



Viswambhara Educational Society

VAAGDEVI PHARMACY COLLEGE

Approved by AICTE, PCI-New Delhi & Affiliated to JNTUH
P.O.BOLLIKUNTA, WARANGAL-506 005(Telangana State)

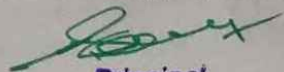
COURSE OUTCOMES (COs)

The learning objectives for the programmes and courses are spelled out in detail by the college. The institution uses the following approach to inform teachers and students about the learning outcomes. For the convenience of the teachers and students, hard copies of the syllabus and learning outcomes are available in the departments. The Program and Course Learning Outcomes are displayed on the walls outside of each Department. For reference, a soft copy of each program's curriculum and learning outcomes is also uploaded on the institution's website. Every IQAC meeting and College Committee meeting has discussed the importance of the learning outcomes with the teachers. Through tutorial meetings, the pupils are also made aware of the same.

PROGRAMME OUTCOMES (POs)

- 1. Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the Profession of Pharmacy, including biomedical sciences; Pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.
- 2. Planning Abilities:** Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.
- 3. Problem analysis:** Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.
- 4. Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.
- 5. Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well-being.




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6. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).
7. **Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.
8. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.
9. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.
10. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
11. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in dependent and life-long learning in the broadest context of technological change



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YEAR: I

**ACADEMIC YEAR 2020-21
 SEMESTER: I**

REGULATION: R17

Course Name: Human Anatomy and Physiology I

Course Code: PS101

CO-1	Identify common vocabulary, cell structure and function, and the histology of various tissues and organs of various human body systems.
CO-2	Understand the concepts and knowledge of gross anatomy, and physiology related to the integumentary, skeletal, muscular and its articulation.
CO-3	Apply concepts of nervous systems and its coordination.
CO-4	Analyze the sense organs mechanism and their disorders.
CO-5	Classify and identify principal hormones and their function.

Course Name: Pharmaceutical Analysis I

Course Code: PS102

CO-1	Develop the ideas with the fundamentals of analytical Chemistry.
CO-2	Construct the fundamental methodology to prepare different strength of solutions and can Predict the sources of Errors.
CO-3	Develop Knowledge on Principe, Classification and applications of different types of titrimetric methods.
CO-4	Develop basic knowledge in the principles of electrochemical analytical techniques.
CO-5	Develop interpretation Skills in terms of choice of analytical techniques to perform the estimation of different category drugs.

Course Name: Pharmaceutics I

Course Code: PS103

CO-1	Summarize the history of pharmacy and list the pharmacopeias along with their features.
CO-2	Utilize the pharmaceutical calculations for formulating and dispensing various dosage forms.
CO-3	Define various pharmaceutical dosage forms along with its formulations and methods of preparations.
CO-4	Inspect the physical, chemical and therapeutic incompatibilities for preparation and dispensing. List out code of ethics.
CO-5	Explain where pharmaceutical additives are used and classify them.



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Course Name: Pharmaceutical Inorganic Chemistry-I

Course Code: PS104

CO-1	DEFINE terminology related to pharmacopoeia and impurities.
CO-2	OUTLINE buffers, methods of tonicity, electrolytes and dental products.
CO-3	UTILIZE the knowledge of gastrointestinal agents
CO-4	EXAMINE the assay and medicinal uses of some miscellaneous compound.
CO-5	EVALUATE activity and properties of radiopharmaceuticals

Course Name: Communication skills

Course Code: HS105

CO-1	Develops language skills like listening, speaking, reading and writing
CO-2	Organize and deliver discussions, presentations effectively with proper syntax.
CO-3	Apply their skills in interviews or in Group Discussions
CO-4	Adapts good pronunciation, good communicative styles.
CO-5	Plan their presentations and seminars in an organized manner

Course Name: Remedial Biology

Course Code: BS106

CO-1	Explain the Cell biology (Basic Nature of Plant cell and Animal cell)
CO-2	Classify the System of both Plants & Animals
CO-3	Discuss various tissue system and organ system in plant and animals
CO-4	Explain the theory of evolution
CO-5	Demonstrate the Anatomy and Physiology of plants and animals



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Course Name: Remedial Mathematics

Course Code: BS107

CO-1	Apply the basic knowledge of algebra to apply in Pharmaceutical Sciences when they require in higher studies
CO-2	Apply the basics of trigonometry and co-ordinate geometry to solve simple problems and use the knowledge in pharmaceutical calculations
CO-3	Understand and apply basic differential equations to solve the problems errors and approximations which arises in Pharmaceutical Sciences
CO-4	Use the knowledge of integral calculus to find the areas and apply the knowledge in Pharmaceutical Sciences accurately.
CO-5	Identify the types of differential equation and use the right method to solve and also apply the knowledge in Pharmaceutical Sciences

Course Name: Human Anatomy and Physiology-I lab

Course Code: PS108


CO-1	Identify the major tissue types and locate examples of each in the body.
CO-2	Describe the different types of bones and provide an example of each type.
CO-3	Locate and identify anatomical structures that surround and protect the brain.
CO-4	Locate and identify anatomical structures of the special senses.
CO-5	Describe the somatic reflex arc.

