SULTAN-UL-ULOOM COLLEGE OF PHARMACY

(Estd. by Sultan-ul-Uloom Education Society)
Approved by AICTE & Pharmacy Council of India
Affiliated to Jawaharlal Nehru Technological University, Hyderabad
B.Pharm Program Accredited by NBA
Recognized under Section 2(f) & 12(B) of the UGC Act, 1956

Program: Bachelor of Phamacy **Duration: 4 years**

COURSE OUTCOMES

I Year I Semester

COURSE CODE	COURSE NAME	COURSE OUTCOME
		Upon completion of the course, the student should be able to
241AA	HUMAN ANATOMY AND PHYSIOLOGY - I	CO.1 Illustrate the Structural organization of body systems and use theanatomical terminology
		CO.2 Identify the functional classification of joints and formations ofbones and integumentary system
		CO.3 Illustrate the Nerve impulse formation, transmission and release ofneurotransmitter.
		CO.4 Identify the functional coordination between the CNS & PNS
		CO.5 Identify the disorders and approach for treatment of special senses.
		CO.6 Identify the disorders and approach for treatment of Endocrine systemand can suggest the non-pharmacological treatment.
241AB	PHARMACEUTICAL ANALYSIS-I	CO.1 Apply different techniques of analysis and methods of expressing concentration in preparation and standardizations of different compounds and explain source, types and minimization of errors.
		CO.2 Classify and understand the theories of acid-base titrations along withan idea of non-aqueous titrations with suitable examples.
		CO.3 Describe concepts in precipitation titrations and complexometrictitrations
		CO.4 Perform gravimetric Analysis along with identification of impurities
		CO.5 Comprehend concepts, principle, types and applications of RedoxTitrations
		CO.6 Implement the Electro chemical method of analysis in Determinationendpoints.
241AC	PHARMACEUTICS-I	CO.1 Describe historical background and development of pharmacy profession with special emphasis on prescriptions, dosage forms and Posology.
		CO.2 Understand advantage and disadvantages of powders and liquiddosage forms along with pharmaceutical calculations.

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		CO.3 Define, Classify, Prepare formulations such as suspensions andemulsions.
		CO.4 Identify stability problems and steps to overcome them along with anidea of monobasic liquids.
		CO.5 Define, Classify, Prepare and Evaluate suppositories and learnclassification of Pharmaceutical Incompatibilities.
		CO.6 Define, Classify and understand mechanisms and factors influencingdermal penetration of drugs and understand preparation and evaluation of semisolid dosage forms.
241AD	PHARMACEUTICAL INORGANIC CHEMISTRY I	CO.1 Determine the sources of impurities and principles involved in limit tests and to determine the impurities in inorganic drugs and pharmaceuticals.
		CO.2 Apprehend theories of acids and bases, buffer capacity and bufferaction, extra and intracellular electrolytes and dental products.
		CO.3 Comprehend the ideal properties and mechanism of action ofgastrointestinal agents.
		CO.4 Define and classify gastrointestinal agents.
		CO.5 Define, prepare following the principles and procedures involved inassay of expectorants, emetics, haematinics, astringent, poison and antidotes.
		CO.6 Apprehend the definition, preparation, assay methods ofradiopharmaceuticals.
241AE	COMMUNICATION SKILLS	CO.1 Know the importance of communication, overcome barriers tocommunicate and perspectives in communication.
		CO.2 Learn elements of communication and communication styles.
		CO.3 Develop Listening skills required for communication
		CO.4 Develop effective writing skills for good communication
		CO.4 Develop skills to face interviews and deliver presentation of seminars.
		CO.5 Improve soft skills and participation in group discussions withouthesitation or fear.
241AF	REMEDIAL BIOLOGY	CO.1 Classify five kingdoms of life with emphasis on salient features ofthem.
		CO.2 Apprehend basic concepts of anatomy and physiology of plants
		CO.3 Comprehend basic components of anatomy and physiology ofanimals.
		CO.4 Describe the basic components of anatomy and physiology of humans
		CO.5 Enumerate essential minerals, macro and micro nutrients for plantnutrition and also an idea on photosynthesis process.
		CO.6 Define the terms respiration, growth and development of plant-cell

