

B. PHARMACY COURSE OUTCOMES

SEMESTER: I

BP101T: Human Anatomy and Physiology – I

Credits: T- 4, P-2

Sessional Marks: 25 (T), 15(P)

L:T:P- 3:1:4

University Exams: 75 (T), 35(P)

The Objectives of the course are

1. Impart fundamental knowledge of the structure and functions of the various systems of the human body.
2. Understand the various homeostatic mechanism of the human body.
3. Understand the coordinated working pattern of different organs of systems viz., Cardio-vascular system, nervous system and skeletal system.
4. Would be able to perform the hematological tests like blood cell counts, hemoglobin estimation, bleeding/clotting time etc., and also
5. Record blood pressure, heart rate, pulse and respiratory volume

COURSE OUTCOMES

S. No.	Course Outcomes (CO)	Knowledge Level (Blooms Level)
After completing this course, the student must demonstrate the knowledge and ability to:		
CO1	Students would identify the gross morphology, structure and functions of cell, skeletal, muscular, cardiovascular system of the human body and apply this knowledge in diagnosis of diseases	L1: identify L3: Apply
CO2	They would understand the various homeostatic mechanisms and interpret their imbalances	L2: Understand L5: Interpret
CO3	Students would be able to identify the compare different types of bones in human body	L2: Understand L4: Compare
CO4	Students would be able to identify& analyse the various tissues of different systems of human body	L1: identify L4: Analyse
CO5	They would illustrate various techniques like blood group determination, blood pressure measurement, blood cells Counting and use this information for predict diseases	L2: Illustrate L3: Use L6: Predict

Bloom's Taxonomy: L1: Remember; L2: Understand; L3: Apply; L4: Analyse; L5: Evaluate; L6: Create

Course Outcomes and Program Outcomes (CO-PO) Mapping:

Course Outcomes	Program Outcomes (PO)										
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	★	★	★			★				★	★
CO2	★	★				★	★			★	★
CO3	★	★	★			★					★
CO4	★					★	★				★
CO5	★		★			★	★				★

BP102T: PHARMACEUTICAL ANALYSIS – I**Credits: T- 4, P-2****Sessional Marks: 25 (T), 15(P)****L:T:P- 3:1:4****University Exams: 75 (T), 35(P)****Course objectives**

- Understand the principles of volumetric and electro chemical analysis.
- Carryout various volumetric and electrochemical titrations.
- Gain skills in selecting analytical techniques for the estimation of drugs.
- Understand the relevance and applications of analytical techniques in the pharmaceutical field.
- Interpret choice of analytical techniques to perform the estimation of different categories of drugs.

Course outcomes

S.No	Course Outcomes	Knowledge level (BLOOMS Level)
After successful completion of the course student shall be able to		
CO1:	Explain fundamentals of pharmaceutical analysis, pharmacopoeia, volumetric analysis, sources and compare methods of minimizing errors, sources of impurities and appraise methods to determine the impurities.	L2:Compare L2:Explain L5: Appraise
CO2:	Understand the need and basic principles of Acid-Base titrations and Non-aqueous titrations and provide their applications in pharmaceutical industry.	L1: Understand L3: Provide
CO3:	Explain Concepts of complexometric titration, precipitation titrations, gravimetric analysis etc and provide their applications.	L2: Explain L3: Provide
CO4:	Illustrate concepts of oxidation and reduction, titrations involving them and provide their applications in pharmaceutical industry.	L2: Illustrate L3: Provide
CO5:	Outline the principle, Classify types of electrodes, instrumentation and provide applications of Potentiometry, Conductometry and Polarography.	L2: Outline L3: Provide L4: Classify

BLOOMS Taxonomy- L1: Remember, L2: Understand, L3: Apply, L4: Analyse, L5: Evaluate, L6: Create

Course Outcomes and Program Outcomes (CO-PO) Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	★	★	★	★	★	★	★	★	★	★	★	★
CO2	★		★				★				★	★
CO3	★	★	★	★	★	★	★	★	★	★	★	★
CO4	★	★		★	★	★	★	★	★	★		★
CO5	★		★	★			★				★	

BP103T: PHARMACEUTICS-I

Credits: T- 4, P-2

Sessional Marks: 25 (T), 15(P)

L: T: P- 3:1:4

University Exams: 75 (T), 35(P)

Course objectives

1. This course is designed to impart a fundamental knowledge on the preparatory Pharmacy with arts and science of preparing the different conventional dosage forms.
2. Upon completion of this course the student should be able to: Know the history of profession of pharmacy
3. Understand the basics of different dosage forms, Pharmaceutical incompatibilities and pharmaceutical calculations
4. Know the professional way of handling the prescription
5. Perform preparation of various conventional dosage forms