Course Name: Pharmaceutical Analysis-I lab

Course Code: PS109

CO-1	Develop the Calculations of various standardized solutions.
CO-2	Construct the fundamental methodology to prepare different strength of solutions and can Predict the sources of Errors.
CO-3	Develop Knowledge on Principle and assay procedure of various titrimetric methods.
CO-4	Develop basic knowledge in the principles of electrochemical analytical techniques.
CO-5	Develop interpretation Skills in terms of choice of analytical techniques to perform the Qualitative and Quantitative estimation of different category drugs.




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Course Name: Pharmaceutics I lab

Course Code: PS108

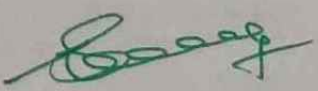
CO-1	Demonstrating and practice preparation and dispensing of various dosage forms the dosage forms
CO-2	Identify the incompatibilities in dispensing a pharmaceutical dosage form
CO-3	Evaluate the prescription and estimate the accurate dose using various calculations.
CO-4	Demonstrating and practice preparation and dispensing of various dosage forms the semisolid dosage form
CO-5	Demonstrating and practice preparation and dispensing of various dosage forms the Mouthwashes

Course Name: Pharmaceutical Inorganic Chemistry-I lab

Course Code: PS108

CO-1	Perform Limit test for the various Inorganic compounds as per the procedure given in Indian pharmacopoeia
CO-2	Calibrate weights, pipette and burette.
CO-3	Perform assay various inorganic compounds with the help of titrations
CO-4	Identify different inorganic compounds
CO-5	Prepare and purify different inorganic compounds




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Course Name: Communication skills lab

Course Code: HS112

CO-1	Adapts good pronunciation, identifying the correct speech sounds and excel to communicate well in the professional and personal contexts.
CO-2	Creates a consistent accent and builds confidence
CO-3	Identifies the errors in pronunciation and facilitates students in speaking Target language i.e. English without the influence of mother tongue.
CO-4	Demonstrates , public speaking skills with clarity and confidence through appropriate verbal and non verbal communication.
CO-5	Develop the comprehension skills and improves appropriate language for public speaking, group discussions and Interviews.

Course Name: Remedial Biology lab

Course Code: PS111

CO-1	Identify the Cell biology (Basic Nature of Plant cell and Animal cell)
CO-2	Classify the System of both Plants & Animals
CO-3	Isolate various tissue system and organ system in plant and animals
CO-4	Explain the theory of evolution
CO-5	Demonstrate the Anatomy and Physiology of plants and animals



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YEAR: I

SEMESTER: II

REGULATION: R17

Course Name: Human Anatomy and Physiology II

Course Code: PS201

CO-1	Identify the major components of the circulatory system and lymphatic system, describe their functions.
CO-2	Describe the flow of blood through the heart and the role of each atrium, ventricle, and valve in this process.
CO-3	Describe the components and functions of major digestive juices, and explain where they are produced
CO-4	Describe pulmonary ventilation and identify the structures and Identify the major components of the urinary system and describe their functions.
CO-5	Locate and identify the structures that make up the female and male reproductive system.

Course Name: Pharmaceutical Organic Chemistry I

Course Code: PS202

CO-1	Apply the principles of organic chemistry to classify and name organic compounds
CO-2	Identify and distinguish the structural isomers organic compounds
CO-3	Analyse and write the reactions and uses of various organic compounds
CO-4	Discuss the orientation, reactivity and stability of organic compounds
CO-5	Identify and confirm the organic compounds by qualitative tests

Course Name: Biochemistry

Course Code: BS203

CO-1	Define different definitions like enzymes, hemostasis, osmoregulation, carbohydrates, protein, vitamins, lipids, nucleic acids and compare the structure and functions of different organelles.
CO-2	Explain electron transport chain and oxidative phosphorylation, its importance and mechanism of actions.
CO-3	Determine the energetic of various metabolic pathways like glycolysis, ETC, Krebs cycle, β oxidation of fatty acids etc.
CO-4	Classify and explain the different types of enzymes and enzyme inhibitions. Demonstrate the factors effecting enzyme action.
CO-5	Outline the concepts and biological importance of biological macromolecules. Discuss and explain the various metabolisms of complex biochemical macromolecules like carbohydrates,



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Course Name: Pathophysiology

Course Code: BS204

CO-1	DEFINE basic principles of Cell injury and able to explain basic mechanism involved in the process of inflammation
CO-2	OUTLINE the diseases related to cardiovascular, respiratory and renal system.
CO-3	UTILIZE the knowledge in diagnosing the diseases related to haematological diseases and endocrine, nervous and gastrointestinal systems
CO-4	EXPLAIN the etiology of diseases related to bone, joints and pathogenesis of cancer
CO-5	ILLUSTRATE the etiology and pathogenesis of infectious diseases.

