

Course Outcomes of B. Pharmacy

First Year B. Pharmacy (SEM-I)

Course Name/Code	NC101 Human Anatomy Physiology I - Theory	Year of Study	2022-23
NC101.1	Recall the basics of the anatomy, physiology, and cell.		
NC101.2	Students would have studied about the gross morphology, structure and functions of various systems of the human body.		
NC101.3	Predict and analyze various homeostatic mechanisms and their imbalances.		
NC101.4	Develop skills for identification of clinical conditions with recent techniques.		
NC101.5	Demonstrate and apply the concepts for patient health care.		

Course Name/Code	NC102 Pharmaceutical Analysis I - Theory	Year of Study	2022-23
NC102.1	Gain fundamental knowledge of chemical methods for pharmaceutical analysis		
NC102.2	The selection and optimization of analytical protocols (sample size, indicator, titrant etc.) will be possible for chemical analysis.		
NC102.3	Purity and impurity assessment of drugs will emphasize its significance as pharmaceutical official requirements and related ethical and social considerations.		
NC102.4	Knowledge of Basics and principles of volumetric and electro chemical analysis.		
NC102.5	Development of analytical skills through knowledge of fundamentals will make students competent analysts for assessing quality, safety and efficacy of medication.		

Course Name/Code	NC103 Pharmaceutics I - Theory	Year of Study	2022-23
NC103.1	The students will gain knowledge of the history & development of pharmacy profession, industry, scope of pharmacy and will understand application of pharmacopeial standards in preparation of various dosage forms		
NC103.2	Understanding prescriptions, posology, preparation of various dosage forms and calculations therein, packaging & labeling, and incompatibilities.		
NC103.3	Strategies required for preparing quality dosage forms. Application of pharmaceutical metrology principles in the preparation of dosage forms		
NC103.4	Undertaking quality control tools in evaluation of pharmaceutical dosage forms		
NC103.5	Understanding in-process and finished product controls, and stability controls of non-sterile dosage forms		

Course Name/Code	NC104 Pharmaceutical Inorganic Chemistry - Theory	Year of Study	2022-23
NC104.1	Students will gain a better understanding of fundamentals of inorganic pharmaceuticals and their ethical and regulatory requirements.		
NC104.2	Understanding of preparation, properties and applications of buffers and isotonic solutions for analysis, stability and product development.		
NC104.3	Ability to perceive symptoms and treatment of diseases arising due to imbalance of physiological ions and microbial agents.		
NC104.4	Application of diagnostic agents, healthcare supplements, its preparation, quality standards, impurities and therapeutic uses of inorganic pharmaceuticals.		
NC104.5	Knowledge of toxic and hazardous inorganic pharmaceuticals will make them understand related ethical and environmental concerns.		

Course Name/Code	NC105 Communication skills – Theory	Year of study	2022-23
NC105.1	Understand and implement importance of communication, eliminate communication barrier and develop wide perspective of communication		
NC105.2	Understand behavioral needs and apply Communication skills in professional life.		
NC105.3	Learn and develop effective writing and listening skills		
NC105.4	Develop self-presentation and technical presentation skills		
NC105.5	Acquire leadership qualities and related essentials		

Course Name/Code	NC106B Remedial Biology – Theory	Year of study	2022-23
NC106B.1	Cell biology (Basic Nature of Plant cell and Animal cell)		
NC106B.2	Classification System of both Plants & Animals.		
NC106B.3	Various tissue system and organ system in plant and animals.		
NC106B.4	Theory of evolution.		
NC106B.5	Anatomy and Physiology of plants and animals.		

Course Name/Code	NC106M Remedial Math – Theory	Year of study	2022-23
NC106M.1	Understanding both conventional and creative techniques to the solutions of mathematical problems		
NC106M.2	Apply range of techniques effectively to solve problems including theory deduction, approximation and simulation, and Relate the mathematical tools to a broad range of situations witch arise in the wide professional views.		
NC106M.3	Students are more likely to come from an ethnic minority group and from a is advantaged background, remedial courses may play an important role in improving their educational opportunities.		
NC106M.4	Apply mathematical principles of algebra, calculus, exponentials, logarithms, and unit analysis in pharmacokinetics and bio pharmaceuticals.		
NC106M.5	Find Laplace transform of elementary functions and apply it in solving Pharmacokinetic equations and chemical kinetics.		

Course Name/Code	NC107 Human Anatomy and Physiology– Practical	Year of Study	2022-23
NC107.1	Ability to perform the hematological tests and also record blood pressure, heart rate and pulse rate.		
NC107.2	Appreciate coordinated working pattern of different organs of each system and musculoskeletal system.		
NC107.3	Planning and execution of experimental data with biomedical ethical considerations.		

Course Name/Code	NC108 (Pharmaceutical Analysis I - Practical)	Year of Study	2022-23
NC108.1	Students with skills to perform chemical analysis of pharmaceuticals create its report and communicate significance of purity and impurity assessment for societal welfare.		
NC108.2	Designing and planning of experiments for chemical analysis of pharmaceuticals with due considerations to toxic, hazardous chemicals and reagents.		
NC108.3	Students with ability to prepare standardized chemical solutions; justify its significance and regulatory importance in pharmaceutical industries.		