Course outcomes

S.No	Course Outcomes	Knowledge level (BLOOMS Level)
After successful completion of the course student shall be able to explain		
CO1:	Understand the professional way of handling the prescription and recall the history of pharmacy, and pharmacy profession. Explain posology & provide dose calculation of drug in children.	L1:Recall L2:Understand L2: Explain L3: Provide
CO2:	Summarize formulation aspects of different dosage forms and solve different pharmaceutical calculations, Understand the basic requirement and formulation of powders and liquid dosage forms.	L2: Summarize L3:Solve L5:Understand
CO3:	Understand basic requirement and formulation of liquid (monophasic& biphasic) dosage forms.	L2: Understand
CO4:	Illustrate knowledge in differentiating different dosage forms, pharmaceutical Incompatibilities. Provide basic requirement, formulation and evaluation of suppositories and pessaries.	L2: Illustrate L3: Provide
CO5:	Understand the mechanisms of drug penetration and also the factors influencing permeation through transdermal route Carry out the formulation and evaluation of semisolid preparation such as ointment, gel cream etc.	L2: Understand L3: Carry out

BLOOMS Taxonomy- L1: Remember, L2: Understand, L3: Apply, L4: Analyse, L5: Evaluate, L6: Create

BP104T: PHARMACEUTICAL INORGANIC CHEMISTRY**Credits: T- 4, P-2****Sessional Marks: 25 (T), 15(P)****L:T:P- 3:1:4****University Exams: 75 (T), 35(P)****Course Objectives**

1. To learn and understand the monographs of inorganic drugs and pharmaceuticals.
2. To know the sources of impurities and
3. Understand the methods to determine the impurities in inorganic drugs and pharmaceuticals
4. Understand the medicinal and pharmaceutical importance of inorganic compounds.
5. Know the different semi-quantitative test for Inorganic pharmaceuticals

Course outcomes

S.No	Course Outcomes	Knowledge level (BLOOMS Level)
After successful completion of the course student shall be able to		
CO1:	Explain impurities in pharmaceutical substances and provide General methods of preparation, assay for the compounds.	L2:Explain L3: Provide
CO2:	Classify acids, bases and buffers, Major extra and intracellular electrolyte. Summarize Functions of major physiological ions, Dentifrices, role of fluoride in the treatment of dental caries, Desensitizing agents, Calcium carbonate, Sodium fluoride, and Zinc, eugenol cement.	L2: Classify L2:Summarize
CO3:	Categorize Gastrointestinal agents, Acidifiers: Ammonium chloride, Cathartics, Antimicrobials: Mechanism, classification	L4: Categorize
CO4:	Explain Expectorants, Emetics: Sodium potassium tartarate, Haematinics: Ferrous sulphate, Ferrous gluconate, Poison and Antidote, Astringents	L2: Explain
CO5:	Outline and Select Radiopharmaceuticals: Explain Radio activity, Measurement of radioactivity, Properties of α , β , γ radiations, Half life, radio isotopes and study of radio isotopes - Sodium iodide I131	L2: Outline L1: Select L2: Explain

BLOOMS Taxonomy- L1: Remember, L2: Understand, L3: Apply, L4: Analyse, L5: Evaluate, L6: Create

BP105T.COMMUNICATION SKILLS (Theory)

Credits: T- 2, P-1

Sessional Marks: 15 (T), 10(P)

L:P- 2:2

University Exams: 35 (T), 15(P)

Course objectives

- This course will prepare the young pharmacy student to interact effectively with doctors, nurses, dentists, physiotherapists and other health workers. At the end of this course the student will get the soft skills set to work cohesively with the team as a team player and will add value to the pharmaceutical business.
- Upon completion of the course the student shall be able to
 - o Understand the behavioral needs for a pharmacist to function effectively in the areas of pharmaceutical operation
 - o Communicate effectively (Verbal and Nonverbal)
 - o Effectively manage the team as a team player
 - o Develop interview skills
 - o Develop Leadership qualities and essentials

Course Outcomes

S.No	Course Outcomes	Knowledge level (BLOOMS Level)
After successful completion of the course student shall be able to		
CO1:	Explain need of communication skills, barriers to communicate effectively.	L2:Explain
CO2:	Provide perspectives of communication required to function effectively in areas of pharmaceutical operation	L3: Provide
CO3:	Apply various elements, styles of communications, Basic listening skills, writing skills to communicate effectively and manage team as team player	L3: Apply
CO4:	Apply Interview skills presentation skills and group discussion for development of leadership qualities and essentials	L3: Apply
CO5:	Illustrate and apply basic communication skills and advance learning Skills	L2: Illustrate L3: Apply

BLOOMS Taxonomy- L1: Remember, L2: Understand, L3: Apply, L4: Analyse, L5: Evaluate, L6: Create

BP106RBT: REMEDIAL BIOLOGY

Credits: T- 4, P-2

Sessional Marks: 25 (T), 15(P)

L:T:P- 3:1:4

University Exams: 75 (T), 35(P)

Course objectives

To learn and understand the components of living world, structure and functional system of plant and animal kingdom.

