**B PHARM COURSE OUTCOMES**

| Course Number & Couse Name | CO No | Course Outcome (CO |
|---|---|---|
| **BP101T Human Anatomy and Physiology-I (Theory)** | Upon completion of this course the graduate is able to | |
| | C101T1 | To learn nervous system, CNS structure, and function, including neurons, synapses, and reflexes. |
| | C101T2 | To grasp GI tract anatomy, functions, acid regulation, digestion, absorption, and related disorders. |
| | C101T3 | To master respiratory system anatomy, mechanics, gas exchange, and life-saving techniques. |
| | C101T4 | To understand urinary tract anatomy, kidney function, urine formation, acid-base balance, and kidney disorders. |
| | C101T5 | To comprehend hormone classification, mechanisms, and functions of major endocrine glands and disorders. |
| | C101T6 | To study reproductive system anatomy, functions, sex hormones, genetics, inheritance patterns, and reproduction processes. |
| **BP102T Pharmaceutical Analysis I ( Theory)** | Upon completion of this course the graduate is able to | |
| | C102T1 | To define different techniques of analysis, to recall fundamental concepts in expressing concentrations and errors |
| | C102T2 | To classify different theories of acids and bases and principle involved in use of nonaqueous solvents |
| | C102T3 | To classify different volumetric techniques and to make use of them in identifying and analysing compounds |
| | C102T4 | To analyse compounds by various types titrimetric methods in Redox titration |
| | C102T5 | To explain principles and instrumentation of electrochemical methods like conductometry, polarography, potentiometry |
| | C102T6 | To maximize knowledge in various volumetric and electrochemical titrations |
| **BP103T Pharmaceutics I (Theory)** | Upon completion of this course the graduate is able to | |
| | C103T1 | Define historical background of pharmacy professionand handling of prescription and pediatric dose calculations |
| | C103T2 | Summarize various pharmaceutical calculations and understand the powder and liquid dosage forms |
| | C103T3 | Formulate and evaluate different kinds of monophasic and biphasic liquid dosage forms |
| | C103T4 | categorize and evaluate different kinds of biphasic liquid dosage forms |
| | C103T5 | Explain and solve pharmaceutical incompatibilities inprescriptions and to prepare suppositories |

| | | |
|---|---|---|
| | C103T6 | Develop and formulate different types of semisolid dosage forms |
| **BP104T Pharmaceutical Inorganic Chemistry (Theory)** | Upon completion of this course the graduate is able to | |
| | C104T1 | Get well acquainted with the principles of limit tests. |
| | C104T2 | Get familiar with different classes of inorganic pharmaceuticals and their analysis |
| | C104T3 | Understand identification of different anions, cations and different inorganic pharmaceuticals. |
| | C104T4 | Gain knowledge about the sources of impurities and their analysis in inorganic drugs and pharmaceuticals |
| | C104T5 | Understand the medicinal and pharmaceutical importance of inorganic compounds |
| | C104T6 | Gain knowledge on a variety of inorganic drug classes. |
| **BP105T Communication skills (Theory)** | Upon completion of this course the graduate is able to | |
| | C105T1 | Understand the importance, barriers and perspectives of communication |
| | C105T2 | Communicate effectively (Verbal and Non Verbal) |
| | C105T3 | Acquire writing skills |
| | C105T4 | Acquire listening skills |
| | C105T5 | Develop presentation skills |
| | C105T6 | Participate effectively in group discussion |
| **BP106RMT Remedial Mathematics (Theory)** | Upon completion of this course the graduate is able to | |
| | C106RMT1 | Apply the knowledge of partial fractions, logarithms, functions and limits for interpreting the pharmaceutical Problems |
| | C106RMT2 | Understand the theory and applications of matrices |
| | C106RMT3 | Understand the theory and applications of determinant in solving pharmacokinetic equations |
| | C106RMT4 | Interpret the calculations using differential calculus |
| | C106RMT5 | Calculate the slope and other parameters using integrations |
| | C106RMT6 | Integrate the differential equations and laplace transform |
| **BP106RBT Remedial Biology (Theory)** | Upon completion of this course the graduate is able to | |
| | C106RBT1 | Classify Monera, Protista, Fungi, Animalia and Plantae |
| | C106RBT2 | Understand the cardiovascular, digestive and respiratory systems in the human body |
| | C106RBT3 | Describe the human excretory and nervous systems |
| | C106RBT4 | Describe the endocrine and reproductive systems |
| | C106RBT5 | Explain the photosynthesis, essential nutrients and nitrogen metabolism in plants |
| | C106RBT6 | Differentiate cells, tissues, cell division and explain the plant respiration and growth |
| **BP107P Human Anatomy and Physiology (Practical)** | Upon completion of this course the graduate is able to | |
| | C107P1 | Analyze and interpret the elements and operations of a compound microscope, as well as scrutinize the distinctions between epithelial and connective tissues |

