



ADITYA COLLEGE OF PHARMACY

(Affiliated to JNTUK, Approved by AICTE)



(ADITYA NAGAR, ADB ROAD, SURAMPALEM 533 437, E.G.Dt, Ph.9949876664, 08852-200005)
Website: www.acop.edu.in, Email: office@acop.edu.in

I B.PHARMACY – I SEMESTER (PCI)			
S.NO	Course	Course code and number	Course outcome
1.	Human anatomy and Physiology-I (Theory) (BP101T)	C_{(BP101T)1}	Enumerate the scope of anatomy and physiology, recognize the various homeostatic mechanisms, basic anatomical terms and cellular level organization, characteristics of different types of tissues and their location in the body. (REMEMBER)
		C_{(BP101T)2}	Discuss the structure and functions of skin, bones and joints of human body and skeletal system (UNDERSTAND)
		C_{(BP101T)3}	Illustrate the importance of blood, lymphatic system and immunity in human body. (UNDERSTAND)
		C_{(BP101T)4}	Describe the physiology of sympathetic, parasympathetic, spinal/cranial nerves. (REMEMBER)
		C_{(BP101T)5}	Demonstrate the anatomy and physiology of special senses. (UNDERSTAND)
		C_{(BP101T)6}	Illustrate the importance of cardiovascular system, regulation of blood pressure, pulse, ECG and disorders of heart. (UNDERSTAND)
2.	Pharmaceutical Analysis I (Theory) (BP102T)	C_{(BP102T)1}	Describe the techniques of pharmaceutical analysis, use different methods to express concentration, and illustrate the sources of errors in analytical methods and minimize techniques (REMEMBER)

		C _{(BP102T)2}	Prepare various strengths of primary and secondary solutions and standardize them by various analytical techniques (CREATE)
		C _{(BP102T)3}	Analyze the compounds by complexometric titration, precipitation titrations & redox titrations (ANALYZE)
		C _{(BP102T)4}	Illustrate about accuracy, precision and significant figures (UNDERSTAND)
		C _{(BP102T)5}	Explain different theories in acid, base titrations & non aqueous titrations and demonstrate adequate knowledge on basic principles & theories of various volumetric analytical methods (UNDERSTAND)
		C _{(BP102T)6}	Assess various electrochemical methods of analysis (EVALUATE)
3.	Pharmaceutics-I (Theory) (BP103T)	C _{(BP103T)1}	Describe the parts of prescription and remember how to handle the prescription. (REMEMBER)
		C _{(BP103T)2}	Understand and discuss about different pharmaceutical calculations. (UNDERSTAND)
		C _{(BP103T)3}	Describe about monophasic liquid dosage forms & remember their preparations. (REMEMBER)
		C _{(BP103T)4}	Differentiate between monophasic and biphasic liquid dosage forms and analyze different preparation methods. (UNDERSTAND)
		C _{(BP103T)5}	Understand about how pharmaceutical incompatibilities occur and discuss about how to avoid such incompatibilities. (UNDERSTAND)
		C _{(BP103T)6}	Enumerate about semi-solid dosage forms and name their preparation methods. (REMEMBER)

4.	Pharmaceutical Inorganic Chemistry (Theory) (BP104T)	C _{(BP104T)1}	Interpret the history and concept of Pharmacopoeia and its editions. (UNDERSTAND)
		C _{(BP104T)2}	Discuss the sources of impurities and methods to determine the impurities in inorganic pharmaceuticals. (UNDERSTAND)
		C _{(BP104T)3}	Develop Knowledge on limit tests of different Pharmaceutical inorganic compounds (CREATE)
		C _{(BP104T)4}	Illustrate the method to prepare Inorganic Pharmaceuticals (UNDERSTAND)
		C _{(BP104T)5}	Tabulate the Medicinal importance of acidifiers, antacids, cathartics and antimicrobial agents as gastro intestinal agents. (REMEMBER)
		C _{(BP104T)6}	Demonstrate the handling and applications of radiopharmaceuticals. (UNDERSTAND)
5.	Communication skills (Theory) (BP105T)	C _{(BP105T)1}	Understand the behavioural needs for a pharmacist to function effectively in the areas of pharmaceutical operation. (UNDERSTAND)
		C _{(BP105T)2}	Review effective Communication (Verbal and Non Verbal). (UNDERSTAND)
		C _{(BP105T)3}	Integrate effective management of the team as a team player. (CREATE)
		C _{(BP105T)4}	Interpret Do's and Don'ts of an interview. (UNDERSTAND)
		C _{(BP105T)5}	Categorize and apply communication skills and other interpersonal skills. (ANALYSE)
		C _{(BP105T)6}	Build Leadership qualities and essentials. (CREATE)

6.	Remedial biology (Theory) (BP106RBT)	C _{(BP106RBT)1}	Describe about characters of Living organism and classification of - Five kingdoms. (UNDERSTAND)
		C _{(BP106RBT)2}	Discuss About the basic Concept of respiratory system, digestive system, Body fluids and their circulation like blood, lymph, systems of kinetics of food.(UNDERSTAND)
		C _{(BP106RBT)3}	Discuss Basic Concept of Excretory products and their elimination, Neural control and coordination, Chemical coordination and regulation, Human reproduction.(UNDERSTAND)
		C _{(BP106RBT)4}	Describe about the Introduction to Plants, mineral nutrition and Photosynthesis. (REMEMBER)
		C _{(BP106RBT)5}	Describe about Introduction to Plant respiration, Plant growth and development.(REMEMBER)
		C _{(BP106RBT)6}	Discuss about the Structure and functions of plant cell , cell organelles, Cell division and Tissues.(REMEMBER)
	Remedial Mathematics (Theory) (BP106RMT)	C _{(BP106RMT)1}	Demonstrate the role of mathematics in pharmacy. (UNDERSTAND)
		C _{(BP106RMT)2}	Review about theory and their application in pharmacy. (UNDERSTAND)
		C _{(BP106RMT)3}	Categorize the mathematical tools in the wide professional views and solve problems of trigonometry, calculus and matrices. (ANALYSE)
		C _{(BP106RMT)4}	Solve the different types of problems by applying theory. (APPLY)
		C _{(BP106RMT)5}	Generate both conventional and creative techniques to the solutions of mathematical problems. (CREATE)
		C _{(BP106RMT)6}	Compute a range of techniques effectively to solve problems including theory deduction, approximation and simulation. (APPLY)

7.	Human Anatomy and Physiology-I (Practical) (BP107P)	C _{(BP107T)1}	Recall the handling of compound microscope and to memorize the various tissues. (REMEMBER)
		C _{(BP107T)2}	Summarize the characteristics of different bones (axial and appendicular skeleton) (UNDERSTAND)
		C _{(BP107T)3}	Analyse the blood cells using haemocytometer. (ANALYSE)
		C _{(BP107T)4}	Predict the bleeding/clotting time and blood groups. (EVALUATE)
		C _{(BP107T)5}	Evaluate the haemoglobin concentration of human blood and blood pressure. (EVALUATE)
		C _{(BP107T)6}	Predict erythrocyte sedimentation rate of human blood and heart rate. (EVALUATE)
8.	Pharmaceutical Analysis I - (Practical) (BP108P)	C _{(BP108P) 1}	Identify the impurities present in compounds by performing limit tests (REMEMBER)
		C _{(BP108P) 2}	Prepare primary and secondary standard solutions of various strengths and standardize them. (CREATE)
		C _{(BP108P) 3}	Calculate the percentage purity of drugs by using volumetric analytical methods. (APPLY)
		C _{(BP108P) 4}	Evaluate the pharmaceutical compounds by acid base titrations, non-aqueous titrations, complex metric, non-aqueous, precipitation and redox titrations (EVALUATE)
		C _{(BP108P) 5}	Determine the normality by electro-analytical methods (APPLY)
		C _{(BP108P) 6}	Understand the principle & reactions involved in various analytical methods (UNDERSTAND)
9.	Pharmaceutics I (Practical) (BP109P)	C _{(BP109P) 1}	Formulate the monophasic internal and external liquid dosage forms. (CREATE)
		C _{(BP109P) 2}	Formulate with biphasic liquid dosage forms. (CREATE)
		C _{(BP109P) 3}	Formulate the solid dosage forms. (CREATE)
		C _{(BP109P) 4}	Formulate the suppositories. (CREATE)
		C _{(BP109P) 5}	Formulate and dispense ointments and semisolid preparations. (CREATE)
		C _{(BP109P) 6}	Formulate and label liquid preparations. (CREATE)

