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CHILKUR BALAJI COLLEGE OF PHARMACY

(Approved by AICTE, New Delhi, Govt of Telangana & Affiliated to JNT University, Hyderabad)
R.V.S. Nagar, Aziz Nagar (Post), Moinabad Road, Near: T.S.Police Academy
HYDERABAD – 500 075.

COURSE OUTCOMES OF B.PHARMACY (R17 Regulations)

COURSE OUTCOMES OF B. PHARMACY 1ST YEAR 1ST SEMESTER	
COURSE CODE:PS101	**COURSE NAME: HUMAN ANATOMY AND PHYSIOLOGY**
CO1	To understand the morphology, structure and functions of various organs of the human body
CO2	Describe various homeostatic mechanisms and their imbalances
CO3	To study the functions of peripheral nervous systems and endocrine systems
CO4	Identify various tissues of different systems of human body
COURSE CODE:PS102	**COURSE NAME: PHARMACEUTICAL ANALYSIS**
CO1	Gain knowledge on fundamentals of analytical chemistry
CO2	Helps to develop the fundamentals of various titrations
CO3	Integrate the knowledge of volumetric and electrochemical analysis
CO4	Comprehended details regarding minimization of errors
COURSE CODE:PS103	**COURSE NAME: PHARMACEUTICS 1**
CO1	Fundamental knowledge on various dosage forms
CO2	Idea on historical background and development of pharmacy
CO3	Acquainted with basics of different dosage forms, pharmaceutical incompatibility and pharmaceutical calculations.
CO4	Preparations of various conventional dosage forms
COURSE CODE:PS104	**COURSE NAME: PHARMACEUTICAL INORGANIC CHEMISTRY 1**

CO1	Understand the medicinal and pharmaceutical importance of inorganic compounds
CO2	Divulge on the sources of impurities and methods to determine the impurities in inorganic drugs and pharmaceuticals
CO3	Inculcate the knowledge of monographs of inorganic drugs and pharmaceuticals
CO4	Understanding the concept of assay of inorganic compounds
COURSE CODE: HS105	**COURSE NAME: COMMUNICATION SKILLS**
CO1	Understand the behavioral needs for a pharmacist to function effectively in the areas of pharmaceutical operation
CO2	Good verbal and nonverbal communications
CO3	Developing interview skills
CO4	Establish leadership qualities and essentials
COURSE CODE:BS106	**COURSE NAME: REMEDIAL BIOLOGY**
CO1	Understand basic components of anatomy and physiology of animals with special reference to humans
CO2	Know the classification and salient features of five kingdoms of life
CO3	Broaden the knowledge of morphology of plants.
CO4	Amplification of information on bodily functions
COURSE CODE:BS107	**COURSE NAME: REMEDIAL MATHEMATICS**
CO1	Know the theory and their application in pharmacy
CO2	Appreciate the important application of mathematics in pharmacy
CO3	Solve the problems by applying theory.
CO4	Understanding the concepts of partial fraction, logarithm, calculus, analytical geometry etc.
COURSE CODE:PS108	**COURSE NAME: HUMAN ANATOMY AND PHYSIOLOGY-I LAB**
CO1	To handling of compound microscope and memorize various animal tissues
CO2	To summarize the characteristics of different bones
CO3	Blood sampling and analyzing various components
CO4	Study the integumentary and special senses using specimens and models.

COURSE CODE:PS109	COURSE NAME: PHARMACEUTICAL ANALYSIS I LAB
CO1	Determination and assessment of various analytical compounds by using qualitative methods of analysis.
CO2	To perform the assay of various compounds along with standardization of titrant
CO3	Preparation and standardization by titrimetric analysis
CO4	To determine the normality by electroanalytical methods
COURSE CODE:PS110	**COURSE CODE: PHARMACEUTICS I LAB**
CO1	Understand the process of formulation by using different excipients and API
CO2	Perceive the solubility enhancement techniques
CO3	To formulate various dosage forms
CO4	To recall the principles used in the preparation of solid, liquid and semi solid dosage forms.
COURSE CODE:PS111	**COURSE NAME: PHARMACEUTICAL INORGANIC CHEMISTRY I LAB**
CO1	To estimate quality of inorganic pharmaceuticals
CO2	To execute limit test for various ions
CO3	Identification of inorganic compounds in pharmaceuticals
CO4	Preparation of inorganic pharmaceuticals
COURSE CODE: HS112	**COURSE NAME: COMMUNICATION SKILLS LAB**
CO1	To discriminate pronunciation of vowel and consonant sounds
CO2	To develop the interview handling skills and improve in email etiquette.
CO3	Pursue effective communication with advanced learning and presentation skills
CO4	Matriculate effective writing skills and listening comprehension.
COURSE CODE:BS113	**COURSE NAME: REMEDIAL BIOLOGY LAB**
CO1	To identify various plant parts and to organize their modifications
CO2	To determine blood group, blood pressure and tidal volume.
CO3	Detailed study of cell and its inclusions.
CO4	Learning various aspects of microscopic studies.

COURSE OUTCOMES OF B. PHARMACY 1ST YEAR 2ND SEMESTER

COURSE CODE:PS201	**HUMAN ANATOMY AND PHYSIOLOGY II**
CO1	Describe the gross morphology, structure and functions of various organs of the human body
CO2	Perform Hematological tests like blood cell count, hemoglobin estimation and record blood pressure, heart rate, pulse and respiratory volume.
CO3	Appreciate the inter linked mechanisms in the maintenance of homeostasis of human body
COURSE CODE:PS202	**PHARMACEUTICAL ORGANIC CHEMISTRY I**
CO1	Confirm the identification of organic compounds
CO2	Put down the structure, name and type of isomerism of organic compounds
COURSE CODE:BS203	**BIOCHEMISTRY**
CO1	Recognize the catalytic role of enzymes, importance of enzyme inhibitors in design of new drugs, therapeutic and diagnostic applications of enzymes.
CO2	Understand the genetic organization of mammalian genome and functions of DNA in the synthesis of RNA and proteins.
COURSE CODE:BS204	**PATHOPHYSIOLOGY**
CO1	Narrate the etiology and pathogenesis of the selected disease states.
CO2	Mention the complications of the diseases.
COURSE CODE:CS205	**COMPUTER APPLICATIONS IN PHARMACY**
CO1	Be familiar with various types of applications of computers in pharmacy
CO2	Well acquainted with various applications of data bases in pharmacy
COURSE CODE:BS206	**ENVIRONMENTAL SCIENCES**
CO1	Create the awareness about environmental problems among beginners
CO2	Transmit basic knowledge about the environment and its allied problems
COURSE CODE:BS209	**BIOCHEMISTRY LAB**
CO1	To study the enzymatic hydrolysis of starch and study the effect of temperature on salivary amylase activity

CO2	Determination of blood creatinine, blood sugar, serum total cholesterol.
COURSE CODE:CS210	**COMPUTER APPLICATIONS IN PHARMACY LAB**
CO1	To design a questionnaire using a word processing package to gather information about a particular disease
CO2	To create mailing labels using label wizard, generating label in MS word
COURSE CODE:PS207	**HUMAN ANATOMY AND PHYSIOLOGY II LAB**
CO1	To assess the knowledge on family planning, pregnancy diagnostic tests, tissues of vital organs and gonads
CO2	To analyze the function of cranial nerves by various sensory and motor functions
COURSE CODE:PS208	**PHARMACEUTICAL ORGANIC CHEMISTRY LAB**
CO1	To explain qualitative analysis and preparation of pharmaceutical organic compounds
CO2	To find the presence of several functional groups in pharmaceutical compounds
COURSE OUTCOMES OF B.PHARMACY 2ND YEAR 1ST SEMESTER	
COURSE CODE:PS301	**PHARMACEUTICAL ORGANIC CHEMISTRY II**
CO1	To gain knowledge on structure and medicinal uses of pharmaceutical organic compounds.
CO2	To estimate the analytical constants of fats and oils.
CO3	Explanation of reactivity and stability of organic compounds.
CO4	In detailed study of named reactions and structural orientation.
COURSE CODE:PS302	**PHYSICAL PHARMACEUTICS I**
CO1	To know the principles of chemical kinetics and to use them in assigning expiry date for formulation.
CO2	Appreciate physicochemical properties of drug molecules in formulation research and development.
CO3	To get a better insight into various areas of formulation and development and stability studies of pharmaceuticals.
CO4	Understand various physic-chemical properties of drug molecules in the designing of dosage forms

COURSE CODE:BS303	**PHARMACEUTICAL MICROBIOLOGY**
CO1	To know the microbiological standardization of pharmaceuticals.
CO2	Understand methods of identification, cultivation and preservation of various microorganisms
COURSE CODE: PC304	**PHARMACEUTICAL ENGINEERING**
CO1	To appreciate various preventive methods used for corrosion control in pharmaceutical industry
CO2	To understand the material handing techniques
COURSE CODE:PS305	**PHARMACEUTICAL ORGANIC CHEMISTRY LAB**
CO1	To determine the purity of fats and oils by acid value, saponification value and iodine value
CO2	To gain knowledge on different recrystallisation and steam distillation techniques
COURSE CODE:PS306	**PHYSICAL PHARMACEUTICS I LAB**
CO1	To deduce the HLB value and critical micellar concentration of surfactant
CO2	To determine stability constant and donor acceptor ratio of cupric glycine complex by PH titration method
COURSE CODE:BS307	**PHARMACEUTICAL MICRO BIOLOGY LAB**
CO1	To isolate pure culture of microorganisms by multiple streak plate techniques and other techniques.
CO2	To demonstrate various staining methods/simple gram staining and acid

	fast staining
COURSE CODE:PC308	**PHARMACEUTICAL ENGINEERING LAB**
CO1	To verify the laws of size reduction using ball mill and determining kicks, Rittingers, bonds coefficients, power requirements and critical speed of ball mill
CO2	To determine moisture content loss on drying and construct drying curves for calcium carbonate and starch.
COURSE OUTCOMES B.PHARMACY 2ND YEAR 2ND SEMESTER	
COURSE CODE:PS401	**PHARMACEUTICAL ORGANIC CHEMISTRY III**
CO1	To explain stereo isomerism in biphenyl compounds and conditions for optical activity.
CO2	To identify medicinal uses, their applications of organic compounds
COURSE CODE:PC402	**MEDICINAL CHEMISTRY I**
CO1	To explain the physical properties stearic aspects of drugs and their metabolic pathways
CO2	To understand the chemistry of drugs with respect to their pharmacological activity
COURSE CODE:PS403	**PHYSICAL PHARMACEUTICS**
CO1	To be familiar with the principles of chemical kinetics and use them in assigning expiry date for formulation
CO2	To deliberate the importance of zeta potential in stabilization of disperse systems
COURSE CODE:PC404	**PHARMACOLOGY I**
CO1	Recognize the correlation of pharmacology with other biomedical sciences
CO2	Apply the basic pharmacological knowledge in the prevention and treatment of various diseases.
COURSE CODE: PC405	**PHARMACOGNOSY AND PHYTO CHEMISTRY**
CO1	To illustrate students about cultivation, collection, processing and storage of crude drugs

CO2	To elaborate the application of advanced technologies of polyploid, mutation and hybridization in medicinal plants
COURSE CODE: PC406	**MEDICINAL CHEMISTRY LAB**
CO1	To perform assay of various drugs
CO2	To prepare various drugs and metabolites
COURSE CODE: PS407	**PHYSICAL PHARMACEUTICS LAB II**
CO1	Determine the surface tension of liquids by drop count and drop weight method
CO2	Determination of sedimentation volume with effect of different suspending agents and effect of concentration of suspending agents
CO3	Determination of Freundlich and Langmuir constants using activated charcoal
COURSE CODE: PC408	**PHARMACOLOGY I LAB**
CO1	To recall the instruments used in experimental pharmacology
CO2	To recall the instruments used in experimental pharmacology
CO3	To examine the effect of hepatic microsomal enzyme inducers on the phenobarbitone sleeping time in mice and effect of skeletal muscle relaxants using rotarod apparatus
COURSE CODE: PC409	**PHARMACOGNOSY AND PHYTOCHEMISTRY I LAB**
CO1	Examination of crude drugs by chemical tests.
CO2	To determine number of starch grains by lycopodium spore method
COURSE CODE:MC400	**GENDER SENSITIZATION LAB**
CO1	To manifest the students to debate on the politics and economics of work
CO2	To come up with a critical perspective on the socialization of men and women.
COURSE OUTCOMES OF B.PHARMACY 3RD YEAR 1ST SEMESTER	
COURSE CODE:PS501	**MEDICINAL CHEMISTRY II**
CO1	To understand the chemistry of drugs with respect to their pharmacological activity
CO2	To study the chemical synthesis of selected drugs

COURSE CODE:PS502	**INDUSTRIAL PHARMACY I**
CO1	To outline the objectives and applications of preformulation studies in the development and stability of dosage forms
CO2	To summarize formulation, manufacturing and evaluation of cosmetic preparations, pharmaceutical aerosols and appraise the science of packaging materials.
COURSE CODE:PS503	**PHARMACOLOGY II**
CO1	To predict principles of bioassay and to construct the bioassay methods of various compounds
CO2	To identify the role of autocoids and related drugs
COURSE CODE:PS504	**PHARMACOGNOSY AND PHYTOCHEMISTRY II**
CO1	To carry out isolation and identification of phytoconstituents
CO2	To know the modern extraction techniques, characterization and identification of the herbal drugs and phytoconstituents
COURSE CODE:PS505	**GENERIC PRODUCT DEVELOPMENT**
CO1	To enhance the knowledge of students with clear information about the scale up studies
CO2	To learn the analytical method development and dossier approval process
COURSE CODE:PS509	**INDUSTRIAL PHARMACY LAB**
CO1	To illustrate the formulation and evaluation of tablets
CO2	To evaluate glass containers as per pharmacopoeia specifications
COURSE CODE:PS510	**PHARMACOLOGY II LAB**
CO1	To determine PA2 and PD values of drugs using rat anococcygeous muscle by schilds plot method
CO2	To predict anti inflammatory and analgesic activity of drugs
COURSE CODE:PS511	**PHARMACOGNOSY AND PHYTOCHEMISTRY II LAB**
CO1	An exercise involving isolation and detection of active principles
CO2	To remember the wide variety of the crude drugs and their sources by morphological characteristics.