Course Name/Code	NC109 Pharmaceutics I - Practical	Year of Study	2022-23
NC109.1	Students will acquire understanding of formulation of Syrups, Elixirs, Solutions, Liniments, Lotions, Throat Paint, Eardrops, Nasal drops, Enemas, Suspensions, Emulsions, Powders and Granules, suppository, ointment, gel, Gargles and Mouthwashes		
NC109.2	Understanding dose calculations, incompatibilities, labeling and packaging procedures, and container & closure selection		
NC109.3	Students will be able to execute formulation, accordingly availability of resources and keeping in view of environmental and safety concern		

Course Name/Code	NC110 Pharmaceutical Inorganic Chemistry - Practical	Year of Study	2022-23
NC110.1	Purity assessment of pharmaceuticals and documentation will make the student competent analyst with ethical and regulatory understanding.		
NC110.2	Expertise in qualitative, semi-quantitative analysis of ions, purity testing of inorganic pharmaceuticals and their significance in assessing quality.		
NC110.3	Skills for handling synthesis of inorganic compounds in pharmaceuticals' use and present the results.		

Course Name/Code	NC111 Communication Skills - Practical	Year of study	2022-23
NC111.1	Develop basic oral communication competency for formal and informal communication,		
NC111.2	Acquire knowledge of verbal and non-verbal communication technique		
NC111.3	Apply essential aspects of effective interview and technical writing skills including pronunciation, letter writing skills, effective presentation, vocabulary and verbal fluency		

Course Name/Code	NC112 Remedial Biology – Practical	Year of study	2022-23
NC112.1	Learn to identify the characteristics of plant parts and distinguish and identify various plant tissues.		
NC112.2	Comprehend human bones and blood, and explore computer assisted biological examination of frog		
NC112.3	Perform and evaluate experimental microscopic investigation		

First Year B. Pharmacy (SEM-II)

Course Name/Code	NC201 Human Anatomy Physiology II - Theory	Year of Study	2022-23
NC201.1	Recall the basics of the anatomy, physiology, and functions of various organs		
NC201.2	Students would have studied about the gross morphology, structure, and functions of various systems of the human body.		
NC201.3	Predict and analyze various homeostatic mechanisms and their imbalances.		
NC201.4	Develop skills for identification of clinical conditions with recent techniques.		
NC201.5	Demonstrate and apply the concepts for patient health care.		

Course Name/Code	NC202 Pharmaceutical Organic Chemistry I - Theory	Year of Study	2022-23
NC202.1	After completion of the syllabus, students shall be able to classify and nomenclate organic compounds.		
NC202.2	They should be able to define, identify and classify isomers and be able to apply them whenever necessary.		
NC202.3	They should be able to understand basic structural aspects related to hybridization, properties, basic chemistry of classes of compounds mentioned in syllabus.		
NC202.4	Students should be able to rectify acidity and basicity of compounds and their effects on reaction, Nature of substituents and their role in reaction.		
NC202.5	Development of basic understanding of reaction mechanism and the way by which a reaction proceeds.		

Course Name/Code	NC203 Biochemistry - Theory	Year of Study	2022-23
NC203.1	After completion of the syllabus, students shall be able to understand and memorize the characteristic features of biomolecules with their importance and applications.		
NC203.2	They should be able to understand and justify nature and types of enzymatic reactions, nature of enzymes and their biological importance.		
NC203.3	They should be able to understand biochemical, synthetic, and metabolic processes, their products and their role.		
NC203.4	Students should understand the genetic makeup of human body, Importance of DNA and RNA and their reactions.		
NC203.5	Should be able to identify the diseases via a mechanistic approach with respect to biochemical processes.		

Course Name/Code	NC204 Pathophysiology - Theory	Year of Study	2022-23
NC204.1	Perceive concepts of Etiology, signs and symptoms, Pathogenesis and Clinical investigation of the selected disease states.		
NC204.2	To get baseline knowledge required to practice medicine safely, confidently, rationally, and effectively with ethical considerations.		
NC204.3	Predict and correlate pathology of clinical conditions with pharmacological applications.		
NC204.4	Know most commonly involved basic mechanisms in disease generation and progression.		
NC204.5	Explore advanced diagnostic techniques in pathology.		

Course Name/Code	NC205 Computer Applications in Pharmacy - Theory	Year of study	2022-23
NC205.1	Learn basics of number system, information system and software and get acquainted with their applications in pharmaceutical industry		
NC205.2	Acquire knowledge of various drug databases and web technologies.		
NC205.3	Understand various computer-based systems for pharmaceutical applications, drug development, therapy management, retail pharmacy etc.		
NC205.4	Gain knowledge of bioinformatics for application in molecular biology, identification of targets for drug and vaccine discovery.		
NC205.5	Create application perspective for use of computers in preclinical development.		

Course name/Code	NC206 Environmental Sciences - Theory	Year of study	2022-23
NC206.1	Understand natural resources and associated problems.		
NC206.2	Implement strategies for conservation of natural resources.		
NC206.3	Learn concept of ecosystem.		
NC206.4	Know the characteristic features, structure and functions of ecosystem.		
NC206.5	Comprehend causes of environmental pollution and implement strategies to minimize it.		

Course Name/Code	NC207 Human Anatomy Physiology II - Practical	Year of Study	2022-23
NC207.1	Able to execute clinical examinations of various body systems.		
NC207.2	Predict and measure clinical correlation with pathological conditions.		
NC207.3	Learn planning, execution, and assimilation of experimental data individually and in a team with professional ethical considerations.		