| | | |
|---|---|---|
| | | in microscopic slides, elucidating their functional relationships. |
| | C107P2 | Demonstrate the ability to analyze and categorize axial bones, showcasing proficiency in recognizing their functions and anatomical distinctions. |
| | C107P3 | Evaluate white blood cell (WBC) and red blood corpuscle (RBC) counts for an understanding of their clinical significance. |
| | C107P4 | Comprehend the clinical significance of bleeding time and clotting time, fostering an awareness of their implications in health assessments. |
| | C107P5 | Engage in a comprehensive examination of hemoglobin content, blood grouping, Erythrocyte Sedimentation Rate (ESR), and other clinical parameters, facilitating a deeper understanding of their diagnostic value. |
| | C107P6 | Analyze cardiovascular parameters like blood pressure, heart rate, and pulse rate, enabling the ability to assess and interpret their implications for overall health and well-being. |
| **BP108P Pharmaceutical Analysis** | Upon completion of this course the graduate is able to | |
| | C108P1 | Able to identify and apply the basic concepts such as the types , glass ware used in the practicals, able to apply statistical significance |
| | C108P2 | Able to identify sources of impurities in pharmaceuticals and limit tests for major anions, heavy metals. |
| | C108P3 | Principles of volumetric analysis, diazotisation titrations |
| | C108P4 | Principles of gravimetric analysis |
| | C108P5 | Complexometry |
| | C108P6 | non aqueous, moisture content and alcohol content determination. |
| **BP109P Pharmaceutics I (Practical)** | Upon completion of this course the graduate is able to | |
| | C109P1 | Prepare syrups and elixirs |
| | C109P2 | Formulate and dispense throat paints, medicated and non-medicated soap solutions |
| | C109P3 | Develop various dosage forms like lotions, mixtures and liniments |
| | C109P4 | Experiment with gels and emulsions |
| | C109P5 | Formulate Compound medicated powders and effervescent granules |
| | C109P6 | Formulate and develop suppositories and ointments |
| **BP110P Pharmaceutical Inorganic Chemistry (Practical)** | Upon completion of this course the graduate is able to | |
| | C110P1 | Apply the principle of limit tests in identification of impurities in pharmaceuticals |
| | C110P2 | Apply knowledge to perform modified limit tests. |

| | | |
|---|---|---|
| | C110P3 | Perform qualitative tests for identification of inorganic compounds |
| | C110P4 | Assess quality of inorganic pharmaceuticals |
| | C110P5 | Determine the neutralizing capacity of antacids. |
| | C110P6 | Select suitable method for the preparation of inorganic pharmaceuticals. |
| **BP111P Communication skills ( Practical)** | Upon completion of this course the graduate is able to | |
| | C111P1 | Develop communication skills |
| | C111P2 | Improve pronunciations |
| | C111P3 | Differentiate direct and indirect speech |
| | C111P4 | Acquire writing skills |
| | C111P5 | Prepare scientific presentations |
| | C111P6 | Develop interview handling skills |
| | Upon completion of this course the graduate is able to | |
| **BP112RBP Remedial Biology (Practical)** | C112P1 | Handle microscope for scientific examination |
| | C112P2 | C112P2 Describe the anatomy and physiology of frog by using computer models |
| | C112P3 | Identify bones |
| | C112P4 | Determine blood groups |
| | C112P5 | Estimate blood pressure |
| | C112P6 | Estimate the tidal volume |
| **BP201T Human Anatomy and Physiology II (Theory)** | Upon completion of this course the graduate is able to | |
| | C201T1 | To learn nervous system, CNS structure, and function, including neurons, synapses, and reflexes. |
| | C201T2 | To grasp GI tract anatomy, functions, acid regulation, digestion, absorption, and related disorders. |
| | C201T3 | To master respiratory system anatomy, mechanics, gas exchange, and life-saving techniques. |
| | C201T4 | To understand urinary tract anatomy, kidney function, urine formation, acid-base balance, and kidney disorders. |
| | C201T5 | To comprehend hormone classification, mechanisms, and functions of major endocrine glands and disorders. |
| | C201T6 | To study reproductive system anatomy, functions, sex hormones, genetics, inheritance patterns, and reproduction processes |
| | Upon completion of this course the graduate is able to | |
| **BP202T Pharmaceutical Organic Chemistry I – (Theory)** | C202T1 | Enable to write the structure and predict the nomenclature of the organic compounds |
| | C202T2 | Gain knowledge about the type of isomerism |
| | C202T3 | Be able write the mechanism and orientation of reactions |
| | C202T4 | Understand reactivity/stability of compounds. |
| | C202T5 | Gain knowledge on analytical tests for various functional groups. |
| | C202T6 | Gain knowledge about named reactions. |