10.	Pharmaceutical Inorganic Chemistry (Practical) (BP110P)	C _{(BP110P)1}	State the sources of limit tests, Preparation and identification of compounds (REMEMBER)
		C _{(BP110P)2}	Summarize the preparation of inorganic pharmaceuticals (UNDERSTAND)
		C _{(BP110P)3}	Compute knowledge to perform modified limit tests (APPLY)
		C _{(BP110P)4}	Evaluate various inorganic pharmaceutical compounds (EVALUATE)
		C _{(BP110P)5}	Choose suitable method for the preparation of inorganic pharmaceuticals (APPLY)
		C _{(BP110P)6}	Justify quality of inorganic pharmaceuticals (EVALUATE)
11.	Communication Skills (Practical) (BP111P)	C _{(BP111P)1}	Interpret the behavioral needs for a pharmacist to function effectively in the areas of pharmaceutical operation. (UNDERSTAND)
		C _{(BP111P)2}	Determine the practical skills for effective communication (Verbal and Non-verbal). (APPLY)
		C _{(BP111P)3}	Characterize pronunciation of vowel and consonant sounds. (ANALYSE)
		C _{(BP111P)4}	Review advanced learning on comprehension/direct and indirect speech. (UNDERSTAND)
		C _{(BP111P)5}	Integrate the interview handling skills. (CREATE)
		C _{(BP111P)6}	Compute in email etiquette. (APPLY)
12.	Remedial biology (Practical) (BP112RBP)	C _{(BP112P)1}	Explain About Basic Concept Of Microscopes And Permanent Slides(UNDERSTAND)
		C _{(BP112P)2}	Assess The Cell And Diferent Tissuses Of Plant Parts Microscopic Method Of Evaluation(EVALUATE)

		C _{(BP112P)3}	Assess The Animal Cell And Tissues By Microscopic Method Of Evaluation(EVALUATE)
		C _{(BP112P)4}	Demonstration of bones(UNDERSTAND)
		C _{(BP112P)5}	Analysis of blood Sample ,Blood Pressure (ANALYSIS)
		C _{(BP112P)6}	Analysis of Lungs (ANALYSIS)

I B.PHARMACY – II SEMESTER (PCI)

S.No	Course	Course Code and number	Course Outcome
1.	Human anatomy and Physiology II (Theory) (BP201T)	C _{(BP201T)1}	Explain the basic knowledge about central nervous system including nervous tissue, brain and spinal cord. (UNDERSTAND)
		C _{(BP201T)2}	Illustrate the structure and functions of gastrointestinal tract and to learn about ATP/CTP/BMR. (UNDERSTAND)
		C _{(BP201T)3}	Describe about structure and functions of respiratory system and various mechanisms involved in regulation of respiration. (REMEMBER)
		C _{(BP201T)4}	Categorize the anatomy of urinary system and physiology of urine formation/micturition. (ANALYSE)
		C _{(BP201T)5}	Identify the essentiality of endocrine glands and their hormones. (REMEMBER)
		C _{(BP201T)6}	Differentiate the physiology of male and female reproductive organs and concepts of genetics. (ANALYSE)
2.	Pharmaceutical Organic Chemistry-I (Theory)	C _{(BP202T)1}	Explain the introduction, nomenclature of organic compounds, isomerism, reaction intermediates (UNDERSTAND)

	(BP202T)	C _{(BP202T)2}	Discuss hybridization, preparations and reactions of alkanes, alkenes (UNDERSTAND)
		C _{(BP202T)3}	Describe preparations and chemical reactions- electrophilic addition, markonikoff, antimarkonikoff rules, ozonolysis of alkenes (REMEMBER)
		C _{(BP202T)4}	Discuss preparations, chemical reactions, qualitative tests and stereochemistry of alkyl halides and alcohols (UNDERSTAND)
		C _{(BP202T)5}	Enumerate preparations and chemical reactions of carbonyl compounds(aldol, crossed aldol, cannizaro, crossed cannizaro, perkin, benzoin condensation reactions)(REMEMBER)
		C _{(BP202T)6}	Discuss preparations, chemical reactions, identification tests of carboxylic acids and aliphatic amines (REMEMBER)
3.	Biochemistry (Theory) (BP203T)	C _{(BP203T)1}	Enumerate the classification, properties, significance and metabolic reactions of carbohydrates, lipids, nucleic acids, proteins and amino acids (REMEMBER)
		C _{(BP203T)2}	Understand the metabolism of carbohydrates and process of electron transport and ATP formation. (UNDERSTAND)
		C _{(BP203T)3}	Discuss the metabolism of nucleic acids, lipids and amino acids. (UNDERSTAND)
		C _{(BP203T)4}	Appraise the causes, manifestations and diagnosis of metabolic Disorders. (EVALUATE)
		C _{(BP203T)5}	Determine the process of DNA replication, transcription and Translation. (APPLY)
		C _{(BP203T)6}	Apply the concept of catalytic activity and enzyme inhibition in design of new drugs, diagnostic and therapeutic applications of enzyme. (APPLY)
4.	Pathophysiology (Theory)	C _{(BP204T)1}	Describe basic aspects of cell injury and adaptation, along with feedback mechanisms and homeostasis. (REMEMBER)

	(BP204T)	C_{(BP204T)2}	<u>Explain</u> the role of chemical mediators in inflammation and healing mechanism, along with biological effects of radiation on cell. (UNDERSTAND)
		C_{(BP204T)3}	<u>Identify</u> the cause and pathophysiology of common diseases associated with cardiovascular system, respiratory system and renal system (REMEMBER)
		C_{(BP204T)4}	<u>Explain</u> the pathophysiology associated with the endocrine system, nervous system, gastrointestinal system and haematological diseases. (UNDERSTAND)
		C_{(BP204T)5}	<u>Describe</u> the principles of pathophysiology involved in cancer and common diseases of bone and joints along with the pathophysiology of inflammatory bowel diseases based on its types, and pathology of jaundice involved in hepatitis (A, B, C, D, E, F) and alcohol liver diseases. (REMEMBER)
		C_{(BP204T)6}	<u>Identify</u> the causative organism and pathophysiology involved in common infectious diseases like meningitis, typhoid, leprosy and tuberculosis, and common sexually transmitted diseases like Acquired Immune Deficiency syndrome, syphilis and gonorrhoea. (REMEMBER)
5.	Computer Applications in Pharmacy (Theory) (BP205T)	C_{(BP205T)1}	<u>Illustrate</u> the concept of number system in computers. (UNDERSTAND)
		C_{(BP205T)2}	<u>Describe</u> use of web technologies such as HTML, XML, CSS, Programming languages, Web servers and pharmacy drug database. (REMEMBER)
		C_{(BP205T)3}	<u>Discuss</u> about different types of databases, applications of computers and databases in pharmacy. (UNDERSTAND)
		C_{(BP205T)4}	<u>Appraise</u> the applications of computers in pharmacy such as drug information services, pharmacokinetics, mathematical model in drug design, hospital and clinical pharmacy etc., (EVALUATE)

		C _{(BP205T)5}	Explain about bioinformatics and its impact in vaccine discovery and database. (UNDERSTAND)
		C _{(BP205T)6}	Analyses computers as data analysis in preclinical development. (ANALYSE)
6.	Environmental sciences (Theory) (BP206T)	C _{(BP206T)1}	Describe fundamental knowledge on environment and its associated problems. (REMEMBER)
		C _{(BP206T)2}	Explain the natural, renewable and non-renewable resources and its allied problems.(UNDERSTAND)
		C _{(BP206T)3}	Enumerate the structure and functions of ecosystem. (REMEMBER)
		C _{(BP206T)4}	Discuss about the introduction, types, characteristic features, structure and functions of ecosystems. (UNDERSTAND)
		C _{(BP206T)5}	Develop attitude of concern regarding environmental pollution like air pollution, water pollution and soil pollution. (CREATE)
		C _{(BP206T)6}	Assess the problems caused due to environmental pollution. (EVALUATE)
7.	Human Anatomy and Physiology-II (Practical) (BP207P)	C _{(BP107P)1}	Demonstrate the knowledge on coordinating working of organs of various systems and the physiology of special senses with the help of models, charts, and specimens. (UNDERSTAND)
		C _{(BP107P)2}	Analyze the function of cranial nerves by various sensory and motor function. (ANALYSE)
		C _{(BP107P)3}	Determine the general neurological Examinations. (APPLY)
		C _{(BP107P)4}	Evaluate Body Temperature and Body Mass Index. (EVALUATE)
		C _{(BP107P)5}	Calculate Tidal volume and Vital Capacity and to develop the knowledge on systems with the help of charts and specimens. (APPLY)