		and tissues.
241AG	REMEDIAL MATHEMATICS	CO.1 Learn in detail about matrices and components of matrices anddeterminants with emphasis on gauss elimination method
		CO.2 Acquire knowledge on logarithms and functions along with theirapplication in solving pharmaceutical problems
		CO.3 Define and study limits and continuity of calculus
		CO.4 Comprehend properties and derivatives in differentiation
		CO.5 Understand integration with its formulae, rules and application.
		CO.6 Perform differential equations and their applications in solvingpharmacokinetic equations.
24101	HUMAN ANATOMY AND PHYSIOLOGY LAB	CO.1 Record body temperature by using sphygmomanometer.
		CO.2 Interpret various organ system of human body with specimens andmodels.
		CO.3 Study handling of simple and compound microscope.
		CO.4 Identify axial and appendicular bones.
		CO.5 Observe microscopically epithelial, connective, muscular and nervoustissue.
24102	PHARMACEUTICAL ANALYSIS I –LAB	CO.1 Prepare and standardize different compounds
		CO.2 Classify titrimetric procedures by performing the assay along withpercentage purity calculation
		CO.3 Perform procedures of different methods of titrations
		CO.4 Work on use of pH meter and conductivity meter
		CO.5 Work on electro chemical method of analysis by calculation ofpotential and conductivity.
24103	PHARMACEUTICS I –LAB	CO.1 Prepare Syrups and Elixirs
		CO.2 Prepare Tinctures and solutions
		CO.3 Prepare suspensions and emulsions
		CO.4 Prepare powders and granules
		CO.5 Prepare suppositories, semi-solids and gargles and mouthwashes.
24104	PHARMACEUTICAL INORGANIC CHEMISTRY LAB	CO.1 Perform the limit test for chlorides, sulphates, lead, iron, heavy metalsand arsenic
		CO.2 Carry out identification tests for magnesium hydroxide, ferroussulphate, sodium carbonate etc
		CO.3 Perform swelling power of Bentonite.

		CO.4 Perform neutralizing capacity of aluminum hydroxide gel
		CO.5 Prepare boric acid, potash alum and ferrous sulphate
24105	COMMUNICATION SKILLS –LAB	CO.1 Develop communicating with people by meeting people, asking questions and making friends and other modes of communicatingpeople.
		CO.2 Learn pronunciation of consonants, vowels and nouns
		CO.3 Listening comprehension by direct and indirect speech.
		CO.4 Develop effective writing skills and facing Interviews.
		CO.5 Learn presentation skills and mailing skills
24106	REMEDIAL BIOLOGY –LAB	CO.1 Handle simple and compound microscope.
		CO.2 Perform section cutting, mounting, staining and permanent slidepreparation
		CO.3 Study of cell, root, leaf and modifications
		CO.4 Study of frog by using computer models
		CO.5 Determine blood group, blood pressure and total volume

I YEAR II SEMESTER

COURSE CODE	COURSE NAME	COURSE OUTCOME
242AA	HUMAN ANATOMY AND PHYSIOLOGY-II	CO.1 Perform and analyze the hematological examination.
		CO.2 Differentiate various CVS & heart disorders
		CO.3 Analyze the GIT disorders based on the knowledge of anatomical &physiological of GIT.
		CO.4 Conceptualize the anatomical aspects and mechanism of respiration
		CO.5 Inter link the role of Urinary system with CVS in regulation andcontrol of Blood Pressure.
		CO.6 Conceptualize genetics to understand and illustrate the concepts ofinheritance.
242AB	PHARMACEUTICAL ORGANIC CHEMISTRY I	CO.1 Write the structure, name and type of isomerism of the organic compound.
		CO.2 Explain the concepts and theories in alkanes, alkenes and conjugated dienes.
		CO.3 Write the reaction, name the reaction and orientation of reactions
		CO.4 Write various reactions and uses of aldehyde and ketones
		CO.5 Recall structure and uses of various carboxylic compounds.
		CO.6 Explain Nucleophilic substitution reactions in alkyl halides.
242AC	PHARMACEUTICAL BIOCHEMISTRY	CO.1 Understand the carbohydrate metabolism via various pathways andtheir significance and biological oxidation.
		CO.2 Acquire knowledge on lipid metabolism and amino acid metabolism
		CO.3 Learn nucleic acid metabolism through biosynthesis and catabolismof nucleotides.
		CO.4 Understand the structure and function of nucleic acids, transcriptionand translation process.
		CO.5 Gain knowledge on biomolecules and bioenergetics
		CO.6 Acquire knowledge on properties nomenclature, classification of enzymes along with enzyme kinetics, enzyme inhibitors regulationof enzyme.
242AD	PATHOPHYSIOLOGY	CO.1 Know and understand the basic principles of cell injury and adaption as well as the basic mechanism involved in the process of inflammation and repair.
		CO.2 Analyse and describe the signs and symptoms, etiology, pathogenesis and complications of diseases/disorders related to Cardiovascular system, Respiratory system and Renal system.

		CO.3 Understand and describe the signs and symptoms, etiology, pathogenesis and complications of hematological diseases. anddiseases/disorders related to Endocrine system,
		CO.4 Correlate the concepts of diseases/disorders related to Endocrinesystem and Nervous system
		CO.5 Understand and describe the signs and symptoms, etiology, pathogenesis and complications of diseases related to liver,intestine, bones and joints.
		CO.6 Outline and describe the signs and symptoms, etiology, pathogenesis and complications of diseases like infectious and sexually transmitted diseases.
242AE	COMPUTER APPLICATIONS IN PHARMACY	CO.1 Apply concepts of Number system, Information systems andSoftware.
		CO.2 Apply knowledge of programming languages, web servers and webproducts and databases in pharmacy.
		CO.3 Apply knowledge of computers in drug designing and electronicprescribing.
		CO.4 Apply knowledge of computers in discharge systems and diagnosticsystems.
		CO.5 Have an idea of Bioinformatics on databases and concepts ofbioinformatics in Vaccine discovery.
		CO.6 Know the importance of computers as part of data analysis n preclinical development.
24205	ENVIRONMENTAL SCIENCES	CO.1 Know the Significance of natural resources, renewable and non-renewable sources.
		CO.2 Get an idea of concepts of structure and function of an Eco-system.
		CO.3 Aware of causes and problems associated with air and waterpollution
		CO.4 Aware of causes and problems associated with soil pollution andmethods to control it.
		CO.5 Understand the impact of biodiversity and man-wildlife conflicts.
		CO.6 Acquire knowledge on environmental policies and concept ofenvironmental management plan.
24201	HUMAN ANATOMY AND PHYSIOLOGY II LAB	CO.1 Enumerate white and red blood cells.
		CO.2 Determine Hemoglobin content, blood group, ESR, Bleeding andclotting time
		CO.3 Record B.P by sphygmomanometer and basal mass index
		CO.4 Aware of using family planning devices and pregnancy diagnose test
		CO.5 Observe and identify permanent slides of vital organs and gonads.