Course Name/Code	NC208 Pharmaceutical Organic Chemistry I - Practical	Year of Study	2022-23
NC208.1	Students should be able to identify, separate and confirm unknown organic compounds as individual compounds or as a mixture.		
NC208.2	Students should develop and acquire basic skills required for synthetic aspects.		
NC208.3	They should be able to understand basic mechanisms or patterns of a reaction and implement those in their practical aspects.		

Course Name/Code	NC209 Biochemistry - Practical	Year of Study	2022-23
NC209.1	Students will have skill sets in classical clinical laboratory techniques and be able to use modern instrumentation.		
NC209.2	Students will have ability to propose and execute experimental approaches to analyze bio chemicals.		
NC209.3	Skills of qualitative and quantitative analysis that can have applications in forensic and nutritional sciences.		

Course Name/Code	NC210 Computer Applications in Pharmacy- Practical	Year of study	2022-23
NC210.1	Use word processing and Create a HTML web page		
NC210.2	Know the Retrieval of drug information, use of Label Wizard and MS WORD		
NC210.3	Learn to maintain patient record in the database for generating report and printing the report from patient database		
NC210.4	Create invoice table, understand drug information storage and retrieval using MS Access		
NC210.5	Gain knowledge of exporting tables, queries, forms and reports to web pages and XML pages		

Second Year B. Pharmacy (SEM-III)

Course Name/Code	NC301 Pharmaceutical Organic Chemistry II - Theory	Year of Study	2022-23
NC301.1	After completion of the syllabus, students shall be able to classify and nomenclate organic compounds.		
NC301.2	They should be able to understand the chemistry related to aromatic compounds.		
NC301.3	Students should be able to analyze and justify the importance of fats and oils considering their chemical aspects and analytical constants.		
NC301.4	Students should be able to rectify acidity and basicity of compounds and their effects on reaction, Nature of substituents and their role in reaction.		
NC301.5	Development of basic understanding of reactivity, stability and theories of stability of organic compounds.		

Course Name/Code	NC302 Physical Pharmaceutics I- Theory	Year of Study	2022-23
NC302.1	Students will be able to discuss and elaborate physicochemical principles of matters, Solubility of drugs, buffers & isotonic solutions, interfacial phenomenon, adsorption, complexation and protein binding		
NC302.2	Students will be able to apply principles of solubility & distribution, phase rule, isotonicity & pH adjustments, adsorption isotherms, interface interactions, complexation in development of pharmaceutical dosage forms		
NC302.3	Students will be able to analyze effect of physicochemical properties on performance and stability of pharmaceutical formulations		
NC302.4	Conceptual understanding & mathematical calculations pertaining to gas behavior, optical rotation, refractive index, isotonicity adjustments, buffer preparation, surface & interfacial properties, complexation and protein binding		
NC302.5	Students will be able to choose effective therapies through understanding of physicochemical phenomena governing in vitro and in vivo actions of pharmaceutical products		

Course Name/Code	NC303 Pharmaceutical Microbiology - Theory	Year of Study	2022-23
NC303.1	Students will acquire an understanding of identification, cultivation and preservation of microbes, infectious diseases, diagnosis, and treatment thereof. Need, control and irradiation of microbes will be understood.		
NC303.2	Techniques of isolation, identification, and culturing of microorganisms from natural resources, sterility testing cell culture techniques and standardization of pharmaceuticals will be developed.		
NC303.3	Strategies for investigating microbial pathogens, potential microorganisms for pharmaceutical use and cell culture techniques and its application would be planned.		
NC303.4	Production of immunologicals against pathogens, implementation of sterilization protocols and standardization of pharmaceuticals at laboratory scale as per regulation guidelines can be explored.		
NC303.5	Microbes, potential healthcare products and applications towards animal and human health will be revealed.		

Course Name/Code	NC304 Pharmaceutical Engineering - Theory	Year of Study	2022-23
NC304.1	Make the student abreast with various unit operations used in pharmaceutical industries.		
NC304.2	Make the student abreast with current material transportation methodologies.		
NC304.3	Students will acquire knowledge on processes involved in pharmaceutical manufacturing process.		
NC304.4	Understand the real time pharmaceutical industry situations for effective design, construction, and its functioning.		
NC304.5	Describe the engineering approaches and alternatives for effective functioning of pharmaceutical plants by avoiding corrosion.		

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Course Name/Code	NC305 Pharmaceutical Organic Chemistry II - Practical	Year of Study	2022-23
NC305.1	Students should be able utilize their skills and knowledge pertaining to separation and purification of organic compounds.		
NC305.2	Students should develop basic skills and knowledge related to analysis of constants in organic chemistry.		
NC305.3	They should be able to understand basic mechanisms or patterns of a reaction and implement those in their practical aspects.		

Course Name/Code	NC306 Physical Pharmaceutics I - Practical	Year of Study	2022-23
NC306.1	Students will be able to determine various physicochemical properties of drugs and pharmaceutical systems including solubility, pKa, partition coefficient, CST, surface tension, HLB, CMC, stability constant of complex, specific surface area etc.		
NC306.2	Demonstrate use of physicochemical properties in the formulation development and be able to suggest suitable technique/instrument in evaluation of physicochemical properties of drug molecules and dosage forms.		
NC306.3	Students will understand measurement units & their conversions, graphical presentation of data, interpretation of scientific data to make sound conclusions about impact of physicochemical properties on performance of pharmaceutical systems.		