		C _{(BP107P)6}	Appraise the knowledge on Family planning devices, pregnancy, diagnostic tests and tissues of vital organs and gonads. (EVALUATE)
8.	Pharmaceutical Organic Chemistry-I (Practical) (BP208T)	C _{(BP208T)1}	Perform the systematic qualitative analysis of unknown organic compound by preliminary tests, extra elemental tests, functional group tests, preparation of their derivatives and Melting point/Boiling point of organic compounds (CREATE & EVALUATE)
		C _{(BP208T)2}	Perform the systematic qualitative analysis of unknown organic compound by preliminary tests (CREATE & EVALUATE)
		C _{(BP208T)3}	Perform the systematic qualitative analysis of unknown organic compound by extra elemental tests (CREATE & EVALUATE)
		C _{(BP208T)4}	Perform the systematic qualitative analysis of unknown organic compound by, functional group tests, preparation of their derivatives and Melting point/Boiling point of organic compounds (CREATE & EVALUATE)
		C _{(BP208T)5}	Preparation of suitable solid derivatives from organic compounds (CREATE & EVALUATE)
		C _{(BP208T)6}	Construction of molecular models using ball and stick molecular models (CREATE)
9.	Biochemistry – Practical (BP209P)	C _{(BP209P)1}	Remember the qualitative analysis of carbohydrates and proteins. (REMEMBER)
		C _{(BP209P)2}	Understand the principle and clinical significance of blood glucose (UNDERSTAND)
		C _{(BP209P)3}	Identify the amount of reducing sugars by DNSA method and preparation of buffers (REMEMBER)
		C _{(BP209P)4}	Analyze the constituents present in Urine and their clinical significance (ANALYZE)
		C _{(BP209P)5}	Determine the effect of temperature and substrate concentration on salivary amylase activity (APPLY)
		C _{(BP209P)6}	Evaluate the clinical significance of creatinine, proteins and cholesterol in blood (EVALUATE)

10.	Computer Applications in Pharmacy (Practical) (BP210P)	C _{(BP210T)1}	Demonstrate and make use of MS Word suite and concepts of information systems and software. (UNDERSTAND)
		C _{(BP210T)2}	Summarize the report and to design a web page Using HTML and drug information system. (UNDERSTAND)
		C _{(BP210T)3}	Explain the adverse effects using online tools and paradigms of program languages and be exposed to at least one database(SQL) (UNDERSTAND)
		C _{(BP210T)4}	Create and make use of MS Access suite and bioinformatics (CREATE)
		C _{(BP210T)5}	Determine the knowledge of computers in pharmacy, web and XML pages (APPLY)
		C _{(BP210T)6}	Design and make use of MS Excel and Power point suite and preclinical development. (CREATE)

B.PHARMACY – II YEAR III SEMESTER (PCI)			
S.NO	Course	Course code and number	Course outcome
1	Pharmaceutical Organic Chemistry-II (Theory) (BP301T)	C _{(BP301T)1}	Illustrate the aromaticity, chemistry and reactions of benzene. To gain knowledge on structure and medicinal uses of pharmaceutical organic compounds. (UNDERSTAND)
		C _{(BP301T)2}	Describe the chemistry of phenols, aromatic amines and aromatic acids (UNDERSTAND)
		C _{(BP301T)3}	Enumerate the concept of hydrolysis, hydrogenation, saponification and rancidity of oils and also to estimate the analytical constants of fats and oils (REMEMBER)
		C _{(BP301T)4}	Summarize the synthesis and reactions of polynuclear hydrocarbons (CREATE)
		C _{(BP301T)5}	Understand the reactions and stability concepts of cycloalkanes (CREATE)
		C _{(BP301T)6}	Summarize the reactions of cycloalkanes like cyclopropane and cyclobutane (REMEMBER)

2	Physical Pharmaceutics-I (Theory) (BP302T)	C(BP302T)1	Demonstrate principles involved, applications of solubility from solids in liquids, liquids in liquids, gas in liquids and Distribution of drugs.(UNDERSTAND)
		C(BP302T)2	Enumerate different states of matters and their conversion from one form to other along with crystallinity and polymorphism. (REMEMBER)
		C(BP302T)3	Characterize various physicochemical properties of drugs which helps to utilize in development, evaluations of pharmaceutical formulations. (ANALYSE)
		C(BP302T)4	Determine surface and interfacial tension at different kinds of interfaces and their applicability in pharmaceutical developments. (APPLY)
		C(BP302T)5	Relate the knowledge on complexation and protein binding in pharmaceutical developments.(ANALYSE)
		C(BP302T)6	Summarize the importance of buffers, Isotonic solutions and its measurement, adjustment methods in development and evaluations of pharmaceuticals.(UNDERSTAND)

3	Pharmaceutical Microbiology (Theory) (BP303T)	C _(BP303T) 1	Demonstrate about importance of Microbiology & its branches, Prokaryotes and Eukaryotes, ultra-structure and morphological classification of bacteria, nutritional requirements, raw materials used for culture media and physical parameters for growth, growth curve, isolation and preservation methods for pure cultures, cultivation of anaerobes, quantitative measurement of bacterial growth (total & viable count), different types of phase contrast microscopy, dark field microscopy and electron microscopy. (UNDERSTAND)
		C _(BP303T) 2	Describe and Identify The concept of Identification of bacteria using staining techniques, biochemical tests (IMViC), sterilization and Evaluation of sterilization methods and Sterility indicators. (REMEMBER)
		C _(BP303T) 3	Summarise and Explain about the Fungi and Viruses and mode of action and evaluation of disinfectants, antiseptics, bacteriostatic and bactericidal actions, Sterility testing of products according to IP, BP, USP (UNDERSTAND)
		C _(BP303T) 4	Describe About aseptic area, sources of contamination and methods of prevention, clean area classification, microbiological assay, Methods for standardization of antibiotics, vitamins and amino acids, Assessment of a new antibiotic. (REMEMBER)
		C _(BP303T) 5	Explain about Types of spoilage, sources, microbial contaminants, assessment of microbial contamination and spoilage, Preservation of pharmaceutical products using antimicrobial agents, microbial stability of formulations. (UNDERSTAND)
		C _(BP303T) 6	Discuss about concept, general procedure, application of animal cells in culture, (UNDERSTAND)
4	Pharmaceutical Engineering- Theory (BP 304T)	C _(BP304T) 1	Describe and define the principles and methodology of various unit operation processes and its application in pharmaceutical

			industry. Theories and basic mechanisms involved in flow of fluids; understand principle, construction and working of equipment used in flow of fluids. (UNDERSTAND)
		C(BP304T)2	Enumerate the importance of unit operations in pharmaceutical manufacturing, importance of size reduction, powder size and size separation, principle, construction and working of equipment used in size reduction and size separation.(REMEMBER)
		C(BP304T)3	Understand mechanism of flow of heat, laws of heat transfer and principle, construction and working of heat exchangers and heat interchangers, learn merits and demerits of equipment used. Explain and understand importance of evaporation and distillation. Understand, recall remember principle construction and working of various evaporators, understand various types of distillation and their principle and mechanism. (UNDERSTAND AND REMEMBER).
		C(BP304T)4	Understand drying process, recall, understand and remember theories of drying, determine rate of drying and merits and demerits of various dryers. Develop knowledge of unit operation mixing, theories as well as basic mechanisms; understand principle, construction and working of equipment used in mixing. (UNDERSTAND, REMEMBER AND CREATE)
		C(BP304T)5	Summarize concepts and methods of filtration and centrifugation during pharmaceutical manufacturing. Understand principle, construction and working of equipment used in filtration and centrifugation.(UNDERSTAND)
		C(BP304T)6	Comprehend selection of type of equipment used in unit operations during pharmaceutical manufacturing and logic behind selection; develop knowledge and skill of designing a proper comprising of set of equipment for various unit operations for quality result. To choose various preventive methods used for corrosion control in pharmaceutical industries.(ANALYSE AND APPLY)
5	Pharmaceutical Organic Chemistry-II Practical (BP305P)	C(BP305P)1	Experiments involving laboratory techniques Recrystallization (CREATE & EVALUATE)