24202	PHARMACEUTICAL ORGANIC CHEMISTRY I –LAB	CO.1 Synthesize Various Organic Compounds.
		CO.2 Carry out systematic qualitative analysis of unknown organiccompounds.
		CO.3 Identify unknown compound using melting and boiling point
		CO.4 Prepare and confirm the identity of derivatives of unknown compounds by melting/boiling point
		CO.5 Construct Molecular models.
24203	PHARMACEUTICAL BIOCHEMISTRY-LAB	CO.1 Carry out qualitative analysis of carbohydrates, reducing sugars andabnormal constituents
		CO.2 Study effect of temperature and substrate concentration on salivaryamylase activity.
		CO.3 Determine blood creatinine, blood sugar and serum total cholesterol.
		CO.4 Identify proteins by using chemical tests
		CO.5 Understand the effect of enzymatic hydrolysis of starch.
24204	COMPUTER APPLICATIONS IN PHARMACY-LAB	CO.1 Retrieve information of a drug and its adverse effects using onlinetools
		CO.2 Create a HTML web page and database in MS Access to storepatient information.
		CO.3 Generate and print report from patient database
		CO.4 Design a questionnaire using a word processing package to gatherinformation about a particular disease.
		CO.5 Export tables, Queries, forms and reports to web pages and XMLPages.

II YEAR I SEMESTER

COURSE CODE	COURSE NAME	COURSE OUTCOME
243AA	PHARMACEUTICAL ORGANIC CHEMISTRY-II	CO.1 Write the structure, name and type of isomerism of the organiccompound.
		CO.2 Explain the concepts and theories in alkanes, alkenes and conjugated dienes.
		CO.3 Write the reaction, name the reaction and orientation of reactions
		CO.4 Write various reactions and uses of aldehyde and ketones
		CO.5 Recall structure and uses of various carboxylic compounds.
		CO.6 Explain Nucleophilic substitution reactions in alkyl halides.
243AB	PHYSICAL PHARMACEUTICS-I	CO.1 To explain various states of matter and their properties along with Physicochemical properties of drug molecules in the designing of thedosage form.
		CO.2 To elaborate the principles of solubility by applying various laws ofdissolution and drug release.
		CO.3 To analyze the micromeritic properties of powders and theircharacteristics.
		CO.4 To acquire knowledge on derived properties of powders
		CO.5 To summarize the concepts of drug complexation and protein binding.
		CO.6 To determine the pH of different solutions and buffers in pharmaceutical and biological systems.
243AC	PHARMACEUTICAL MICROBIOLOGY	CO.1 Acquire knowledge on history, scope, and diversity of microorganisms. Understand morphology, cultivation andpreservation of various microorganisms.
		CO.2 Identify the bacteria by using various staining techniques and biochemical tests and understand the importance of sterilization inpharmaceutical industry
		CO.3 Describe the microbiology of fungi and virus.
		CO.4 Outline disinfectants and their evaluation tests, sterility testing ofdifferent pharmaceutical substances.
		CO.5 Apprehend the concepts of aseptic area, laminar air flow equipment,microbiological assays. standardization of antibiotics, vitamins, amino acids and general aspects of environmental cleanliness
		CO.6 Relate the cell culture technology and its applications inpharmaceutical industries.
		CO.1 Aware of size separation of different material to know about the equipments used in size separation. Aware of mechanism of mixing&different type of mixers.