COURSE CODE:MC500	ENVIRONMENTAL SCIENCES
CO1	Create the awareness about environmental problems among learners
CO2	Acquire skills to help the concerned individuals in identifying and solving environmental problems
COURSE OUTCOMES OF B. PHARMACY 3RD YEAR 2ND SEMESTER	
COURSE CODE:PS601	**MEDICINAL CHEMISTRY III**
CO1	To discuss the approaches in drug design including QSAR, pharmacophore modelling,docking and combinatorial chemistry
CO2	Understand the importance of drug design and different techniques of drug design.
COURSE CODE:PS602	**PHARMACOLOGY III**
CO1	Comprehend the principles of toxicology and treatment of various poisonings and appreciate correlation of pharmacology with related medical sciences
CO2	Appreciate the correlation of pharmacology with related medical sciences
CO3	Understand the mechanism of drug action and its relevance in the treatment of different infectious diseases
COURSE CODE:PS603	**HERBAL DRUG TECHNOLOGY**
CO1	To illustrate the scope and future prospects of the herbal drug industry
CO2	To appreciate patenting of herbal drugs and GMP
COURSE CODE:PS604	**BIOPHARMACEUTICS AND PHARMACOKINETICS**
CO1	Critically evaluate biopharmaceutic studies involving drug product equivalency
CO2	Use plasma data and derive the pharmacokinetic parameters to describe the process of drug absorption, distribution, metabolism and elimination.
COURSE CODE:PS605	**PHARMACEUTICAL QUALITY ASSURANCE**
CO1	Understand the aspects of cGMP in pharmaceutical industry
CO2	Appreciate the importance of documentation

COURSE CODE:PS609	**MEDICINAL CHEMISTRY III LAB**
CO1	Acknowledge the principles underlying the preparation of drugs and intermediates
CO2	Determination of physicochemical properties using drug design software and drug likeliness screening.
COURSE CODE:PS610	**PHARMACOLOGY III LAB**
CO1	To demonstrate the effect of gastro intestinal motility and effect of agonist/antagonist on Guinee pig ileum
CO2	To predict the pharmacokinetic parametres and adapt the biostatistics methods in experimental pharmacology
COURSE CODE:PS611	**HERBAL DRUG TECHNOLOGY LAB**
CO1	To determine aldehyde, phenolic and total alkaloidal content
CO2	To perform preliminary phytochemical screening of crude drugs.
COURSE CODE:MC600	**HUMAN VALUES AND PROFESSIONAL ETHICS**
CO1	To enable the students to imbibe and internalize the values and ethical behavior in the personal and professional lives.
CO2	Learn the rights and responsibilities as an employee, team member and a global citizen
COURSE OUTCOMES B.PHARMACY 4TH YEAR 1ST SEMESTER	
COURSE CODE:PS701	**INSTRUMENTAL METHODS OF ANALYSIS**

CO1	To elaborate various principles, theory and instruments employed for the characterization and analysis of drugs.
CO2	To gain knowledge on interaction of electromagnetic radiation with matter
CO3	To build the analytical understanding at the level of atom, group and molecular structure of organic and inorganic compounds with different functional groups and their application in pharmacy.
CO4	Perform qualitative and quantitative analysis of drugs using various analytical instruments.
COURSE CODE:PS702	**INDUSTRIAL PHARMACY II**
CO1	To acknowledge the approval process and regulatory requirements for drug products.
CO2	To outline various aspects of technology transfer involved from R&D to production.
CO3	To know different laws and acts that regulate pharmaceutical industry in India and US.
CO4	To notice the process of pilot plant and scale up of pharmaceutical dosage forms.
COURSE CODE:PS703	**PHARMACY PRACTICE**
CO1	To appreciate the pharmacy stores management and inventory control.
CO2	To categorize and evaluate the role of hospital pharmacist in pharmacy and therapeutic committee and drug information services.
CO3	Drug therapy monitoring-medication chart review, clinical review, pharmacist intervention and pharmaceutical care.
CO4	Rational use of common over the counter medications.
COURSE CODE:PS704	**NOVEL DRUG DELIVERY SYSTEMS**
CO1	To understand the criteria for selection of drugs and polymers for the development of novel drug delivery systems.
CO2	Drug delivery systems formulation and evaluation.
CO3	To illustrate the principles and fundamentals of drug targeting in the design of site specific drug delivery systems.
CO4	Various approaches for the development of controlled drug delivery systems.

COURSE CODE:PS705	PHARMACEUTICAL MARKETING
CO1	Provide an understanding of marketing concepts and techniques.
CO2	Application of marketing concepts in the pharmaceutical industry.
CO3	Overview of Drug price control order and National pharmaceutical pricing authority.
CO4	Product decisions, product life cycle and product portfolio analysis of products in pharmaceutical industry.
COURSE CODE:PS706	**PHARMACEUTICAL REGULATORY SCIENCE**
CO1	To know the regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals.
CO2	To understand the regulatory approval process and their registration in Indian and international markets.
CO3	To learn the process of drug discovery and development.
CO4	Developing, managing, and monitoring of clinical trial protocols.
COURSE CODE:PS707	**PHARMACOVIGILANCE**
CO1	Study of history and development of pharmacovigilance
CO2	Developing international standards for classification of diseases and drugs.
CO3	Advancements in adverse drug reaction reporting systems and communication in pharmacovigilance.
CO4	Overview on adverse drug reactions.
COURSE CODE:PS708	**QUALITY CONTROL AND STANDARDIZATION OF HERBALS**
CO1	Be familiar with WHO guidelines for quality control of herbal drugs
CO2	Know the regulatory approval process and their registration in Indian and international markets.
CO3	Be acquainted with quality assurance in herbal drug industry.
CO4	Appreciate EU and ICH guidelines for quality control of herbal drugs.
COURSE CODE:PS709	**INSTRUMENTAL METHODS OF ANALYSIS LAB**
CO1	To recall the principle involved in spectroscopy and importance of absorption maximum in the estimation of organic compounds
CO2	To estimate the amount of sodium and potassium ions by flame photometry.

CO3	To estimate dextrose and sulphanilamide by calorimetry.
CO4	Conduct demo experiments on HPLC and GC
COURSE CODE:PS710	**PRACTICE SCHOOL**
CO1	To realize the importance of realistic learning through practice in various domains such as community pharmacy, drug testing and manufacturing, preclinical testing and clinical practice.
CO2	To get familiarize with the aspects of realistic practice in the domain interest.
CO3	Collect and analyze some important cases filed by drug control officers.
CO4	Collect the data related to the most important prescribed medicines in that area, prescription patterns, medical audit and submit the report.
COURSE CODE:PS711	**INDUSTRIAL TRAINING**
CO1	To expose the students to real work of environment experience.
CO2	To gain the knowledge through hands on observation and job execution.
CO3	To develop skills in work ethics, communication and management.
CO4	Application of theoretical knowledge to practice and realize their actual potential.
COURSE OUTCOMES OF B. PHARMACY 4TH YEAR 2ND SEMESTER	
COURSE CODE:PS801	**BIOSTATISTICS AND RESEARCH METHODOLOGY.**
CO1	To understand the basic aspects of statistics such as central tendency, dispersion and correlation.
CO2	To build the ability to perform various parametric and nonparametric statistical tests and to draw graphs and plots based on type of data.
CO3	To design and analyze the experiments based on factorial design and response surface methodology.
CO4	Know the operation of MS Excel, SPSS, R and MINITAB, Design of experiments.
COURSE CODE: PS802	**SOCIAL AND PREVENTIVE PHARMACY**
CO1	To create awareness about various preventive measures of stated communicable and non-communicable diseases.
CO2	To elaborate various vaccines under National immunization program and their schedule.

CO3	Have a critical way of thinking based on current healthcare development.
CO4	Acquire high consciousness of current issues related to health and pharmaceutical problems with in the country and worldwide.
COURSE CODE:PS803	**PHARMACEUTICAL JURISPRUDENCE**
CO1	To relate the significance of drugs and cosmetics act 1940 and its rules 1945 in relation to import, manufacture, sale and distribution of drugs.
CO2	To discuss the salient features of Pharmacy act 1948, Drugs and Magic Remedies act, Prevention of Cruelty to Animal's act and Drug Price Control Order.
CO3	To be familiarized with the code of ethics during the pharmaceutical practice and Pharmaceutical Services in Trade and Profession.
CO4	To understand the pharmaceutical legislations and their implications in the development and marketing of Drugs and Pharmaceuticals.
COURSE CODE:PS804	**COMPUTER AIDED DRUG DESIGN**
CO1	To perceive the role of drug design in drug discovery process.
CO2	To understand the concept of QSAR and DOCKING.
CO3	To design new drug molecules using molecular modelling software.
CO4	To know the various stages of drug discovery and development and get well acquainted with analog based drug design.
COURSE CODE:PS805	**NANO TECHNOLOGY**
CO1	Be able to select the right kind of materials In the synthesis of nano materials.
CO2	To develop nano formulations with appropriate technologies.
CO3	To perform characterization, drug release and stability studies of nano materials
CO4	Accustomed with nano technology products used for invitro diagnostics and their applications in imaging.
COURSE CODE:PS806	**EXPERIMENTAL PHARMACOLOGY**
CO1	Appraise the regulations and ethical requirements for the usage of experimental animals.
CO2	Epitomize various animals and newer screening methods used in drug discovery.

CO3	Be aware of research methodology to be followed in biostatistical data interpretation of the assays.
CO4	To recall the techniques for blood collection and common routes of drug administration in laboratory animals.
COURSE CODE:PS807	**ADVANCED INSTRUMENTATION TECHNIQUES**
CO1	To elaborate various principles and procedures employed in radio immune assay and extraction techniques.
CO2	To maximize knowledge on characterization and estimation of drugs by spectroscopical and thermal techniques.
CO3	To impart advanced knowledge on the principles and instrumentation of chromatographic hyphenated techniques.
CO4	Emphasize on theoretical and practical knowledge on modern analytical instruments used for drug testing.
COURSE CODE:PS808	**PROJECT WORK**
CO1	Challenge's students to think beyond boundaries of the class room.
CO2	Help them to develop the skills, behavior and confidence necessary for success.
CO3	Describe the assessment that evaluates content knowledge as well as additional skills like problem solving and innovation.
CO4	To assess work quality, understanding and participation from the moment students begin to work.

COURSE OUTCOMES OF B.PHARMACY (R16 Regulations)

COURSE OUTCOMES OF B. PHARMACY 1ST YEAR 1ST SEMESTER	
COURSE CODE:BS101	**COURSE NAME: REMEDIAL MATHEMATICS**
CO1	Application of basics of mathematics in pharmaceutical calculations
CO2	Application of determinants to solve simultaneous equations
CO3	Integrations of trigonometric functions
CO4	Formation of differential equation of first order and first degree
COURSE CODE:BS102	**COURSE NAME: REMEDIAL BIOLOGY I**
CO1	To know about classification and some aspects of physiology of frogs and animals
CO2	Study the types of tissues, their functions and tissue systems
CO3	Knowledge on histology of root, stem, bark, leaf, flower, fruit and seed
CO4	Study systemic position and classification of families like Umbelliferae, Apocyanaceae and Liliaceae
COURSE CODE:PS103	**COURSE NAME: DISPENSING AND GENERAL PHARMACY**
CO1	Should be familiar with the hospital pharmacy organization and drug distribution procedures
CO2	Know about storage, incompatibilities and patient related factors
CO3	Aware of principles involved and procedures adopted in dispensing of liquid, semisolid dosage forms
CO4	Comprehensive knowledge on pharmaceutical ethics and ethical guidelines for retail pharmacist, manufacturing pharmacist and pharmaceutical researches
COURSE	**COURSE NAME: ANATOMY, PHYSIOLOGY, HEALTH**

CODE:PS104	EDUCATION I
CO1	Cognition on the structure and functions of various organs of human bodies and mechanisms in maintenance of normal functioning
CO2	Physiology of muscle contraction and physiological properties of skeletal muscles
CO3	Insight on basic anatomy, physiology and conduction system of heart, blood vessels and circulation
CO4	Brief outline of communicable diseases, demography and family planning
COURSE CODE:BS105	**PHARMACEUTICAL ORGANIC CHEMISTRY I**
CO1	Includes detailed study on the mechanisms involved in various reactions
CO2	Understand the synthesis of higher organic compounds
CO3	Isomerism, relative and ring stabilities of cyclohexane
CO4	Insight on stability and addition reactions of conjugated alka dienes
COURSE CODE: HS106	**PROFESSIONAL COMMUNICATION IN ENGLISH**
CO1	Includes skill development, fostering ideas and practicing language skills.
CO2	Use English language effectively in spoken and written forms.
CO3	Comprehend the given texts and respond appropriately.
CO4	Communicate confidently in formal and informal contexts.
COURSE CODE:PS107	**DISPENSING AND GENERAL PHARMACY LAB**
CO1	Includes dispensing of prescriptions of mixtures, solutions, emulsions, creams etc.
CO2	Dispensing of prescriptions involving adjustment of tonicity.
CO3	Categorization and storage of pharmaceutical products based on legal requirements of labelling and storage.
CO4	Dispensing procedures involving pharmaceutical calculations, pricing of prescriptions and dosage calculations for pediatric and geriatric patients.
COURSE CODE:PS108	**COURSE NAME: ANATOMY, PHYSIOLOGY, HEALTH EDUCATION I LAB**
CO1	Estimation of haemoglobin in blood, bleeding time and clotting time
CO2	Determination of vital capacity

CO3	Study of special senses with the help of charts and models
CO4	Recording of body temperature, pulse rate and blood pressure
COURSE CODE:BS109	**PHARMACEUTICAL ORGANIC CHEMISTRY I LAB**
CO1	Systematic qualitative analysis of monofunctional organic compounds
CO2	Preparation of organic compounds each involving a specific organic reaction
CO3	Determination of melting point and boiling point by Thiels method
CO4	Recrystallization of organic compounds
COURSE CODE:BS102	**COURSE NAME: REMEDIAL BIOLOGY I LAB**
CO1	Introduction to simple and compound microscope and their handling
CO2	Morphological study of various parts of plants
CO3	Study of structure of human parasites and insects mentioned with the help of specimen
CO4	Microscopic examination of specimen slides related to plant and animal tissues
COURSE OUTCOMES OF B. PHARMACY 1ST YEAR 2ND SEMESTER	
COURSE CODE:BS201	**PHARMACEUTICAL INORGANIC CHEMISTRY**
CO1	Know the classification of inorganic pharmaceuticals based upon their applications and therapeutic uses
CO2	Gain knowledge on electrolytes, acid base regulators and dialysis fluids
CO3	Detailed study of gastro intestinal agents, laxatives and mineral nutrients
CO4	Understand different categories of pharmaceutical aids and topical agents
COURSE CODE:BS202	**PHARMACEUTICAL ORGANIC CHEMISTRY II**
CO1	Understand the basic principles and mechanisms of different types of organic reactions
CO2	Detailed study of synthesis of higher organic compounds
CO3	Study the nomenclature of various organic compounds

CO4	Understand the concept of intermolecular association and stability of carboxylate ion
COURSE CODE:PS203	**PHYSICAL PHARMACY I**
CO1	Know the physical properties of molecules
CO2	Thorough knowledge on phase equilibria and phase rule
CO3	Aware of buffers, buffered isotonic solutions and methods of adjusting tonicity
CO4	Understand the importance of physical properties of molecules in formulation development
COURSE CODE:BS204	**STATISTICAL METHODS AND COMPUTER APPLICATIONS**
CO1	Recognize the importance of Biostatistics in pharmacy
CO2	Know the basic concepts of sampling and quality control
CO3	Knowledge on calculation of statistical parameters using excel, working with texts and graphics
CO4	Aware of database management systems and structured query language
COURSE CODE:PS205	**COURSE NAME: ANATOMY, PHYSIOLOGY, HEALTH EDUCATION II**
CO1	Impart fundamental knowledge on the structure and functions of human body
CO2	Enhance the understanding of mechanism of action of drugs on various body systems
CO3	Knowledge on interlinked mechanisms in the maintenance of homeostasis of human body
CO4	Know the basic principles of cell injury, adaptation and process of inflammation
COURSE CODE:BS206	**PHARMACEUTICAL INORGANIC CHEMISTRY II LAB**
CO1	Preparation and purification of different compounds
CO2	Perform identification test as per Indian pharmacopeia
CO3	Determine the impurities qualitatively by performing test for purity
CO4	Analyze the purity of compounds quantitatively by performing assay
COURSE CODE:BS207	**STATISTICAL METHODS AND COMPUTER APPLICATIONS LAB**