Course Name/Code	NC307 Pharmaceutical Microbiology - Practical	Year of Study	2022-23
NC307.1	Students will acquire an understanding of isolation, identification, control techniques and standardization of pharmaceuticals.		
NC307.2	Plan strategies to carry out antibacterial and antifungal activities, microbial assays, and sterility testing at industrial level		
NC307.3	Quality control of antibiotics as per set protocols will allow students to perform independently and in team.		

Course Name/Code	NC308 Pharmaceutical Engineering - Practical	Year of Study	2022-23
NC308.1	Perform unit operations such as filtration, evaporation, drying, size reduction, size separation, and distillation.		
NC308.2	Draw conclusions about processes based upon experimental finding in various unit operations.		
NC308.3	Estimation of radiation constant of metals in response to heat transfer in unit operations.		

Second Year B. Pharmacy (SEM-IV)

Course Name/Code	NC401 Pharmaceutical Organic Chemistry III - Theory	Year of Study	2022-23
NC401.1	Should be able to understand and apply all aspects of stereoisomerism, nomenclature of optical isomers, reactivity of chiral compounds and asymmetric synthesis.		
NC401.2	Should be able to comprehend and use geometric isomerism, nomenclature of geometric and conformational isomers, stereoselective and stereospecific reactions.		
NC401.3	Gain knowledge of nomenclature, classification, reactivity, synthetic reactions, medicinal uses and related hazards of five membered simple heterocycles.		
NC401.4	Gain knowledge of nomenclature, classification, reactivity, synthetic reactions, medicinal uses and related hazards of some simple bicyclic and 2 hetero atom containing heterocycles.		
NC401.5	Understand chemistry and applications of some common reactions of synthetic importance involving reduction, oxidation, condensation, and rearrangements.		

Course Name/Code	NC402 Medicinal Chemistry I - Theory	Year of Study	2022-23
NC402.1	Understand history of medicinal chemistry, correlate physicochemical properties of drugs with biological activity and predict drug metabolism and its pathways.		
NC402.2	Comprehend the chemistry of drugs, chemical classification, adverse effects, and therapeutic value of drugs acting on autonomic and central nervous system.		
NC402.3	Apply the principles of drug action, drug-receptor interactions with safety of drugs and correlate with biological activities.		
NC402.4	Explore the structure activity relationship of different chemical classes of drugs acting on autonomic and central nervous system.		
NC402.5	Execute the knowledge of synthetic chemistry to prepare strategy for synthesis of drug molecules		

Course Name/Code	NC403 Physical Pharmaceutics II - Theory	Year of Study	2022-23
NC403.1	Identify and explain principles of rheology & deformation of solids, micromeritics, colloidal & coarse dispersions, and drug stability studies.		
NC403.2	Relate and discover effect of various physicochemical properties on designing of pharmaceutical dosage forms.		
NC403.3	Justify and recommend use of different instruments/equipments or manufacturing processes/methods for development of disperse systems and their evaluation for micromeritic, rheological, and interfacial properties.		
NC403.4	Predict and solve problems in development of stable and effective pharmaceutical disperse systems.		
NC403.5	Dosage form design for pediatric and geriatric population by understanding basic principles & formulation design of liquid disperse systems.		

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Course Name/Code	NC404 Pharmacology I - Theory	Year of Study	2022-23
NC404.1	Understand concepts of pharmacokinetic and Pharmacodynamic behavior of therapeutic agents.		
NC404.2	Develop understanding of ethical considerations necessary for clinical application of included class of therapeutic agents and controlled substances.		
NC404.3	Integrate pharmacological implications of included class of therapeutic agents and controlled substances and the variety of pathological conditions.		
NC404.4	Able to execute strategies for safer use of included class of therapeutic agents and controlled substances.		
NC404.5	Communicate and demonstrate rational use of included class of therapeutic agents and controlled substances for societal health care.		

Course Name/Code	NC405 Pharmacognosy & Phytochemistry I - Theory	Year of Study	2022-23
NC405.1	Students will learn about crude drugs, including their sources, organized drugs, unorganized drugs, classification, and quality control.		
NC405.2	Apply the use of medicinal plant, cultivation, collection, processing and storage of plant with its industrial importance, farmers and society at large.		
NC405.3	Understanding the techniques of plant tissue culture.		
NC405.4	Acquaintance with alternative systems of medicine and chemical nature of secondary metabolites.		
NC405.5	General overview of plant products and primary metabolites.		

Course Name/Code	NC406 Medicinal Chemistry I - Practical	Year of Study	2022-23
NC406.1	Acquire skills to apply basic organic chemistry and reactivity in synthesis and purification of active pharmaceutical ingredients and intermediates		
NC406.2	Gain skills of preparation, standardization, assay and partition coefficient determination of active pharmaceutical ingredients.		
NC406.3	Execute multi-step synthesis and understand its commercial applications.		