Course Name: Computer Applications in Pharmacy

Course Code: CS205

CO-1	Understand the concept of data collection and treatment
CO-2	Apply the knowledge of data collection to find statistical information
CO-3	Understand the concept CRD, RBD and LSD and evaluate to the Design concept.
CO-4	Demonstrate the basic concepts of MS Excel and MS Power Point
CO-5	Analyze benefits of Data base Management systems and Structured Query Languages

Course Name: Human Anatomy and Physiology II lab

Course Code: PS206

CO-1	Describe and Classify the different types of blood cells
CO-2	Review the major steps in blood coagulation.
CO-3	Describe a nephron and explain the functions of its major parts.
CO-4	List the major components of blood plasma and describe the functions of each
CO-5	Define pregnancy and describe the process of fertilization.



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Course Name: Pharmaceutical Organic Chemistry I lab

Course Code: PS207

CO-1	Apply the qualitative analysis principles to analyse organic compound having different functional groups.
CO-2	Identify the unknown organic compound having different functional groups.
CO-3	Explain and understand the principals of qualitative analysis.
CO-4	Demonstrate the laboratory skills to prepare organic compounds.
CO-5	Explain the organic chemistry concepts by constructing the molecular models.

Course Name: Biochemistry lab

Course Code: BS208

CO-1	Identify the Carbohydrates by performing their individual identification tests.
CO-2	Evaluate the Glucose content which is present in Urine.
CO-3	Calculate the percentage of creatinine present in Blood.
CO-4	Identify the proteins by performing their individual identification tests.
CO-5	Identify the Amino acids by performing their individual identification tests.

Course Name: Computer Applications in Pharmacy lab

Course Code: CS209

CO-1	Apply the concept of data collection and treatment
CO-2	Apply the knowledge of data collection to find statistical information
CO-3	Apply the concept CRD, RBD and LSD and evaluate to the Design concept.
CO-4	Demonstrate the basic concepts of MS Excel and MS Power Point
CO-5	Analyze benefits of Data base Management systems and Structured Query Languages



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ACADEMIC YEAR 2020-21

YEAR: II

SEMISTER: I

REGULATION: R17

Course Name: **Pharmaceutical Organic chemistry-II**

Course Code: **PS301**

CO-1	Analyse and write the structure, nomenclature, Aromaticity, reactivity and orientation of benzene and its derivatives
CO-2	Interpret and Explain the Acid –base properties of phenols and amines and its substituents
CO-3	Identify the nature and reactions of Fatty acids, Fats-oils and their estimation in analytical constants with significance.
CO-4	write the synthesis, reactions with mechanisms and uses of Polycyclic Aromatic Hydrocarbons
CO-5	Predict the stabilities of cycloalkanes and their reactivity.

Course Name: **Physical Pharmaceutics -I**

Course Code: **PS302**

CO-1	DEFINE terminology related to properties of matter.
CO-2	OUTLINE physicochemical properties, complexation and protein binding of drug molecules
CO-3	UTILIZE the knowledge of solubility of drugs in formulation
CO-4	EXAMINE the tonicity of parenteral and ophthalmic preparations.
CO-5	EVALUATE formulation based on its solid state properties

Course Name: **Pharmaceutical Microbiology**

Course Code: **PS303**

CO-1	Define pharmaceutical microbiology, pure culture, and able to choose nutrient media for isolation of different microorganisms by using different microscopes
CO-2	Understand staining, preservation and sterilization techniques accordingly they can compare and classify the microorganisms.
CO-3	Develop a new method for cultivation of virus and fungi, they got to know make use of disinfectants and testing of sterilizing agents.
CO-4	Classify clean areas and analyze antimicrobial activity of a new substance
CO-5	Evaluate microbial spoilage of pharmaceutical products and apply cell cultures in pharmaceutical industry



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Course Name: Pharmaceutical Engineering

Course Code: PS304

CO-1	Explain the concepts of fluid flow & describe the phenomenon of size reduction and size separation for effective practices sizing on pharmaceutical field.
CO-2	Outline the concepts of heat transfer mechanisms and summarize the importance of various unit operations used in pharmaceutical industries like evaporation and distillation.
CO-3	Demonstrate the principles and applications of unit operations like drying, mixing filtration and centrifugation.
CO-4	Discuss the various material handling systems, types of corrosion and their preventive methods in pharmaceutical industries.
CO-5	Emphasis on various factors affecting the materials selected for pharmaceutical plant construction.