| | | |
|---|---|---|
| **BP203T Biochemistry (Theory)** | Upon completion of this course the graduate is able to | |
| | C203T1 | To understand the importance of metabolism of substrates. |
| | C203T2 | understand the importance of metabolism of substrates. |
| | C203T3 | acquire chemistry and biological importance of biological macromolecules. |
| | C203T4 | acquire knowledge in qualitative and quantitative estimation of the biological macromolecules. |
| | C203T5 | know the interpretation of data obtained from a clinical Test Lab. |
| | C203T6 | know how physiological conditions influence the structures and re -activities of biomolecules. |
| **BP204T Pathophysiology (Theory)** | Upon completion of this course the graduate is able to | |
| | C204T1 | To understand the process of cell injury, morphology of cell injury and cellular adaptations |
| | C204T2 | To understand the etiopathogenesis of cardiovascular, respiratory and renal diseases mentioned. |
| | C204T3 | To apply the principles of pathogenesis in understanding symptoms, signs and complications of disease states mentioned. |
| | C204T4 | To explain the etiopathogenesis of hematologic, endocrine, nervous, gastrointestinal, musculoskeletol diseases and Immunopathogenesis of infectious diseases. |
| | C204T5 | To appraise the principles of physical, chemical and biologic carcinogenesis. |
| | C204T6 | To adapt the principles of inflammation in understanding pathogenesis of various disease states. |
| **BP205T Computer Applications in Pharmacy** | Upon completion of this course the graduate is able to | |
| | C205T1 | Understand the importance of Software's in the field of Pharmaceutical Sciences |
| | C205T2 | Explain the databases and Web technologies in Pharmacy |
| | C205T3 | Implement the knowledge of computers in Pharmacy( |
| | C205T4 | Discuss the concepts of bioinformatics and their impact in vaccine discovery |
| | C205T5 | Execute data in preclinical development( |
| | C205T6 | know the various applications of databases in pharmacy |
| **BP206T Environmental sciences ( Theory)** | Upon completion of this course the graduate is able to | |
| | C206T1 | To create awareness about multidisciplinary nature of environment |
| | C206T2 | To impart basic knowledge regarding various resources |
| | C206T3 | To develop an attitude to preserve the natural environment for the future |
| | C206T4 | To motivate public to participate in the programmes for improving ecosystems |

| | | |
|---|---|---|
| | C206T5 | To acquire skills in identifying and solving environmental issues |
| | C206T6 | To attain harmony with nature for all kinds of pollution |
| **BP207P Human Anatomy and Physiology II (Practical)** | Upon completion of this course the graduate is able to | |
| | C207P1 | To understand the structure and function of the integumentary and special senses using specimens, models, etc. |
| | C207P2 | To gain insights into the nervous system using specimens, models, etc. |
| | C207P3 | To explore the endocrine system using specimens, models, etc. |
| | C207P4 | To demonstrate proficiency in conducting a general neurological examination. |
| | C207P5 | To exhibit a comprehensive understanding of the olfactory nerve function. |
| | C207P6 | To examine and appreciate the diversity of taste. |
| **BP208P Pharmaceutical Organic Chemistry I (Practical)** | Upon completion of this course the graduate is able to | |
| | C208P1 | Explain the qualitative analysis and preparation of pharmaceutical organic compounds. |
| | C208P2 | Identify the extra elements present in the pharmaceutical organic compounds. |
| | C208P3 | Find the presence of several functional groups in pharmaceutical compounds. |
| | C208P4 | Appraise the rules concerned with reactivity and orientation of organic compounds. |
| | C208P5 | Analyse unknown pharmaceutical organic compounds by determining their melting point/boiling point. |
| | C208P6 | Prepare and characterize the derivatives of organic compounds |
| **BP209P Biochemistry (Practical)** | Upon completion of this course the graduate is able to | |
| | C209P1 | Perform the qualitative analysis of carbohydrates and proteins |
| | C209P2 | Understand the principle and clinical significance of blood glucose |
| | C209P3 | Identify the amount of reducing sugars by DNSA method |
| | C209P4 | Examine the constituents present in urine and their clinical significance |
| | C209P5 | Determine the effect of temperature and substrate concentration on salivary amylase activity |
| | C209P6 | Elaborate the clinical significance of creatinine, proteins and cholesterol in blood. |
| **BP210P Computer Applications in Pharmacy (Practical)** | Upon completion of this course the graduate is able to | |
| | C210P1 | Design a questionnaire for a particular disease( |
| | C210P2 | Create a HTML web page, mailing labels, databases, invoice tables and queries in MS access |