Course Name/Code	NC407 Physical Pharmaceutics II - Practical	Year of Study	2022-23
NC407.1	Measure and estimate micromeritic properties like particle size, size distribution, powder densities, flow properties and viscosity, sedimentation volume, reaction rate constant and expiration date of drug products		
NC407.2	Choose and plan suitable techniques and instruments to evaluate physicochemical properties of powders and disperse systems.		
NC407.3	Identify and utilize measurement units & their conversions, graphical presentation of data, interpretation of scientific data to make sound conclusions about impact physicochemical properties on performance of pharmaceutical systems.		

Course Name/Code	NC408 Pharmacology I - Practical	Year of Study	2022-23
NC408.1	Students will acquire various skill sets required for pharmacological screening keeping in view ethical, regulatory, environmental and safety concerns.		
NC408.2	Understand pharmacological aspects with simulated experiments and their application for drug discovery and development.		
NC408.3	Learn planning, execution, and assimilation of experimental data individually and in a team with professional ethical considerations.		

Course Name/Code	NC409 Pharmacognosy & Phytochemistry I - Practical	Year of Study	2022-23
NC409.1	Students will know crude drugs by chemical tests.		
NC409.2	Students will be able inculcate attitude for applying the acquired knowledge to identify important diagnostic features of plants and crude drugs.		
NC409.3	Understanding physical evaluation of crude drugs.		

Third Year B. Pharmacy (SEM-V)

Course Name/Code	NC501 Medicinal Chemistry II	Year of study	2022-23
NC501.1	Understand classification, mechanism of action, uses and structure activity relationship of antihistaminic agents and antineoplastic agents.		
NC501.2	Acquire knowledge of classification, mechanism of action, uses and structure activity relationship of anti-anginal drugs, diuretics and anti-hypertensive agents.		
NC501.3	Comprehend classification, mechanism of action, uses and structure activity relationship of anti-arrhythmic drugs, anti-hyperlipidemic agents, coagulant, anticoagulants, and drugs used in congestive heart failure.		
NC501.4	Understand nomenclature, stereochemistry, mechanism of action, uses and structure activity relationship of drugs acting on endocrine system.		
NC501.5	Know the classification, mechanism of action, uses and structure activity relationship of antidiabetic agents and local anesthetics.		

Course Name/Code	NC502 Industrial Pharmacy I - Theory	Year of Study	2022-23
NC502.1	Understand basic concept and applications of preformulation and conventional and novel excipients used in formulation development of various dosage forms.		
NC502.2	Know various formulation and manufacturing considerations in development of pharmaceutical dosage forms.		
NC502.3	Formulate and prepare solid, liquid and semisolid dosage forms and evaluate them for their quality.		
NC502.4	Select excipients and formulate and prepare various cosmetic preparations.		
NC502.5	Select and evaluate appropriate packaging materials for various pharmaceutical dosage forms and understand legal and official requirements for packaging.		

Course Name/Code	NC503 Pharmacology II - Theory	Year of Study	2022-23
NC503.1	Explain the mechanism of drug action at organ system/sub cellular/ Macromolecular levels.		
NC503.2	Understand the pharmacological actions and rational use of autacoids, cardiovascular and hormonal therapeutic agents.		
NC503.3	Clinical exposition of pharmacological implications of autacoids, cardiovascular and hormonal therapeutic agents in various disorders.		
NC503.4	Ability to execute ethical strategies for safer use of autacoids, cardiovascular and hormonal therapeutic agents		
NC503.5	Acquire the basic knowledge of bioassay of drugs applicable in new drug discovery and development process.		

Course Name/Code	NC504 Pharmacognosy & Phytochemistry II - Theory	Year of Study	2022-23
NC504.1	Students will be able to understand metabolic pathways in higher plants.		
NC504.2	Understanding general introduction, composition, chemistry, chemical classes, biosources, therapeutic uses, and commercial applications of secondary metabolites.		
NC504.3	Learn about the industrial extraction methods of some potential phyto-pharmaceuticals with estimation and utilization.		
NC504.4	Understand the methods of isolation, identification and analysis of phytoconstituents.		
NC504.5	Techniques of extraction, isolation, separation, and purification of various groups of chemical constituents.		

Course name/Code	NC505 Pharmaceutical Jurisprudence - Theory	Year of study	2022-23
NC505.1	Understand the objectives and regulations for import and manufacture of drugs in accordance with Drugs and Cosmetics Act, 1940 and its rules 1945.		
NC505.2	Gain knowledge of schedules, regulations for sale of drugs, requirements for labelling and packaging in agreement with Drugs and Cosmetics Act, 1940 and its rules 1945.		
NC505.3	Comprehend objectives and regulations of Pharmacy Act 1948, Medicinal and Toilet Preparation Act 1955 and Narcotic Drugs and Psychotropic Substances Act-1985.		
NC505.4	Understand salient features of Drugs and Magic Remedies Act and its rules, objectives, and guidelines of Prevention of Cruelty to animals Act-1960 and National Pharmaceutical Pricing Authority.		
NC505.5	Acquire knowledge of Pharmaceutical Legislations, Code of Pharmaceutical Ethics, Medical Termination of Pregnancy Act, Right to Information Act and Intellectual Property Rights.		

Course Name/Code	NC506 Industrial Pharmacy I - Practical	Year of Study	2022-23
NC506.1	Carry out preformulation testing to relate the physicochemical properties of drugs to dosage form characteristics.		
NC506.2	Prepare formulations of different dosage forms as per the batch formula to develop the skills in manufacturing.		
NC506.3	Evaluate different dosage forms by performing quality control tests.		