243AD	PHARMACEUTICAL ENGINEERING	CO.2 Understand the basics of evaporation, equipments of evaporation.To know the heat transfer mechanisms. Acquire knowledge on Crystallization techniques.
		CO.3 Acquire knowledge on different types of dryers; EMC, FMC, DRC.Acquire knowledge on Distillation techniques.
		CO.4 Aware of Filtration of different material to know about the equipments used in Filtration & Centrifugation.
		CO.5 Aware of plant location, plant layout, plant safety along withmaterials used in plant construction along with emphasis on Industrial Hazards and Accidents.
		CO.6 Gain the knowledge on the various equipment which are used in thepharmaceutical industry.
24301	PHARMACEUTICAL ORGANIC CHEMISTRY-II LAB	CO.1 Perform laboratory techniques such as recrystallization and steamdistillation.
		CO.2 Determine acid value, saponification value and iodine value for oils.
		CO.3 Preparation of Various organic compounds using Acylation,Halogenation,Nitration,Oxidation,Hydrolysis and Coupling Reactions
		CO.4 Prepare Dibenzal acetone from Benzaldehyde by Claisen Schmidt reaction
		CO.5 Prepare Cinnamic acid from benzaldehyde by Perkin reaction.
24302	PHYSICAL PHARMACEUTICS -1 LAB	CO.1 Determine % composition of NaCl in a solution using phenol-watersystem by CST method.
		CO.2 Determine solubility of drug at room temperature
		CO.3 Analyze particle size, particle size distribution using sieving methodand Microscopic method
		CO.4 Calculate and compare bulk density, true density and porosity, angleof repose of various powders and granules.
		CO.5 Determine pKa value by Half Neutralization/ Henderson HasselBalch equation
24303	PHARMACEUTICAL MICROBIOLOGY LAB	CO.1 Carry out sterilization of glassware and culture media
		CO.2 Determine motility of microorganism and bacteriological analysis ofwater
		CO.3 Demonstrate and perform different staining methods ofmicroorganisms.
		CO.4 Incorporate and evaluate isolation of pure culture of microorganism.
		CO.5 Evaluation of microbiological assay of different antibiotics.
24304	PHARMACEUTICAL	CO.1 Determine the radiation constant of brass, iron, unpainted glass, various techniques of distillation and to gain knowledge aboutoverall heat transfer mechanism.
		CO.2 Determine the rate of drying, moisture content on rate of drying,humidity (relative humidity & absolute humidity)

	ENGINEERING LAB	CO.3 Know about principles, working of various dryers and mixers. Tocalculate uniformity index by using double cone blender.
		CO.4 Discuss about factors influencing rate of filtration & evaporation.To study the effect of time on rate of crystallization.
		CO.5 Gain the knowledge on the various equipment which is used in thepharmaceutical industry.

II YEAR II SEMESTER

COURSE CODE	COURSE NAME	COURSE OUTCOME
244AA	PHARMACEUTICAL ORGANIC CHEMISTRY- III	CO.1 Demonstrate the stereo chemical aspects of organic compoundsand stereo chemical reactions.
		CO.2 Understand and explain Stereo isomerism in biphenyl compounds(Atropisomerism) and conditions for optical activity.
		CO.3 Classify heterocyclic compounds with nomenclature.
		CO.4 Synthesize and recall the medicinal uses of some heterocycliccompounds.
		CO.5 Write the reaction mechanisms of some named reactions.
		CO.6 Recall properties of organic compounds and prepare heterocyclic compounds
244AB	MEDICINAL CHEMISTRY-I	CO.1 Understand the chemistry of drugs with respect to their pharmacological activity
		CO.2 Understand the drug metabolic pathways, adverse effect andtherapeutic value of drugs
		CO.3 Understand the Biosynthesis and Metabolism of Neurotransmitters
		CO.4 Know the Structural Activity Relationship (SAR) of different classof drugs
		CO.5 Write the chemical synthesis of some drugs
		CO.6 Know the medicinal uses of some drugs
244AC	PHYSICAL PHARMACEUTICS-II	CO.1 Apply the principles of chemical kinetics in assigning expiry datefor Formulation
		CO.2 Demonstrate the rheological properties of dug molecules.
		CO.3 Demonstrate use of physicochemical properties in evaluation ofdosage forms.
		CO.4 Explain physical stability of emulsions and their preservation
		CO.5 Apply physicochemical properties of drug molecules in formulation research and Development.
		CO.6 Recall Classification of dispersed systems & their generalcharacteristics
244AD	PHARMACOLOGY-I	CO.1 Define concepts of general pharmacology and their importance
		CO.2 Apply the concepts of signal transduction in drug discovery & development; and to analyze and report adverse drug reactionsand drug interactions

		CO.3 Apply mechanism of drug action and its relevance in the treatmentof different ANS diseases.
		CO.4 Identify drug of choice in management of epilepsy
		CO.5 List out various neurotransmitters and their role in CNS Disorders
		CO.6 Apply basic pharmacological knowledge in the prevention andtreatment of various CNS diseases.
244AE	PHARMACOGNOSY AND PHYTOCHEMISTRY-I	CO.1 Describe basic concepts of pharmacognosy with emphasis on sources of drugs, their classification and quality control tests
		CO.2 Apprehend Cultivation, Collection, Processing and storage ofdrugs of natural origin
		CO.3 Elaborate historical development of plant tissue culture, types ofcultures.
		CO.4 Determine nutritional requirements, growth and applications ofplant tissue culture in pharmacognosy.
		CO.5 Discuss the role of Pharmacognosy and secondary metabolites inallopathy and traditional systems of medicine.
		CO.6 Comprehend biological source, chemical nature and uses of drugsof natural origin with emphasis on Plant Products like Primary metabolites, Proteins, Enzymes and Lipids.
24401	MEDICINAL CHEMISTRY-I LAB	CO.1 Synthesize various drugs and gain skills in synthetic organicchemistry
		CO.2 Synthesize various drug Intermediates.
		CO.3 Acquire the skills required for purification of organic Compoundsthrough Column Chromatography method.
		CO.4 Know the importance and methods to perform assay of variousdrugs
		CO.5 Determine Partition coefficient of drugs.
24402	PHYSICAL PHARMACEUTICS-II LAB	Determine Surface tension.
		CO.1 Determine of HLB number of a surfactant by saponificationmethod & know the acid base values
		CO.2 Determine viscosity of liquid using Ostwald's viscometer &know the viscosity of various liquids.
		CO.3 Determine viscosity of semisolids by using Brookfield viscometer& know the viscosity of various liquids.
		CO.4 Design Accelerated stability studies
24403	PHARMACOLOGY-I LAB	CO.1 Measure the effect of drug on Ciliary motility of frog oesophagus
		CO.2 Observe the effects of drugs on locomotor activity usingactophotometer
		CO.3 Expertise in common laboratory techniques such as blood