CO1	Know the graphical representation of data with the help of calculators and software programs
CO2	Program to calculate simple and complex arithmetic expressions
CO3	Programs using loops and nested loops and simple programs using arrays
CO4	Well versed with Software packages like MS WORD, EXCEL, ACCESS and POWERPOINT
COURSE CODE:PS208	**PHYSICAL PHARMACY I LAB**
CO1	Calculation and determination of % composition by capillary flow method
CO2	Molecular weight determination by Landsberger method
CO3	Calibration of pH meter
CO4	Know the effect of dielectric constant on drug solubility
COURSE OUTCOMES OF B. PHARMACY 2ND YEAR 1ST SEMESTER	
COURSE CODE:PS301	**PHARMACEUTICAL ORGANIC CHEMISTRY III**
CO1	Discussion on structural and stereochemical aspects and chemistry of organic compounds
CO2	Good command over evaluation and analyzing the chemistry of organic compounds
CO3	Study and application of stereochemistry of organic compounds
CO4	Detailed study of mechanisms and applications invoved in name reactions
COURSE CODE:PS302	**PHARMACEUTICAL UNIT OPERATIONS I**
CO1	Understand the concepts of flow of fluids
CO2	Understand the safety factors and possess a sound knowledge on different unit operations
CO3	To be aware of different laws related to distillation
CO4	Be familiar with industrial hazards and their safety precautions
COURSE CODE:PS303	**HOSPITAL AND COMMUNITY PHARMACY**
CO1	Familiar with hospital pharmacy organization, incompatibilities and patient related factors
CO2	Appreciate the practice-based research methods

CO3	Know the manufacturing practices of various formulations in hospital setup
CO4	Provide unbiased drug information to the doctors
COURSE CODE:PS304	**PHARMACOGNOSY I**
CO1	Know the medicinal and pharmaceutical importance of drugs obtained from natural sources
CO2	Acquire the knowledge on crude drugs by studying them under a suitable pharmacognostic scheme
CO3	Aware of different sources of crude drugs, cultivation aspects of medicinal and aromatic plants
CO4	Appreciate the role of crude drugs as excipients in various pharmaceutical dosage forms
COURSE CODE:PS305	**PHARMACEUTICAL ANALYSIS**
CO1	Knowledge on computation of analytical results, calibration of analytical equipment used in volumetric analysis
CO2	Study of separations and determinations involving different chromatographic techniques
CO3	Working principles and applications of Flame photometry, Refractometry, Polarimetry
CO4	Different physical and chemical methods of determination of moisture content
COURSE CODE:PS306	**PHARMACEUTICAL ORGANIC CHEMISTRY II LAB**
CO1	To carry out Systematic analysis of organic binary mixtures

CO2	Synthesize some simple heterocyclic compounds from parent compounds
CO3	To know the molecular rearrangements occurring in some named reactions
COURSE CODE:PS307	**PHARMACOGNOSY I LAB**
CO1	To recall the materials required for microscopic work and preparation of histological slides
CO2	To identify cell contents in plant materials by microscopical and microchemical tests
CO3	Measure the dimensions of cells and cell contents using camera lucida
CO4	To detect carbohydrates and lipids by chemical tests
COURSE CODE:PS308	**PHARMACEUTICAL ANALYSIS I LAB**
CO1	To perform assay of pharmaceutical compounds based on chemical methods
CO2	To identify amino acids and alkaloids by chromatography
CO3	To determine ions by flame photometry
CO4	To determine refractive index of liquids by Abbe refractometer
COURSE CODE:MC309ES	**ENVIRONMENTAL STUDIES**
CO1	Understand the importance of ecological balance for sustainable development
CO2	Know the impact of development activities and mitigation measures
CO3	Aware of environmental policies and regulations
CO4	Develop technologies on the basis of ecological principles which help in sustainable development
COURSE OUTCOMES OF B. PHARMACY 2ND YEAR 2ND SEMESTER	
COURSE CODE:PS401	**PHARMACEUTICAL UNIT OPERATIONS II**
CO1	Know the basic concepts of phase equilibria, factors affecting evaporation and types of evaporators
CO2	To be familiar with concepts of size reduction and types of mills
CO3	To be well acquainted with theory of mixing and types of mixers

CO4	Understand the concepts of size separation and equipment's used for size separation
COURSE CODE:BS402	**BIOCHEMISTRY**
CO1	Understand the classification of enzymes and co enzymes, their structure and mechanism of action
CO2	Know the concept of free energy and laws of thermodynamics
CO3	Recall the biochemical organization of cell and molecular constituents of membrane
CO4	Know the biochemistry of carbohydrates and proteins
COURSE CODE:PS403	**PHARMACEUTICAL JURISPRUDENCE**
CO1	Familiarization with all the legal tenets and enforceable in the country, besides pharmaceutical ethics and policies.
CO2	Brief review on pharmaceutical legislations.
CO3	Be aware of salient features of WTO and Indian patents act 1970.
CO4	Elaborate study of pharmacy act and drugs and cosmetics act 1940 and rules 1945.
COURSE CODE:PS404	**PHYSICAL PHARMACY II**
CO1	know the influence of temperature and other factors on rate of reactants.
CO2	Aware on formulation, evaluation and stability aspects on coarse dispersions. 2
CO3	Study the working of various visco meters in the determination of viscosity.
CO4	Know the methods to determine surface area, particle size and surface area of particles.
COURSE CODE:HS405	**INTELLECTUAL PROPERTY RIGHTS**
CO1	Know the background, salient features and impact of international conventions.
CO2	Aware of patent filing procedures under PCT, non infringement techniques and design around strategies.
CO3	Provide clear information about the salient features of Indian patents act 1999.

CO4	Know the opposition, regrant opposition and post grant opposition of patents.
COURSE CODE:PS405	**HERBAL DRUG TECHNOLOGY**
CO1	Be informed with methods of preparation and evaluation of herbal solid, liquid and semisolid dosage forms.
CO2	Reconcile with different companies manufacturing with different herbal extracts, standardized extracts and claims regarding their uses.
CO3	Have good command on processes and equipment's used in extraction of herbal constituents.
CO4	Command on different pharmaceutical excipients, their uses and their storage conditions.
COURSE CODE:BS405	**GREEN CHEMISTRY**
CO1	Emphasis about the chemicals and solvents which are eco friendly.
CO2	Detailed study of various catalytic reagents used in synthesis of pharmaceutical products.
CO3	Know the significance and importance and principles of green chemistry.
CO4	Be conversant with microwave synthesis
COURSE CODE:BS407	**BIOCHEMISTRY LAB**
CO1	To prepare standard buffers and measure pH.
CO2	To perform separation of lipids by TLC.
CO3	Conduct tests for identification of carbohydrates, amino acids and lipids.
CO4	To estimate the effect of temperature on the activity of alpha amylase.
COURSE CODE:PS408	**PHYSICAL PHARMACY LAB**
CO1	To determine the viscosity by Ostwald and Brookfield viscometer.
CO2	To demonstrate preparation of micro and multiple emulsions, zeta potential.
CO3	To determine flow properties of powders.
CO4	Microscopic size analysis, plotting of graphs, calculation of geometric mean and diameter of powders.

COURSE CODE:MC409HS	GENDER SENSITIZATION LAB
CO1	Men and women students and professionals will be better equipped to work and live together and as equals.
CO2	Will attain a finer grasp on how gender discrimination works in our society and how to counter it.
CO3	Students will develop sense of appreciation of women in all walks of life.
CO4	Develop a better understanding of important issues related to gender in contemporary India.
COURSE OUTCOMES OF B. PHARMACY 3 RD YEAR 1ST SEMESTER	
COURSE CODE:PS501	**PHARMACEUTICAL MICRO BIOLOGY**
CO1	Know the anatomy, identification and cultivation of micro organisms.
CO2	Perform sterilization of various pharmaceutical products, equipment and culture media.
CO3	Perform sterility testing of pharmaceutical products.
CO4	Do micro biological analysis of air, water and milk.
COURSE CODE:PS502	**PHARMACUETICAL TECHNOLOGY I**
CO1	Know the preformulation parameters in designing the dosage forms.
CO2	Be aware of different types of tablets and machinery used in granulation techniques.
CO3	Well versed with fundamentals of cosmetic science, formulation , preparation and packaging of cosmetics.
CO4	Gain knowledge on different micro encapsulation techniques and their importance in pharmacy.

COURSE CODE:PS503	**PHARMACOLOGY I**
CO1	Understand the pharmacological aspects of drugs.
CO2	Learn about the drug with regard to classification, pharmacodynamics and pharmacokinetics aspects.
CO3	Know the importance of pharmacology subject as a basis of therapeutics and correlate the knowledge therapeutically.
CO4	Have a good command on adverse effects, uses, dose, route of administration, contra indication and interaction of drugs.
COURSE CODE:PS504	**PHARMACOGNOSY II**
CO1	Knowledge on the formation of pharmaceutically important secondary metabolites in plants and their commercial significance.
CO2	Appreciate the role of fibers, natural sweetening agents, tannins and resins in pharmaceutical, cosmetic and food industry.
CO3	Know about the various applications of crude drugs in the preparation of formulations as medicaments and excipients.
CO4	To make the student aware of Ayurveda and its various preparations.
COURSE CODE:PS505	**DRUG REGULATORY AFFAIRS**
CO1	Be aware of organization structure of India in central and state division of drug controller of India and their function.
CO2	Procedure for import and export of drugs and their permission.
CO3	To know various procedures for approval of formulations and API's
CO4	To know the salient features and principles of QBD,ICH and WHO.
COURSE CODE:PS506	**ACTIVE PHARMACEUTICAL INGREDIENT PROCESS DEVELOPMENT**
CO1	Understand the various aspects regarding process development and synthesis from pilot preparation to bulk drug
CO2	Development and scale up techniques for the manufacture of new API's
CO3	Includes process technologies for natural products from plants, animals, marine and microbial sources
CO4	Includes commercial production of bulk drugs
COURSE CODE:MS507	**ENTERPRENUERSHIP AND SMALL BUSINESS ENTERPRISES**

CO1	Enable to learn the basics of entrepreneurship and entrepreneurial development which helps to provide vision for own startup
CO2	Evolution and entrepreneurial training methods are included
CO3	Know about the final harvest of new venture technology and business incubation
CO4	Explains about factors in service marketing responsible for key success
COURSE CODE:PS508	**PHARMACEUTICAL MICROBIOLOGY LAB**
CO1	Preparation of various culture media and cultivation of microbes
CO2	Learn about sterilization techniques and validations
CO3	Know about characterization of microbes by staining techniques
CO4	Notice oligodynamic action of metals on bacteria
COURSE CODE:PS509	**PHARMACEUTICAL TECHNOLOGY I LAB**
CO1	Perceive solubility profile estimation in different pH media
CO2	Study the effect of crystallinity and amorphous structures on the solubility of drugs
CO3	Consists of preparation and evaluation of ointments and gels
CO4	Covers the evaluation of packaging materials such as glass, plastics and cotton
COURSE CODE:PS510	**PHARMACOLOGY I LAB**
CO1	Introduces various preparation methods for different solutions used in experiments
CO2	Covers common laboratory animals and anesthetics used in animal studies
CO3	Includes the study of the effect of autonomic drugs on rabbits' eye
CO4	To record the concentration response curve of acetylcholine using rectus abdominus muscle of frog
COURSE CODE:MC500	**PROFESSIONAL ETHICS**
CO1	Understand the importance of values and ethics in personal life and professional careers
CO2	Learn the rights and responsibilities as an employee, team member and global citizen
CO3	Consists of governing ethics, life skills and emotional intelligence

CO4	Introduce norms of professional conduct Vs profession, responsibilities and obligations
COURSE OUTCOMES OF B. PHARMACY 3 RD YEAR 2ND SEMESTER	
COURSE CODE:PS601	**MEDICINAL CHEMISTRY I**
CO1	Knowledge about basic considerations of drug activity
CO2	Organized way of explanation regarding synthesis and mechanism of action of adrenergic and cholinergic agents
CO3	Brief study of the chemistry of neurotransmitters
CO4	Helps to understand the medicinal uses of compounds
COURSE CODE:PS602	**PHARMACEUTICAL TECHNOLOGY II**
CO1	Know the formulation and evaluation of tablets, coated tablets and capsules
CO2	Aware of preformulation factors and formulation details pertaining to parenteral products
CO3	Well versed with packaging of pharmaceutical products and stability aspects of packaging
CO4	Knowledge on general formulation, manufacturing and packaging methods of pharmaceutical aerosols
COURSE CODE:PS603	**PHARMACOLOGY II**
CO1	Provide opportunity to learn about the drug with regard to classification
CO2	Know about pharmacology of drugs acting on hematopoietic system and urinary system
CO3	Understand the importance of pharmacology as a basis of therapeutics and correlate the knowledge therapeutically
CO4	Aware of pharmacodynamic and pharmacokinetic aspects, precautions, contraindications and interaction with other drugs
COURSE CODE:PS604	**CHEMISTRY OF NATURAL PRODUCTS**
CO1	Clear information about the chemistry and pharmaceutical importance of purine and xanthine derivatives
CO2	Aware of general properties and importance of sterols

CO3	Know the general methods of isolation, chemistry and structure elucidation of terpenoids
CO4	Enhanced knowledge about the poly functional natural products
COURSE CODE:PS605	**GENERAL DRUG PRODUCT DEVELOPMENT**
CO1	Well versed with concept of generic drug product and its history
CO2	Aware of drug product approval process in India and US
CO3	Grasp the knowledge on analytical method development for verification and validation of active ingredients
CO4	Be clear about the bioequivalence studies and in vitro tests to ensure bioequivalence of test product
COURSE CODE:PS606	**DRUG DESIGN AND DISCOVERY**
CO1	Emphasizes on the conceptual background and development of medicinal chemistry and drug design
CO2	Helps in identification of lead for new drug design
CO3	Modification of lead aimed at changing pharmacodynamic and pharmacokinetics
CO4	Gain knowledge on Principles of combinatorial chemistry
COURSE CODE:PS607	**SCREENING METHODS IN PHARMACOLOGY**
CO1	Know the care handling and breeding techniques of laboratory animals
CO2	Aware of guidelines for handling animals
CO3	Understand the regulations for screening new drug molecules and human volunteers
CO4	Command over CPCSEA and OECD guidelines

COURSE CODE:PS608	MEDICINAL CHEMISTRY I
CO1	Able to synthesize some medicinal compounds and their analogues
CO2	Qualitative estimation of halogens by Strepheno's method
CO3	Qualitative estimation of methoxy groups by Zeissel's method
CO4	Qualitative estimation of carboxy groups by silver salt method
COURSE CODE:PS609	**PHARMACEUTICAL TECHNOLOGY II**
CO1	Demonstrate different coatings of tablets
CO2	Illustrate preparation and evaluation of gastro retentive dosage forms
CO3	Formulate and evaluate chewable and buccal tablets
CO4	Aim to prepare and evaluate pharmaceutical products like fast dissolving and sublingual tablets
COURSE CODE:PS610	**PHARMACOLOGY-II LAB**
CO1	Calculate the PA2 value of atropine using acetylcholine as an antagonist on rat ileum preparation.
CO2	To calculate the PA2 value of mepyramine using histamine as antagonist on guinea pig ileum.
CO3	Calculating the strength of acetylcholine, histamine, 5-HT, oxytocin.
CO4	Performing matching, two point and three point assay methods.
COURSE CODE:HS611	**ADVANCED COMMUNICATION SKILLS LAB**
CO1	Improve students fluency in spoken English.
CO2	Enable them to listen to English spoken at normal conversational speed.
CO3	Communicate their ideas relevantly and coherently in writing.
CO4	Develop proficiency in academic reading and writing.
COURSE OUTCOMES OF B. PHARMACY 4thYEAR 1st SEMESTER	
COURSE CODE:PS701	**PHARMACEUTICAL ANALYSIS-II**
CO1	Includes the study of pharmaceuticals which are useful in academia and industry.
CO2	Study of principles, instrumentation and applications of fluorimetry.