Upon completion of the course student shall be able to

1. Explain Cell biology (Basic Nature of Plant cell and Animal cell)
2. Discuss classification System of both Plants & Animals
3. Identify various tissue system and organ system in plant and animals
4. Discuss the theory of evolution
5. Discuss anatomy and Physiology of plants and animals

Course outcomes

S.No	Course Outcomes	Knowledge level (BLOOMS Level)
After successful completion of the course student shall be able to		
CO1:	Explain characters of living organisms, Diversity in the living world, Binomial nomenclature, Five kingdoms of life and basis of classification. Salient features of Monera, Protista, Fungi, Animalia and Plantae, Virus,.	L2:Explain
CO2:	Outline the Composition of blood, blood groups, coagulation of blood, Composition and functions of lymph, Human circulatory system, Structure of human heart and blood vessels, Cardiac cycle, cardiac output and ECG, Digestion and Absorption, Breathing and respiration	L2: Outline
CO3:	Identify excretory products and their elimination, Neural control and coordination, Chemical coordination and regulation, Endocrine glands and their secretions, Human reproduction	L1: Identify
CO4:	Outline Plants and mineral nutrition and explain Photosynthesis	L2: Outline L2: Explain
CO5:	Explain Plant respiration: Respiration, glycolysis, fermentation (anaerobic). Plant growth and development, Phases and rate of plant growth, Condition of growth, Introduction to plant growth regulators, Cell - The unit of life	L2: Explain

BLOOMS Taxonomy- L1: Remember, L2: Understand, L3: Apply, L4: Analyse, L5: Evaluate, L6:Create

Course objectives

This is an introductory course in mathematics. This subject deals with the introduction to Partial fraction, Logarithm, matrices and Determinant, Analytical geometry, Calculus, differential equation and Laplace transform.

Upon completion of the course the student shall be able to

1. Know the theory and their application in Pharmacy.
2. Solve the different types of problems by applying theory.
3. Appreciate the important application of mathematics in Pharmacy.
4. Apply mathematical concepts and principles to perform computations for Pharmaceutical Sciences.
5. To equip the students with standard concepts and tools at an intermediate to advanced level mathematics to develop the confidence and ability among the students to handle various real-world problems and their applications.

Course outcomes

S.No	Course Outcomes	Knowledge level (BLOOMS Level)
After successful completion of the course student shall be able to		
CO1:	Explain systems of linear equations, use technology to facilitate row reduction determine the rank, eigen values and eigen vectors.	L2: Explain L3: Use
CO2:	Identify special properties of a matrix, such as positive definite, etc., and use this information to facilitate the calculation of matrix characteristics.	L1: Identify L3: Use
CO3:	Develop partial derivatives numerically and symbolically and use them to analyse and interpret the way a function varies.	L3: Develop L4: Analyse L5: Interpret
CO4:	Demonstrate the Knowledge maxima and minima of functions of several variable.	L2: Demonstrate
CO5:	Apply mathematical knowledge in solving Pharmacokinetic equations and chemical kinetics.	L3: Apply

BLOOMS Taxonomy- L1: Remember, L2: Understand, L3: Apply, L4: Analyse, L5: Evaluate, L6: Create

Course Outcomes and Program Outcomes (CO-PO) Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	★	★		★	★	★	★	★	★		★	★
CO2	★	★	★	★	★	★			★	★		★
CO3		★	★	★	★	★	★		★	★		
CO4		★	★	★	★		★		★	★	★	★
CO5	★	★	★	★	★		★	★	★	★	★	★

SEMESTER-III

BP301T : PHARMACEUTICAL ORGANIC CHEMISTRY –II

Credits: T- 4, P-2

Sessional Marks: 25 (T), 15(P)

L:T:P- 3:1:4

University Exams: 75 (T), 35(P)

Course objectives

Upon completing the course, the student

- Shall be able to write the structure, name, synthesis, and the reactions of the aromatic compounds like benzene, naphthalene, anthracene, and cycloalkanes (cyclopropane and cyclobutane).
- Able to compare the reactivity of organic compounds.
- Understand the concept of resonance.
- Discuss chemistry of fats and oils.
- Understand analytical constants' applications like acid value, saponification value, and ester value useful in the quality assurance of oils and fats.