		withdrawal, serum separation and anesthesia used for animal studies
		CO.4 Expertise different routes of drug administration in rats and mice
		CO.5 Perform anxiolytic activity of drugs using rats and mice
24404	PHARMACOGNOSY AND PHYTOCHEMISTRY-I LAB	CO.1 Determine morphology, histology, extraction and detection ofdifferent powder crude drugs
		CO.2 Extract and isolate caffeine from tea
		CO.3 Carry out Isolation of herbal extraction by using TLC method
		CO.4 Perform Extraction and Detection of various volatile oils by TLC.
		CO.5 Perform Quality control tests of crude drugs.
24405	GENDER SENSITIZATION LAB	CO.1 Understand gender equality and also learn about the new laws thatprovide protection and relief to women.
		CO.2 Acquire knowledge on socialization of women and men and alsoabout the gender discrimination works in our society.
		CO.3 Develop the importance of women's invisible work and understand the relationship of gendered division of labour to society politics and economics.
		CO.4 Reflect critically on gender violence and basic dimensions of the biological, sociological, psychological and legal aspects of gender.
		CO.5 Develop a sense of appreciation of women in all walks of life.

III YEAR I SEMESTER

COURSE CODE	COURSE NAME	COURSE OUTCOME
245AA	MEDICINAL CHEMISTRY- II	CO.1 Analyze the chemistry of Anti histaminic and Anti neoplastic drugs with respect to their biological activity.
		CO.2 Work on the concepts of SAR of Anti-anginal, Diuretics and Anti-hypertensive Agents
		CO.3 Answer the Chemistry, Metabolism and SAR of Anti-arrhythmic and Anti-hyper lipidemic agents
		CO.4 Answer the Chemistry, Metabolism and Uses of Coagulant, Anticoagulants and Drugs used in Congestive Heart Failure.
		CO.5 Answer the Nomenclature, Stereochemistry, Degradation, Adverseeffects and therapeutic value of Drugs acting on Endocrine system
		CO.6 Gain knowledge on Classification, Mechanism of action, uses andsynthesis of Anti diabetic and Local Anesthetic agents.
245AB	INDUSTRIAL PHARMACY – I	CO.1 Analyze the pre-formulation characteristics of drug substance in formulation & development of various dosage forms.
		CO.2 Acquire knowledge on manufacturing considerations in development of tablets and liquid orals
		CO.3 Gain knowledge on formulation requirements and in process quality control tests for capsules and pellets with emphasis onspecial techniques.
		CO.4 Design a layout on parenteral and ophthalmic product with emphasis on evaluation studies.
		CO.5 Learn the fundamentals of cosmetics and learn about various skin and hair care products
		CO.6 List out the types of Parenteral Products, Formulation of injections, Containers and closures, Ophthalmic Preparations
245AC	PHARMACOLOGY-II	CO.1 Recall and explain pharmacology of drugs acting on cardiovascular System.
		CO.2 Enlist the drugs acting on hematopoietic system and able to explain pharmacology of drugs acting on urinary system.
		CO.3 Analyze the pharmacological action of autacoids and related drugs.
		CO.4 Apply the concepts of inflammatory mediators and their role in themanagement of inflammation.
		CO.5 Identify endocrine glands & treatment strategies in the management of endocrine imbalances.
		CO.6 Define the clinical significance of hormonal analogues and antagonists enumerate the types and application of bioassay.
24504	ENVIRONMENTAL SCIENCES	CO.1 Create awareness about natural resources available with an emphasis on the role of individual in conservation of energy.
		CO.2 Impart basic knowledge about the ecosystem and concepts of

