	Understand various regulations applicable to Dietary supplements and nutraceuticals.

Year	Semester	Course with code	Course outcome number	Course Outcome: Upon completion of the course, the learner shall be able to:
FOURTH YEAR B. PHARMACY	Semester- VIII	**Biostatistics and Research Methodology**	801.1	Understand basic concepts of Statistics and Biostatistics
			801.2	Apply regression, probability anong with parametric and nonparametric statistical analysis
			801.3	Perceive research methodology and its applications
			801.4	Explain regression modeling along with practical components of industrial and clinical trials problems.
			801.5	Interpret design and analysis of experiments
		Social and Preventive Pharmacy	802.1	Explain the basics involved in health care and current healthcare development.
			802.2	Create awareness about various preventive measures and control of the specific disease.
			803.3	Apply knowledge of National health programs in the real world to serve society.
			804.4	Perceive National and social healthcare programme including the role of WHO.
			805.5	Evaluate alternative ways of solving problems related to health and pharmaceutical issues.
		Pharmaceutical Marketing	803.1	Apply general concepts and scope of marketing
			803.2	Appraise product decision in marketing
			803.3	Simplify promotion in relation to marketing
			803.4	Propose pharmaceutical marketing channels and Professional sales representative
			803.5	Explain pricing along with emerging concepts in marketing
		Pharmacovigilance	805.1	Discuss the basic concepts of Pharmacovigilance and adverse drug reactions.
			805.2	Interpret the importance of therapeutics and drug information resources in the establishment of Pharmacovigilance programme.
			805.3	Explain the methods of surveillance and communication in Pharmacovigilance.
			805.4	Appraise the statistical methods and ICH guidelines for Pharmacovigilance.
			805.5	Elaborate the role of CIOMS and CDSCO in Pharmacovigilance with special reference to pharmacogenomics and drug safety in special population.
		Quality Control and Standardization of Herbals	806.1	Understand WHO guidelines for quality control of herbal drugs.
			806.2	Outline quality assurance aspects in herbal drug industry.
			806.3	Summarize regulatory approval process and their registration in Indian and international markets.
			806.4	Contrast on Stability testing and GMPs of herbal medicines.
			806.5	Appreciate regulatory requirements for herbal medicines.

Year	Semester	Course with code	Course outcome number	Course Outcome: Upon completion of the course, the learner shall be able to:
FOURTH YEAR B. PHARMACY	Semester- VIII	Cosmetic Science	809.1	Apply basic aspects of cosmetic products
			809.2	Summarize regulations related to cosmetics
			809.3	Simplify raw materials for cosmetics
			809.4	Categorize various cosmetic formulations along with its evaluation
			809.5	Appraise problems associated with cosmetics
		Advanced Instrumentation Techniques	811.1	Adapting advanced instrumentation techniques for drug analysis.
			811.2	Predicting the utility of NMR & Mass spectrometric and Hyphenated techniques.
			811.3	Adapting analytical techniques of thermal methods. XRD, RIA and Extraction.
			811.4	Defending the calibration and validation of analytical instruments.