Course outcomes

S.No	Course Outcomes	Knowledge level (BLOOMS Level)
After successful completion of the course student shall be able to		
CO1:	Illustrate the structures and categorize the various organic compounds like benzene, phenols, aromatic amines aromatic acids etc.	L2: Illustrate L4: Categorize
CO2:	Explain the concepts of aromaticity of aromatic hydrocarbons.	L2: Explain
CO3:	Understand and write the aromatic electrophilic reaction name and interpret effect of substitution on orientation of aromatic electrophilic reactions.	L2: Understand L5: Interpret
CO4:	Explain the use of analytical constants in analysis of fats and oils	L2: Explain
CO5:	Understand and write the reaction, mechanism and appraise the synthesis of benzene and its derivatives, phenols, aromatic amines and acids, polynuclear hydrocarbons and cycloalkanes like cyclopropane and cyclobutane	L2: Understand L5: Appraise

BLOOMS Taxonomy- L1: Remember, L2: Understand, L3: Apply, L4: Analyse, L5: Evaluate, L6: Create

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
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CO1	★			★	★			★			★	★
CO2	★	★			★				★	★	★	★
CO3	★	★			★		★	★	★			★
CO4	★	★			★	★	★	★				★
CO5	★	★	★	★	★			★		★		
CO6	★	★		★	★	★				★		★

Course Outcomes and Program Outcomes (CO-PO) Mapping:

BP302T. PHYSICAL PHARMACEUTICS-I

Credits: T- 4, P-2

Sessional Marks: 25 (T), 15(P)

L:T:P- 3:1:4

University Exams: 75 (T), 35(P)

Course objectives

Scope: The course deals with the various physical and physicochemical properties, and principles involved in dosage forms/formulations. Theory and practical components of the subject help the student to get a better insight into various areas of formulation research and development, and stability studies of pharmaceutical dosage forms.

Upon the completion of the course student shall be able to

1. Understand various physicochemical properties of drug molecules in the designing the dosage forms.
2. Know the principles of chemical kinetics
3. Discuss stability testing and determination of expiry date of formulations.
4. Demonstrate use of physicochemical properties in the formulation development
5. Perform evaluation of dosage forms.

Course outcomes

S.No	Course Outcomes	Knowledge level (BLOOMS Level)
After successful completion of the course student shall be able to		
CO1:	Understand the mechanisms of solute solvent interaction. Provide the limitations and applications of Distribution law	L2: Understand L3: Provide
CO2:	Show the use of physicochemical properties in formulation research and development	L2: Show
CO3:	Assume skills and working knowledge of the principles and concepts of surface tension and its measurement	L4: Assume
CO4:	Understand the various intermolecular forces involved in the formation of complexes and its applications.	L2: Understand
CO5:	Infer & Criticize the steps involved in the preparation of pharmaceutical buffers and its importance	L2: Infer L5: Criticize

BLOOMS Taxonomy- L1: Remember, L2: Understand, L3: Apply, L4: Analyse, L5: Evaluate, L6: Create

BP303T: PHARMACEUTICAL MICROBIOLOGY

Credits: T- 4, P-2

Sessional Marks: 25 (T), 15(P)

L:T:P- 3:1:4

University Exams: 75 (T), 35(P)

Course objectives

This course deals with the fundamentals of microbiology and methods of application of microbiology in pharmacy

- Upon completion of the course student shall be able to
 1. Understand methods of identification, cultivation and preservation of various microorganisms
 2. To understand the importance and implementation of sterilization in pharmaceutical processing and industry
 3. Learn sterility testing of pharmaceutical products.
 4. Carried out microbiological standardization of Pharmaceuticals.
 5. Understand the cell culture technology and its applications in pharmaceutical industries..

Course outcomes

S.No	Course Outcomes	Knowledge level (BLOOMS Level)
After successful completion of the course student shall be able to		
CO1:	Understand methods of identification, cultivation and preservation of various microorganisms	L2:Understand
CO2:	Appraise the importance and implementation of sterilization in pharmaceutical processing and industry	L5: Appraise
CO3:	Estimate the nutritional requirement of microorganism.	L5: Estimate
CO4:	Demonstrate isolation of and identification of microbes.	L1: Identify L2: Demonstrate
CO5:	Assess cultivation and isolation of bacteria by different technique and interpret zone of Inhibition	L5: Interpret L5: Assess

BLOOMS Taxonomy- L1: Remember, L2: Understand, L3: Apply, L4: Analyse, L5: Evaluate, L6:Create

Course Outcomes and Program Outcomes (CO-PO) Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	★				★		★	★	★		★	★
CO2	★	★	★	★					★	★		★
CO3		★	★	★	★		★		★	★		★
CO4				★	★		★			★	★	★
CO5	★		★		★	★	★	★		★	★	★

BP304: PHARMACEUTICAL ENGINEERING

Credits: T- 4

Sessional Marks: 25 (T)

L:T:P- 3:1:4

University Exams: 75 (T)

Course objectives

This course is designed to impart a fundamental knowledge on the art and science of various unit operations used in pharmaceutical industry.