		ecosystem
		CO.3 Acquire knowledge on biodiversity, concepts of biodiversity alongwith laws for the protection of biodiversity.
		CO.4 Self-motivate to participate in environmental protection againstdifferent types of pollution
		CO.5 Aware of all the rules and regulations and the punishments laid onviolation of laws pertaining to environmental protection
		CO.6 Strive to attain harmony with nature
245AD	PHARMACOGNOSY AND PHYTOCHEMISTRY – II	CO.1 Inculcate the knowledge on biogenesis of secondary metabolites inthe plant and utilization of radioactive isotopes in the investigation of Biogenetic studies
		CO.2 Comprehend different extraction methods at laboratory withemphasis on chemical nature of few crude drugs
		CO.3 Understand and explain different crude drugs under the categoryof tannins and Resins
		CO.4 Understand and explain different crude drugs under the categoryof glycosides and terpenoids
		CO.5 Isolate, Identify and analyze Phyto-constituents belonging toAlkaloids, Glycosides, Terpenoids and Resins
		CO.6 Obtain awareness on industrial production of phytoconstituents.
245AE	GENERIC PRODUCT DEVELOPMENT	CO.1 Learn the generic drug product development process, dosage form design and development, analytical method development and dossier approval process.
		CO.2 Knowledge of the students is enhanced with the clear information about the generic product development.
24501	INDUSTRIAL PHARMACY LAB	CO.1 Understand to Perform the pre-formulation parameters of drugsubstance
		CO.2 Formulate and evaluate tablets
		CO.3 Develop skills on filling and evaluation of capsules
		CO.4 Formulate and evaluate Parenteral
		CO.5 Evaluate materials used for packaging such as glass, plastic, rubber closures etc.
24502	PHARMACOLOGY -II LAB	CO.1 Measure the effect of drug on isolated frog heart
		CO.2 Observe the diuretic activity of drugs using rats and mice
		CO.3 Conduct DRC using frog rectus abdominus muscle by acetylcholine
		CO.4 Perform bioassay of different drugs on rats by matching method,interpolation method and four-point methods
		CO.5 Perform anti-inflammatory and analgesic activities on rats

24503	PHARMACOGNOSY AND PHYTOCHEMISTRY - II LAB	CO.1 Determine morphology, histology, extraction and detection of different powder crude drugs of Alkaloids
		CO.2 Extract and isolate caffeine from tea
		CO.3 Carry out isolation of herbal extraction by using TLC method
		CO.4 Carry out Extraction and Detection of various volatile oils by TLC.
		CO.5 Perform Quality control tests of crude drugs.
		CO.6 Determine morphology, histology, extraction and detection of different powder crude drugs of Glycosides

III YEAR II SEMESTER

COURSE CODE	COURSE NAME	COURSE OUTCOME
246AA	MEDICINAL CHEMISTRY – III	CO.1 Answer the Nomenclature, Stereochemistry, Degradation,Adverse effects and therapeutic value of Beta Lactam antibiotics, Aminoglycosides and Tetracyclines.
		CO.2 Work on the concepts of SAR of Macrolide, Quinoline and Biguanide antibiotics.
		CO.3 Analyze the chemistry of drugs with respect to their biological activity.
		CO.4 Determine Chemistry, Metabolism and SAR of Anti tubercular, Anti-viral, Qunilones and urinary tract ant infective agents.
		CO.5 Classify and understand Mechanism of action, uses and synthesis of Anti-fungal, Anti-protozal, Anti-helminthics andsulfonamides.
		CO.6 Apply different techniques on drug design.
246AB	PHARMACOLOGY III	CO.1 Enlist the different drugs used to treat various Respiratory and GIT disorders.
		CO.2 Analyze the general principles of chemotherapy and list the clinical uses, side effects of different antibiotics.
		CO.3 Enumerate the different therapeutic agents used to manage various diseases like tuberculosis, leprosy, malaria, etc.
		CO.4 Identify the drug of choice in the management of different viral and fungal infections.
		CO.5 Apply the chemotherapeutic approaches for the management of various infectious diseases.
		CO.6 Define the principles of toxicology and can list out the treatment options for various poisoning conditions.
246AC	HERBAL DRUG TECHNOLOGY	CO.1 Apply the fundamentals of herbal raw materials in biodynamic farming techniques.
		CO.2 Correlate the insights of nutraceuticals and herbal food interactions.
		CO.3 Improve knowledge of herbal formulation preparation and evaluation.
		CO.4 Explain the role of cosmetic excipients and building blocks in cosmetic formulation.
		CO.5 Demonstrate the regulations that applies to protection of traditional knowledge against infringement.
		CO.6 Describe the herbal drug industry's present and future prospects,as well as the components of Good Manufacturing Practice (GMP) for Indian medical systems.
	BIOPHARMACEUTICS AND	CO.1 Explain the concepts of biopharmaceutics and pharmacokinetics, factors affecting drug absorption, distribution and Clinical