Course Name: Pharmaceutical Organic chemistry-II Lab

Course Code: PS305


CO-1	apply the basic knowledge of organic chemistry in identification of functional groups and synthesis of organic compounds
CO-2	Analyse and predict the principles of chemical reactions
CO-3	Analyse and interpret the mechanism of chemical reactions
CO-4	apply the concept of moles in calculating theoretical yield
CO-5	calculate and estimate the percentage purity of the compounds synthesised

Course Name: Physical Pharmaceutics Lab

Course Code: PS306

CO-1	Determine the physicochemical properties of pharmaceutical substances
CO-2	Estimate the pH of the fluids
CO-3	Estimate the pH of the liquids
CO-4	Construct phase diagrams
CO-5	Calculate phase diagrams




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Course Name: Pharmaceutical Microbiology Lab

Course Code: BS307

CO-1	Understand various accessories for microbiology practicals.
CO-2	Develop basic skill in aseptic techniques.
CO-3	Perform various staining techniques.
CO-4	Isolate and identify microorganism form laboratory sample.
CO-5	Standard protocols in pharmaceutical industry – IP.

Course Name: Pharmaceutical Engineering Lab

Course Code: PC308

CO-1	Explain Size Analysis By Sieving , Size Reduction Using Ball Mill, Mixing, Distillation
CO-2	Determine Construction Working And Application Of Pharmaceutical Machinery
CO-3	Calculate The Efficiency Of Steam Distillation And Uniformity Index For Given Sample
CO-4	Evaluate Materials Used For Mixing, Drying, Filtration, Centrifugation
CO-5	Demonstration Of Colloid Mill, Planetary Mixer, Fluidized Bed Dryer, Freeze Dryer And Such Other Major Equipment



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YEAR: II

SEMISTER: II

REGULATION: R17

Course Name: **Pharmaceutical Organic chemistry-III**

Course Code: **PS401**

CO-1	Apply the concepts of stereochemistry in identifying the chiral and achiral molecules, Racemisation and Resolution of Racemic mixture.
CO-2	Determine the nomenclature and configuration of stereoisomer and conformation of saturated compounds and atropisomerism
CO-3	Interpret the nomenclature and classification of heterocyclic compounds and write the synthesis
CO-4	Compare the reactivity and properties of heterocyclic compounds with uses.
CO-5	Outline and discuss the reaction with its mechanism and Applications of Named reactions and Reagents

Course Name: **Medicinal chemistry-I**

Course Code: **PC402**

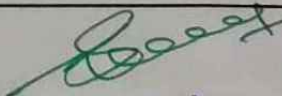
CO-1	Apply the concept of physicochemical properties of drug molecule in relation to biological activity and their phases of metabolism, in the development of New drug
CO-2	Analyze and interpret the nomenclature of compounds of synthetic origin
CO-3	Explain the mechanism of action of various category of drugs
CO-4	Apply the knowledge of medicinal chemistry in the study of Structural activity relationship of drug molecules.
CO-5	Apply the concepts of organic chemistry in the synthesis and development of lead molecules for new drug discovery

Course Name: **Physical Pharmaceutics -II**

Course Code: **PS403**

CO-1	Apply mathematical models to determine the rate and order of reaction, shelf life and explain various factors influencing reaction rates
CO-2	Explain and determine interfacial properties of liquids. Explain types and properties of colloidal systems.
CO-3	Estimate the size, shape and surface area of powder
CO-4	Determine the nature of flow of liquids and their measurement
CO-5	Formulate and evaluate suspensions and emulsions.




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Course Name: Pharmacology-I

Course Code: PC404

CO-1	Outline the basic scientific concepts and principles that serve as the foundational underpinnings of the pharmacological sciences including pharmacokinetics, pharmacodynamics, drug metabolism
CO-2	Enumerates about autonomic nervous system and list out different types of drugs used to treat disorders of autonomic nervous system.
CO-3	List and discuss selected drugs used to treat disorders of central nervous system including their clinical uses and potential adverse effects.
CO-4	Explains the pharmacology of NSAIDS, Narcotic analgesics & antagonists, local anaesthetics and drugs acting on various CNS disorders.
CO-5	Understands pharmacology of anti-psychotics, anti-depressants, anti-maniacs, hallucinogens, anti-epileptic and anti-parkinsonian drugs.

Course Name: Pharmacognosy and Phytochemistry-I

Course Code: PC405

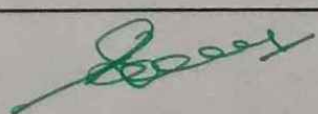
CO-1	Define pharmacognosy, classify the crude drugs and explain methods of drug evaluation.
CO-2	Explain the techniques and methods involved in cultivation and collection production of crude drug.
CO-3	Illustrate the plant tissue culture and its applications. brief note on edible vaccines.
CO-4	Explain role of pharmacognosy in traditional system of medicine
CO-5	Study of primary metabolites from natural sources

Course Name: Medicinal Chemistry-I Lab

Course Code: PC406

CO-1	Apply the basic knowledge of organic chemistry in synthesis of medicinal compounds
CO-2	Analyse and predict the principles of chemical reactions
CO-3	Apply and interpret the mechanism of chemical reactions
CO-4	apply the concept of moles in calculating theoretical yield
CO-5	calculate and estimate the percentage purity of the compounds synthesised