| | | |
|---|---|---|
| | C210P3 | Store and retrieve the information of a drug and its adverse effects using online tools |
| | C210P4 | Generate and print the reports from patient database |
| | C210P5 | Export the tables, queries, forms and reports to web and XML pages |
| | C210P6 | Integrate the information obtained from data resources |
| **BP301T Pharmaceutical Organic Chemistry II (Theory)** | Upon completion of this course the graduate is able to | |
| | C301T1 | Illustrates the history, elucidation, concepts, general methods of preparation and reactions of benzene and its derivatives |
| | C301T2 | Gain knowledge on the substitutent types and effect of substitutents on reactivity and orientation of mono substituted benzene compounds. |
| | C301T3 | Emphasize on general methods of preparation and reactions of phenols and amines computing their acidity and basicity respectively. |
| | C301T4 | List the reactions, principle involved in their determination of analytical constants of fats and oils. |
| | C301T5 | Gain knowledge on synthesis and reactions polynuclear hydrocarbons. |
| | C301T6 | Understand the reactions and stabilities of cycloalkanes. |
| **BP302T Physical Pharmaceutics I (Theory)** | Upon completion of this course the graduate is able to | |
| | C302T1 | To recall the importance of solubility of drugs in designing of dosage forms and diffusion principles in biological systems. |
| | C302T2 | To explain the states of matter and understand the applications of various physicochemical properties of drug molecules to design dosage forms. |
| | C302T3 | To utilize the principles of Interfacial tention and the applications of surface active agent in drug solubilisation. |
| | C302T4 | To analyze the concepts of complexation and protein binding in pharmacy. |
| | C302T5 | To estimate the thermodynamic stability constants of complexes. |
| | C302T6 | To discuss PH, buffers and their use in the stabilization of pharmaceutical formulations. |
| **BP303T Pharmaceutical Microbiology (Theory)** | Upon completion of this course the graduate is able to | |
| | C303T1 | To define the basics of microorganisms and their identification, cultivation and preservation |
| | C303T2 | To explain the concepts of staining and sterilization process in different fields of science. |
| | C303T3 | To apply sterility testing for different pharmaceutical products |
| | C303T4 | To analyze the vitamins and antibiotics by microbiological assays |

| | | |
|---|---|---|
| | C303T5 | To determine aseptic areas and their maintenance for different pharmaceutical procedures. |
| | C303T6 | To develop different animal cell Cultures and apply them in various fields of pharmaceutical industries. |
| **BP304T Pharmaceutical Engineering (Theory)** | Upon completion of this course the graduate is able to | |
| | C304T1 | To define and list various unit operations involved in manufacturing of Pharmaceuticals |
| | C304T2 | To outline the concepts of flow of fluids, size reduction and size separation |
| | C304T3 | To demonstrate different types of heat transfer mechanisms and principles of evaporation and distillation |
| | C304T4 | To categorize various drying and mixing processes and their application in pharmaceutical industry |
| | C304T5 | To explain the principles and applications of filtration and centrifugation processes |
| | C304T6 | To purpose and adopt different materials in pharmaceutical plant construction, corrosion and it's prevention |
| **BP305P Pharmaceutical Organic Chemistry II (Practical)** | Upon completion of this course the graduate is able to | |
| | C305P1 | Gain the knowledge on different recrystalization and steam distillation techniques. |
| | C305P2 | Remember and recall the different laboratory techniques used in pharmaceutical chemistry. |
| | C305P3 | Identify the purity of fats and oils by acid value, saponification value and iodine value. |
| | C305P4 | Perform named reactions by using carbonyl compounds. |
| | C305P5 | Perform synthesis of compounds by oxidation, reduction and hydrolysis. |
| | C305P6 | Perform synthesis of compounds by acetylation, diazotization and coupling mechanisms. |
| **BP306P Physical Pharmaceutics I (Practical)** | Upon completion of this course the graduate is able to | |
| | C306P1 | To find the significance of physical properties such as solubility, surface tension, partition coefficient and pka in the design of dosage forms. |
| | C306P2 | To explain adsorption isotherms and determine Freundlich-langmuir constant using activated charcoal. |
| | C306P3 | To apply Henderson –Hasselbalch equation for interpretation of pKa value of drugs. |
| | C306P4 | To analyze the surface tension of sample liquids by drop count and drop weight methods. |
| | C306P5 | To determine the HLB value and critical micellar concentration of a surfactant. |
| | C306P6 | To estimate the stability constants of complexes by solubility and pH titration methods. |