		C(BP305P)2	Experiments involving laboratory techniques Steam distillation (CREATE & EVALUATE)
		C(BP305P)3	Determination of following oil values (including standardization of reagents) Acid value, Saponification value, Iodine value (CREATE & EVALUATE)
		C (BP305P)4	Preparation of compounds <ul style="list-style-type: none"> • Benzanilide/Phenylbenzoate/Acetanilide from Aniline/Phenol /Aniline by acylation reaction. • 2,4,6-Tribromo aniline/Para bromo acetanilide from Aniline/ • Acetanilide by halogenation (Bromination) reaction. 5-Nitro salicylic acid/Meta di nitro benzene from Salicylic acid / Nitro benzene by nitration reaction. (CREATE & EVALUATE)
		C (BP305P)5	Preparation of compounds <ul style="list-style-type: none"> • Benzoic acid from Benzyl chloride by oxidation reaction. • Benzoic acid/ Salicylic acid from alkyl benzoate/ alkyl salicylate by hydrolysis reaction. • 1-Phenyl azo-2-naphthol from Aniline by diazotization and coupling reactions. Benzil from Benzoin by oxidation reaction (CREATE & EVALUATE)
6	Physical pharmaceuticals -I Practical (BP306P)	C (BP306P)1	Determine solubility of a drug (APPLY)
		C(BP306P)2	Determine Partition coefficient of a drug (APPLY)
		C (BP306P)3	Construct phase diagram of phenol water system and to determine concentration of impurities present in this system. (CREATE)

		C _{(BP306P)4}	Compute CMC and HLB value of surfactants. (APPLY)
		C _{(BP306P)5}	Calculate surface tension of liquids by drop weight and drop count methods (APPLY)
		C _{(BP306P)6}	Evaluate Adsorption rate constants and to determine complexations by different methods. (EVALUATE)
7	Pharmaceutical Microbiology- Practical (BP307P)	C _{(BP307P)1}	Introduction and <u>demonstration</u> of different equipments like B.O.D. incubator, laminar flow, aseptic hood, autoclave, hot air sterilizer, deep freezer. (Understand)
		C _{(BP307P)2}	<u>Demonstrate</u> sterilization of glassware, preparation and sterilization of media. Sub culturing of bacteria and fungus. Nutrient stabs and slants preparations (Understand)
		C _{(BP307P)3}	<u>Determine</u> Staining methods- Simple, Grams staining and acid fast staining (Apply)
		C _{(BP307P)4}	<u>Prepare</u> Isolation of pure culture of micro-organisms by multiple streak plate technique and other Techniques (Create)
		C _{(BP307P)5}	<u>Develop</u> microbiological assay of antibiotics by cup plate method and other methods, motility determination by Hanging drop method. (Create)
		C _{(BP307P)6}	<u>Evaluate</u> Sterility testing of pharmaceuticals. Bacteriological analysis of water, biochemical test. (Evaluate)
8	Pharmaceutical engineering- Practical (BP308P)	C _{(BP308P)1}	<u>Determination</u> of radiation constant of brass, iron, unpainted and painted glass. To determine the overall heat transfer coefficient by heat exchanger. Steam distillation – To calculate the efficiency of steam distillation (APPLY)
		C _{(BP308P)2}	<u>Verify</u> the laws of size reduction using ball mill and power requirement and critical speed of Ball Mill. Size analysis by sieving – To evaluate size distribution of tablet granulations (EVALUATION)
		C _{(BP308P)3}	<u>Construction</u> of drying curves (for calcium carbonate and starch). Determination of moisture content and loss on drying. <u>Determination</u> of humidity of air – i) From wet and dry bulb temperatures – use of Dew point method and equipment's rotary. tablet machine,

			fluidized bed coater, fluid energy mill, dehumidifier (Create)
		C (BP308P)4	Demonstration of colloid mill, planetary mixer, fluidized bed dryer, freeze dryer and such other major equipment (UNDERSTAND)
		C (BP308P)5	Study the effect of time on the Rate of Crystallization. To calculate the uniformity index for given sample by using Double Cone Blender. (APPLY)
		C (BP308P)6	Enumerate the. Factors affecting Rate of Filtration and Evaporation (REMEMBER)

B.PHARMACY – II YEAR IV SEMESTER (PCI)

S.NO	Course	Course code and number	Course outcome
1	Pharmaceutical organic chemistry-III (Theory) (BP401T)	C (BP401T)1	Discuss the fundamentals of stereo chemical aspects like optical isomerism-optical activity, enantiomers, Distereo-isomerism and meso-compounds. .(UNDERSTAND)
		C (BP3401T)2	Understand knowledge on Geometrical and conformational isomers, stereoisomerism in biphenyl compounds and their related aspects. (UNDERSTAND)
		C (BP401T)3	Enumerate the nomenclature, properties and methods of preparation of heterocyclic compounds.
		C (BP401T)4	Summarize concept of synthesis, reactions, medicinal uses of few heterocyclic compounds and their derivatives. (UNDERSTAND)
		C (BP401T)5	Illustrate the oxidation and reduction reactions of synthetic importance like Metal hydride reductions, Birch reductions etc. (UNDERSTAND)
		C (BP401T)6	Illustrate the rearrangement and condensation reactions of synthetic importance like Beckmanns rearrangement, Claisen Schmidt Condensation. (UNDERSTAND)
2	Medicinal chemistry-I (Theory) (BP402T)	C (BP402T)1	Recall the knowledge on History and development of medicinal chemistry, physicochemical properties in relation to biological action And Drug metabolism. (REMEMBER)

		C _{(BP402T)2}	Illustrate the concept of Biosynthesis, catabolism of catecholamine's and adrenergic receptors and their distribution, To illustrate the Classification, Structure activity relationship and Mechanism of action of Adrenergic agents. (UNDERSTAND)
		C _{(BP402T)3}	Explain the biosynthesis of cholinergic agents, catabolism of acetylcholine and cholinergic receptors and their distribution. (UNDERSTAND)
		C _{(BP402T)4}	Discuss about the Classification, Structure activity relationship and Mechanism of action of Cholinergic drugs.(UNDERSTAND)
		C _{(BP402T)5}	Summarize the Classification, Structure activity relationship, mechanism of action and synthesis of Few classes of Drugs acting on CNS (sedative&hypnotics,anti-psychotics,anti-convulsants)(UNDERSTAND)
		C _{(BP402T)6}	Describe the concept of Classification, Structure activity relationship mechanism of action and synthesis of Few classes of Drugs acting on Central nervous system (General anaesthetics, narcotic antagonists, anti-inflammatory agents) (REMEMBER)
3	Physical Pharmaceutics-II (Theory) (BP403T)	C _{(BP403T)1}	Demonstrate the classification and properties of dispersion systems of colloids and the effect of electrolytes. Classify various colloid systems, types, properties and evaluation.(UNDERSTAND)
		C _{(BP403T)2}	Describe Newtonian and non-Newtonian systems and determine viscosity of a system using various viscometers. Identify the effect of thixotropy in formulation.(REMEMBER)
		C _{(BP403T)3}	Explain the coarse dispersions, differentiate various suspensions and emulsions, understand the theories of emulsification, prepare and evaluate. (UNDERSTAND AND EVALUATE)
		C _{(BP403T)4}	Summarize the significance of particle size and distribution in a formulation and to determine micromeritic properties and their applications.(UNDERSTAND AND APPLY)
		C _{(BP403T)5}	Determine the kinetic rates, order of reaction, decomposition pathways and methods of stabilization (APPLY)
		C _{(BP403T)6}	Assess the significance of stability testing methods, accelerated stability studies. (EVALUATE)

4	Pharmacology-I (Theory) (BP404T)	C_{(BP404T)1}	Discuss the general principles and fundamental concepts of pharmacology and pharmacokinetics. (UNDERSTAND)
		C_{(BP404T)2}	Summarize the basics of pharmacodynamics, Adverse reactions, drug interactions and drug discovery. (UNDERSTAND)
		C_{(BP404T)3}	Identify the role of neuro humoral transmission and drugs acting on Peripheral Nervous System and Neuromuscular blocking agents, Local anaesthetics and disorders of PNS (REMEMBER)
		C_{(BP404T)4}	Analyse the functions of neurotransmitters and drugs acting on central nervous System, alcohol & disulfiram. (ANALYSE)
		C_{(BP404T)5}	Appraise the pharmacology of psychopharmacological agents and to predict the effects of drugs against neurodegenerative Disorders. (EVALUATE)
		C_{(BP404T)6}	Demonstrate the concepts of opioids and drug addiction/abuse/tolerance/dependence. (UNDERSTAND)