CO3	Basic principles in the interpretation of NMR spectra.
CO4	Instrumentation and applications of atomic absorption spectroscopy.
COURSE CODE:PS702	**BIOPHARMACEUTICS AND PHARMACOKINETICS**
CO1	Be able to understand bioavailability, bioequivalence, biopharmaceutical parameters.
CO2	Detailed study on pharmacodynamic and pharmacokinetics of drug.
CO3	Explains the ADME of the drug besides non linear pharmacokinetics.
CO4	Involves the study of compartment modeling and calculations of pharmacokinetic parameters.
COURSE CODE:PS703	**PHARMACOLOGY III**
CO1	Know the importance of pharmacology as a basis of therapeutics and correlate the knowledge therapeutically.
CO2	Well versed with experimental methodologies on various animal models.
CO3	Therapeutic approach for the management of diseases.
CO4	Study on chemotherapeutic agents and their application.
COURSE CODE:PS704	**MEDICINAL CHEMISTRY II**
CO1	Knowledge about drug discovery and design with respect to the lead molecules.
CO2	Able to participate in the community pharmacy activities with the knowledge they gained through the study.
CO3	Provide information about various antibiotics and their chemotherapeutic agents.
CO4	Know the concept of CADD.
COURSE CODE:HS705	**PHARMACY ADMINISTRATION**
CO1	Expose the students to facets of business administration in the new economic environment.
CO2	Be familiar with manufacturing management and statistical quality control charts.
CO3	Know about social and behavior aspects of pharmacy.
CO4	Familiarize with structure of pharma industry in India, export and import of drugs and pharmaceuticals.

COURSE CODE:PS706	**PHARMACEUTICAL ANALYSIS II LAB**
CO1	Interpret IR spectra of different compounds.
CO2	Determine absorption maximum of bulk drugs.
CO3	Carry out Assay of bulk drugs and formulations by various spectroscopic methods.
CO4	Demonstrate gel electrophoresis and HPLC.
COURSE CODE:PS707	**BIOPHARMACEUTICS AND PHARMACOKINETICS LAB**
CO1	Estimation of various pharmacokinetic parameters from the data given.
CO2	Know the influence of dosage form on dissolution behavior of same API.
CO3	Enhance the dissolution rate of drugs by different approaches.
CO4	Statistical treatment of pharmaceutical data by using Chi-square test and ANOVA.
COURSE CODE:PS708	**MEDICINAL CHEMISTRY II LAB**
CO1	Estimation of ascorbic acid and vitamin B1.
CO2	Estimation of alkaloids by gravimetry.
CO3	Determination of ibuprofen by volumetric method.
CO4	Identification of isoniazid and benzoic acid.
COURSE OUTCOMES OF B. PHARMACY 4thYEAR 2nd SEMESTER	
COURSE CODE:PS801	**NOVEL DRUG DELIVERY SYSTEMS**
CO1	Fundamental study of different types of oral controlled drug delivery systems
CO2	Impart knowledge on transdermal drug delivery systems
CO3	Helps to know how regulatory agencies act on release of ANDA and NDA
CO4	Aware of principle and fabrication of Intra-uterine devices and Implants
COURSE CODE:PS802	**CLINICAL PHARMACY**
CO1	Know the pathophysiology of selected disease states and the rationale for drug therapy

CO2	Understand the needs to identify the patient specific parameters relevant in initiating drug therapy and its monitoring
CO3	Impart quality use of medicines and their therapeutics if various disease management
CO4	Monitor adverse drug reaction, interpret and formulate drug or medicine information
COURSE CODE:PS803	**PHARMACEUTICAL BIOTECHNOLOGY**
CO1	Know screening of industrially interesting microbes
CO2	Optimize fermentation process parameters
CO3	Know about bioinformatics and its applications in pharmacy
CO4	Familiarizes about regulatory control of biotechnological products
COURSE CODE:PS803	**PHARMACOGNOSY III**
CO1	Learn about therapeutically important crude drugs and phytopharmaceuticals
CO2	Understand the importance of plant tissue culture in pharmacy
CO3	Aware of biologically important molecules from marine sources and nutraceuticals
CO4	Knowledge on the use of crude drugs in a systematic way and the use of crude drugs and phytopharmaceuticals
COURSE CODE:PS805	**NANO TECHNOLOGY**
CO1	Able to select the right kind of materials for developing nano formulations
CO2	Able to develop nano formulations with appropriate technologies
CO3	Evaluate the product related test and for identified diseases
CO4	Develop expertise regarding suitability and evaluation of nanomaterials
COURSE CODE:PS806	**PHARMACOEPIDEMIOLOGY, PHARMACOECONOMICS AND PHARMACOVIGILANCE**
CO1	Understand the risk of pharmacoepidemiology history
CO2	Impart knowledge and skills in vigilance
CO3	Understand the need of Pharmacoeconomics and assessment of pharmacovigilance
CO4	Enable the students to understand cost effectiveness in the management of disease and ADR’s

COURSE CODE:PS807	MEDICINAL PLANT BIOTECHNOLOGY
CO1	Get exposed to various techniques of plant tissue culture
CO2	Gain knowledge o metabolic engineering of secondary metabolic pathways, scaleup and commercialization of secondary metabolites
CO3	Understand the strategies for production of secondary metabolites and transgenic technology
CO4	Aware of the concept of totipotency and sterilization techniques
COURSE CODE:PS808	**NOVEL DRUG DELIVERY SYSTEMS AND REGULATORY AFFAIRS LAB**
CO1	Assignment on product development and filing to various regulatory agencies
CO2	Prepare and evaluate film coated and enteric coated tablets
CO3	Formulate and evaluate mucoadhesive delivery systems
CO4	Prepare and evaluate nano particles
COURSE CODE:PS808	**PHARMACOGNOSY III LAB**
CO1	Isolate Caffeine and Piperine
CO2	Differentiate glycoside and its aglycone by TLC
CO3	Identification of powdered crude drugs containing alkaloids and glycosides by chemical tests
CO4	Identification of crude drugs by organoleptic method

COURSE OUTCOMES OF PHARM.D.

COURSE OUTCOMES OF PHARM D 1ST YEAR	
COURSE CODE:1.1	**COURSE NAME: HUMAN ANATOMY AND PHYSIOLOGY**
CO1	Describe the structure and functions of various organs of human body.
CO2	Describe the various Homeostatic mechanism and their imbalances of various systems.
CO3	Identify the various tissue and organs of the different systems of the human body.
CO4	Perform the hematological test and also record Blood pressure, heart rate, Pulse and Respiratory volumes.
CO5	Appreciate coordinated working pattern of different organs of each systems.
CO6	Appreciate the interlinked mechanism in the maintenance of normal functioning (Homeostasis) of human body.
CO7	Exemplify different types of tissues and explain various anatomical models.
CO8	Identify the bones of skeletal system
CO9	Find out blood cell count. Hemoglobin, blood grouping, ESR, bleeding time and clotting time
CO10	Record blood pressure, pulse rate and body temperature
CO11	Identify family planning devices and perform pregnancy diagnostic test.
COURSE CODE:1.2	**COURSE NAME: PHARMACEUTICS**
CO1	Know the formulation accepts of different dosage forms
CO2	Do different pharmaceuticals calculations involved in formulations
CO3	Formulate different types of dosage forms
CO4	Appreciate the importance of good formulation for effectiveness
CO5	Formulate various solid and liquid dosage forms
CO6	Identify and apply suitable remedial measures to solve in incompability

	problems observe in formulations
C07	Demonstrate different techniques involved in formulations
COURSE CODE 1.3	**MEDICINAL BIOCHEMSTRY**
CO1	Understand the catalytic activity of enzymes and importance of Iso enzymes in diagnosis of diseases
CO2	Know the metabolic process of biomolecules in health and illness
CO3	Understand the genetic organization of mammalian genome; protein synthesis; Replication; Mutations and Repair mechanism
CO4	Know the biochemical principles of organ function test of kidney, liver and Endocrine gland
CO5	Do the qualitative analysis and determination of biomolecules in the body fluids
CO6	Interpret the Lipid profile and Liver function test
CO7	Estimate various electrolytes in serum
CO8	Determine the biomolecules by qualitative and quantitative analysis of Urine and blood samples
COURSE CODE 1.4	**PHARMACEUTICAL ORGANIC CHEMISTRY**
CO1	IUPAC / common system of nomenclature of simple organic compounds belonging to different classes of organic compounds
CO2	Some important physical property of organic compounds
CO3	Free radicals / Nucleophilic / nucleophilicsubstitution, free radicals / nucleophilic / electrophilic addition, elimination, oxidation and reduction reactions with mechanism, orientation of the reaction, order of reactivity, stability of compounds.
CO4	Some named organic reactions with mechanisms
CO5	Methods of preparation, Test for purity, Principles involved in the assay, important medicinal uses of some important organic compounds
CO6	Introduction to the various laboratory techniques through demonstration involving synthesis of different compounds
CO7	Apply stereo models and explain structural aspects of organic compounds
CO8	Identify various classes of organic compounds by systematic qualitative analysis
COURSE CODE 1.5	**PHARMACEUTICAL INORGANIC CHEMISTRY**

CO1	Understand the principles and procedures of Analysis of drugs and also regarding the application of inorganic pharmaceuticals.
CO2	Know the analysis of the inorganic pharmaceuticals and their applications
CO3	Appreciate the importance of inorganic pharmaceuticals in preventing and curing diseases
CO4	Perform identification test as per Indian pharmacopeia
CO5	Determine the impurities qualitatively by performing test for purity
CO6	Analyze the purity of compounds quantitatively by performing assay
COURSE CODE 1.6	**REMEDIAL BIOLOGY**
CO1	Explain the classification of plants, plant cell and its organization, types of tissue and their functions
CO2	Describe Taxonomical Characters of various family's
CO3	Classify plants based on morphological and microscopic characters
CO4	Identify a given plant part based on its morphological and microscopic characters
CO5	Identify the cell wall constituents and cell inclusions
CO6	Perform Experiment related to plants physiology
CO7	Identify the crude drugs by its morphological characteristics and study the anatomical characters by preparing slides.
COURSE CODE 1.6	**REMEDIAL MATHEMATICS**
CO1	Explain the principles of matrix Algebra, determinants, Trigonometry, Analytical geometry, Differential calculus, Integral calculus, Differential equations and Laplace Transforms
CO2	State and explain the theorems such as Leibnitz's theorem, Euleus Theorem.
CO3	Identify appropriate standard form for a differential equation.
CO4	Solve complex mathematical problems associated with matrix algebra, differential equation, differential and integral calculus as well as Laplace transform.
COURSE OUTCOMES OF PHARM D 2ND YEAR	
COURSE CODE 2.1	**PATHOPHYSIOLOGY**
CO1	Describe the etiology and pathogenies of the selected diseases
CO2	Name the sign and symptoms of diseases

CO3	Mention the complication of diseases
COURSE CODE 2.2	**PHARMACEUTICAL MICROBIOLOGY**
CO1	Know the anatomy, Identification, growth factors and sterilization of micro-organisms
CO2	Know the mode of transmission of diseases causing microorganisms, symptoms of diseases and treatment aspects
CO3	Do estimation of RNA and DNA and there by identify the source
CO4	Do cultivation and identification of the microorganisms in the laboratory
CO5	Do identification of diseases by performing the diagnostic test
CO6	Appreciate the behavior of motility and behavior characteristics of micro-organisms
CO7	Prepare various culture medium for the growth of microorganism
CO8	Identify and isolate bacteria
CO9	Evaluate antimicrobial and determine the minimum inhibitory concentration of antimicrobial agents
CO10	Perform micro biological assay of antibiotics and vitamins by cup plate method and turbidometry method
COURSE 2.3	**PHARMACOGNOSY AND PHYTOPHARMACEUTICALS**
CO1	Understand the basic principles of cultivation, collection and storage of crude drugs
CO2	Know the source, active constituents and uses of crude drugs
CO3	Appreciate the application of primary and secondary metabolite of the plants
CO4	Study of cell wall constituent and cell inclusions
CO5	Identify the crude drugs by its morphological characteristics and study the anatomical characteristic by preparing slides
CO6	Perform chemical test to identify unorganized crude drugs and lipids
CO7	Determination of various values like acid value, Ester, Iodine value and saponification value.
COURSE CODE 2.4	**PHARMACOLOGY – I**
CO1	Understand the pharmacological aspects of drugs
CO2	Appreciate the importance of Pharmacology subjects as a basis of therapeutics
CO3	Correlates and apply the knowledge therapeutically

CO4	To gain knowledge on pharmacokinetic and pharmacodynamics aspects of drugs on different organ system
COURSE CODE 2.5	**COMMUNITY PHARMACY**
CO1	Know the pharmaceutical care services
CO2	Know the business and professional practice management skills in community pharmacies
CO3	Do patient counselling and provide health screening services to public in community pharmacy
CO4	Respond to minor ailments and provide appropriate medications
CO5	Show Empathy and Sympathy to patients
CO6	Appreciate the concept of Rational drug therapy
COURSE CODE 2.6	**PHARMACOTHERAPEUTICS I**
CO1	The pathophysiology of selected diseases state and Rational for drug therapy
CO2	The therapeutic approach to management of this diseases
CO3	The controversy in drug therapy
CO4	The importance of preparation of Individualized therapeutic plan based on diagnosis
CO5	Needs to identify the patient specific parameter relevant in initiating drug therapy and monitoring therapy
CO6	Describe the pathophysiology of selected diseases state and explain the rational for drug therapy
CO7	Summarize the therapeutic approach to management of the diseases including reference to the latest available evidence
CO8	Discuss the controversy of drug therapy
CO9	Discuss the preparation of individualized therapeutic plan based evidence
CO10	Identify the patient specific parameter relevant in initiating drug therapy and monitoring therapy
CO11	Discuss the therapeutic approach to management of therapy diseases
CO12	Prepare Individualized therapeutic plan based on diagnosis
COURSE OUTCOMES OF PHARM D 3RD YEAR	
COURSE CODE 3.1	**PHARMACOLOGY II**
CO1	Understand the pharmacological aspects of drugs.