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Course Name: Physical Pharmaceutics-II Lab

Course Code: PC407

CO-1	Determine the order of a reaction
CO-2	Analyze the properties of powders
CO-3	Determine the surface phenomena and surfactant properties
CO-4	Construct adsorption isotherms
CO-5	calculation of adsorption isotherms

Course Name: Pharmacology-I Lab

Course Code: PC408

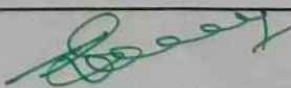
CO-1	Describes about basics of experimental pharmacology
CO-2	Demonstrates usage of animals in experimental pharmacology and gives knowledge about animal handling, routes of drug administration and bleeding techniques.
CO-3	To interpret various drug actions on experimental animals
CO-4	To distinguish <i>in-vitro</i> and <i>in-vivo</i> experiments
CO-5	Understands ethical considerations while housing and handling of experimental animals

Course Name: Pharmacognosy and Phytochemistry-I Lab

Course Code: PC409

CO-1	Describes about essential oil content in Eucalyptus by Clavengres apparatus
CO-2	Demonstrates about extraction procedure of crude drugs
CO-3	To interpret the Rf values of chemical constituents
CO-4	To distinguish about microscopical characters of leaf constituents
CO-5	Understands and differentiate spotting of crude drugs




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ACADEMIC YEAR 2020-21

YEAR: III

SEMESTER: I

REGULATION: R17

Course Name: Medicinal Chemistry II

Course Code: PS501

CO-1	Describe the chemistry of drugs with respect to their pharmacological activity.
CO-2	Discuss the drug metabolic pathways, adverse effects and therapeutic value of drugs
CO-3	Explain the physicochemical properties and pharmacokinetic properties of the drugs
CO-4	Explain the structural activity relationship of different class of drugs.
CO-5	Examine the chemical synthesis of various drugs.

Course Name: Industrial Pharmacy - I

Course Code: PS502

CO-1	Define various Pharmaceutical dosage forms
CO-2	Explain considerations involved in development of Pharmaceutical dosage forms
CO-3	Apply preformulation concepts in the development of solid, liquid and parenteral dosage forms
CO-4	Compare various dosage forms based on their formulation and usage
CO-5	Evaluate the dosage forms for their quality

Course Name: Pharmacology II

Course Code: PS503

CO-1	Understanding of Anatomy and Physiology of cardiovascular system, concept of various cardio vascular disorders (Hypertension, Congestive heart failure, Angina)
CO-2	Describes treatment of hyperlipidemias along with their classification of drugs and pharmacology, Drugs acting on blood and blood forming agents.
CO-3	Outline Concept of Autacoids- various types of autacoids (amine autacoids, lipid derived autacoids and peptide autacoids).
CO-4	Summarize Physiology of respiration and drugs acting on respiratory disorders. Concept of Bio-assay- Principle, types, Importance and applications of biological
CO-5	Demonstrates Treatment of metabolic disorders like Diabetes Mellitus, Drugs acting on Thyroid disorders. Steroidal anti-inflammatory agents and Oral



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Course Name: Pharmacognosy and Phytochemistry - II

Course Code: PS504

CO-1	Define Primary metabolites. Explain about shickmic acid path way .
CO-2	Explain about biogenesis of Atropine and Morphine.
CO-3	List out factors effecting tracer technique .
CO-4	Define Alkaloids and glycosides with extraction procedure .
CO-5	Define tannins and resins

Course Name: Green Chemistry

Course Code: PS506

CO-1	Apply the 12 principles of green chemistry for environment benign chemical synthesis
CO-2	Discuss anout the the solvent less reactions and green solvent used for chemical synthesis
CO-3	Apply the principles of sonochemsity and microwave irradiations in green synthesis
CO-4	Discuss the principles and green chemistry strategies by using catalysts and alternative reagents.
CO-5	Apply the principle of green chemistry in synthesizing some important drugs

Course Name: Cosmetic science

Course Code: PS508

CO-1	RECALL regulations pertaining to cosmetics and cosmetic excipients
CO-2	OUTLINE classification of cosmetics and cosmeceuticals
CO-3	UTILIZE the knowledge of creams, antiperspirants, deodorants, skin and hair care products etc.in further formulation.
CO-4	ANALYZE various oral, hair and skin related problems.
CO-5	EVALUATE various cosmetic formulations based on skin functions, hair and oral care.