5	Pharmacognosy and phytochemistry-I (Theory) (BP405T)	C _(BP405T) 1	Describe basics of Pharmacognosy, Sources of Drugs, Organized drugs, unorganized drugs, Classification of drugs, Quality control of Drugs of Natural Origin (UNDERSTAND)
		C _(BP405T) 2	Discuss the Concept of Cultivation, Collection, Processing and storage of drugs of natural origin and Conservation of medicinal plants(UNDERSTAND)
		C _(BP405T) 3	Demonstrate the Plant tissue culture and their Applications of plant tissue culture in pharmacognosy and Edible Vaccines(UNDERSTAND)
		C _(BP405T) 4	Assess the importance of various systems of medicine in Pharmacognosy and describe about the Ayurveda, Unani, Siddha, Homeopathy and Chinese systems of medicine (EVALUATE).
		C _(BP405T) 5	Describe basic Introduction to secondary metabolites like Alkaloids, Glycosides, Flavonoids, Tannins, Volatile oil and Resins. (REMEMBER)
		C _(BP405T) 6	Describe the Plant Products like Fibers, Hallucinogens, Teratogens, Natural allergens Primary metabolites, General introduction, detailed study with respect to chemistry, sources, preparation, evaluation, preservation, storage, therapeutic used and commercial utility as Pharmaceutical Aids and/or Medicines for the following Primary metabolites like Carbohydrates, Proteins and Enzymes, Lipids , Marine Drugs. (REMEMBER)
6	Medicinal Chemistry -I (Practical) (BP406P)	C _(BP406P) 1	Recall the basic Techniques involved in preparation of drugs/ intermediates (REMEMBER)
		C _(BP406P) 2	Synthesize and B about purification steps in medicinal compounds (CREATE)
		C _(BP406P) 3	Demonstrate techniques in characterization of drugs (UNDERSTAND & ANALYSE)
		C _(BP406P) 4	Analyze the amount of drug in dosage form by using various analytical techniques. (ANALYSE)
		C _(BP406P) 5	Determine the percentage purity of various dosage forms.(APPLY)

		$C_{(BP406P)6}$	Determination of impact of physicochemical properties in relation to biological activity by performing partition co-efficient studies. (EVALUATE)
7	Physical Pharmaceutics-II(Practical) (BP407P)	$C_{(BP407P)1}$	Determination of derived Properties of powders using different methods. (APPLY)
		$C_{(BP407P)2}$	Determination of flow Properties of powders using different methods. (APPLY)
		$C_{(BP407P)3}$	Determination of Rheological studies by different methods. (APPLY)
		$C_{(BP407P)4}$	To conclude the effect of suspending agents in the product formulation. (EVALUATE)
		$C_{(BP407P)5}$	Interpretation of Rate order kinetics (UNDERSTAND)
		$C_{(BP407P)6}$	Evaluation of stability of Drugs at different temperatures. (EVALUATION)
8	Pharmacology-I (Practical) (BP408P)	$C_{(BP408P)1}$	Enumerate about basic instruments, common laboratory animals used in experimental pharmacology and to organize animal house as per the CPCSEA guidelines. (REMEMBER)
		$C_{(BP408P)2}$	Demonstrate the common laboratory techniques like routes of administration, blood withdrawal, anesthetics and euthanasia used for animal studies. (UNDERSTAND)
		$C_{(BP408P)3}$	Determine the effects of various drugs on rabbit eye and ciliary motility of frog esophagus in correlation with humans. (APPLY)
		$C_{(BP408P)4}$	Analyze the effect of drugs acting as enzyme inducers, skeletal muscle relaxants and affecting locomotor activity in laboratory animals. (ANALYZE)
		$C_{(BP408P)5}$	Evaluate the stereotype and anticonvulsant activity of drugs in rats/mice. (EVALUATE)
		$C_{(BP408P)6}$	Predict various screening models for anticonvulsant and anxiolytic activity. (EVALUATE)

9	Pharmacognosy and Phytochemistry-I (Practical) (BP409P)	C _{(BP409P)1}	Introduction (UNDERSTAND)
		C _{(BP409P)2}	Asses The Crude Drugs By Chemical Test(ANALYSE)
		C _{(BP409P)3}	Assess The Leaf Constants By Microscopic Method Of Evaluation(EVALUATE)
		C _{(BP409P)4}	Assess The Cell Constituents By Microscopic Method Of Evaluation(EVALUATE)
		C _{(BP409P)5}	Evaluation Of Crude Drugs By Quantitative Method(EVALUATE)
		C _{(BP409P)6}	Evaluation Of The Crude Drugs By Physical Method Of Evaluation(EVALUATE)

B.PHARMACY – III YEAR V SEMESTER (PCI)			
S.NO	Course	Course code and number	Course outcome
1	Medicinal Chemistry-II (Theory) (BP501T)	C _{(BP501T)1}	Discuss about the classification, structures, M.O.A and synthesis of drugs specified in antihistamines and anticancer drugs. (UNDERSTAND)
		C _{(BP501T)2}	Illustrate the concept of mechanisms in mode of action and chemistry involved in anti-anginal, Antihypertensive and diuretics drugs (UNDERSTAND)
		C _{(BP501T)3}	Explain the mechanism of cardiac action potential for better understanding of cardiovascular drugs, describe about structure, synthesis, metabolic aspects, therapeutic

			uses and adverse effects of antiarrhythmic and cardiotonics. (UNDERSTAND)
		C _(BP501T) 4	Describe the pathways in blood coagulation and define antihyperlipidemics and anticoagulants and understand the M.O.A, structure and synthesis of specified drugs. (REMEMBER)
		C _(BP501T) 5	Discuss about the rules in nomenclature, metabolism and stereochemistry of steroids and endocrine drugs. (UNDERSTAND)
		C _(BP501T) 6	Summarize the Classification, Structure activity relationship, mechanism of action and Synthesis of specified drugs in local anaesthetics. (UNDERSTAND)
		C _(BP501T) 7	Describe the concept of Classification, mechanism of action and Synthesis of specified drugs in oral hypoglycemic agents (REMEMBER)
2	Industrial Pharmacy-I (Theory) (BP502T)	C _(BP502T) 1	Illustrate pre formulation parameters, physical chemical properties and their application for development of solid, liquid and parenteral dosage form along with BCS classification. (UNDERSTAND)
		C _(BP502T) 2	Develop tablet formulation by using granulation methods, methods of tablet coating along with quality control tests and liquid orals preparation and evaluation. (CREATE)
		C _(BP502T) 3	Design the methods used for preparation of soft and hard gelatin capsules and pellets along with the quality control tests, packaging and storage of these preparations. (CREATE)
		C _(BP502T) 4	Build essential requirements for formulation of parenteral products and ophthalmics along with the quality control tests, Labelling, packaging and storage. (CREATE)

		C _(BP502T) 5	Develop different types of cosmetics and Pharmaceutical aerosols with quality control tests and stability studies. (CREATE)
		C _(BP502T) 6	Demonstrate the kind of material, choice of containers used for packaging of pharmaceutical products. (UNDERSTAND)
3	Pharmacology–II (Theory) (BP503T)	C _(BP503T) 1	Identify and Describe various drugs, their benefits and risks for use in various cardiac complications. (REMEMBER)
		C _(BP503T) 2	Elucidate and Differentiate the drugs that have effects on blood and blood formation, shock, and those drugs used as diuretics and anti-diuretics. (UNDERSTAND)
		C _(BP503T) 3	Illustrate various autocooids, their classification and roles, and to identify drug groups relating to the autocooid. (UNDERSTAND)
		C _(BP503T) 4	Characterize the endocrine system, its hormones and categorize different drugs acting on endocrine system. (ANALYSE)
		C _(BP503T) 5	Classify various sex hormones and their physiological roles, and to identify the effects of oral contraceptives and drugs acting on the uterus. (ANALYSE)
		C _(BP503T) 6	Appraise the principles of bioassay, its applications, and to Justify the bioassay design and methods for some compounds. (EVALUATE)
4	Pharmacognosy and Phytochemistry-II (Theory) (BP504T)	C _(BP504T) 1	Describes the basic metabolic pathways and their determination in higher plants, utilization of radioactive isotopes in the investigation of Biogenetic studies. (REMEMBER)
		C _(BP504T) 2	Summarizes the introduction, composition, chemistry & chemical classes, biosources, therapeutic uses and commercial applications of secondary metabolites like Alkaloids, Steroids, Volatile oils. (UNDERSTAND)
		C _(BP504T) 3	Explains the introduction, composition, chemistry & chemical classes, biosources, therapeutic uses and commercial applications of secondary metabolites like Tannins, Resins, Glycosides. (UNDERSTAND)