CO2	Appreciate the importance of drugs as the basis of therapeutics
CO3	To know the knowledge of anti-microbial therapy in various infectious diseases
CO4	To know the knowledge of genetics
CO5	Correlate and apply the knowledge therapeutically
CO6	Carry out the animal experiment confidently
CO7	To gain knowledge on the pharmacological actions through animal experimentations
COURSE CODE 3.2	**PHARMACEUTICAL ANALYSIS**
CO1	Understand the theoretical aspects, instrumentation, elements of interpretation of data and applications of absorption spectroscopy, flame photometry, atomic absorption spectrometry, atomic emission spectroscopy
CO2	To get familiarize with the principles and its techniques of separation of drugs from excipients like column chromatography, gas chromatography, gel filtration and affinity chromatography
CO3	To understand the concepts of statistical quality control and regulatory control
CO4	At the end of the course, students will be able to operate and handle instrument such as UV visible and IR spectrophotometer to obtain the spectra of given sample
CO5	To study the Quenching effect in fluorimetry
CO6	Determination of dissociate constant of indicator using UV visible

	spectrometry
CO7	To compare the UV spectrum of the compounds with that of its derivatives
COURSE CODE 3.3	**PHARMACOTHERAPEUTICS II**
CO1	To know the pathophysiology of selected diseases state and the rational for drug therapy
CO2	Know the therapeutic approach to management of diseases
CO3	Know the controversy in drug therapy
CO4	Know the importance of preparation of individualized therapeutic plans based on diagnosis
CO5	Appreciate the need to identify the patient specific parameter relevant in initiating drug therapy and monitoring therapy
CO6	Discus the therapeutic approach to management of selected diseases
CO7	Identify drug interaction and rationalize the prescription
CO8	Prepare individualized therapeutic plan based on diagnosis
CO9	Understand the patient problems related to drug therapy and Provide Patient counseling
COURSE CODE 3.4	**PHARMACEUTICAL JURISPRUDENCE**
CO1	Practice the professional ethics
CO2	Understand the various concepts of the pharmaceutical legislation in India
CO3	Know the various parameter in the drug and cosmetic act rule
CO4	Know the drug policy, DPCO, Patent and designs act
CO5	Understand the labeling requirement and packaging guidelines for drugs and cosmetics
CO6	Be able to understand the concepts of dangerous drug of pharmacy act and excise duty act
CO7	Others laws as prescribed by the pharmacy council of India from time to time including international laws
COURSE CODE 3.5	**MEDICINAL CHEMSITRY**
CO1	Brief introduction to quantitative structure activity relationship, pro drug, combinatorial chemistry and computer added drug design and concepts of anti-sense molecules
CO2	Study the SAR, mechanism of action, synthesis, chemical nomenclature and side effects of different classes of drugs

CO3	Explain the mode of action, the mode of resistance, therapeutic uses of different classes of drugs
CO4	Cogitate of modern concepts of rational drug design pretending to diuretics, thyroid and anti-thyroid agents, diagnostic agents, steroidal hormones and adreno corticoids
CO5	Conduct monographic analysis of different pharmaceuticals compounds
CO6	Determine partition co efficient, dissociation constant and Molar refractometry of different compounds
CO7	Preparation of medicinally important compounds or intermediates required for synthesis of drugs
COURSE CODE 3.6	**PHARMACEUTICAL FORMULATION**
CO1	Understand the principle involved in formulation of various pharmaceuticals dosage forms
CO2	Prepare various pharmaceutical formulation
CO3	Perform evaluation of pharmaceutical dosage forms
CO4	Understand and appreciate the concepts of bioavailability and bioequivalence, their role in clinical situations.
CO5	Manufacturing of tablets using different techniques
CO6	Formulation and filing of hard gelatin capsule
CO7	Perform different quality control test for various dosage forms
CO8	Preparation of various cosmetics like lipsticks, cold cream, vanishing cream, clear liquid shampoo and Dentifrices
COURSE OUTCOMES OF PHARM D 4TH YEAR	
COURSE CODE 4.1	**PHARMACOTHERAPUTICS III**
CO1	Understand the pathophysiology of selected diseases state and the rational for drug therapy
CO2	Acknowledge the therapy approach to management of the diseases
CO3	Understand the controversy in drug therapy
CO4	Importance of preparation of individualized therapeutic plan based on diagnosis
CO5	Understand the needs to identify the patient specific parameter relevant in initiating drug therapy and monitoring therapy

CO6	Describe the pathophysiology of selected diseases state and explain the rational for drug therapy
CO7	To summarize the therapeutic approach to management of these diseases including reference to the latest available evidence
CO8	Discuss the therapeutic approach to management of selected diseases
CO9	Identify drug interaction and rationalize the prescription
CO10	Prepare individualized therapeutic plan based on diagnosis
CO11	Understand the patient problems related to drug therapy and Provide Patient counselling
COURSE CODE 4.2	**HOSPITAL PHARMACY**
CO1	To know the various drug distribution method
CO2	To know the professional practice, management skills in hospital pharmacy
CO3	Provide unbiased drug information to the doctors
CO4	To know the manufacturing practices of various formulations in hospital set up
CO5	Appreciate the practice-based research method
CO6	Appreciate the stores management and inventory control
CO7	Analyze prescriptions for drug interactions
CO8	Formulate and prepare parenteral formulation and powders
CO9	Perform inventory analysis
CO10	Provide drug information query thought literature search
COURSE CODE 4.3	**CLINICAL PHARMACY**
CO1	Monitor drug therapy of patient through medication chart Review and clinical review
CO2	Obtain medication history interview and council the patient
CO3	Identifying and resolve drug related problems
CO4	Detect, assess and monitor adverse drug reaction
CO5	Interpret selected laboratory result of spficfic diseases case
CO6	Retrieve, Analyze, interpret and formulate drug or medication information
CO7	Assess prescription for drug interaction and provide drug information query
CO8	Perform Patient counselling on medication and conduct medication history regarding
CO9	Analyzes and interpret the data obtained through laboratory test

CO10	Perform patient medication history interview
COURSE 4.4	**BIOSTATISTICS AND RESEARCH METHODOLOGY**
CO1	Explain the importance of research methods in the design of pharmacoepidemiologic study
CO2	Discuss the method of collection of data and its analysis and interpretation
CO3	Explain the various method of testing hypothesis
CO4	Discuss and evaluate various software for statistical analysis of data
CO5	Recognize the importance of Biostatistics in pharmacy
COURSE 4.5	**BIOPHARMACEUTICS AND PHARMACOKINETICS**
CO1	Explain the mechanism and factors affecting ADME process.
CO2	Discuss the significance of pharmacokinetics in the design and evolution of dosage forms
CO3	Differentiate between bioavailability and bioequivalence along with their measurement
CO4	Identify and select right pharmacokinetic model for drugs administered by different routes
CO5	Compare the invitro dissolution profiles of different marketed products of same drug
CO6	Perform solubility enhancement technique for improvement of drug release of poorly watersoluble drugs
CO7	Calculate and interpret various pharmacokinetic parameter from the given clinical data
CO8	Estimate the bioavailability and bioequivalence for the given clinical data
COURSE CODE 4.6	**CLINICAL TOXICOLOGY**
CO1	Discuss clinical symptoms and management of acute poisoning for the given compounds
CO2	Discuss clinical symptoms and management of Chronic poisoning for the given compounds
CO3	Detect sign and symptoms of drug abuse and suggest suitable remedial methods
CO4	Select appropriate laboratory test to identifying and determining of severity of poisoning
COURSE OUTCOMES OF PHARM D 5TH YEAR	
COURSE CODE 5.1	**CLINICAL RESEARCH**

CO1	Discuss the pharmacological and toxicological consideration in process of drug development
CO2	Discuss the principles and phases in clinical trials of drug
CO3	Recognize different roles and obligations of the principal investigator, sponsor and Contract basis organization
CO4	Explain the guidelines GCP and methods of post marketing surveillance
COURSE CODE 5.2	**PHARMACOEPIDEMIOLOGY AND PHARMACOECONOMICS**
CO1	Discuss the scope need, origin and evaluation of pharmacoepidemiology
CO2	Explain the importance of measurement of outcomes in pharmacoepidemiology
CO3	Discuss the basic principles, roles, and relevance of Pharmacoeconomics in the development of new drug
CO4	Identify, justify and appropriate evaluation method of Pharmacoeconomic study of diseases
COURSE CODE 5.3	**CLINICAL PHARMACOKINETICS AND PHARMACOTHERAPEUTIC DRUG MONITORING**
CO1	Determine Dose, dosing intervals and dosage adjustment of a drug for a given patient
CO2	Apply the principles of pharmacokinetics to analysis and predict the drug interaction
CO3	Discuss the concept of genetic polymorphism in drug metabolism, drug

	transport and drug targets
CO4	Discuss the pharmacokinetic principles to individualized drug therapy
COURSE CODE 5.4	**CLERKSHIP**
CO1	Discuss the role of pharmacist in clinical pharmacy services
CO2	Demonstrate the skills of clinical pharmacist
CO3	Discuss the available therapeutic option in the management of diseases
CO4	Prepare a pharmaceutical care plan for a given case
CO5	Detect interpret and report medication errors and drug interaction
COURSE OUTCOMES OF PHARM D 5TH YEAR	
COURSE CODE 5.5	**PROJECT**
CO1	Address a problem related to pharmacy practice in hospital, community service or clinical setup with a wider perspective and generality
CO2	Define the problem to be addressed and translate into the statement of aim, objective, scope and planning for the project
CO3	Carry out and report an information survey and take account of funding in executing project
CO4	Evaluate select and apply relevant theories and techniques from the full range of courses studied using conceptual models and framework enhance depth of understanding
CO5	Select appropriate methodology for investigative work, taking into the account the fors and against of the alternative available and developed solution proposals based on reasoned judgment
CO6	Present a coherent, logically argued, fully referenced report and engaged in a professional manner in a viva voce discussion about the project
COURSE OUTCOMES OF PHARM D 6TH YEAR	
INTERNSHIP	
CO1	Explain the pathophysiology of diseases state and rational for drug therapy
CO2	Discuss the available therapeutic option to provide patient care in cooperation with patient, prescribed dose and other members of an inter professional health care team
CO3	Identify, manage and use resources of the health care system, incorporation with patient, prescribers and other health care providers

CO4	Analyze the therapeutic approaches to promote healthcare improvement, wellness and diseases prevention
CO5	Demonstrate skills in monitoring of the national health programs and scheme
CO6	Develop Leadership quality to function effectively as a member of health care team
CO7	Communicate effectively with patient and the community

COURSE OUTCOMES OF M.PHARM (PHARMACEUTICS)
R19 REGULATIONS

M.PHARMACY (PHARMACEUTICS) I YEAR I SEMESTER	
COURSE CODE: PC I	**MODERN PHARMACEUTICS I**
CO1	To know about formulation and designing of dosage form
CO2	To know the active pharmaceutical ingredients and generic drug product development
CO3	To attain the knowledge of using excipients in different dosage forms
CO4	To know the different physical properties in preformulation.
COURSE CODE: PC II	**APPLIED BIOPHARMACEUTICS AND PHARMACOKINETICS**
CO1	To understand various ADME parameters
CO2	To understand factors effecting bioavailability and stability of dosage forms.
CO3	To know Drug interactions and problems associated in pharmacokinetic parameters.
CO4	To know bioequivalence studies and protocols to bioequivalence studies.
COURSE CODE: PE I	**DRUG REGULATORY AFFAIRS**
CO1	Know about different competent regulatory authorities globally
CO2	To be aware of technical aspects pertaining to the marketing authorisation application
CO3	To know about regulatory guidelines framed by regulatory authorities.
CO4	Be familiar with GMP and ICH guidelines for stability testing
PE I	**ADVANCED PHYSICAL PHARMACEUTICS**

CO1	Deduce the factors affecting dissolution, and solubility in related *invitro* and *invivo* correlations.
CO2	Have knowledge about stability calculations, shelf life calculations and accelerated stability studies.
CO3	Anticipating the analysis of particle size, solid dispersion, physics of tablets, polymer classification and its applications.
CO4	Understand rheology, absorption, related to liquids and semi-solid dosage forms.
PE I	**TOTAL QUALITY MANAGEMENT**
CO1	Establish regular guidelines in GMP, GCP, GLP, USFDA, WHO, ISO etc.
CO2	Acquire vast knowledge regarding the quality control aspects of different regulatory bodies.
CO3	Regulatory requirements of single dose and repeat dose toxicity studies
CO4	To escalate the knowledge of students in various quality control and regulatory aspects.
COURSE CODE: PE II	**COSMETICS AND COSMECEUTICALS**
CO1	Expand scientific knowledge on developing cosmetics and cosmeceuticals and herbal products.
CO2	To know regulatory biological aspects of cosmetics, excipients used in various formulations.
CO3	Perceive the knowledge of designing of cosmeceuticals and herbal products.
CO4	Sunscreen Products classifications and regulatory aspects.
PE II	**PHARMACEUTICAL VALIDATION**
CO1	Be acquainted with the knowledge of validation of instruments and equipment's.
CO2	Carry out validation of manufacturing processes
CO3	Interpretation of various methods of validation.
CO4	Application of various methodologies in pharmaceutical validation.
PE II	**STABILITY OF DRUGS AND DOSAGE FORMS**
CO1	To characterize the evaluation of stability of solutions, solids and formulations against adverse conditions.
CO2	Competency of students to retain stability and storage conditions.
CO3	Proficiency of students in retaining the efficacy of the pharmaceutical products.

CO4	Knowledge on methods of sampling and tests for various cosmetics according to bureau of Indian standards.
COURSE CODE: MC	**RESEARCH METHODOLOGY AND IPR**
CO1	To analyse the research related information.
CO2	To emphasise the need of information about intellectual property rights among students.
CO3	Figure out research problems and formulations.
CO4	Investigations of solutions research problems, data collection, analysis and interpretation of data.
COURSE CODE: LAB I	**MODERN PHARMACEUTICS I LAB**
CO1	To execute the preformulation studies of solid dosage forms.
CO2	Calculate the effect of compressional force on tablet disintegration time.
CO3	Preparation and evaluation of beta cyclodextrin complexes of new drugs
CO4	Perform accelerated stability testing of different tablets.
COURSE CODE: LAB II	**APPLIED BIO PHARMACEUTICS AND PHARMACOKINETICS LAB**
CO1	Computation of pharmacokinetic parameters of one compartment oral data and two compartment IV data.
CO2	Calculation of bioavailability and bioequivalence studies.
CO3	Evaluation of drug protein binding analysis.
CO4	Construction of calibration curves of different API's by UV/HPLC/HPTLC**.**
COURSE CODE: AUDIT COURSE I	**ENGLISH FOR RESEARCH PAPER WRITING**
CO1	To know how to improve writing skills and level of readability.
CO2	Fathom the skills needed when writing Title Ensure the good quality of paper at very first submission.
CO3	Ascertain about what to write in each section.
CO4	Flourish with skills needed when writing methods, results, conclusions etc.
AUDIT COURSE I	**DISASTER MANAGEMENT**

CO1	Learn to demonstrate and critical understanding of key concepts in disaster risk reduction and humanitarian response.
CO2	Critically evaluate disaster risk reduction and humanitarian response policy and practice from multiple perspectives.
CO3	Planning and programming in different countries, particularly their home country or the countries they work in.
CO4	Critically understand the strengths and weakness of disaster management approaches.
AUDIT COURSE I	**SANSKRIT FOR TECHNICAL KNOWLEDGE**
CO1	To obtain working knowledge in illustrious Sanskrit,the scientific language in the world.
CO2	Learning of Sanskrit to improve brain functioning.
CO3	The engineering scholars equipped with Sanskrit will be able to explore the huge knowledge from ancient literature.
CO4	Learning of Sanskrit to develop the logic in mathematics, science, and other subjects enhancing the memory power.
AUDIT COURSE I	**VALUE EDUCATION**
CO1	Sympathise value of education and self-development.
CO2	Imbibe good values in students.
CO3	Developing the overall personality.
CO4	learn the importance of character and competence.