Course Name/Code	NC507 Pharmacology II - Practical	Year of Study	2022-23
NC507.1	Understand basics of <i>in-vivo</i> and <i>in-vitro</i> pharmacological screening techniques using simulated experimental conditions that can impart skills for preclinical studies.		
NC507.2	Integrate and efficiently apply various bioassay techniques for potency determination.		
NC507.3	Learn planning, execution and assimilation of experimental data individually and in a team with professional ethical considerations.		

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Course Name/Code	NC508 Pharmacognosy & Phytochemistry II - Practical	Year of Study	2022-23
NC508.1	Students will become skilled in the Morphology, histology, powder characteristics, extraction and detection of crude drugs.		
NC508.2	Understanding the techniques of extraction, isolation, separation, and purification of various groups of chemical constituents.		
NC508.3	Identification of the crude drugs by chemical tests.		

Third Year B. Pharmacy (SEM-VI)

Course Name/Code	NC601 Medicinal Chemistry III -Theory	Year of Study	2022-23
NC601.1	Implement modern techniques of drug design in development of drugs exploring prodrug concept, SAR, metabolism, and adverse effects.		
NC601.2	Understand history and recent developments in antibiotics & chemotherapeutic agents		
NC601.3	Explore the significance of mechanism of action and pharmacologic aspects of antibiotics and chemotherapeutic agents.		
NC601.4	Establish relationship between physicochemical properties with pharmacokinetics of chemotherapeutic agents.		
NC601.5	Plan and execute chemical synthesis of included class of therapeutic agents with safety and environmental considerations.		

Course Name/Code	NC602 Pharmacology III - Theory	Year of Study	2022-23
NC602.1	Perceive knowledge regarding use of Immunological agents in pharmacotherapy.		
NC602.2	Gain in depth understanding of clinical use of drugs in various infectious diseases and malignancies.		
NC602.3	Understand the Clinical exposition of pharmacological agents in respiratory and gastrointestinal disorders.		
NC602.4	Comprehend the principles of toxicology and treatment of various poisonings.		
NC602.5	Communicate and demonstrate the concept of chronopharmacology.		

Course Name/Code	NC603 Herbal Drug Technology - Theory	Year of Study	2022-23
NC603.1	Understanding raw material as source of herbal drugs, good agricultural practices, and basic principles of Indian system of medicine.		
NC604.2	Ability to learn, benefits of various plants as nutraceuticals in ailments and also the herb-food interaction of various plant drugs.		
NC605.3	Learn about herbal cosmetics, excipients, and formulations.		
NC606.4	Regulatory provisions for herbal drug evaluations in accordance with WHO and ICH guidelines, natural product patenting, and ASU medicine.		
NC607.5	Create the awareness of present status, prospects of herbal drug-based industry and Good Manufacturing Practice for Indian systems of medicine.		

Course Name/Code	NC604 Biopharmaceutics & Pharmacokinetics - Theory	Year of Study	2022-23
NC604.1	Understand the passage of drugs within the body through ADME.		
NC604.2	Explain the biopharmaceutical factors assess the absolute and relative bioavailability of drugs.		
NC604.3	Understand the statistical treatment of pharmaceutical data and its application to assess the pharmacokinetic parameters.		
NC604.4	Describe different pharmacokinetic models and evaluate and estimate drug changes in the body.		
NC604.5	Evaluate drug bioavailability and bioequivalence and establish IVIVC.		

Course Name/Code	NC605 Pharmaceutical Biotechnology - Theory	Year of Study	2022-23
NC605.1	Understanding the importance of immobilized enzymes in pharmaceutical industries.		
NC605.2	Conceptualizing principles of genetic engineering and its applications in pharmaceuticals.		
NC605.3	Importance of immunity and production of immunologicals in industries		
NC605.4	Studying immunoblotting techniques and microbial transformations		
NC605.5	Appreciate the use of microorganisms in fermentation technology		

Course Name/Code	NC606 Quality Assurance –Theory	Year of Study	2022-23
NC606.1	Understand and apply cGMP, GLP, ICH guidelines, ISO management system and NABL accreditation in pharmaceutical industry work environment.		
NC606.2	Recognize the responsibilities of QA & QC departments.		
NC606.3	Apply principles of qualification and execute calibration and validation of equipments, method and facilities.		
NC606.4	Perceive importance and exercise proper documentation and complaint handling from technical and regulatory perspectives		
NC606.5	Explore concept of quality control and learn quality control testing methods of packaging materials.		

Course Name/Code	NC607 Medicinal Chemistry III - Practical	Year of Study	2022-23
NC607.1	Understand reaction mechanisms, execute laboratory synthesis and characterization of medicinally important organic compounds considering environmental and safety concerns.		
NC607.2	Use Chem Draw and various drug design software's for calculating and correlating physiochemical properties of molecules.		
NC607.3	Learn planning, execution, and assimilation of experimental data individually and in a team with professional ethical considerations		

Course Name/Code	NC608 Pharmacology III - Practical	Year of Study	2022-23
NC608.1	Well acquainted with virtual pharmacological screening techniques in experimental pharmacology.		
NC608.2	Integrate and efficiently apply various biostatistics methods in investigational new drugs.		
NC608.3	Learn planning, execution, and assimilation of experimental data individually and in a team with professional ethical considerations.		