Objectives: Upon completion of the course student shall be able:

1. To know various unit operations used in Pharmaceutical industries.
2. To understand the material handling techniques.
3. To perform various processes involved in pharmaceutical manufacturing process.
4. To carry out various test to prevent environmental pollution.
5. To appreciate and comprehend significance of plant lay out design for optimum use of resources.
6. To appreciate the various preventive methods used for corrosion control in Pharmaceutical industries

Course outcomes

S.No	Course Outcomes	Knowledge level (BLOOMS Level)
After successful completion of the course student shall be able to		
CO1:	Understand the concepts of Flow of fluids, Size reduction and size separation with importance of various equipment used in these Unit Operations	L1:Remember L2:Understand
CO2:	Analyze and evaluate the fundamentals of Heat transfer and the basic concepts and equipment used for evaporation and distillation with their applications in pharmaceutical industry.	L2:Understand L4: Analyse L5: Evaluate
CO3:	Appraise various types of equipment and applications of Drying and Mixing operations in Pharmaceutical industry	L3: Apply L4: Analyse L5: Evaluate
CO4:	Understand and apply the concepts of centrifugation and filtration process and their evaluate applications in pharmaceutical industry.	L3: Apply L4: Analyse L5: Evaluate
CO5:	Understands about different materials of construction, analyse various types of corrosion and preventive methods used for Corrosion control in Pharmaceutical industries.	L3: Apply L4: Analyse

BLOOMS Taxonomy- L1: Remember, L2: Understand, L3: Apply, L4: Analyse, L5: Evaluate, L6: Create

Course Outcomes and Program Outcomes (CO-PO) Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	★				★	★	★	★	★		★	★
CO2	★	★	★	★	★		★		★	★		★
CO3		★	★	★	★		★			★	★	
CO4			★	★	★		★		★		★	★
CO5	★		★	★		★		★	★		★	★

SEMESTER – V

BP501T: MEDICINAL CHEMISTRY-II

Credits: T- 4

Sessional Marks: 25 (T)

University Exams: 75 (T)

Course objectives

This subject is designed to impart fundamental knowledge on the structure, chemistry and therapeutic value of drugs. The subject emphasizes on structure activity relationships of drugs, importance of physicochemical properties and metabolism of drugs. The syllabus also emphasizes on chemical synthesis of important drugs under each class.

Objectives:

Upon completion of the course the student shall be able to

1. Understand the chemistry of drugs with respect to their pharmacological activity
2. Understand the drug metabolic pathways, adverse effect and therapeutic value of drugs
3. Know the Structural Activity Relationship of different class of drugs
4. Study the chemical synthesis of selected drug

Course outcomes

S.No	Course Outcomes	Knowledge level (BLOOMS Level)
After successful completion of the course student shall be able to		
CO1:	To understand the classification, nomenclature and structure activity relationship with respect to their mechanism of actions of various anti histamines, proton pump inhibitors and anti neoplastic agents.	L1: Remember L2:Understand
CO2:	To understand the different chemical aspects along with the synthesis, mode of action, medicinal benefits for various classes of cardiovascular agents viz Diuretics, anti anginal, calcium channel blockers and other anti hypertensive agents	L2:Understand
CO3:	The student shall understand the synthetic methods as well as the basic structural requirements, pharmacophoric features, apply this knowledge to estimate the structural activity relationships for various classes of medicinal agents used as anti arrhythmics, anti hyperlipidemics, coagulants and anticoagulants and drugs used in congestive heart failure.	L2:Understand L3: Apply L5: Estimate
CO4:	The student shall understand the role of hormones and conclude their structure, biological and therapeutic significance.	L2:Understand L4: Conclude
CO5:	The student shall understand the structural aspects and synthesis of various agents used for the treatment of diabetes and examine drugs applied in Local anaesthesia.	L2:Understand L4: Examine

BLOOMS Taxonomy- L1: Remember, L2: Understand, L3: Apply, L4: Analyse, L5: Evaluate, L6: Create

Course Outcomes and Program Outcomes (CO-PO) Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	★				★	★	★	★	★		★	★
CO2	★	★	★	★	★				★	★		
CO3	★	★	★	★	★		★		★	★		★
CO4			★	★	★				★	★	★	★
CO5	★		★	★	★	★	★	★		★		★

BP502T: INDUSTRIAL PHARMACY I

Credits: T- 4, P-2

Sessional Marks: 25 (T), 15(P)

L:T:P- 3:1:4

University Exams: 75 (T), 35(P)

Course objectives

1. Upon successful completion of the course, student able to follow theory, do the practical's related to Industrial Pharmacy.
2. This subject Course enables the student to understand and appreciate the influence of Pharmaceutical additives and various pharmaceutical dosage forms on the performance of the drug product.
3. Upon completion of the course the student shall be able to know the various pharmaceutical dosage forms and their manufacturing techniques.
4. Students will know about various considerations in development of pharmaceutical dosage forms.
5. They acquire knowledge about Formulation of solid, liquid and semisolid dosage forms and their evaluation.