M.PHARMACY (PHARMACEUTICS) I YEAR II SEMESTER

COURSE CODE: PC III	**MODERN PHARMACEUTICS II**
CO1	Perceive the planning of pilot plant techniques used for all pharmaceutical dosage forms such as tablets, capsules, parenteral, aerosols, cosmetics and nutraceuticals.
CO2	Distinguish Formulation approaches, preparation & method of manufacturing labelling & Q.C. of anti-ageing products, sun screen lotion and fairness creams.
CO3	Overview of role of nutraceuticals in cancer prevention & cardio vascular disorders.
CO4	Advances in propellants, metered dose inhaler designs, manufacture and quality control.
COURSE CODE: PC IV	**ADVANCED DRUG DELIVERY SYSTEMS**

CO1	Selection of the drugs for CDDS design of the formulation
CO2	fabrication of systems of above drug delivery systems with relevant applications.
CO3	Biochemical and molecular biology approaches to controlled drug delivery of Bioadhesive drug delivery systems
CO4	Drug targeting to particular organs lungs , brain etc
COURSE CODE: PE III	**INDUSTRIAL PHARMACY**
CO1	Explain the machinery involved in milling, mixing, filtration and drying used in production of pharmaceutical materials.
CO2	Learn salient features of GMP, TQM applicable in industry.
CO3	Understand the effluent treatments and prevention of pollution.
CO4	Evaluate the validation of analytical methods and processes.
PE III	**HERBAL COSMETICS**
CO1	Gain knowledge on classification, economic aspects and regulatory provisions related to manufacture of cosmetics.
CO2	Get exposed to processes involved in manufacturing of herbal cosmetics related to skin.
CO3	Brief account on herbal extracts and herbal products of cosmetic importance.
CO4	Elaborative study of formulations related to hair care with regard to their composition and claims for various herbs used in them.
PE III	**PHARMACEUTICAL MANGEMENT**
CO1	Useful for the students to know how to manage a pharma industry.
CO2	Aids the students to develop leadership qualities, communication and interpersonal skills.
CO3	Helps to understand the concepts of managerial control and its importance in pharma industry.
CO4	Helps the students to understand various managerial functions and professional skills required for a dynamic profession.
COURSE CODE: PE IV	**NANO BASED DRUG DELIVERY SYSTEMS**
CO1	Able to apply the properties related to the fabrication of nano pharmaceuticals.
CO2	Be aware of molecular formulations based on nano technology and science behind them.

CO3	Be able to select the right kind of materials and evaluate the product.
CO4	Improvements to medical or molecular imaging using nano technology.
PE IV	**NUTRACEUTICALS**
CO1	Recognise the occurrence and characteristic features of phytochemicals as nutraceuticals.
CO2	Know the importance of nutraceuticals in various common problems with the concept of free radicals.
CO3	Acknowledge the role of antioxidants in free radical induced disease conditions.
CO4	Expose to various food laws and regulations, health claims and dietery supplement claims.
PE IV	**CLINICAL RESEARCH AND PHARMACOVIGILANCE**
CO1	Demonstrate the types of clinical trial designs
CO2	Execute safety monitoring, reporting, and close out activities
CO3	Detect new adverse drug reactions and their assessment
CO4	Perform the adverse drug reaction reporting system and communication in pharmacovigilance.
COURSE CODE: LAB III	**MODERN PHARMACEUTICS-II**
CO1	To evaluate the effect of surfactant in invitro drug release.
CO2	Preparation and evaluation of film coated, floating, fast dissolving and chewable tablets.
CO3	To formulate and evaluate cold cream, vanishing cream, foundation and cleansing creams.
CO4	Preparation of oral care products like mouth washes.
COURSE CODE: LAB IV	**ADVANCED DRUG DELIVERY SYSTEMS LAB**
CO1	Study on diffusion of drugs through various polymeric membranes.
CO2	Preparation and evaluation of enteric coated pellets.
CO3	To formulate and evaluate sustained release oral matrix and reservoir systems.
CO4	Compare invitro dissolution profiles of various sustained release products available in the market.
	MINI PROJECT WITH SEMINAR

CO1	Allows the students to study, do research and act by themselves using their abilities.
CO2	Improves communication skills and networking with others.
CO3	Helps in gaining expert knowledge and renewing motivational confidence.
CO4	Provides latest information in the field of science and technology.
COURSE CODE: AUDIT COURSE II	**CONSTITUTION OF INDIA**
CO1	Understanding the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.
CO2	Confer the intellectual origins of the frame work of argument that informed the conceptualization of social reforms leading to revolution in India.
CO3	Dissertate the circumstances surrounding the foundation of the congress socialist party under the leadership of Jawaharlal Nehru and eventual failure of the proposal of direct elections through adult suffrage in the Indian constitution.
CO4	Discuss the passage of the Hindu Code Bill of 1956.
AUDIT COURSE II	**PEDAGOGY STUDIES**
CO1	Figure out what pedagogical practices are being used by teachers in formal and informal class rooms in developing countries.
CO2	The evidence on the effectiveness of these pedagogical practices, in what conditions and with what population of learners.
CO3	How can teacher education, school curriculum and guidance materials best support effective pedagogy?
CO4	Identify critical evidence gaps to guide the development.
AUDIT COURSE II	**STRESS MANAGEMENT BY YOGA**
CO1	Develop healthy mind in a healthy body thus improving social health.
CO2	Improve efficiency
CO3	overcome stress.
CO4	To get well acquinted with types of pranayama.
AUDIT COURSE II	**PERSONALITY DEVELOPMENT THROUGH LIFE ENLIGHTENMENT SKILLS**
CO1	Study of Shrimad-Bhagwad-Geeta help the student in developing his personality and achieve the highest goal in life.
CO2	Study of neethishatakam will help in developing versatile personality of students.

CO3	To awaken wisdom in students.
CO4	To became a person with stable mind, pleasing personality and determination.
M.PHARMACY (PHARMACEUTICS) II YEAR I SEMESTER	
COURSE CODE: PE V	**BIOSTATISTICS**
CO1	Discuss the basic concept and importance of statistical analysis.
CO2	Explain various methods of testing hypothesis.
CO3	Dissert the methods of collection of data, analysis and interpretation.
CO4	To understand the basic aspects of statistics such as central tendency, dispersion and correlation.
PE V	**SCALE UP AND TECHNOLOGY TRANSFER**
CO1	Manage the scale up process in pharmaceutical industry.
CO2	Assist in technology transfer.
CO3	To establish safety guidelines which prevent industrial hazards.
CO4	Be aware of process validation.
PE V	**PRODUCTION AREA DESIGN AND PACKAGING DEVELOPMENT**
CO1	To elaborate the current good manufacturing practices.
CO2	To maximise knowledge on pharmaceutical packaging and design.
CO3	To familiarise the packaging of solids, semisolids, parenterals, ophthalmic and aerosols.
CO4	To be acquainted with components of packaging and packaging materials.
COURSE CODE: OE I	**SCREENING METHODS IN PHARMACOLOGY**
CO1	Know various techniques for screening of drugs for different pharmacological activities.
CO2	Aware of guidelines and regulations for screening new drug molecules on animals.
CO3	Notice the guidelines for handling animals and animal ethics for screening of drugs.
CO4	Care handling and breeding techniques of laboratory animals.
OE I	**ENTREPRENEURSHIP MANAGEMENT**
CO1	Be able to involve in the role of enterprise in national and global economy.

CO2	Able to handle entrepreneurship concepts
CO3	Should meet the demands and challenges of growth strategies and networking.
CO4	Be able to launch and organise an enterprise.
OE I	**COSMETIC SCIENCE**
CO1	Know various cosmetics their preparation, properties, MOA and uses.
CO2	Understanding the properties and evaluation of cosmetics by analytical methods.
CO3	Should be able to suggest proper usage of cosmetics.
CO4	Application of skin care products in the formulation of cosmeceuticals.
OE I	**HAZARDS AND SAFETY MANAGEMENT**
CO1	should disclose environmental problems among learners.
CO2	Develop an attitude of concern for the industrial environment.
CO3	Ensure safety standards in pharmaceutical industry.
CO4	Empower ideas to clear mechanism and management in different kinds of hazard management system.
OE I	**AUDITS AND REGULATORY COMPLIANCE**
CO1	Capable of understanding the importance of auditing.
CO2	Have sound knowledge on methodology of auditing.
CO3	Understand the process of auditing in pharmaceutical industries.
CO4	Be competent with the planning process, responsibilities andadministration**.**
COURSE CODE: DISSERTATION	**DISSERTATION WORK REVIEW II**
CO1	Search and evaluate the available literature in your given subject or chosen topic area
CO2	Read the selected articles thoroughly and evaluate them
CO3	Organise the selected papers by looking for patterns and by developing sub topics
CO4	Analyse critically a segment of published body of knowledge through summary
M.PHARMACY (PHARMACEUTICS) II YEAR II SEMESTER	
COURSE CODE: DISSERTATION	**DISSERTATION WORK REVIEW III**

CO1	Apply knowledge and understanding in relation to the agreed area of study
CO2	Communicate in written form by integrating, analysing and applying key texts and practices
CO3	Demonstrate advanced critical research skills in relation to career development
CO4	Integrate the theory and practice in evaluation
COURSE CODE: DISSERTATION	**DISSERTATION VIVA VOCE**
CO1	Demonstrate knowledge in the program domain
CO2	Presenting views cogently and precisely
CO3	Exhibit professional etiquette suitable for career progression
CO4	Exhibit sustained curiosity and have an attitude of attention in detailing of the project

COURSE OUTCOMES OF M.PHARM (PHARMACEUTICAL ANALYSIS) R19 REGULATIONS

M.PHARMACY (PHARMACEUTICAL ANALYSIS) I YEAR I SEMESTER	
COURSE CODE: PC I	**MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES**
CO1	Gain insight towards modern pharmaceutical analysis.
CO2	Apply knowledge in developing new methods for determination and validate procedures.
CO3	Imply theories in the analysis of various bulk drugs and their formulations.
CO4	Elaboration of knowledge in various instrumentation techniques.
COURSE CODE: PC II	**PHARMACEUTICAL FOOD ANALYSIS**
CO1	Application of various analytical techniques in determination of various food constituents and finished food products.
CO2	Able to apply analytical techniques in analyzing food additives.
CO3	Possess awareness on food regulations and legislations.
CO4	To analyze biomolecules in various food products.

COURSE CODE: PE I	ADVANCED PHARMACEUTICAL ANALYSIS
CO1	Perception on qualitative determination of various organic compounds
CO2	Accomplished with spectral analysis, dissolution parameters and microbial assays.
CO3	Knowledge on principles and procedures involved in determination of organic functional groups.
CO4	Performing different tests on excipients such as bulk density, particle size distribution etc.

PE I	DRUG REGULATORY AFFAIRS
CO1	Mind full of technical aspects pertaining to the marketing authorization application.
CO2	Detailed study of regulatory aspects that effect drug product design and pharmaceutical and bulk drug manufacture.
CO3	Appraised of different competent regulatory authorities globally.
CO4	Well versed with quality, safety and legislation for cosmetic products and herbal products.
PE I	**PHYTO CHEMISTRY**
CO1	Comprehension on various types of phytoconstituents present in plants
CO2	Detailed study of isotropic tracer techniques.
CO3	Lead structure selection process and optimization.
CO4	Separation of phytoconstituents by vaccum and flash column chromatography.
COURSE CODE: PE II	**QUALITY CONTROL AND QUALITY ASSURANCE**
CO1	Understand the cGMP aspects in pharmaceutical industry.
CO2	To appreciate the importance of documentation in pharmaceutical industry.
CO3	To comprehend with the scope of quality certifications.
CO4	Proficiency and responsibilities of QA and QC.
PE II	**COSMETICS AND COSMECEUTICALS**
CO1	To know regarding regulatory biological aspects of cosmetics, excipients used for various formulations.
CO2	Designing of cosmeceuticals and herbal products.
CO3	Factors affecting microbial preservatives efficacy.
CO4	Sunscreen's classifications and regulatory aspects.
PE II	**STABILITY OF DRUGS AND DOSAGE FORMS**
CO1	Describe the evaluation of stability of solutions, solids and formulations against adverse conditions.
CO2	Be able to suggest retain stability and storage conditions for retaining the efficacy of the dosage forms.
CO3	Have overview on physical stability of novel drug carriers, liposomes, niosomes and nano particles.