		C _{(BP504T)4}	Describes the Isolation, Identification and Analysis of Phytoconstituents of Alkaloids, Terpenoids, Glycosides, Resins. (REMEMBER)
		C _{(BP504T)5}	Explains the Industrial production, estimation and utilization of various phytoconstituents. (UNDERSTAND)
		C _{(BP504T)6}	Describes the basics of Phytochemistry, Modern methods of extraction, application of latest techniques like Spectroscopy, chromatography and electrophoresis in the isolation, purification and identification of crude drugs. (REMEMBER)
5	Pharmaceutical Jurisprudence (Theory) (BP505T)	C _{(BP505T)1}	Describe the schedules and provisions given under Drugs and Cosmetics act 1940 and its rules 1945 (UNDERESTAND)
		C _{(BP505T)2}	Apply the provisions of Pharmacy act 1948 and procedure for registration of pharmacist and to describe constitution and functions of PCI and State Pharmacy councils (APPLY)
		C _{(BP505T)3}	List out the provisions under medicinal and toilet preparations act, narcotic drugs and psychotropic substances act and rules (REMEMBER)
		C _{(BP505T)4}	Discuss the salient features of drugs and magic remedies act and rules and Prevention of cruelty to animals act 1960 (UNDERESTAND)
		C _{(BP505T)5}	Illustrate the importance of National drug pricing authority and To recall the pharmaceutical legislations in India and code of pharmaceutical ethics (UNDERESTAND)
		C _{(BP505T)6}	Explain about the medical termination of pregnancy act , Right to information act and IPR (UNDERESTAND)
		C _{(BP506P)1}	Determine pre formulation studies on different types of drugs. (APPLY)
		C _{(BP506P)2}	Formulate and Evaluate different types of tablets. (CREATE, EVALUATE)

6	Industrial Pharmacy-I (Practical) (BP506P)	C _{(BP506P)3}	Formulate and Evaluate different types of capsules. (CREATE, EVALUATE)
		C _{(BP506P)4}	Develop parenteral dosage forms and different types of ophthalmic products. (CREATE)
		C _{(BP506P)5}	Prepare different types of cosmetic preparations. (CREATE)
		C _{(BP506P)6}	Evaluate the glass containers as per Indian Pharmacopoeia (EVALUATE)
7	Pharmacology-II (Practical) (BP507P)	C _{(BP507P)1}	Illustrate and understand the importance of physiological salt solutions and to elucidate the effect of some drugs on isolated frog heart, blood pressure and heart rate of dog. (UNDERSTAND)
		C _{(BP507P)2}	Demonstrate and illustrate the diuretic activity of drugs in mice or rats. (UNDERSTAND)
		C _{(BP507P)3}	Appraise the dose-response relationship (DRC), effect of drugs on DRC and to design drug concentrations by various bioassay methods using animal simulator software. (EVALUATE)
		C _{(BP507P)4}	Designate PA ₂ and PD ₂ value of drugs using rat anococcygeus muscle and guinea pig ileum. (CREATE)
		C _{(BP507P)5}	Identify and elucidate the effect of spasmogens and spasmolytics using rabbit jejunum. (REMEMBER)
		C _{(BP507P)6}	Compute some screening models and approaches for studying analgesic and anti-inflammatory activities. (APPLY)
8	Pharmacognosy and Phytochemistry-II (Practical) (BP508P)	C _{(BP508P)1}	Illustrate the morphology, histology and powder characteristics & extraction & detection of: Cinchona, Cinnamon, Senna, Clove, Ephedra, Fennel and Coriander (UNDERSTAND)
		C _{(BP508P)2}	Prepare the Isolation & detection of active principles from a. Caffeine - from tea dust. b. Diosgenin from Dioscorea

			c. Atropine from Belladonna d. Sennosides from Senna (CREATE)
		C_{(BP508P)3}	To prepare and differentiate separation of sugars by Paper chromatography (ANALYSE)
		C_{(BP508P)4}	Determine TLC of herbal extract (APPLY)
		C_{(BP508P)5}	Demonstrate and rearrange distillation of volatile oils and detection of phyto-constituents by TLC (UNDERSTAND)
		C_{(BP508P)6}	Classify Analysis of crude drugs by chemical tests (ANALYSE)

B.PHARMACY – III YEAR VI SEMESTER (PCI)			
S.NO	Course	Course code and number	Course outcome
1	Medicinal Chemistry-III (Theory) (BP601T)	C_{(BP601T)1}	Recall the knowledge on History and development of antibiotics and focus on chemistry and degradation reactions and SAR of beta lactam antibiotics and tetracyclines. (REMEMBER)
		C_{(BP601T)2}	Illustrate, explain Classification, Structure activity relationship, stereochemistry and Mechanism of action of aminoglycosides, macrolides. (UNDERSTAND)
		C_{(BP601T)3}	Explain etiology of malaria, structure, SAR of antimalarials and identify the mechanism of action and therapeutic uses of drugs, To choose the synthetic route for selected category of antimalarial and pro drugs (UNDERSTAND)

		C_{(BP601T)4}	Illustrate, explain Classification, Structure activity relationship, and Mechanism of action and synthesis of anti-tb, urinary anti- infectives, and antiviral drugs (UNDERSTAND)
		C_{(BP601T)5}	Summarize the Classification, Structure activity relationship and Mechanism of action, adverse effects and synthesis of antifungals, anti-amoebic, anti-fungal, antihelmenthic, and sulphonamides (UNDERSTAND)
		C_{(BP601T)6}	Discuss about the approaches in drug design like QSAR, pharmacophore modelling, Docking. (UNDERSTAND)
		C_{(BP601T)7}	Describe the concept and applicaions of combinatorial chemistry and various techniques used in synthesis of library of compounds. (REMEMBER)
2	Pharmacology–III (Theory) (BP602T)	C_{(BP602T)1}	Describe the various drug classes used for different respiratory system health conditions and elucidate their mechanism of action. (REMEMBER)
		C_{(BP602T)2}	Identify drugs used for gastrointestinal tract complications and study some pharmacological aspects of these drugs. (REMEMBER)
		C_{(BP602T)3}	Review the general principles of chemotherapy and understand the mechanism of action of some antibiotics. (UNDERSTAND)
		C_{(BP602T)4}	Assess the mechanism of action for anti-mycobacterial, antifungal, anti-viral, anti-helminthic, anti-malaria drugs and their classification. (EVALUATE)
		C_{(BP602T)5}	Categorize and Analyze the chemotherapy of UTIs, STDs and anti-cancer drugs, and to identify drugs utilized in immune pharmacology. (ANALYSE)
		C_{(BP602T)6}	Discuss the principles of toxicology, and assess aspects of mutagenicity, genotoxicity, carcinogenicity & teratogenicity, and to comprehend the body's

			biological rhythm & clock, illustrating its importance in chronotherapy. (UNDERSTAND)
3	Herbal drug technology (Theory) (BP603T)	C _(BP603T) 1	Describes herbs as raw materials, Selection, identification and authentication of herbal materials Processing of herbal raw material. The basic principles involved in Ayurveda, Siddha, Unani and Homeopathy, Preparation and standardization of Ayurvedic formulations viz Aristas and Asawas, Ghutika, Churna, Lehya and Bhasma. (REMEMBER)
		C _(BP603T) 2	Explains the General aspects, Market growth, scope and types of products available in the market. Healthbenefits and role of Nutraceuticals in ailments like Diabetes, CVS diseases, Cancer, Irritable bowel syndrome and various Gastro intestinal diseases. (UNDERSTAND)
		C _(BP603T) 3	Differentiates and explains aboutGeneral introduction to interaction and classification. Study of drugs and their possible side effects and interactions. (UNDERSTAND)
		C _(BP603T) 4	Explains the Sources and description of raw materials of herbal origin in products such as skin care, hair care and oral hygiene, Significance of substances of natural origin as excipients Conventional herbal formulations like syrups, mixtures and tablets and Novel dosage forms like phytosomes. (UNDERSTAND)
		C _(BP603T) 5	Describes evaluation of Drugs WHO & ICH guidelines for the assessment of herbal drugs,Stability testing of herbal drugs. Patenting and Regulatory requirements of natural products: Regulatory Issues. (REMEMBER)
		C _(BP603T) 6	Enumerates brief account of plantbased industries and institutions involved in work on medicinal and aromatic plants in India. Schedule T– Good Manufacturing Practice of Indian systems of medicine. (REMEMBER)