246AD	PHARMACOKINETICS	significance of protein binding.
		CO.2 Acquire knowledge on basic metabolic pathways, renal excretion and protocols for bioequivalence studies.
		CO.3 Outline the dosage regimens of the drugs using pharmacokineticand biopharmaceutic parameters
		CO.4 Compute various pharmacokinetic parameters from plasma andurinary excretion data by applying compartment and non-compartment modeling.
		CO.5 Familiarize with two compartment open model and IV bolus Kinetics of multiple dosing and their significance.
		CO.6 Detect the causes of nonlinearity and compute Km and Vmax byMichaelis menton equation using graphical methods.
246AE	PHARMACEUTICAL QUALITY ASSURANCE	CO.1 Define the concepts of quality control and quality assurance andimplement the pharmacy guidelines in pharmaceutical industry
		CO.2 Work at the different areas of maintenance, purchase, stores ofraw materials and designs of the pharmaceutical premises
		CO.3 Describe QC tests for containers, closures and secondary packaging materials.
		CO.4 Work on testing and controlling are as, testing facilities on clinical laboratory studies according to GLP.
		CO.5 Document various records in pharmaceutical industries.
		CO.6 Calibrate and validate various analytical instruments like UV.
24601	MEDICINAL CHEMISTRY - III LAB	CO.1 Prepare Drugs and important intermediates.
		CO.2 Analyze the purity of drugs
		CO.3 Synthesize medicinally important compounds and intermediates by using microwave irradiation technique
		CO.4 Draw structures and reactions using chem draw software
		CO.5 Determine physicochemical properties such as logP, clogP, MR,Molecular weight, Hydrogen bond donors and acceptors for class of drugs.
24602	PHARMACOLOGY – III LAB	CO.1 Calculate the dose for different pharmacological experiments.
		CO.2 Evaluate the various novel compounds for their anti-ulceractivity.
		CO.3 Apply the concepts of pharmacological screening methods fordetermining the therapeutic effect of different drugs.
		CO.4 Estimate the serum biochemical parameters by using semi-auto-analyzer.
		CO.5 Apply several bio-statistic methods in experimental pharmacology.
24603	HERBAL DRUG TECHNOLOGY LAB	CO.1 Carry out phytochemical screening for crude drugs
		CO.2 Determine aldehyde, phenolic and alkaloid content in crudedrugs
		CO.3 Evaluate different excipients of natural origin

		CO.4 Incorporate and evaluate natural extract in shampoos and creams
		CO.5 Incorporate and evaluate natural extract in syrups, tablets andmixtures
24604	HUMAN VALUES AND PROFESSIONAL ETHICS	CO.1 Recall the importance of Values and Ethics in their personal lifeand professional life
		CO.2 Imbibe the students about the personal ethics by few Moralcontents and to implement in their lives
		CO.3 Analyze the role of Pharmacy in relation to other professions
		CO.4 Aware of their rights and responsibilities in work place and howto implement professional ethics
		CO.5 Know their rights and responsibilities as an employee, teammember and a global citizen
		CO.6 List the current scenarios like world summits, issues andglobalization

IV YEAR I SEMESTER

COURSE CODE	COURSE NAME	COURSE OUTCOME
247AA	INSTRUMENTAL METHODS OF ANALYSIS	CO.1 Describe concepts of UV & Visible Spectrophotometry andFluorimetry.
		CO.2 Describe the principle, instrumentation and applications of IRand Atomic absorption spectra.
		CO.3 Explain the Principles, Instrumentation and Applications of TLCand paper chromatography.
		CO.4 Explain the principles, instrumentation and applications ofelectrophorosis
		CO.5 Write the Principles, Instrumentation and Applications of HPLC and GC
		CO.6 Describe the principles, instrumentation and applications of Ion exchange and Gel Chromatographic Techniques and Affinity chromatography.
247AB	INDUSTRIAL PHARMACY-II	CO.1 Discuss the pilot plant and scale-up processes for pharmaceutical dosage forms, as well as the SUPACguidelines.
		CO.2 Categorize the different aspects of technology transfer involved from research and development to manufacture.
		CO.3 Comprehend and implement different responsibilities and regulatory requirements for drug approval
		CO.4 Communicate different laws and acts that regulate pharmaceutical industry in India and US
		CO.5 Explore the functions and responsibilities of regulatory agencies in drug approval.
		CO.6 Describe the structure and functions of the national and statelicensing authorities.
247AC	PHARMACY PRACTICE	CO.1 Organize the hospital according to the primary, secondary andTertiary Hospitals and their functioning.
		CO.2 Educate and implement various drug distribution methodsused in the hospital.
		CO.3 Understand and to be able to do patient counseling incommunity pharmacy
		CO.4 Apply Clinical review, Medication history management andpharmaceutical care in health care sector.
		CO.5 Organize the pharmacy stores, Drug information Centre andimportance of management
		CO.6 Carry out inventory control of pharmacy according to theneeds of the hospital.
247AD	NDDS	CO.1 Describe various approaches for the development of controlled drug delivery systems and application of polymers.
		CO.2 Summarize the concepts and formulation considerations of