| | | |
|---|---|---|
| **BP307P Pharmaceutical Microbiology (Practical)** | Upon completion of this course the graduate is able to | |
| | C307P1 | To list and prepare various culture media for the growth of microorganisms |
| | C307P2 | To show, identify and isolate bacteria |
| | C307P3 | To plan, select and demonstrate aseptic procedures |
| | C307P4 | To test for assessment of the sterility of different pharmaceutical products |
| | C307P5 | To Estimate the potency of antibiotics. |
| | C307P6 | To design and conduct planned experiments and prepare laboratory report in |
| **BP 308P Pharmaceutical Engineering (Practical)** | Upon completion of this course the graduate is able to | |
| | C308P1 | To recall basic principles involved in unit operations such as size reduction, size separation, distillation and drying |
| | C308P2 | To demonstrate and explain about the construction, working, applications of pharmaceutical mixer, fluidised bed dryer and freeze dryer |
| | C308P3 | To test for the radiation constant of brass, iron, unpainted and painted glass |
| | C308P4 | To experiment with the process variables of filtration, evaporation and crystallization. |
| | C308P5 | To estimate the moisture content, loss on drying and construct drying curves for calcium carbonate and starch |
| | C308P6 | To determine overall heat transfer co-efficient by heat exchanger and calculate the efficiency of steam distillation |
| **BP401T Pharmaceutical Organic Chemistry III (Theory)** | Upon completion of this course the graduate is able to | |
| | C401T1 | Discuss optical isomerism-optical activity, enantiomerism, diastereoisomerism and meso compounds. |
| | C401T2 | Understand the fundamentals of stereo chemical aspects. |
| | C401T3 | Explain stereo isomerism in biphenyl compounds (atropisomerism) and conditions for optical activity. |
| | C401T4 | Understand the nomenclature, properties, methods of preparation,reactivity of heterocyclic rings with one heteroatom. |
| | C401T5 | Understand the uses, properties, methods of preparation,reactivity of fused heterocyclic rings. |
| | C401T6 | Elaborate the reactions and synthetic importance of metal hydrides, named reactions and rearrangements. |
| **BP402T Medicinal Chemistry-I (Theory)** | Upon completion of this course the graduate is able to | |
| | C402T1 | Gain knowledge on introduction, history, development of medicinal chemistry. |
| | C402T2 | Understand the importance of physicochemical properties in relation to biological action and drug |

| | | |
|---|---|---|
| | | metabolism phases including factors affecting metabolism. |
| | C402T3 | Gain knowledge on classification, mechanism of action, structure activity relationship, uses of drugs acting on sympathetic nervous system |
| | C402T4 | Understands the classification, mechanism of action, structure activity relationship, uses of drugs acting on cholinergic nervous system |
| | C402T5 | Understands the classification, mechanism of action, structure activity relationship, uses of drugs acting on central nervous system. |
| | C402T6 | Gain knowledge on the classification, mechanism of action, structure activity relationship of general anaesthetics, narcotic and non-narcotic analgesics |
| **BP403T Physical Pharmaceutics II (Theory)** | Upon completion of this course the graduate is able to | |
| | C403T1 | To find the significance of physical properties such as solubility, surface tension, partition coefficient and pka in the design of dosage forms. |
| | C403T2 | To explain adsorption isotherms and determine Freundlich-langmuir constant using activated charcoal. |
| | C403T3 | To apply Henderson –Hasselbalch equation for interpretation of pka value of drugs. |
| | C403T4 | To analyze the surface tension of sample liquids by drop count and drop weight methods. |
| | C403T5 | To determine the HLB value and critical micellar concentration of a surfactant. |
| | C403T6 | To estimate the stability constants of complexes by solubility and pH titration methods. |
| **BP404T Pharmacology I (Theory)** | Upon completion of this course the graduate is able to | |
| | C404T1 | Apply the concepts of pharmacokinetics of various drugs acting on human body on regular day today life. |
| | C404T2 | Evaluate the pharmacological aspects of drugs acting on ANS |
| | C404T3 | Analyse the pharmacology of drugs acting on CNS |
| | C404T4 | Understand the information pertaining to the principles of pharmacodynamics of drugs acting on human body. |
| | C404T5 | Interpret the actions of Psychoactive drugs and their role in treatment of psychotic patients. |
| | C404T6 | Remember the concepts of drug addiction, abuse and correlate them with their negative impact on society. |
| **BP405T Pharmacognosy and Phytochemistry I (Theory)** | Upon completion of this course the graduate is able to | |
| | C405T1 | Distinguish the organized and unorganized drugs and be familiar with quality control of crude drugs. |
| | C405T2 | To estimate the quality of crude drugs based on evaluation of crude drugs |