4	Biopharmaceutics and Pharmacokinetics (Theory) (BP604T)	C _{(BP604T)1}	Recall basic concepts of absorption and distribution of drugs. (REMEMBER)
		C _{(BP604T)2}	Explain the mechanisms; interpret various factors affecting drug metabolism and excretion of drugs. (UNDERSTAND)
		C _{(BP604T)3}	Design the bioavailability testing protocol of a drug and Compare the bioequivalence between marketed products. (CREATE) (UNDERSTAND)
		C _{(BP604T)4}	Apply the pharmacokinetic models like one compartment and also non compartment models for the determination of pharmacokinetic parameters. (APPLY)
		C _{(BP604T)5}	Choose the multi compartment models for the determination of pharmacokinetic parameters of a drugs. (APPLY)
		C _{(BP604T)6}	Evaluate various pharmacokinetic parameters for the drugs exhibiting saturation kinetics. (EVALUATE)
5	Pharmaceutical Biotechnology (Theory) (BP605T)	C _{(BP605T)1}	Describe the basic concepts of biotechnology with respect to enzyme technology, immunology, microbial technology, genetic engineering and protein engineering. (REMEMBER)
		C _{(BP605T)2}	Explain the steps involved in development of biosensors, recombinant products and concepts of immunology. (UNDERSTAND)
		C _{(BP605T)3}	Explain the production parameters important in pharmaceutical product development using principles of biotechnology. (UNDERSTAND)
		C _{(BP605T)4}	Differentiate the genetic organization of different types of cells and to list detection methods at genomic level, gene transfer methods and mutagens. (ANALYSE)

		C_{(BP605T)5}	Explain general requirements of fermentative production and biotechnological production of pharmaceuticals. (UNDERSTAND)
		C_{(BP605T)6}	Discuss on microbial genetics, biotransformation and various immunological products. (UNDERSTAND)
6	Quality Assurance (Theory) (BP606T)	C_{(BP606T)1}	Describe the concept of GMP and TQM also list out the responsibilities of QA & QC Departments. (UNDERSTAND)
		C_{(BP606T)2}	Explain about the personnel, equipment and materials in a pharmaceutical laboratory or industry. (UNDERSTAND)
		C_{(BP606T)3}	List Out the various evaluation studies for the packing materials also explained about the GLP. (REMEMBER) (UNDERSTAND)
		C_{(BP606T)4}	Apply the procedure for giving complaints while dealing with pharmaceuticals. (APPLY)
		C_{(BP606T)5}	Choosing of or following of various documentation the pharmaceutical industry during manufacturing. (APPLY)
		C_{(BP606T)6}	Discuss about calibration and validation of various equipments which are used in pharmaceutical. (UNDERSTAND)
7	Medicinal Chemistry-III (Practical) (BP607P)	C_{(BP607P)1}	Discuss about the procedures and techniques in preparation of drugs/ intermediates (REMEMBER)
		C_{(BP607P)2}	Synthesize, purify and characterization of medicinal compounds (CREATE & ANALYSE)
		C_{(BP607P)3}	Analyze and the amount of drug in dosage form and determine the percentage purity. (ANALYSE)

		C_{(BP607P)4}	Preparation of medicinally important compounds or intermediates by Microwave irradiation technique (CREATE)
		C_{(BP607P)5}	Design structures and reaction using chem draw (CREATE)
		C_{(BP607P)6}	Determination of physicochemical properties by using drug design software (EVALUATE)
8	Pharmacology–III (Practical) (BP608P)	C_{(BP608P)1}	Recollect the dose calculations in various pharmacological experiments, and to demonstrate the anti-allergic activity or anti-ulcer activity in rat models. (REMEMBER)
		C_{(BP608P)2}	Illustrate and understand the effect of drugs on gastrointestinal motility and the effect of agonist/antagonists on guinea pig ileum. (UNDERSTAND)
		C_{(BP608P)3}	Deign serum biochemical parameters using semi auto analyzer. (CREATE)
		C_{(BP608P)4}	Analyse the effect of saline purgative on frog intestine, elucidate insulin hypoglycaemic effect and to test for pyrogens using rabbit method. (ANALYSE)
		C_{(BP608P)5}	Determine the acute oral toxicity (LD50), acute skin irritation / corrosion and acute eye irritation / corrosion of a test substance. (APPLY)
		C_{(BP608P)6}	Understand the pharmacokinetic parameters and comprehend biostatistics methods and designs in experimental pharmacology. (UNDERSTAND)
9	Herbal drug technology (Practical) (BP609P)	C_{(BP609P)1}	Perform preliminary phytochemical screening of crude drugs. (EVALUATE)
		C_{(BP609P)2}	Determination of the alcohol content of Asava and Arista. (APPLY)
		C_{(BP609P)3}	Evaluation of excipients of natural origin (EVALUATE)
		C_{(BP609P)4}	Incorporation of prepared and standardized extract in cosmetic formulations like creams, lotions and shampoos and their evaluation (CREATE)

		C_{(BP609P)5}	Incorporation of prepared and standardized extract in formulations like syrups, mixtures and tablets and their evaluation as per Pharmacopoeial requirements. (CREATE)
		C_{(BP609P)6}	Monograph analysis of herbal drugs from recent Pharmacopoeias (ANALYSE)
		C_{(BP609P)7}	Determination of Aldehyde content, Phenol content and Determination of total alkaloids. (APPLY)

B.PHARMACY – IV YEAR VII SEMESTER (PCI)			
S.NO	Course	Course code and number	Course outcome
1	Instrumental Method of Analysis (Theory) (BP701T)	C_{(BP701T)1}	Differentiate and illustrate the instrumental methods of analysis such as spectroscopic, chromatography and electrophoretic techniques with volumetric methods of analysis. (UNDERSTAND, ANALYSE)
		C_{(BP701T)2}	Demonstrate the interaction of EMR with matter and its phenomenon in various spectroscopic techniques and to assess the spectral data. (UNDERSTAND, EVALUATE)
		C_{(BP701T)3}	Enumerate on affinity of matter with stationary and mobile phase, physico-chemical properties of matter to choose suitable chromatographic and electrophoretic technique. (REMEMBER, ANALYSE)
		C_{(BP701T)4}	Identify and categorize organic and inorganic compounds with different functional groups and to understand their structure at atomic, ionic, group and molecular level to recommend an

			appropriate spectroscopic technique for analysis. (UNDERSTAND, EVALUATE, APPLY)
		C _(BP701T) 5	Demonstrate the theory, principle, construction and working of instrument components and the methodology employed for the analysis of drugs in various samples. (UNDERSTAND)
		C _(BP701T) 6	Summarize and recall on estimation, characterization and interpretation of elements, ions, molecules by suitable instrumental technique.(UNDERSTAND, REMEMBER)
2	Industrial Pharmacy-II (Theory) (BP702T)	C _(BP702T) 1	Design general requirements, personal requirements, space requirements of pilot plant scale up techniques for solids, liquid orals and semi solids. (CREATE)
		C _(BP702T) 2	Develop step wise procedures for technology transfer from raw material up to documentation, approved regulatory bodies and technology transfer agencies in India. (CREATE)
		C _(BP702T) 3	Demonstrate historical overview of regulatory affairs and roles and responsibilities of regulatory affairs professionals (UNDERSTAND)
		C _(BP702T) 4	Illustrate the regulatory requirements for approval of a new drug by submitting investigational new drug and new drug application forms (UNDERSTAND)
		C _(BP702T) 5	Interpret the various quality parameters like total quality management, six sigma concept and quality by design for maintaining quality of the product (UNDERSTAND)
		C _(BP702T) 6	Demonstrate the organization and responsibilities of State licensing authority and Central drug standard control organization (UNDERSTAND)