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Course Name: Industrial Pharmacy - I Lab

Course Code: PS509

CO-1	Explain how solubility, particle size, particle shape, crystallinity, amorphous structure of pure drug as preformulation parameters plays a major role in the
CO-2	Determine the formulation and manufacturing procedures of different types of tablet dosage forms and capsule dosage forms.
CO-3	Develop different coating procedures to tablets and evaluate prepared coated tablets.
CO-4	Evaluate materials used for packaging such as glass, plastic and rubber containers.
CO-5	Formulate various types of cosmetics and perform evaluation of cosmetic preparations

Course Name: Pharmacology II Lab

Course Code: PS510

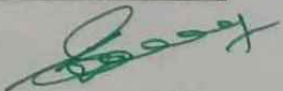
CO-1	Define various terminology used in pharmacology
CO-2	Identify the pharmacological actions of drugs on the tissues
CO-3	Identify the unknown concentration of a drug on the animal model
CO-4	Compare the potency of standard with the test compound
CO-5	Demonstrate the animal model or bioassay method by using stimulated softwares

Course Name: Pharmacognosy and Phytochemistry - II

Course Code: PS511

CO-1	Define Primary metabolites. Explain about shickmic acid path way .
CO-2	Explain about biogenesis of Atropine and Morphine.
CO-3	List out factors effecting tracer technique .
CO-4	Define Alkaloids and glycosides with extraction procedure .
CO-5	Define tannins and resins




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Course Name: Environmental sciences

Course Code: MC500

CO-1	Define Ecosystem and classify food chain and food web and biogeocycles
CO-2	Explain About different types of natural resources with examples.
CO-3	List out different nation parks present in india and write about conservation of biodiversity.
CO-4	Define pollution and explain about different types of pollution
CO-5	Define environmental policy and legislation and write about forest act



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YEAR: III

SEMISTER: II

REGULATION: R17

Course Name: Medicinal Chemistry - III

Course Code: PS601

CO-1	Describe the chemistry of drugs with respect to their pharmacological activity.
CO-2	Discuss the drug metabolic pathways, adverse effects and therapeutic value of drugs.
CO-3	Explain the physicochemical properties and pharmacokinetic properties of the drugs
CO-4	Explain the structural activity relationship of different class of drugs.
CO-5	Examine the chemical synthesis of various drugs

Course Name: Pharmacology - III

Course Code: PS602

CO-1	Define various diseases and the drugs category which are used in their treatment.
CO-2	Classify various drugs for the treatment according to their action category and Summarize their pharmacological actions with side effects, dose,
CO-3	Summarize the mechanism of action of drugs and its relevance in the treatment of different diseases.
CO-4	Distinguish between the available treatments procedures and select the appropriate method of treatment.
CO-5	Evaluate the condition of patient and council him with their knowledge of pharmacology.

Course Name: Herbal Drug Technology

Course Code: PS603

CO-1	Illusurate WHO guide lines for standardisation of herbal drugs .
CO-2	Explain and evaluate about formulation of herbal shampoos.
CO-3	Demonstrate about Nutraceuticals with classification .
CO-4	Define plant tissue culture with applications .
CO-5	Ensure about formulation of herbal syrups .



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Course Name: Biopharmaceutics and Pharmacokinetics

Course Code: PS604

CO-1	Compare the influence of dosage forms on dissolution behaviour of same API
CO-2	Connect various physicochemical properties of drug affect on dissolution rate of drug substance
CO-3	Design various techniques that enhance the dissolution rate of drugs
CO-4	Correlate <i>In-vitro</i> – <i>In-vivo</i> absorption studies of various dosage forms
CO-5	Solve and interpret various pharmacokinetic parameters by applying statistical treatment to pharmacokinetic data

Course Name: Pharmaceutical Quality Assurance

Course Code: PS605

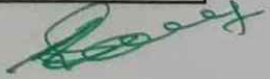
CO-1	Understand the c GMP aspects in a pharmaceutical industry.
CO-2	Appreciate the importance and Construct the documentation.
CO-3	Develop Knowledge and understand the scope of quality certifications applicable to Pharmaceutical industry
CO-4	Develop basic knowledge and understand the responsibilities of QA & QC departments.
CO-5	Develop basic knowledge Manufacturing operations and controls.

Course Name: Pharmaceutical Biotechnology

Course Code: PS606

CO-1	Define basic concepts of enzyme biotechnology and protein engineering.
CO-2	Outline about recombinant DNA technology and Immunity
CO-3	Utilize the knowledge of hybridoma technology and vaccines
CO-4	Examine immune blotting techniques and genetic organization
CO-5	Explain about mutants, use of microorganisms in fermentation technology




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Course Name: Bioinformatics

Course Code: PS607

CO-1	Interpret relationships among living things and analyze and solve biological problems, from the chemical to molecular level using bioinformatics concepts,
CO-2	Create computer programs that facilitate biological data analysis including protein, mRNA annotation
CO-3	Conduct their own basic, fundamental bioinformatics research that solves most of the biological problems
CO-4	Identify and use bioinformatics tools to solve problems in biochemistry, molecular biology and biomedicine.
CO-5	Effective usage of existing software to extract information from large databases and to use this information in computer modeling