| | | |
|---|---|---|
| | C405T3 | Describe the methods of cultivation, collection, processing and storage of crude drugs. |
| | C405T4 | Explain the importance of plant tissue cultures and applications of edible vaccines. |
| | C405T5 | Understand the role and importance of Pharmacognosy in various Traditional systems of medicines. |
| | C405T6 | Discuss the importance of various classes of natural drugs |
| **BP406P Medicinal Chemistry I – (Practical)** | Upon completion of this course the graduate is able to | |
| | C406P1 | Recall the basic requirements for synthesis and assay of drugs |
| | C406P2 | Explain the techniques involved in synthesis, isolation, purification of drugs and intermediates |
| | C406P3 | Evaluate assay of drugs by aqueous titration method |
| | C406P4 | To evaluate of assay of drugs by non-aqueous titration method |
| | C406P5 | Analyze the selected drugs present in dosage forms and to determine the percentage purity |
| | C406P6 | Determine the physicochemical property of drugs and draw its importance |
| **BP407 P Physical Pharmaceutics II (Practical)** | Upon completion of this course the graduate is able to | |
| | C407P1 | To find the derived properties of powders |
| | C407P2 | To demonstrate particle size determination of powders and coarse dispersions |
| | C407P3 | To experiment with viscosity determination of liquids and semi-solids |
| | C407P4 | To inspect the properties of coarse dispersions |
| | C407P5 | To estimate the rate of a reaction |
| | C407P6 | To estimate the Accelerated stability of various medicinal agents. |
| **BP408P Pharmacology I (Practical)** | Upon completion of this course the graduate is able to | |
| | C408P1 | Create certain drugs and techniques by studying the maintenance of laboratory animals. |
| | C408P2 | Analyze the concepts of various routes of drug administration and blood withdrawal techniques. |
| | C408P3 | Apply the concepts of drugs affecting ciliary motility on animal experimentation. |
| | C408P4 | Evaluate the effect of drugs acting on CNS. |
| | C408P5 | Remember the concepts of Anti-psychotic drugs by conducting experiments on animals. |
| | C408P6 | Understand the mechanism of action of locally acting drugs by performing animal experimentation. |
| **BP409P Pharmacognosy and Phytochemistry I (Practical)** | Upon completion of this course the graduate is able to | |
| | C409P1 | Perform qualitative chemical tests to identify chemical constituents of crude drugs. |
| | C409P2 | Identify the leaf drugs by analysing leaf surface data. |
| | C409P3 | Evaluate the purity of powdered crude drugs based on microscopic measurements. |

| | | |
|---|---|---|
| | C409P4 | Assess the processing of crude drugs |
| | C409P5 | Assess quality and purity of crude drugs |
| | C409P6 | To demonstrate the quantitative microscopy |
| **BP501T Medicinal Chemistry II (Theory)** | Upon completion of this course the graduate is able to | |
| | C501T1 | Describes the classification, mechanism of action, structure activity relationship of drugs used as $H^1$, $H^2$ antagonists, proton pump inhibitors and as antineoplastic agents. |
| | C501T2 | Knowledge on classification, mechanism of action, SAR of drugs used as antianginals, diuretics and as antihypertensives. |
| | C501T3 | Enlist various classes of drugs used as antiarrhythmics, coagulants, anticoagulants, congestive heart failure and antihyperlipedimics. |
| | C501T4 | Gain knowledge on nomenclature, stereochemistry and metabolism of steroids |
| | C501T5 | Illustrates chemical nature various steroids used as sex hormones erectile dysfunction, oral contraceptives, corticosteroids, thyroid and antithyroid drugs |
| | C501T6 | Enlist the classification, SAR, structures of drugs indicated in the treatment of diabetes and as local anaesthetics. |
| **BP502T Industrial Pharmacy I (Theory)** | Upon completion of this course the graduate is able to | |
| | C502T1 | To find the application of preformulation studies in the dosage form development |
| | C502T2 | To explain formulation of tablets and liquid orals |
| | C502T3 | To develop the formulation approches for formulation of capsules and pellets |
| | C502T4 | To inspect various approaches for formulation of parenterals |
| | C502T5 | To evaluate various approaches for the formulation ophthalmic preparations |
| | C502T6 | To develop cosmetics, Pharmaceutical Aerosols and to choose materials for packaging of pharmaceuticals |
| **BP503T Pharmacology II (Theory)** | Upon completion of this course the graduate is able to | |
| | C503T1 | Relate the relative pros and cons in the use of drugs for variouscardiac complications. |
| | C503T2 | Illustrate the drugs acting on hematopoietic system, shock diureticsand anti-diuretics. |
| | C503T3 | Analyze and summarize the drugs acting on endocrine system |
| | C503T4 | Appraise the physiological role of sex hormones and to assess the effects of oral contraceptives and drugs acting on the uterus |
| | C503T5 | Predict principles of bioassay and to construct the bioassaymethods of various compounds |
| | C503T6 | Autocoids and related drugs |