		Microencapsulation, Mucoadhesive and Implantable drug delivery system.
		CO.3 Design and evaluate the Transdermal and Gastro Retentive Drug Delivery systems.
		CO.4 Explain the concepts of Nasopulmonary drug delivery systems.
		CO.5 Acquire the concepts, approaches and applications of TargetedDrug Delivery Systems.
		CO.6 Outline the concepts and applications of Ocular andIntrauterine Drug Delivery Systems.
247AF	PHARMACEUTICAL REGULATORY SCIENCE	CO.1 Explain the Importance of safety monitoring of Medicine &able to Detect and report adverse drug reactions.
		CO.2 Recall the Drug dictionaries and coding in pharmacovigilance.
		CO.3 Explain various Pharmacovigilance methods.
		CO.4 Evaluate statistical methods for medication safety during newdrug development process.
		CO.5 Explain the significance of altered Pharmacogenomics ofadverse drug reactions.
		CO.6 Analyze and assess the drug safety evaluation in specialpopulation
24701	INSTRUMENTAL METHODS OF ANALYSIS LAB	CO.1 Perform the analysis of compounds by colorimetry, UV andFlourimetry.
		CO.2 Determine absorption maxima of organic compounds
		CO.3 Estimate compounds by Flame photometry and nephloturbidimetry
		CO.4 Carry out the separation of compounds by paper, column andThin layer chromatography
		CO.5 Analyze the compounds by HPLC & GC
24702	PRACTICE SCHOOL	CO.1 Interact with executives to facilitate the process of learning byobservations and discussions duly aided by checklist.
		CO.2 Visit the hospitals and work on some case studies likecardiovascular, diabetes and chronic diseases.
		CO.3 Collect the data from different pharmacy shops related to the most prescribed medicines in that area, prescription patterns,medical audit.
		CO.4 Submit the detailed report, to the concerned organization aftersuccessful completion of 150 hours in the hospital.
		CO.5 Collect and analyze the regulatory affairs of some important cases filed by drug control officers to be analyzed and reported.
24703	INDUSTRIAL TRAINING	CO.1 Visit Industries and get exposed to various equipment's usedfor formulations/Preparations in industries.
		CO.2 Get exposure to basic facilities required for an industry.

		CO.3 Understand GMP/GLP of Industries by practically observingthem in industry.
		CO.4 Learn applications of theory which they have studied in theirsubject theoretically.
		CO.5 Develop presentation skills of what they have learnt.

IV YEAR II SEMESTER

COURSE CODE	COURSE NAME	COURSE OUTCOME
248AA	BIOSTATISTICS AND RESEARCH METHODOLOGY	CO.1 Define biostatistics, Statistics, measures of central tendency, measures of dispersion with emphasis on Karl pearson coefficientof correlation.
		CO.2 Perform parametric tests along with acquiring knowledge on theconcepts of Regression
		CO.3 Carry out non-parametric tests using specific tests like WilcoxinRank some test, Mann whitney test and friedman test
		CO.4 Design methodology of clinical trials using cohurt studies, observational studies, experimental studies with specialfocus on phases of clinical trials.
		CO.5 Operate MS EXCEL, SPSSR and MINITAB and Design ofexperiments.
		CO.6 Apply statistical techniques to design and carry out analysis ofexperiments like optimization software.
248AB	SOCIAL AND PREVENTIVE PHARMACY	CO.1 Discuss the concepts of Health, Prevention & control of diseases, food in relation to nutrition, poverty, personal hygiene and health.
		CO.2 Analyze the preventive & control measures for Communicable &Non-communicable Diseases.
		CO.3 Acquire knowledge on National Health Programs and itsobjectives.
		CO.4 Summarize the functioning and outcomes of National HealthPrograms.
		CO.5 Explain the concepts of various National health interventionprogram and Role of WHO in Indian National Program.
		CO.6 Extend the community services in rural, urban and school healthlike rural sanitation and health education programs.
248AC	PHARMACEUTICAL JURISPRUDENCE	CO.1 Define the standards of schedules to the act and rules of D& C Act, Conditions for grant of license and conditions of license formanufacture of drugs,
		CO.2 List out important schedules administrative agencies of D& C Act
		CO.3 Acquire knowledge on Pharmacy Act – 1948, Medicinal andToilet Preparation Act -1955,
		CO.4 Acquire knowledge on Narcotic Drugs and Psychotropic substances Act-1985 and Rules
		CO.5 Restate Salient Features of Drugs and magic remedies Act and itsrules, Prevention of Cruelty to animals Act-1960, National Pharmaceutical Pricing Authority
		CO.6 Acquire knowledge on Pharmaceutical Legislations, Code of

		Pharmaceutical ethics, Medical Termination of pregnancy act, Right to information Act and Intellectual Property Rights (IPR)
248AE	NANO TECHNOLOGY	CO.1 This course will provide an insight into the fundamentals of Nanoscience and Nanotechnology.
		CO.2. The course provides basics of nanostructures and different types of nanostructures.
		CO.3. It also provides information about different thin film deposition techniques and transport phenomena.
24801	PROJECT WORK	CO.1 Learn basic level of research like literature collection, literature review by visiting online journals and reading offline journals andbooks.
		CO.2 Learn to select an area of research for their project work keeping, in view of their subject of interest.
		CO.3 Get exposure to Experimental works beyond regular laboratorystudies in curriculum along with operation of equipment's.
		CO.4 Acquire knowledge on basics of all subjects in a nut shell andnew techniques in various departments of Pharmacy.
		CO.5 Learn techniques involved in documentation of results obtained,interpretation of results and thesis writing.
		CO.6 Learn presentation skills with emphasis on ppt preparation andcommunication skills.