Course outcomes

S.No	Course Outcomes	Knowledge level (BLOOMS Level)
After successful completion of the course student shall be able to		
CO1:	Understand various physicochemical properties of drug and their influence on product	L2:Understand
CO2:	Classify and explain tablet, capsule and liquid dosage form.	L4:Classify
CO3:	Explain formulation, processing and evaluation aspect of parenteral and ophthalmic products.	L2:Explain L5: Evaluate
CO4:	Appraise formulation and preparation of cosmetic products	L5: Appraise
CO5:	Identify and Judge various packaging material with their merits and demerits.	L1: Identify L5: Judge

BLOOMS Taxonomy- L1: Remember, L2: Understand, L3: Apply, L4: Analyse, L5: Evaluate, L6: Create

Course Outcomes and Program Outcomes (CO-PO) Mapping:

	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	★				★	★	★	★	★		★	★
CO2	★	★	★	★	★				★	★		★
CO3	★	★	★	★	★		★		★	★		★
CO4	★		★	★	★		★		★	★	★	★
CO5	★		★	★		★	★	★			★	

BP503T: PHARMACOLOGY II

Credits: T- 4, P-2

Sessional Marks: 25 (T), 15(P)

L:T:P- 3:1:4

University Exams: 75 (T), 35(P)

Course objectives

1. Understanding the mechanism of drug action and its relevance in the treatment of different diseases helping in making decisions in therapy.
2. Develop skill to demonstrate isolation of different organs/tissues from the laboratory animals by simulated experiments.
3. The various receptor actions using isolated tissue preparations were understood and applied.
4. The correlation of pharmacology with other bio medical sciences is appreciated.

COURSE OUTCOMES:

S. No.	Course Outcomes (CO)	Knowledge Level (Blooms Level)
After completing this course, the student must demonstrate the knowledge and ability to:		
CO1	Explain the Neurotransmitters involved in the autonomic nervous system and assess their synthesis and metabolism	L2: Explain L5: Assess
CO2	Classify various adrenoceptors and cholinceptor, compare their subtypes and the clinical applications of their general and selective agonist and antagonist	L3: Apply L4: Classify L4: Compare
CO3	Categorize the agents that stimulate or relax skeletal muscle, including the cholinergic neuromuscular agonists and antagonists as well as the neuromuscular agents acting at noncholinergic sites	L4: Categorize
CO4	Explain the essential pharmacotherapy and pharmacological features of common and important drugs used in cardiovascular diseases and Respiratory Disorders	L2: Explain
CO5	Understand and analyse various pharmacological Agents	L2: Understand L4: Analyse
CO6	Explain and Interpret the essential pharmacotherapy and pharmacological features of common and important drugs used in cardiovascular diseases and respiratory Disorders	L2: Explain L4: Interpret

Bloom's Taxonomy: L1: Remember; L2: Understand; L3: Apply; L4: Analyse; L5: Evaluate; L6: Create

a. MAPPING COURSE OUTCOMES LEADING TO THE ACHIEVEMENT OF PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES:

Course Outcomes	Program Outcomes (PO)										
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1		★	★			★				★	
CO2	★	★				★	★			★	★
CO3	★		★			★					★
CO4	★					★	★				★
CO5	★	★	★			★	★				★

BP504T: PHARMACOGNOSY AND PHYTOCHEMISTRY II

Credits: T- 4, P-2

Sessional Marks: 25 (T), 15(P)

L:T:P- 3:1:4

University Exams: 75 (T), 35(P)

Course objectives

1. Know the modern extraction techniques, characterization and identification of the herbal drugs and phytoconstituents
2. Understand the preparation and development of herbal formulation.
3. Understand the herbal drug interactions
4. Carryout isolation and identification of phytoconstituents.

Course outcomes

S.No	Course Outcomes	Knowledge level (BLOOMS Level)
After successful completion of the course student shall be able to		
CO1:	Understand and appraise phytochemical production in medicinal plants, their extraction, isolation, identification, estimation and characterization.	L2:Understand L4: Appraise
CO2:	Classify and Interpret Herb drug-drug, food-herb interactions, basic principles of traditional systems of medicine, modern extraction techniques, preparation and development of herbal formulations.	L4: Classify L5: Interpret
CO3:	Identification and quality assessment of Crude drugs including detection of type of adulteration and type of adulterants in crude drugs.	L1: Identify L5: Assess
CO4:	Carry out isolation, estimation and structure assessment of phytochemicals of pharmaceutical significance by UV-VIS spectrometry, CC, HPTLC, HPLC, MS, IR, NMR.	L3: Carry out L5: Assess
CO5:	Explain methods for industrial production, estimation and utilization of some therapeutically important phytoconstituents.	L2: Explain

BLOOMS Taxonomy- L1: Remember, L2: Understand, L3: Apply, L4: Analyse, L5: Evaluate, L6:Create

Course Outcomes and Program Outcomes (CO-PO) Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	★	★			★	★	★	★		★	★	★
CO2	★	★	★	★	★				★	★	★	
CO3	★	★	★	★		★	★	★		★		★
CO4				★	★	★	★	★		★	★	★
CO5	★		★	★	★		★	★	★		★	★

BP 505 T. PHARMACEUTICAL JURISPRUDENCE (Theory)

Credits: T- 4

Sessional Marks: 25 (T)

L:T- 3:1

University Exams: 75 (T)

Course objectives

- This course is designed to impart basic knowledge on important legislations related to the profession of pharmacy in India.
- Upon completion of the course, the student shall be able to understand:
 1. The Pharmaceutical legislations and their implications in the development and marketing of pharmaceuticals.
 2. Various Indian pharmaceutical Acts and Laws.
 3. The regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals.
 4. The code of ethics during the pharmaceutical practice.