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Course Name/Code	NC609 Herbal Drug Technology - Practical	Year of Study	2022-23
NC609.1	For industrial applications, students will be familiar with the morphological and chemical testing of crude drugs.		
NC609.2	Understanding the incorporation of prepared and standardized extracts in herbal formulations and their evaluation as per Pharmacopeial standards.		
NC609.3	Students will be able to inculcate attitude for applying the acquired knowledge for standardization techniques of herbal drug analysis.		

Final Year B. Pharmacy (SEM-VII)

Course Name/Code	NC701 Instrumental Methods of Analysis - Theory	Year of Study	2022-23
NC701.1	To impart a fundamental knowledge on the principles and instrumentation of spectroscopic and chromatographic technique.		
NC701.2	Understand the interaction of matter with electromagnetic radiations and its applications in drug analysis.		
NC701.3	Emphasizes on theoretical and practical knowledge on modern Spectroscopic and chromatographic instruments that are used for drug testing.		
NC701.4	Perform quantitative & qualitative analysis of drugs using various Spectroscopic techniques.		
NC701.5	Thoroughly Understanding the chromatographic separation and it's applications for pharmaceutical analysis.		

Course Name/Code	NC702 Industrial Pharmacy II- Theory	Year of Study	2022-23
NC702.1	Understanding process of pilot plant and scale up of pharmaceutical dosage forms.		
NC702.2	Students will be able to understand process of technology transfer from lab scale to commercial batch.		
NC702.3	Know different Laws and Acts that regulate pharmaceutical industry.		
NC702.4	Understand the approval process and regulatory requirements for drug products.		
NC702.5	Students will be able to understand Quality management & Certifications required in Pharmaceutical Industry.		

Course Name/Code	NC703 Pharmacy Practice - Theory	Year of Study	2022-23
NC703.1	Perceive the Structure and functions of Hospital, Hospital Pharmacy and Community Pharmacy, with assessment, management and reporting of adverse drug reactions to regulatory authorities.		
NC703.2	Understand Formulary and various drug distribution methods in Hospital and obtain medication history, interview, monitor drug therapy of patient through medication chart and clinical review.		
NC703.3	Acquire skills of patient counseling, pharmacy education and training program in hospitals and understand Pharmacy and therapeutic committee with drug information services.		
NC703.4	Develop understanding of Budget, Concept of clinical pharmacy and rational use of common over the counter medications.		
NC703.5	Comprehend pharmacy store management with inventory control and interpretation of clinical laboratory tests with respect to Therapeutic Drug Monitoring.		

Course Name/Code	NC704 Novel Drug Delivery System-Theory	Year of Study	2022-23
NC704.1	Understanding of various approaches for development of novel drug delivery systems.		
NC704.2	The criteria for selection of drugs and polymers for the development of delivery systems		
NC704.3	Formulation and evaluation of novel drug delivery systems		
NC704.4	Prospective drug delivery system for certain diseases/disorders		
NC704.5	Cost effective novel dosage forms for improved therapeutic efficacy		

Course Name/Codes	NC705 Instrumental Methods of Analysis - Practical	Year of Study	2022-23
NC705.1	Students will acquire skills to apply knowledge of Spectroscopic techniques for analysis of pharmaceutical ingredients and intermediates.		
NC705.2	Students will acquire knowledge regarding chromatographic techniques, and they will apply the same for qualitative and quantitative analysis.		
NC705.3	Conceptual understanding of advanced instrument will impart students with ability of applying knowledge and skills for commercial purpose.		

Final Year B. Pharmacy (SEM-VIII)

Course Name/Code	NC801 Biostatistics and Research Methodology - Theory	Year of Study	2022-23
NC801.1	Learn correlations among variables using statistical analysis measures of central tendency and dispersion.		
NC801.2	Analyze the results using parametric and non-parametric tests for measuring significance of studies and hypothesis testing. Know the various statistical techniques to solve statistical problems		
NC801.3	Understand the need of research, design of experiments and interpretation of results in graphical representation.		
NC801.4	Comprehend the knowledge of regression studies using Excel, SPSS, design of experiments tools and software's.		
NC801.5	Implementation of experimental design approach in solving the pharmaceutical examples		

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Course Name/Code	NC802 Social and Preventive Pharmacy	Year of Study	2022-23
NC802.1	Students will acquire an understanding of current issues related to health and pharmaceutical problems within the country and worldwide.		
NC802.2	Ability to identify number of health challenges and preventive measures associated thereof.		
NC802.3	Ability to have a critical way of thinking based on current healthcare development.		
NC802.4	Promotion of community services in rural and urban in line with professional ethics.		
NC802.5	Students will be able to evaluate alternative ways of solving problems related to health and pharmaceutical issues.		

Course Name/Code	NC803 Pharma Marketing management	Year of study	2022-23
NC803.1	Understand scope of marketing, quantitative and qualitative aspects of pharmaceutical market and role of market research.		
NC803.2	Acquire knowledge of various aspects of product decision.		
NC803.3	Implement promotion methods for pharmaceutical product.		
NC803.4	Comprehend various aspects of pharmaceutical marketing channels and responsibilities of professional sales representative.		
NC803.5	Learn importance, objectives and methods of pricing.		