| | | |
|---|---|---|
| **BP504T Pharmacognosy and Phytochemistry II (Theory)** | Upon completion of this course the graduate is able to | |
| | C504T1 | To Outline the Metabolic pathways in higher plants and their determination. |
| | C504T2 | To Summarize the chemistry, biosources, therapeutic uses, and commercial applications of the secondary metabolites of the alkaloids, flavonoids, steroids, glycosides and Volatile oils. |
| | C504T3 | To Summarize the chemistry, biosources, therapeutic uses, and commercial applications of the secondary metabolites of the Tannins, resins, Iridoids and terpenoids. |
| | C504T4 | To explain the Isolation, Identification and Analysis of Phytoconstituents. |
| | C504T5 | To elaborate industrial production, estimation and utilization of phytoconstituents. |
| | C504T6 | To describe extraction and chromatographic techniques . |
| **BP505T Pharmaceutical Jurisprudence (Theory)** | Upon completion of this course the graduate is able to | |
| | C505T1 | To tell the basic concepts of import, manufacture and conditions for grant of license in different facilities in drug and cosmetics act |
| | C505T2 | To classify the different schedules and explain sale, labeling. Outline the administration of the act. Describe the government drug analyst and drug inspector |
| | C505T3 | To identify the different statutory bodies like PCI, state and joint state pharmacy council's. applying the knowledge in construction of in-bond and outside bond |
| | C505T4 | To list the narcotic drugs and psychotropic substances and categorize different forms of narcotic and psychotropic substances |
| | C505T5 | To justify the prohibition of advertisements in drugs and magic remedies. Explain the importance of animal ethics. Estimate the price of formulations |
| | C505T6 | To discuss various pharmaceutical legislations. Elaborate the theory of patents. Create awareness in pharmacist in various fields |
| **BP506P Industrial Pharmacy I (Practical)** | Upon completion of this course the graduate is able to | |
| | C506P1 | To choose various preformulation parameters in the dosage form development |
| | C506P2 | To demonstrate preparation, evaluation of tablets and tablet coating |
| | C506P3 | To experiment with preparation and evaluation of capsules |
| | C506P4 | To examine preparation and evaluation of injections |
| | C506P5 | To evaluate formulation aspects of ophthalmic preparations |

| | | |
|---|---|---|
| | C506P6 | To develop cosmetics and evaluation methods for packaging of pharmaceuticals |
| **BP507P Pharmacology II (Practical)** | Upon completion of this course the graduate is able to | |
| | C507P1 | Learn the importance of physiological salt solutions and to identifythe effect of various drugs on isolated frog heart, blood pressure and heart rate of dog |
| | C507P2 | Illustrate the diuretic activity of drugs in mice/rats. |
| | C507P3 | Identify the dose response relationship, effect of drugs on DRC andto construct the drug concentrations by various bioassay methods using animal simulator software. |
| | C507P4 | Categorize the PA2 and PD2 value of drugs using rat anococcygeusmuscle and guinea pig ileum. |
| | C507P5 | Predict various screening models for analgesic and anti-inflammatory activities |
| | C507P6 | Analgesic activity of drugs using central and peripheral methods. |
| **BP508P Pharmacognosy and Phytochemistry II (Practical)** | Upon completion of this course the graduate is able to | |
| | C508P1 | To analyse the morphological characters of crude drugs |
| | C508P2 | To evaluate crude drugs by histological and powder analysis. |
| | C508P3 | To identify the crude drugs by chemical tests |
| | C508P4 | Experiment with isolation and detection of active principles from crude drugs. |
| | C508P5 | To develop the chromatographic techniques for separation of phytoconstituents from mixtures. |
| | C508P6 | To identify the isolated phytoconstituent from crude drugs |
| **BP601T Medicinal Chemistry III (Theory)** | Upon completion of this course the graduate is able to | |
| | C601T1 | Develop an understanding of the physico-chemical properties of drugs. |
| | C601T2 | Understand how current drugs were developed by using pharmacophore modelling and docking technique. |
| | C601T3 | Acquire knowledge in the chemotherapy for cancer and microbial diseases and different anti-viral agents. |
| | 601T14 | Acquire knowledge about the mechanism pathways of different class of medicinal compounds. |
| | C601T5 | Have been introduced to a variety of drug classes and some pharmacological properties. |
| | C601T6 | Acquire knowledge on thrust areas fir further research. |
| **BP602T Pharmacology III (Theory)** | Upon completion of this course the graduate is able to | |
| | C602T1 | List the drugs used in respiratory and gastrointestinal complications |
| | C602T2 | Understand the principles of chemotherapy and illustrate the mechanism of action of antibiotics |