C04	Quantitative determination of preservatives, antioxidants, colouring materials, emulsifiers and stabilizers used in pharmaceutical formulations.
COURSE CODE: MC	**RESEARCH METHODOLOGY AND INTELLECTUAL PROPERTY RIGHTS**
CO1	To scrutinize the research related information.
CO2	To accentuate the need of information about intellectual property rights among students.
CO3	Inspect out research problems and formulations.
CO4	Investigations of solutions, research problems, data collection, analysis and interpretation of data.
COURSE CODE: Lab I	**MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES LAB**
CO1	To study Incompatibility studies
CO2	Identification of functional groups and determination by FTIR
CO3	Separation and calculation of Rf values by using paper chromatography, TLC, HPTLC
CO4	Estimation of multi component containing formulations by UV Spectrophotometry.
COURSE CODE: Lab II	**PHARMACEUTICAL AND FOOD ANALYSIS LAB**
CO1	Determination of fat content and rancidity in food products
CO2	Determination of pesticide residue in food products
CO3	Assay of analgesics and antipyretic drugs(API dosage forms) official in IP
CO4	Determination of saponification value, iodine value, peroxide value, acid value in food products.
COURSE CODE: AUDIT COURSE I	**ENGLISH FOR RESEARCH PAPER WRITING**
CO1	To know how to improve writing skills and level of readability.
CO2	Comprehend the skills needed when writing Title Ensure the good quality of paper at very first submission.
CO3	Ascertain about what to write in each section.
CO4	Flourish with skills needed when writing methods, results, conclusions etc.
AUDIT COURSE I	**DISASTER MANAGEMENT**

CO1	Learn to demonstrate and critical understanding of key concepts in disaster risk reduction and humanitarian response.
CO2	Critically evaluate disaster risk reduction and humanitarian response policy and practice from multiple perspectives.
CO3	Planning and programming in different countries, particularly their home country or the countries they work in.
CO4	Critically understand the strengths and weakness of disaster management approaches.
AUDIT COURSE I	**SANSKRIT FOR TECHNICAL KNOWLEDGE**
CO1	To obtain working knowledge in illustrious Sanskrit, the scientific language in the world.
CO2	Learning of Sanskrit to improve brain functioning.
CO3	The engineering scholars equipped with Sanskrit will be able to explore the huge knowledge from ancient literature.
CO4	Learning of Sanskrit to develop the logic in mathematics, science, and other subjects enhancing the memory power.
AUDIT COURSE I	**VALUE EDUCATION**
CO1	Sympathise value of education and self development
CO2	Imbibe good values in students.
CO3	Developing the overall personality.
CO4	learn the importance of character and competence.
M.PHARMACY (PHARMACEUTICAL ANALYSIS) I YEAR II SEMESTER	
COURSE CODE: PC III	**ADVANCED INSTRUMENTAL ANALYSIS I**
CO1	Thorough knowledge on various spectral aspects of X ray, IR, SEM
CO2	Be familiar with principles, instrumentation of ORD
CO3	Overview on CE in pharmaceutical analysis
CO4	Principles, instrumentation, pharmaceutical application of supercritical fluid chromatography
COURSE CODE: PC IV	**MODERN BIOANALYTICAL TECHNIQUES**
CO1	Able to understand extraction of drugs from biological sources
CO2	Familiar with separation of drugs using different techniques
CO3	Know the guidelines for BA & BE studies
CO4	Well versed with automation and computer aided analysis in sampling

COURSE CODE: PE III	PHARMACEUTICAL VALIDATION
CO1	Be acquainted with the knowledge of validation of instruments and equipment's.
CO2	Carry out validation of manufacturing processes
CO3	Interpretation of various methods of validation.
CO4	Application of various methodologies in pharmaceutical validation.
PE III	**HERBAL COSMETICS**
CO1	Gain knowledge on classification, economic aspects and regulatory provisions related to manufacture of cosmetics.
CO2	Get exposed to processes involved in manufacturing of herbal cosmetics related to skin.
CO3	Brief account on herbal extracts and herbal products of cosmetic importance.
CO4	Elaborative study of formulations related to hair care with regard to their composition and claims for various herbs used in them.
PE III	**PHARMACOEPIDEMIOLOGY AND PHARMACOECONOMICS**
CO1	Perceive various epidemiological methods and their applications.
CO2	Be able to understand fundamental principles of Pharmacoeconomics.
CO3	Should perform the key Pharmacoeconomics analysis methods.
CO4	Understand Pharmacoeconomics decision analysis methods and their applications.
PE IV	**ADVANCED INSTRUMENTAL ANALYSIS II**
CO1	Thorough knowledge on various electrochemical methods like fluorimetry, ELISA, RIA, etc.
CO2	Introduction and applications of conductometry
CO3	Methods of potentiometric titration to determine the end point
CO4	Working and applications of dropping mercury and rotating platinum electrodes
PE IV	**NUTRACEUTICALS**
CO1	Recognise the occurrence and characteristic features of phytochemicals as nutraceuticals.
CO2	Know the importance of nutraceuticals in various common problems with the concept of free radicals.
CO3	Acknowledge the role of antioxidants in free radical induced disease conditions.

CO4	Expose to various food laws and regulations, health claims and dietary supplement claims.
PE IV	**CLINICAL RESEARCH AND PHARMACOVIGILANCE**
CO1	**To explain the regulatory requirements for conducting clinical trials**
CO2	To demonstrate the types of clinical trial designs
CO3	Execute safety monitoring, reporting and close out activities
CO4	Detect new adverse drug reactions and their assessment
COURSE CODE: LAB III	**ADVANCED INSTRUMENTAL ANALYSIS I LAB**
CO1	To determine chlorides and sulphates by nephloturbidometry
CO2	To estimate riboflavin by flourimetry
CO3	To perform assay of official compounds by potentiometry and conductometric titrations
CO4	To determine phosphate interference on absorption of calcium
COURSE CODE: LAB IV	**MODERN BIOANALYTICAL TECHNIQUES LAB**
CO1	To analyse biomolecules quantitatively by gel electrophoresis
CO2	Isolation of analgesics from biological fluids
CO3	Protocol preparation and performance of bioanalytical method validation
CO4	Indicate the stability development by HPLC of API's
	MINI PROJECT WITH SEMINAR
CO1	Allows the students to study, do research and act by themselves using their abilities.
CO2	Improves communication skills and networking with others.
CO3	Helps in gaining expert knowledge and renewing motivational confidence.
CO4	Provides latest information in the field of science and technology.

COURSE CODE: AUDIT COURSE II	CONSTITUTION OF INDIA
CO1	Understandinge the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.
CO2	Confer the intellectual origins of the frame work of argument that informed the conceptualization of social reforms leading to revolution in India.
CO3	Dissertate the circumstances surrounding the foundation of the congress socialist party under the leadership of Jawaharlal Nehru and eventual failure of the proposal of direct elections through adult suffrage in the Indian constitution.
CO4	Discuss the passage of the Hindu Code Bill of 1956.
AUDIT COURSE II	**PEDAGOGY STUDIES**
CO1	Figure out what pedagogical practices are being used by teachers in formal and informal class rooms in developing countries.
CO2	The evidence on the effectiveness of these pedagogical practices, in what conditions and with what population of learners.
CO3	How can teacher education, school curriculum and guidance materials best support effective pedagogy?
CO4	Identify critical evidence gaps to guide the development.
AUDIT COURSE II	**STRESS MANAGEMENT BY YOGA**
CO1	Develop healthy mind in a healthy body thus improving social health.
CO2	Improve efficiency
CO3	overcome stress.
CO4	To get well acquinted with types of pranayama.
AUDIT COURSE II	**PERSONALITY DEVELOPMENT THROUGH LIFE ENLIGHTENMENT SKILLS**
CO1	Study of Shrimad-Bhagwad-Geeta help the student in developing his personality and achieve the highest goal in life.
CO2	Study of neethishatakam will help in developing versatile personality of students.
CO3	To awaken wisdom in students.
CO4	To became a person with stable mind, pleasing personality and determination.
M.PHARMACY (PHARMACEUTICAL ANALYSIS) II YEAR I SEMESTER	

COURSE CODE: PE V	BIOSTATISTICS
CO1	Discuss the basic concept and importance of statistical analysis.
CO2	Explain various methods of testing hypothesis.
CO3	Dissert the methods of collection of data, analysis and interpretation.
CO4	To understand the basic aspects of statistics such as central tendency, dispersion and correlation.
PE V	**SCALE UP AND TECHNOLOGY TRANSFER**
CO1	Manage the scale up process in pharmaceutical industry.
CO2	Assist in technology transfer.
CO3	To establish safety guidelines which prevent industrial hazards.
CO4	Be aware of process validation.
PE V	**PRODUCTION AREA DESIGN AND PACKAGING DEVELOPMENT**
CO1	To elaborate the current good manufacturing practices.
CO2	To maximise knowledge on pharmaceutical packaging and design.
CO3	To familiarise the packaging of solids, semisolids, parenterals, ophthalmic and aerosols.
CO4	To be acquainted with components of packaging and packaging materials.
COURSE CODE: OE	**SCREENING METHODS IN PHARMACOLOGY**
CO1	Know various techniques for screening of drugs for different pharmacological activities.
CO2	Aware of guidelines and regulations for screening new drug molecules on animals.
CO3	Notice the guidelines for handling animals and animal ethics for screening of drugs.
CO4	Care handling and breeding techniques of laboratory animals.
OE	**ENTREPRENEURSHIP MANAGEMENT**
CO1	Be able to involve in the role of enterprise in national and global economy.
CO2	Able to handle entrepreneurship concepts
CO3	Should meet the demands and challenges of growth strategies and networking.
CO4	Be able to launch and organise an enterprise.

OE	COSMETIC SCIENCE
CO1	Know various cosmetics their preparation, properties, MOA and uses.
CO2	Understanding the properties and evaluation of cosmetics by analytical methods.
CO3	Should be able to suggest proper usage of cosmetics.
CO4	Application of skin care products in the formulation of cosmeceuticals.
OE	**HAZARDS AND SAFETY MANAGEMENT**
CO1	Should disclose environmental problems among learners.
CO2	Develop an attitude of concern for the industrial environment.
CO3	Ensure safety standards in pharmaceutical industry.
CO4	Empower ideas to clear mechanism and management in different kinds of hazard management system.
OE	**AUDITS AND REGULATORY COMPLIANCE**
CO1	Capable of understanding the importance of auditing.
CO2	Have sound knowledge on methodology of auditing.
CO3	Understand the process of auditing in pharmaceutical industries.
CO4	Be competent with the planning process, responsibilities and administration**.**
COURSE CODE: DISSERTATION	**DISSERTATION WORK REVIEW II**
CO1	Search and evaluate the available literature in your given subject or chosen topic area
CO2	Read the selected articles thoroughly and evaluate them
CO3	Organise the selected papers by looking for patterns and by developing subtopics
CO4	Analyse critically a segment of published body of knowledge through summary
M.PHARMACY (PHARMACEUTICAL ANALYSIS) II YEAR II SEMESTER	
COURSE CODE: DISSERTATION	**DISSERTATION WORK REVIEW III**
CO1	Apply knowledge and understanding in relation to the agreed area of study
CO2	Communicate in written form by integrating, analysing and applying key texts and practices
CO3	Demonstrate advanced critical research skills in relation to career development

CO4	Integrate the theory and practice in evaluation
COURSE CODE: DISSERTATION	**DISSERTATION VIVA VOCE**
CO1	Demonstrate knowledge in the program domain
CO2	Presenting views cogently and precisely
CO3	Exhibit professional etiquette suitable for career progression
CO4	Exhibit sustained curiosity and have an attitude of attention in detailing of the project

COURSE OUTCOMES OF M.PHARM (PHARMACEUTICAL QUALITY ASSURANCE

R19 REGULATIONS

M.PHARMACY (PHARMACEUTICAL QUALITY ASSURANCE) I YEAR I SEMESTER	
COURSE CODE: PC I	**MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES**
CO1	Gain insight towards modern pharmaceutical analysis.
CO2	Apply knowledge in developing new methods for determination and validate procedures
CO3	Imply theories in the analysis of various bulk drugs and their formulations
CO4	Elaboration of knowledge in various instrumentation techniques
COURSE CODE: PC II	**QUALITY CONTROL AND QUALITY ASSURANCE**
CO1	Understand the CGMP aspects in pharmaceutical industry
CO2	To appreciate the importance of documentation in pharmaceutical industry
CO3	To comprehend with the scope of quality certifications
CO4	Proficiency and responsibilities of QA and QC.
COURSE CODE: PE I	**QUALITY MANAGEMENT SYSTEMS**
CO1	To impart fundamental knowledge and concepts about various quality management principles
CO2	To encompass six system inspection model and concept of IPQC
CO3	Look through ICH guidelines for stability testing of drug substances and drug products, risk management tools and HACCP

CO4	To study the tools for quality improvement and statistical approaches for quality.
PE I	**PHARMACEUTICALS AND FOOD ANALYSIS**
CO1	Application of various analytical techniques in determination of various food constituents and finished food products.
CO2	Able to apply analytical techniques in analysing food additives
CO3	Possess awareness on food regulations and legislations.
CO4	To analyse biomolecules in various food products
PE I	**DRUG REGULATORY AFFAIRS**
CO1	Mind full of technical aspects pertaining to the marketing authorization application.
CO2	Detail study of regulatory aspects that effect drug product design and pharmaceutical and bulk drug manufacture
CO3	Appraised of different competent regulatory authorities globally.
CO4	Well versed with quality, safety and legislation for cosmetic products and herbal products.
COURSE CODE: PE II	**PRODUCT DEVELPOMENT AND TECHNOLOGY TRANSFER**
CO1	To elucidate necessary information to transfer technology of existing products between various manufacturing places
CO2	To be familiar with development and informational content for IND, NDA, ANDA, and SNDA.
CO3	To know the concept, significance, design and layout of pilot plant scale up studies.
CO4	To be aware of pharmaceutical dosage form and their packaging requirements
PE II	**ADVANCED PHARMACEUTICAL ANALYSIS**
CO1	Perception on qualitative determination of various organic compounds
CO2	Knowledge on principles and procedures involved in determination of organic functional groups.
CO3	Accomplished with spectral analysis, dissolution parameters and microbial assays.
CO4	Performing different tests on excipients such as bulk density, particle size distribution etc.
PE II	**PHARMACEUTICAL MANAGEMENT**

CO1	Help students to know how to manage a pharma industry and its various departments.
CO2	Aids the students to develop leadership qualities, communication and interpersonal skills, decision making and motivation.
CO3	Management helps to understand the concept of managerial control, its levels and role , importance in pharma industry.
CO4	Allows the students to develop various managerial functional and professional skills required for a dynamic professional
COURSE CODE: MC	**RESEARCH METHODOLOGY AND IPR**
CO1	To analyse the research related information.
CO2	To emphasise the need of information about intellectual property rights among students.
CO3	Figure out research problems and formulations.
CO4	Investigation of solutions, research problems, data collection, analysis and interpretation of data.
COURSE CODE: LAB I	**MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES LAB**
CO1	Separation and calculation of Rf values by using paper chromatography, TLC, HPTLC techniques
CO2	To identify different functional groups and incompatibilities by FTIR
CO3	To perform simultaneous estimation of multicomponent containing formulations by UV spectrophotometry
CO4	To calibrate glass ware, pH meter, UV visible spectrophotometer, FTIR Spectrophotometry, HPLC
COURSE CODE: LAB II	**QUALITY CONTROL AND QUALITY ASSURANCE LAB**
CO1	Conduct solubility studies of weekly acidic and weekly basic drugs.
CO2	Interpret spectra's by IR, NMR and MASS .
CO3	Perform QC test for tablets, capsules, oral liquids and parenterals.
CO4	Demonstration of functional groups of the given samples by IR spectrophotometer**.**
COURSE CODE: AUDIT COURSE I	**ENGLISH FOR RESEARCH PAPER WRITING**
CO1	To know how to improve writing skills and level of readability.
CO2	Fathom the skills needed when writing Title Ensure the good quality of paper at very first submission.