Course Name: Screening Methods in Pharmacology

Course Code: PS608

CO-1	Apply the knowledge gained on preclinical evaluation of drugs and recent experimental techniques in the drug discovery and development.
CO-2	Understand the maintenance of laboratory animals as per the guidelines, basic knowledge of various in-vitro and in-vivo preclinical evaluation processes
CO-3	Apply the regulations and ethical requirement for the usage of experimental animals.
CO-4	Describe the various animals used in the drug discovery process and good laboratory practices in maintenance and handling of experimental
CO-5	Describe the various screening methods involved in the drug discovery process

Course Name: Medicinal chemistry - III lab

Course Code: PS609

CO-1	Experiment with chemicals to prepare drugs and Intermediates.
CO-2	Estimate the percentage purity of the compounds by performing different types of assay techniques.
CO-3	Utilize the microwave irradiation technique for the preparation of drugs and intermediates.
CO-4	Design the structures and reactions using chem draw.
CO-5	Determine the physiological properties of drugs.



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Course Name: Pharmacology - III lab

Course Code: PS610

CO-1	Determination of PA ₂ value of antagonists on various isolated tissue
CO-2	Interpretation of unknown concentration of drugs by various bioassay methods
CO-3	Identify the antiulcer activity of a drug using pylorus ligation method in rats.
CO-4	Determination of PA ₂ value of agonists on various isolated tissue
CO-5	Interpret various drug actions on experimental animals

Course Name: Herbal Drug Technology lab

Course Code: PS611

CO-1	Perform preliminary phytochemical screening of crude drugs.
CO-2	Incorporation of prepared and standardized extract in cosmetics formulations
CO-3	Analysis of herbal drugs from recent Pharmacopoeias
CO-4	Determination of Aldehyde content
CO-5	Determination of phenolic content

Course Name: Human Values and Professional Ethics

Course Code: MC600

CO-1	Develop the critical ability to distinguish between what is of value and what is superficial in life
CO-2	Understand the values, the need for value adoption and prepare them meet the challenges
CO-3	Develop the potential to adopt values, develop a good character and personality and lead a happy life
CO-4	Practice the values in life and contribute for the society around them and for the development of the institutions /organisation around them
CO-5	Understand the professional ethics and their applications to their profession



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ACADEMIC YEAR 2020-21

YEAR: IV

SEMESTER: I

REGULATION: R16

Course Name: Pharmaceutical Analysis – II

Course Code: PS701

CO-1	Understand the interaction of matter with EMR and its applications in Drug analysis
CO-2	Remember and Explain the principle, instrumentation of various spectrophotometry techniques
CO-3	Perform qualitative and quantitative analysis of drugs using various analytical instruments
CO-4	Understand the chromatographic separation and analysis of drugs and explain the principle, instrumentation and its applications in various chromatographic
CO-5	Explain the principle of Electrophoresis, RIA and ELISA

Course Name: Biopharmaceutics and Pharmacokinetics

Course Code: PS702

CO-1	understand the basic concepts of biopharmaceutics, pharmacokinetics & pharmacokinetic models
CO-2	Identify the physiological, physicochemical and dosage form-related factors that affects drug absorption from different dosage forms
CO-3	Outline and recognize various drug disposition process that can cause pharmacokinetic and Pharmacodynamic variability
CO-4	Identify and understand different study designs and various statistical tests applied in bioequivalence studies.
CO-5	Evaluate the PK parameters and examine absolute, relative bioavailability of drugs from different dosage forms using either plasma or urine data along with <i>In vitro</i> -

Course Name: Pharmacology - III

Course Code: PS703

CO-1	Define various diseases and the drugs category which are used in their treatment.
CO-2	Classify various drugs for the treatment according to their action category and Summarize their pharmacological actions with side effects, dose, contraindications
CO-3	Summarize the mechanism of action of drugs and its relevance in the treatment of different diseases.
CO-4	Distinguish between the available treatments procedures and select the appropriate method of treatment.
CO-5	Evaluate the condition of patient and council him with their knowledge of pharmacology.



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Course Name: Medicinal Chemistry – II

Course Code: PS704

CO-1	Apply the various concepts of Computer Aided Drug Design for new lead identification.
CO-2	Analyse the mechanism of action of drugs
CO-3	Explain the structural activity relationship of antibiotics and chemotherapeutic agents
CO-4	Apply the knowledge of chemistry for synthesis of new compounds
CO-5	To understand the drug metabolic pathways, adverse effect and therapeutic value of drugs

Course Name: Pharmacy Administration

Course Code: HS705

1	Gain different types of business form of organization and determine the business trends in national health care delivery and assess the drivers of and
2	Assess the goals of production management and organization production, planning control. Apply knowledge of current societal trends to describe the regional,
3	Develop an idea on social and behavior aspects of pharmacy.
4	Demonstrate adequate competencies and determine research skill in area of pharmaceutical Marketing, consumer behavior, Pharmaceutical promotion,
5	Design business strategies to successfully manage human and capital resources in provision of healthcare services & show the leadership qualities internally and

Course Name: Pharmaceutical Analysis – II Lab

Course Code: PS706

CO-1	Handling of analytical Instrument for analysing the compounds qualitatively and quantitatively
CO-2	Apply separation techniques for separation and analysis of the compounds
CO-3	Prepare dilutions and estimate the amount of drug by uv methods
CO-4	Demonstrate the HPLC instrument for analysis of some drugs.
CO-5	Perform assay of different dosage form for purity.