3	Pharmacy Practice- (Theory) (BP703T)	C _{(BP703T)1}	Explain the basic knowledge on organization of hospital and hospital pharmacy, Various methods of distribution and hospital formulary in hospitals applying it in the practice of pharmacy. Summarizing ADR's. (UNDERSTAND)
		C _{(BP703T)2}	Develop the organisation and structure of community pharmacy and to build ability to design and run own community Pharmacy. Dispensing of proprietary products and maintenance of records. (CREATE)
		C _{(BP703T)3}	Demonstrate the knowledge of therapeutic drug monitoring, patient medication history interview and to apply the knowledge on assessment of drug related problems. (UNDERSTAND)
		C _{(BP703T)4}	Categorize and evaluate the role of hospital pharmacist in pharmacy and therapeutic committee, drug information services, patient counselling, prescribed medication order, education and training programmes in hospitals (ANALYSE)
		C _{(BP703T)5}	Enumerate budget preparation and implementation. Illustrating Clinical pharmacy and OTC drugs (UNDERSTAND)
		C _{(BP703T)6}	Differentiate and interpret clinical laboratory tests of specific disease states to provide better patient centered service. (UNDERSTAND) Describe the principles of drug store management and inventory control methods during practice. (REMEMBER)
4	Novel drug delivery systems (Theory) (BP704T)	C _{(BP704T)1}	Explain basic knowledge and approaches to design controlled release formulations by different mechanisms, Physicochemical and biological properties of drugs and classification of polymers. (UNDERSTAND)
		C _{(BP704T)2}	INTERPRET various approaches for development of microcapsules, Micro particles, Implants, Osmotic pump, Concept of mucosal

			drug delivery systems and its applications. (UNDERSTAND)
		C _(BP704T) 3	Design basic components, permeation enhancers and formulation approaches for transdermal drug delivery system.(CREATE)
		C _(BP704T) 4	ILLUSTRATE various types of Gastro retentive drug delivery systems and its applications, Introduction of Naso-pulmonary routes of drug delivery systems example dry powder and nebulizers. (UNDERSTAND)
		C _(BP704T) 5	Formulate the concept of targeted drug delivery systems and its applications.(CREATE)
		C _(BP704T) 6	Develop Ocular and Intrauterine drug delivery systems along with advantages, disadvantages and its applications.(CREATE)
5	Instrumental Method of Analysis (Practical) (BP705P)	C _(BP705P) 1	Recall the principles of spectroscopic techniques and relate the importance of absorption maxima, specific absorbance, solvents in the estimation of organic compounds. (REMEMBER)
		C _(BP705P) 2	Experiment and analyze the selected drugs by UV, Visible Spectroscopy and Fluorimetry. (APPLY)
		C _(BP705P) 3	Estimate the concentration of alkaline earth metals (sodium, potassium) by Flame Emission Spectroscopy. (ANALYZE)
		C _(BP705P) 4	Determine certain organic compounds by nepheloturbidimetry. (APPLY)
		C _(BP705P) 5	Characterize and quantify of organic compounds, amino acids, plant pigments by chromatographic techniques.(ANALYZE)

		C _{(BP705P)6}	Recommend a suitable quantitative method (direct comparison method, calibration curve method, A1% 1cm method, simultaneous equation method etc) for analyzing the sample. (EVALUATE)
6	Practice School (Practical) [BP706PS]	C _{(BP706PS)1}	Enumerate the importance of realistic learning through practice in various domains such as community pharmacy, drug testing and manufacturing, preclinical testing, clinical practice, patent filing, regulatory filing accounting, green audit and article writing. (REMEMBER)
		C _{(BP706PS)2}	Illustrate and Familiarize with the aspects of realistic practice in the domain of interest (UNDERSTAND)
		C _{(BP706PS)3}	Determine the knowledge and skills related to practical learning in the domain of interest (APPLY)
		C _{(BP706PS)4}	Analyse the problems encountered during realistic practice and make use of theoretical knowledge to resolve those problems. (ANALYSE)
		C _{(BP706PS)5}	Develop and build up the ability to perform well in the domain of interest after becoming an employee/entrepreneur. (CREATE)

B.PHARMACY – IV YEAR VIII SEMESTER (PCI)

S.NO	Course	Course code and number	Course outcome
1	Biostatistics and Research Methodology (Theory) (BP801T)	C _{(BP801T)1}	Calculate measures of central tendency-mean, median, mode, pharmaceutical problems involving range, standard deviation and correlation and solve statistical problems (APPLY)
		C _{(BP801T)2}	Make use of regression and probability while analysing data by statistical methods (APPLY)

		C _{(BP801T)3}	Discuss need for research, experimental designs, parametric and non-parametric tests (UNDERSTAND)
		C _{(BP801T)4}	Analyze data by constructing different graphs and software's (ANALYSE)
		C _{(BP801T)5}	Design various experiments and generate methodologies (CREATE)
		C _{(BP801T)6}	Assess the importance of regression modelling and to build-up the ability to use in statistical problems (EVALUATE)
2	Social and Preventive Pharmacy (Theory) (BP802T)	C _{(BP802)1}	Understand the concept of health and education (UNDERSTAND)
		C _{(BP802)2}	Create awareness about various preventive measures of stated communicable and non-communicable diseases (CREATE)
		C _{(BP802)3}	Apply the knowledge of national health programmes mention in real world to serve the society (APPLY)
		C _{(BP8102)4}	Explain various vaccines under national immunization programme and their schedules (UNDERSTAND)
		C _{(BP802)5}	Demonstrate the impact of socio-cultural factors and urbanization on health(UNDERSTAND)
		C _{(BP802)6}	Evaluate the health and pharmacy related problems in societal perspective (EVAUATE)

3	Cosmetic Science (Theory) (BP809ET)	C _(BP809ET) 1	Define Cosmetics and Cosmeceuticals as per Indian and EU regulations and describe role of cosmetic excipients and building blocks in the formulation of cosmetics (REMEMBER)
		C _(BP809ET) 2	Formulate cosmetics for skin care and hair care as well as dental and oral care (CREATE)
		C _(BP809ET) 3	Explain the structure and function of the skin, hair, teeth and gums and discuss the fundamentals of sun protection, formulation of Sunscreens, antiperspirants and deodorants (UNDERSTAND)
		C _(BP809ET) 4	Design herbal cosmetics for skin care, hair care and oral care (CREATE)
		C _(BP809ET) 5	Assess cosmetics for various physico-chemical properties (EVALUATE)
		C _(BP809ET) 6	Design cosmetics and cosmeceuticals that address the problems of dry skin, acne, dermatitis, prickly heat, wrinkles, blemishes, hair fall, Dandruff, body odour, bleeding gums, mouth odour, teeth discoloration and sensitive teeth. (CREATE)
4	Advanced Instrumentation Techniques (Theory) (BP811ET)	C _(BP811ET) 1	Explain Principles of H-NMR and C-NMR, chemical shift, factors affecting chemical shift, coupling constant, Spin - spin coupling, relaxation, instrumentation and applications (UNDERSTAND)
		C _(BP811ET) 2	Describe the Principles, Fragmentation, Ionization techniques – Electron impact, chemical ionization, MALDI, FAB, Analyzers- Time of flight and Quadrupole, instrumentation, applications (REMEMBER)
		C _(BP811ET) 3	Enumerate Principles, instrumentation and applications of Thermogravimetric Analysis (TGA), Differential Thermal Analysis (DTA),

			Differential Scanning Calorimetry (DSC)(REMEMBER)
		C _(BP811ET) 4	Discuss the Origin of X-rays, basic aspects of crystals, X-ray Crystallography, rotating crystal technique, single crystal diffraction, powder diffraction, structural elucidation and applications(UNDERSTAND)
		C _(BP811ET) 5	Develop Electronic balance, UV-Visible spectrophotometer, IR spectrophotometer Fluorimeter, Flame Photometer, HPLC and GC (REMEMBER)
		C _(BP811ET) 6	Illustrate Radio immune assay: Importance, various components, Principle, different methods, Limitation and Applications of Radio immune-assay. Extraction techniques: General principle and procedure involved in the solid phase extraction and liquid-liquid extraction (UNDERSTAND)
		C _(BP 811 ET) 7	Summarize Hyphenated techniques-LC-MS/MS, GC-MS/MS, HPTLC-MS (UNDERSTAND)