CO3	Ascertain about what to write in each section.
CO4	Flourishwith skills needed when writing methods, results, conclusions etc.
AUDIT COURSE I	**DISASTER MANAGEMENT**
CO1	Learn to demonstrate and critical understanding of key concepts in disaster risk reduction and humanitarian response.
CO2	Critically evaluate disaster risk reduction and humanitarian response policy and practice from multiple perspectives.
CO3	Planning and programming in different countries, particularly their home country or the countries they work in.
CO4	Critically understand the strengths and weakness of disaster management approaches.
AUDIT COURSE I	**SANSKRIT FOR TECHNICAL KNOWLEDGE**
CO1	To obtain working knowledge in illustrious Sanskrit,the scientific language in the world.
CO2	Learning of Sanskrit to improve brain functioning.
CO3	The engineering scholars equipped with Sanskrit will be able to explore the huge knowledge from ancient literature.
CO4	Learning of Sanskrit to develop the logic in mathematics, science, and other subjects enhancing the memory power.
AUDIT COURSE I	**VALUE EDUCATION**
CO1	Sympathise value of education and self development
CO2	Imbibe good values in students.
CO3	Developing the overall personality.
CO4	learn the importance of character and competence.
M.PHARMACY (PHARMACEUTICAL QUALITY ASSURANCE) I YEAR II SEMESTER	
COURSE CODE: PC III	**PHARMACEUTICAL VALIDATION**
CO1	Able to explain the concept of validation.
CO2	Carry out validation of manufacturing process.
CO3	Apply the knowledge of validation to instruments and equipment's.
CO4	Acquainted with cleaning validation and analytical method validation.
COURSE CODE: PC IV	**PHARMACEUTICAL MANUFACTURING TECHNOLOGY**
CO1	Impart knowledge and skills necessary to train the students with industrial activities during pharmaceutical manufacturing.

CO2	Will be familiar with the principles and practices of aseptic process technology.
CO3	Have a better understanding of principles and instrumentation of quality by design and process analytical technology in pharmaceutical manufacturing.
CO4	Able to understand the common practice in pharmaceutical industry developments, plant layout and production planning.
COURSE CODE: PE III	**HAZARDS AND SAFETY MANAGEMENT**
CO1	Should disclose environmental problems among learners.
CO2	Develop an attitude of concern for the industrial environment.
CO3	Ensure safety standards in pharmaceutical industry.
CO4	Empower ideas to clear mechanism and management in different kinds of hazard management system.
PE III	**SPECTRAL ANALYSIS**
CO1	Acquire the knowledge about various aspects of X-Ray diffraction methods.
CO2	Knowledge on various spectral aspects of IR and ATR.
CO3	Familiar with principles , instrumentation and applications of potentiometer.
CO4	Principles, interference and applications of flame emission spectroscopy.
PE III	**SCREENING METHODS IN PHARMACOLOGY**
CO1	Know various techniques for screening of drugs for different pharmacological activities.
CO2	Aware of guidelines and regulations for screening new drug molecules on animals.
CO3	Notice the guidelines for handling animals and animal ethics for screening of drugs.
CO4	Care handling and breeding techniques of laboratory animals.
COURSE CODE: PE IV	**AUDITS AND REGULATORY COMPLIANCE.**
CO1	Capable of understanding the importance of auditing.
CO2	Have sound knowledge on methodology of auditing.
CO3	Understand the process of auditing in pharmaceutical industries.
CO4	Be competent with the planning process, responsibilities and administration**.**
PE IV	**HERBAL DRUG TECHNOLOGY**

CO1	Acquire knowledge on the preparation and standardization of herbal preparations.
CO2	Expose to various research institutions of natural products.
CO3	Acquinted with method of extraction, preparation and purification of herbal extracts.
CO4	Aware of colorants and sweeteners of natural origin.
PE IV	**STABILITY OF DRUGS AND DOSAGE FORMS**
CO1	Describe the evaluation of stability of solutions, solids, and formulations against adverse conditions.
CO2	Able to suggest the measures to retain stability and storage conditions for reataining the efficacy of drug products.
CO3	To know various drug decomposition mechanisms and stabilization of pharmaceuticals.
CO4	To understand the method of analysis in determination of quality of cosmetics in the finished forms and legislation of cosmetic products.
COURSE CODE: LAB III	**PHARMACEUTICAL VALIDATION LAB III**
CO1	Calibration of electronic balance and PH metre.
CO2	Qualification of pharmaceutical testing equipment like dissolution, disintegration and friability apparatus.
CO3	Preparation of batch manufacturing and master formula records.
CO4	Validation of analytical methods in processing area.
COURSE CODE: LAB IV	**PHARMACEUTICAL MANUFACTURING TECHNOLOGY LAB**
CO1	To study the design of sterile and non sterile plant layouts.
CO2	To prepare checklist for water for injection and sterile production area.

CO3	To perform stability study of tablet dosage forms.
CO4	To formulate and evaluate enteric coated pellets.
COURSE CODE: AUDIT COURSE II	**CONSTITUTION OF INDIA**
CO1	Understanding the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.
CO2	Confer the intellectual origins of the frame work of argument that informed the conceptualization of social reforms leading to revolution in India.
CO3	Dissertate the circumstances surrounding the foundation of the congress socialist party under the leadership of Jawaharlal Nehru and eventual failure of the proposal of direct elections through adult suffrage in the Indian constitution.
CO4	Discuss the passage of the Hindu Code Bill of 1956.
AUDIT COURSE II	**PEDAGOGY STUDIES**
CO1	Figure out what pedagogical practices are being used by teachers in formal and informal class rooms in developing countries.
CO2	The evidence on the effectiveness of these pedagogical practices, in what conditions and with what population of learners.
CO3	How can teacher education, school curriculum and guidance materials best support effective pedagogy.
CO4	Identify critical evidence gaps to guide the development.
AUDIT COURSE II	**STRESS MANAGEMENT BY YOGA**
CO1	Develop healthy mind in a healthy body thus improving social health.
CO2	Improve efficiency
CO3	Overcome stress.
CO4	To get well acquainted with types of pranayama.
AUDIT COURSE II	**PERSONALITY DEVELOPMENT THROUGH LIFE ENLIGHTENMENT SKILLS**
CO1	Study of Shrimad-Bhagwad-Geeta help the student in developing his personality and achieve the highest goal in life.
CO2	Study of neethishatakam will help in developing versatile personality of students.
CO3	To awaken wisdom in students.

CO4	To became a person with stable mind, pleasing personality and determination.

M.PHARMACY (PHARMACEUTICAL QUALITY ASSURANCE) II YEAR I SEMESTER	
COURSE CODE: PE V	**BIOSTATISTICS**
CO1	Discuss the basic concept and importance of statistical analysis.
CO2	Explain various methods of testing hypothesis.
CO3	Dissert the methods of collection of data, analysis and interpretation.
CO4	To understand the basic aspects of statistics such as central tendency, dispersion and correlation.
PE V	**SCALE UP AND TECHNOLOGY TRANSFER**
CO1	Manage the scale up process in pharmaceutical industry.
CO2	Assist in technology transfer.
CO3	To establish safety guidelines which prevent industrial hazards.
CO4	Be aware of process validation.
PE V	**PRODUCTION AREA DESIGN AND PACKAGING DEVELOPMENT**
CO1	To elaborate the current good manufacturing practices.
CO2	To maximise knowledge on pharmaceutical packaging and design.
CO3	To familiarise the packaging of solids, semisolids, parenterals, ophthalmic and aerosols.
CO4	To be acquainted with components of packaging and packaging materials.
COURSE CODE: OE	**ENTREPRENEURSHIP MANAGEMENT**
CO1	Be able to involve in the role of enterprise in national and global economy.
CO2	Able to handle entrepreneurship concepts
CO3	Should meet the demands and challenges of growth strategies and networking.
CO4	Be able to launch and organise an enterprise.
OE	**COSMETIC SCIENCE**
CO1	Know various cosmetics their preparation, properties, MOA and uses.

CO2	Understanding the properties and evaluation of cosmetics by analytical methods.
CO3	Should be able to suggest proper usage of cosmetics.
CO4	Application of skin care products in the formulation of cosmeceuticals.
OE	**NANO BASED DRUG DELIVERY SYSTEMS**
CO1	Able to apply the properties related to the fabrication of nano pharmaceuticals.
CO2	Be aware of molecular formulations based on nano technology and science behind them.
CO3	Be able to select the right kind of materials and evaluate the product.
CO4	Improvements to medical or molecular imaging using nano technology.
OE	**NUTRACEUTICALS**
CO1	Recognise the occurrence and characteristic features of phytochemicals as nutraceuticals.
CO2	Know the importance of nutraceuticals in various common problems with the concept of free radicals.
CO3	Acknowledge the role of antioxidants in free radical induced disease conditions.
CO4	Expose to various food laws and regulations, health claims and dietary supplement claims.
OE	**PHARMACOEPIDEMIOLOGY AND PHARMACOECONOMICS**
CO1	Perceive various epidemiological methods and their applications.
CO2	Be able to understand fundamental principles of pharmacoeconomics.
CO3	Should perform the key pharmacoeconomics analysis methods.
CO4	Understand pharmacoeconomics decision analysis methods and their applications.
COURSE CODE: DISSERTATION	**DISSERTATION WORK REVIEW II**
CO1	Search and evaluate the available literature in your given subject or chosen topic area
CO2	Read the selected articles thoroughly and evaluate them

CO3	Organise the selected papers by looking for patterns and by developing subtopics
CO4	Analyse critically a segment of published body of knowledge through summary
M.PHARMACY (PHARMACEUTICAL QUALITY ASSURANCE) II YEAR II SEMESTER	
COURSE CODE: DISSERTATION	**DISSERTATION WORK REVIEW III**
CO1	Apply knowledge and understanding in relation to the agreed area of study
CO2	Communicate in written form by integrating, analysing and applying key texts and practices
CO3	Demonstrate advanced critical research skills in relation to career development
CO4	Integrate the theory and practice in evaluation
COURSE CODE: DISSERTATION	**DISSERTATION VIVA VOCE**
CO1	Demonstrate knowledge in the program domain
CO2	Presenting views cogently and precisely
CO3	Exhibit professional etiquette suitable for career progression
CO4	Exhibit sustained curiosity and have an attitude of attention in detailing of the project

B. PHARMACY 1ST YEAR R17 REGULATIONS PO CO MAPPING

		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
PS101	CO1	X										
	CO2	X										
	CO3	X										
	CO4	X										
PS102	CO1	X										
	CO2	X										
	CO3	X										
	CO4	X										
PS103	CO1	X										
	CO2	X										
	CO3	X										
	CO4	X										
PS104	CO1	X										
	CO2	X										
	CO3	X										
	CO4	X										
HS105	CO1											X
	CO2											X
	CO3											X
	CO4											X
BS106	CO1								X			
	CO2								X			
	CO3								X			
	CO4								X			
BS107	CO1	X										
	CO2	X										
	CO3	X										
	CO4	X										
PS108	CO1	X										
	CO2	X										
	CO3	X										
	CO4	X										
PS109	CO1			X								
	CO2			X								
	CO3			X								
	CO4			X								
PS110	CO1	X										
	CO2	X										
	CO3	X										
	CO4	X										
PS111	CO1	X										
	CO2	X										
	CO3	X										
	CO4	X										
HS112	CO1					X						
	CO2					X						
	CO3					X						
	CO4					X						

BS113	CO1	X										
	CO2	X										
	CO3	X										
	CO4	X										
PS201	CO1	X										
	CO2	X										
	CO3	X										
PS202	CO1	X										
	CO2	X										
BS203	CO1	X										
	CO2	X										
BS204	CO1									X		
	CO2									X		
CS205	CO1				X							
	CO2				X							
BS206	CO1										X	
	CO2										X	
BS209	CO1			X								
	CO2			X								
CS210	CO1				X							
	CO2				X							
PS207	CO1	X										
	CO2	X										
PS208	CO1	X										
	CO2	X										

PHARMA D 1ST YEAR R17 REGULATIONS PO CO MAPPING

		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13
CODE:1.1	CO1			X										
	CO2			X										
	CO3				X									
	CO4					X								
	CO5				X									
	CO6			X										
	CO7				X									
	CO8			X										
	CO9			X										
	CO10			X										
	CO11			X										
CODE:1.2	CO1		X											
	CO2		X											
	CO3				X									
	CO4				X									
	CO5								X					
	CO6				X									
	CO7			X										
CODE:1.3	CO1								X					
	CO2								X					
	CO3								X					
	CO4	X												
	CO5	X												
	CO6			X										
	CO7			X										
	CO8			X										
CODE:1.4	CO1		X											
	CO2		X											
	CO3		X											
	CO4			X										
	CO5			X										
	CO6			X										
	CO7		X											
	CO8			X										
CODE:1.5	CO1			X										
	CO2			X										
	CO3			X										
	CO4			X										
	CO5			X										
	CO6			X										
CODE:1.6	CO1			X										
	CO2				X									
	CO3				X									
	CO4				X									
	CO5				X									
	CO6				X									
	CO7				X									

CODE:1.7	CO1				X									
	CO2				X									
	CO3				X									
	CO4				X									

M.PHARMACY

PHARMACEUTICS R19 REGULATIONS PO CO MAPPING

COURSE CODE	COURSE OUTCOME	PO1	PO2	PO3	PO4
PC I	CO1				X
	CO2	X			
	CO3				X
	CO4			X	
PC II	CO1	X			
	CO2				X
	CO3			X	
	CO4		X		
PE I	CO1		X		
	CO2	X			
	CO3				X
	CO4	X			
PE I	CO1			X	
	CO2			X	
	CO3		X		
	CO4				X
PE I	CO1				X
	CO2	X			
	CO3			X	
	CO4				X
PE II	CO1	X			
	CO2	X			
	CO3		X		
	CO4		X		
PE II	CO1	X			
	CO2	X			
	CO3				X
	CO4				X
PE II	CO1		X		
	CO2			X	
	CO3		X		
	CO4				X
MC	CO1	X			
	CO2		X		
	CO3				X
	CO4	X			
LAB I	CO1				X
	CO2				X
	CO3				X
	CO4				X
LAB II	CO1			X	
	CO2			X	
	CO3			X	
	CO4			X	

AUDIT COURSE I	CO1	X			
	CO2	X			
	CO3	X			
	CO4	X			
AUDIT COURSE I	CO1	X			
	CO2	X			
	CO3	X			
	CO4	X			
AUDIT COURSE I	CO1	X			
	CO2	X			
	CO3	X			
	CO4	X			

PHARMACEUTICAL ANALYSIS R19 REGULATIONS PO CO MAPPING

COURSE CODE	COURSE OUTCOME	PO1	PO2	PO3
PC I	CO1	X		
	CO2			X
	CO3		X	
	CO4	X		
PC II	CO1	X		
	CO2	X		
	CO3		X	
	CO4			X
PE I	CO1	X		
	CO2		X	
	CO3		X	
	CO4		X	
PE I	CO1			X
	CO2			X
	CO3			X
	CO4			X
PE I	CO1		X	
	CO2		X	
	CO3			X
	CO4	X		
PE II	CO1	X		
	CO2			X
	CO3			X
	CO4	X		
PE II	CO1		X	
	CO2		X	
	CO3		X	
	CO4		X	
PE II	CO1			X
	CO2			X
	CO3			X
	CO4		X	
MC	CO1			X
	CO2			X
	CO3			X
	CO4			X
LAB I	CO1	X		
	CO2	X		
	CO3	X		
	CO4	X		
LAB II	CO1		X	
	CO2		X	
	CO3		X	
	CO4		X	
AUDIT COURSE	CO1	X		

I	CO2	X		
	CO3	X		
	CO4	X		
AUDIT COURSE I	CO1			X
	CO2			X
	CO3			X
	CO4			X
AUDIT COURSE I	CO1	X		
	CO2	X		
	CO3	X		
	CO4	X		
AUDIT COURSE I	CO1	X		
	CO2	X		
	CO3	X		
	CO4	X		