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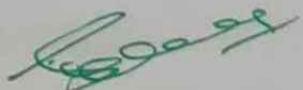
Course Name: Biopharmaceutics and Pharmacokinetics Lab **Course Code: PS707**

CO-1	Compare the influence of dosage forms on dissolution behaviour of same API
CO-2	Connect various physicochemical properties of drug affect on dissolution rate of drug substance
CO-3	Design various techniques that enhance the dissolution rate of drugs
CO-4	Correlate <i>In-vitro</i> – <i>In-vivo</i> absorption studies of various dosage forms
CO-5	Solve and interpret various pharmacokinetic parameters by applying statistical treatment to pharmacokinetic data

Course Name: Medicinal Chemistry – II Lab **Course Code: PS708**

CO-1	Determine the percentage purity of Ascorbic acid by performing acid-base titration.
CO-2	Estimate the percentage purity of Ampicillin by their assay method.
CO-3	Calculate the purity of Metronidazole by performing assay.
CO-4	Estimate the percentage purity of ibuprofen by their volumetric titration
CO-5	Determine the percentage purity of compounds by gravimetric analysis




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YEAR: IV

SEMISTER: II
REGULATION: R16

Course Name: Novel Drug Delivery Systems

Course Code: PS801

CO-1	Define various types of drug delivery systems
CO-2	Compare the different types of delivery systems based on their formulation and usage
CO-3	Evaluate drug delivery systems for their quality
CO-4	Apply the mechanisms in developing various drug delivery systems
CO-5	Develop various devices related to drug delivery systems

Course Name: Clinical Pharmacy

Course Code: PS80

CO-1	Monitor drug therapy of patient through medication chart review and clinical review
CO-2	Identify diseases related to CNS, CVS, respiratory and muscular system
CO-3	Identify and resolve drug related problems
CO-4	Detect assess and monitor adverse drug reactions
CO-5	Interpret selected laboratory results of specific disease states

Course Name: Pharmaceutical Biotechnology

Course Code: PS403

CO-1	Classify types and methods of fermentation process and recall the fermented products.
CO-2	Summarize the method of genetic engineering and explain about monoclonal antibodies.
CO-3	Compare the types of immunity and recall the types of vaccines and its standardizations.
CO-4	Explain the theory of enzyme immobilization and name the enzymes used in pharmaceutical industry.
CO-5	Infer blood and related products and define surgicals



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Course Name: Nano Technology

Course Code:PS805

CO-1	Discuss the approaches for development of novel drug delivery systems
CO-2	Preform the formulation and evaluation of novel drug delivery systems.
CO-3	Apply the criteria for selection of drugs and polymers for the development of Nano technology delivery systems
CO-4	Develop nano formulations with appropriate technologies
CO-5	Evaluate the product related test and for identified diseases

Course Name: Pharmacoepidemiology, Pharmacoeconomics, and pharmacovigilance CourseCode: PC405

CO-1	Describe the methods used in Pharmacoepidemiology
CO-2	Demonstrate competency in the design, conduct and evaluation of Pharmacoepidemiology studies
CO-3	Describe the methods used in Pharmacoeconomic analysis.
CO-4	Demonstrate competency in the design, conduct and evaluation of Pharmacoeconomic studies
CO-5	Explain the principles of Pharmacovigilance

Course Name: Medicinal Plant Biotechnology

Course Code: PS807

CO-1	Explain plant tissue culture and its applications.
CO-2	Describe culture techniques and organogenesis, cryopreservation and synthetic seeds
CO-3	Explain the strategies of production of secondary metabolites.
CO-4	Describe the production of secondary metabolic from callus culture and suspension culture, production of biomedicinals like rosemaric acid.
CO-5	Define metabolic engineering of secondary metabolic pathways, development of bioreactors.



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Course Name: Novel Drug Delivery Systems and Regulatory Affairs Lab Course Code: PC407


1	Formulate different types of tablets.
2	Evaluate various types of tablets for their quality.
3	Develop different drug delivery systems.
4	Study the mechanisms in developing various alginate beads
5	Compare various marketed tablets along with their formulation in terms of quality

Course Name: Pharmacognosy – III Lab

Course Code: PS809

CO-1	Determination of alkaloids in powder crude drug by precipitation test
CO-2	Differentiation of Glycoside and its aglycon by TLC
CO-3	Identify of powdered crude drugs by microscopical characterization
CO-4	Study of Morphology and microscopy of crude drugs by transverse section
CO-5	Spotting – Identification of crude drugs mentioned in theory by organoleptic method




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