Course outcomes

S.No	Course Outcomes	Knowledge level (BLOOMS Level)
After successful completion of the course student shall be able to		
CO1:	Explain and criticize the schedules and functioning of various committees in the Drug and Cosmetic Act and rules and Indian pharmaceutical Acts.	L1: Remember L2: Explain L3: Criticize
CO2:	Select and Explain the regulatory authorities and agencies governing the manufacture and sale labelling requirements and packaging guidelines for drugs and cosmetics.	L2: Explain L3: Select
CO3:	Explain and Classify narcotic and psychotropic drugs, its productions and drug abuse, its controlling.	L2: Explain L4: Classify
CO4:	Understand and Apprasie Salient Features of Drugs and Magic Remedies Act and its Rules, Prevention of Cruelty to animals Act-1960 and National Pharmaceutical Pricing Authority	L1: Understand L5: Appraise
CO5:	Interpret code of ethics during the pharmaceutical practice and explain other laws as prescribed by the Pharmacy Council of India from time to time including International Laws.	L2: Explain L5: Interpret

BLOOMS Taxonomy- L1: Remember, L2: Understand, L3: Apply, L4: Analyse, L5: Evaluate, L6: Create

Course Outcomes and Program Outcomes (CO-PO) Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	★	★	★	★	★	★		★		★		★
CO2	★	★		★		★		★		★		★
CO3	★		★	★		★			★	★		★
CO4	★	★	★	★		★		★		★	★	★
CO5	★	★		★		★			★	★	★	★

SEMESTER VII

BP701T. INSTRUMENTAL METHODS OF ANALYSIS (Theory)**Credits: T- 4, P-2****Sessional Marks: 25 (T), 15(P)****L:T:P- 3:1:4****University Exams: 75 (T), 35(P)****Course objectives**

1. Understand the interaction of matter with electromagnetic radiations and its applications in drug analysis
2. Understand the chromatographic separation and analysis of drugs.
3. Perform quantitative & qualitative analysis of drugs using various analytical instruments.
4. Acquire a fundamental knowledge on the principles and instrumentation of spectroscopic and chromatographic technique.
5. Know the application of instrumental methods in qualitative and quantitative analysis of drugs

Course outcomes

S.No	Course Outcomes	Knowledge level (BLOOMS Level)
After successful completion of the course student shall be able to		
CO1:	Understand the basic theoretical principles and instrumentation and interpret UV, IR, fluorimeter, flame photometer data. Estimate the requirements of multi components.	L2: Understand L5: Interpret L5: Estimate
CO2:	Carry out separation and identification of compounds by various chromatographic techniques. Principles, Instrumentation, separation and identification of compounds by TLC, column chromatography, paper chromatography and electrophoresis technique.	L3: Carry out L4: Analyse L5: Evaluate
CO3:	Explain theory and instrumentation of GC, HPLC, gel chromatography, ion exchange chromatography and affinity chromatography.	L3: Apply L4: Analyse L5: Evaluate
CO4:	Justify applications of various chromatographic techniques for organic, inorganic and natural products.	L3: Apply L5: Justify
CO5:	Generate skills for the analysis of drugs and excipients using various instrumentation techniques.	L6: Generate

BLOOMS Taxonomy- L1: Remember, L2: Understand, L3: Apply, L4: Analyse, L5: Evaluate, L6: Create

Course Outcomes and Program Outcomes (CO-PO) Mapping (Theory):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	★	★	★	★	★	★	★	★	★	★	★	★
CO2	★		★	★	★		★			★	★	★
CO3	★	★		★	★	★	★			★	★	★
CO4	★	★			★			★	★			★
CO5		★	★	★		★		★		★		★

BP702T : INDUSTRIAL PHARMACY-II

Credits: T- 4

Sessional Marks: 25 (T)

L:T- 3:1

University Exams: 75 (T)

Course objectives

1. This course will enable the student to know the process of pilot plant and scale up of pharmaceutical products.
2. Upon completion of the course, the students will also get knowledge with respect to the technology transfer from lab scale to commercial batch.
3. This course gives complete package of different laws and acts that regulate the operations in pharmaceutical industries.
4. This course also gives an idea to the students about the regulatory requirements for new drug approval process
5. Understand day-to-day operations in the pharmaceutical industries and provides the confidence to the students to take up jobs in industries.