Course Name/Code	NC804 Pharmaceutical regulatory Science	Year of study	2022-23
NC804.1	Comprehend process of new drug discovery and development, concept of generics and generic product development.		
NC804.2	Understand regulatory approval processes for Investigational New Drug Application, New Drug Application and Abbreviated New Drug Application.		
NC804.3	Understand the regulatory procedure for export of pharmaceutical products and required technical documentation.		
NC804.4	Acquire knowledge of clinical trial protocols and the concept of pharmacovigilance.		
NC804.5	Learn regulatory concepts.		

Course Name/Code	NC805 Pharmacovigilance	Year of Study	2022-23
NC805.1	Know History and development of Pharmacovigilance, National and global scenario, and importance of drug safety monitoring.		
NC805.2	Acquire knowledge of Dictionaries, terminologies, coding, and softwares used in clinical data management.		
NC805.3	Detect, assess, manage, and report adverse drug reactions as per regulatory requirements of CIOMS, FDA, ICH.		
NC805.4	Generate pre-clinical, clinical and post approval safety data of drugs used in general and special patient population.		
NC805.5	Understand Pharmacovigilance methods with respect to Vaccine safety surveillance.		

Course Name/Code	NC806 Quality control and standardization of herbals	Year of Study	2022-23
NC806.1	Students will know WHO guidelines for quality control of herbal drugs.		
NC806.2	Understanding quality assurance in herbal drug industry.		
NC806.3	EU and ICH guidelines for quality control of herbal drugs.		
NC806.4	Know the stability testing of herbal drugs, chromatographic techniques, preparation of new drug application and export registration documents.		
NC806.5	Regulatory approval process and process for registration in Indian and International markets.		

Course Name/Code	NC807 Computer Aided Drug Design	Year of Study	2022-23
NC807.1	Discriminate the various stages of drug development and appraise the role of computer aided drug designing for developing novel customized drugs.		
NC807.2	Understand techniques utilized for correlation of biological activity and Physico-chemical characteristics		
NC807.3	Construct a virtual model of drug actions via application of molecular docking and virtual screening techniques.		
NC807.4	Develop professional skills in handling information from large database sets for annotation of gene & proteins.		
NC807.5	Apply quantum and molecular mechanical concepts in the drug design.		

Course Name/Code	NC808 Cell and Molecular Biology	Year of Study	2022-23
NC808.1	Gain in depth knowledge of cellular reproduction, functions, and molecular biology.		
NC808.2	Acquaint with physical and chemical functions of macromolecules like DNA, RNA and proteins.		
NC808.3	Understanding DNA, RNA and proteins synthesis and it's regulatory process.		
NC808.4	Describing cellular functions by cell signalling pathways using transgenics and genetic analysis.		
NC808.5	Knowing cell division processes by understanding cell cycles		

Course Name/Code	NC809 Cosmetics Science	Year of Study	2022-23
NC809.1	Students will be able to understand basic structure and function of skin, hair, nail and eye, regulatories, excipients in relation to development of cosmetic formulations.		
NC809.2	Students will understand various problems and need for development of cosmetic formulation for skin, hair and teeth to solve various problems thereof.		
NC809.3	Students will know the general aspects, building blocks and basic & novel ingredients of cosmetic preparations and their safe use in development of various cosmetic products for skin & hair as per regulation.		
NC809.4	Students will able to know regulatory provision in manufacturing, evaluation, packaging, sale and safe use of cosmetic formulations.		
NC809.5	Students will able to plan, formulate, manufacture packing, labeling and quality evaluation of conventional and modern cosmetic for skin & Hair formulations.		

Course Name/Code	NC810 Experimental Pharmacology	Year of Study	2022-23
NC810.1	Appreciate the selection and handling of various commonly used laboratory animals as per regulatory guidelines.		
NC810.2	Demonstrate the various in-vitro, in-vivo screening methods used in preclinical research.		
NC810.3	Understand the importance of biostatistics and acquire skills for its application in research methodology.		
NC810.4	Design and execute a research hypothesis independently.		
NC810.5	Learn importance of Three R principle concerned with animal welfare and execute in preclinical research.		

Course Name/Code	NC811 Advanced Instrumentation Techniques	Year of Study	2022-23
NC811.1	Understanding the chromatographic separation and it's applications for analysis of drugs.		
NC811.2	Students will thoroughly understand the calibration of various analytical instruments.		
NC811.3	Comprehensive understanding of uses of advanced instruments and its applications in pharmaceuticals analysis.		
NC811.4	To impart advanced knowledge on the principles and instrumentation of hyphenated techniques and this will help them for achieving various job opportunities.		
NC811.5	Helps to develop the skill of choosing the appropriate analytical technique for analysis of different types of drugs samples.		

Course Name/Code	NC812 Dietary supplements and nutraceutical	Year of Study	2022-23
NC812.1	Identify the need of dietary supplements by the various groups of people for maintaining healthy lifestyle.		
NC812.2	Understand role, use and classification, deficiencies of nutraceuticals, functional foods and dietary supplements in prevention or cure various diseases.		
NC812.3	Explore source and medicinal uses of the chemical constituents from natural sources as nutraceuticals.		
NC812.4	Analyse role of free radicals in various diseases like diabetes and cancer and use of anti-oxidant functional foods in prevention of chronic diseases.		
NC812.5	Evaluate the regulatory aspects required for efficacy and safety assessment of nutraceutical and functional foods		