Course outcomes

S.No	Course Outcomes	Knowledge level (BLOOMS Level)
After successful completion of the course student shall be able to		
CO1:	Understand and assess the process of pilot plant and scale up of dosage forms	L2: Understand L5: Assess
CO2:	Understand and Criticize the process of technology transfer from lab scale to commercial batch	L2: Understand L5:Criticize
CO3:	Explain and Justify different laws and acts that regulate pharmaceutical industry	L2: Explain L5: Justify
CO4:	Apply and Appraise Quality Management System	L3: Apply L5: Appraise
CO5:	Formulate solid, liquid and semisolid dosage forms and evaluate them for their quality.	L5: Evaluate L6: Formulate

BLOOMS Taxonomy- L1: Remember, L2: Understand, L3: Apply, L4: Analyse, L5: Evaluate, L6: Create

Course Outcomes and Program Outcomes (CO-PO) Mapping:

	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	★				★		★	★			★	★
CO2	★	★	★	★	★				★	★		★
CO3			★		★		★		★	★		★
CO4	★		★	★		★	★		★	★	★	★
CO5	★		★	★	★	★		★	★	★		★

BP703T: PHARMACY PRACTICE

Credits: T- 4

Sessional Marks: 25 (T)

L:T- 3:1

University Exams: 75 (T)

Course objectives

1. Know various drug distribution methods in a hospital, appreciate the pharmacy stores management and inventory control
2. monitor drug therapy of patient through medication chart review and clinical review
Obtain medication history interview and counsel the patients
3. Identify drug related problems and detect and assess adverse drug reactions
4. Interpret selected laboratory results (as monitoring parameters in therapeutics) of specific disease states and know pharmaceutical care services
5. Do patient counseling in community pharmacy; appreciate the concept of Rational drug therapy.

Course outcomes

S.No	Course Outcomes	Knowledge level (BLOOMS Level)
After successful completion of the course student shall be able to		
CO1:	Demonstrate knowledge of and ability to use principles of therapeutics, quality improvement, communication, economics, health behavior, social and administrative aspects, health policy and legal issues in the practice of pharmacy	L2: Demonstrate L3: Use
CO2:	Use knowledge of drug distribution methods in hospital and apply it in the practice of pharmacy.	L3: Use L3: Apply
CO3:	Effectively apply and assess principles of drug store management and inventory control to medication use.	L3: Apply L5: Assess
CO4:	Provide patient-centered care to diverse patients using the best available evidence and monitor drug therapy of patient through medication chart review, examine medication history interview and counsel the patients, judge drug related problems.	L3: Provide L4: Examine L5: Judge
CO5:	Plan healthcare activities by making use of the knowledge of clinical trials	L3: Use L6: Plan

BLOOMS Taxonomy- L1: Remember, L2: Understand, L3: Apply, L4: Analyse, L5: Evaluate, L6: Create

Course Outcomes and Program Outcomes (CO-PO) Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	★	★		★	★				★		★	
CO2			★				★		★	★	★	★
CO3			★		★	★	★	★	★			
CO4	★	★		★	★	★						★
CO5		★			★	★				★		★

BP 704T: NOVEL DRUG DELIVERY SYSTEMS

Credits: T- 4, P-2

Sessional Marks: 25 (T), 15(P)

L: T: P- 3:1:4

University Exams: 75 (T), 35(P)

Course objectives

1. To understand various approaches for development of novel drug delivery systems.
2. To understand the criteria for selection of drugs
3. Know use of Polymers for the development of Novel drug delivery systems
4. Explain formulation of novel drug delivery systems
5. Conduct evaluation of novel drug delivery systems

Course outcomes

S.No	Course Outcomes	Knowledge level (BLOOMS Level)
After successful completion of the course student shall be able to		
CO1:	Assess controlled release formulations based on diffusion, dissolution and ion exchange principles. Examine Physicochemical and biological properties of drugs relevant to controlled release formulations	L4: Examine L5: Assess
CO2:	Understand and appraise the various processes of microencapsulation and evaluation of the microcapsules	L2: Understand L5: Apprasie
CO3:	Criticize the concept of mucosal drug delivery system and its design considerations with respect to various theories of mucoadhesion	L5: Criticize
CO4:	Explain and justify concept of transdermal drug delivery Systems, gastroretentive drug delivery systems, nasopulmonary drug delivery system and its design considerations	L2: Explain L5: Justify
CO5:	Examine targeted drug delivery system and support its design considerations	L4: Examine L5: Support

BLOOMS Taxonomy- L1: Remember, L2: Understand, L3: Apply, L4: Analyse, L5: Evaluate, L6: Create

Course Outcomes and Program Outcomes (CO-PO) Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	★			★	★	★	★	★	★			
CO2	★		★	★	★	★		★	★	★	★	★
CO3		★	★	★	★		★	★		★		★
CO4	★	★	★			★			★	★	★	★
CO5	★		★	★		★	★	★	★		★	★