| | | |
|---|---|---|
| | C602T3 | To compare the mechanism of anti-mycobacterial, antifungal, anti-viral agents. |
| | C602T4 | Analyze the chemotherapy of UTI's, STD's, anti-cancer drugs and to categorize the immunopharmacology |
| | C602T5 | Assess the various types of toxicity studies, principles of treatment of poisoning and management of various poisonedconditions |
| | C602T6 | Understand the Definition of rhythm and cycles. And Explain the Biological clock and their significance leading to chronotherapy |
| **BP603T Herbal Drug Technology (Theory)** | Upon completion of this course the graduate is able to | |
| | C603T1 | To define the terms like herb, herbal medicinal products raw materials etc. |
| | C603T2 | To give a brief out line about biodynamic agriculture and Indian system of medicine. |
| | C603T3 | To identify the herbal drug and herbal food interactions along with importance of nutraceuticals. |
| | C603T4 | To categorize the herbal cosmetics and herbal excipients. |
| | C603T5 | To explain the evaluation parameters of herbal drugs and to know the importance of patenting and regulatory issues. |
| | C603T6 | To elaborate GMP of Indian system medicine. |
| **BP604T Biopharmaceutic s and Pharmacokinetic s (Theory)** | Upon completion of this course the graduate is able to | |
| | C604T1 | To define the basic concepts of Biopharmaceutics, Pharmacokinetics and their significance |
| | C604T2 | To demonstrate the mechanisms of drug absorption through GIT and to explain the factors influencing the process of absorption and distribution |
| | C604T3 | To categorize drug metabolism and metabolic pathways in renal excretion of drugs and make use of principles of bioavailability |
| | C604T4 | To analyze the principles of pharmacokinetics and various compartment models. To distinguish various routes of administration in compartment modelling |
| | C604T5 | To determine various rate constants using two compartment model by different routes of administration |
| | C604T6 | To discuss factors causing non linearity and to explain methods for estimating parameters |
| **BP605T Pharmaceutical Biotechnology (Theory)** | Upon completion of this course the graduate is able to | |
| | C605T1 | To select different techniques of Enzyme Immobilization, Biosensors and Protein Engineering in Pharmaceutical Industries. |
| | C605T2 | To explain the Recombinant DNA Technology Tools and Products of Pharmaceutical Importance. |

| | | |
|---|---|---|
| | C605T3 | To apply the Concepts of Immunology in development of official Vaccines |
| | C605T4 | To function the Concepts of Microbial Biotransformation and Mutations in Different Fields of Science |
| | C605T5 | To choose and Design Fermentor(S) for the Production of Secondary Metabolites. |
| | C605T6 | To discuss and construct the Blood Products and Plasma Substitutes in Various Fields of Pharmaceutical Industries. |
| **BP606T Quality Assurance (Theory)** | Upon completion of this course the graduate is able to | |
| | C606T1 | To know what are quality assurance and quality management concepts and ICH guidelines |
| | C606T2 | To know the outline of premises, plant layout, equipments and raw materials used in pharmaceutical industry |
| | C606T3 | To develop complete knowledge regarding GLP and quality control tests for containers, closures etc |
| | C606T4 | To know about the list records like batch formula records, SOP, ETC that are maintained in pharmaceutical industries |
| | C606T5 | To know how to evaluate the complaints raised against the products in pharmaceutical industries |
| | C606T6 | To improve the knowledge regarding good ware housing practices and also calibrations of various equipments |
| **BP607P Medicinal chemistry III (Practical)** | Upon completion of this course the graduate is able to | |
| | C607P1 | Define and select the method for preparation of drugs and intermediates |
| | C607P2 | Explain principle underlying the preparation of drugs |
| | C607P3 | Choose the method for assay of drugs by quantitative analysis |
| | C607P4 | Compare the advantages of microwave technique over conventional synthesis of drugs |
| | C607P5 | Select the tools needed for drawing structures and reactions |
| | C607P6 | Predict the relation between physicochemical properties and biological activity |
| **BP608P Pharmacology III (Practical )** | Upon completion of this course the graduate is able to | |
| | C608P1 | Recall the dose calculations in pharmacological experiments, andto relate the antiallergic activity / anti-ulcer activity in rat models. |
| | C608P2 | Demonstrate of effect of drugs on gastrointestinal motility and theeffect of agonist/antagonists on guinea pig ileum |
| | C608P3 | Construct serum biochemical parameters by using semi autoanalyzer |

| | | |
|---|---|---|
| | C608P4 | Analyze effect of saline purgative on frog intestine, insulin hypoglycemic effect and test for pyrogens using rabbit method |
| | C608P5 | Evaluate acute oral toxicity (LD50), acute skin irritation / corrosionand acute eye irritation / corrosion of a test substance |
| | C608P6 | Calculation of pharmacokinetic parameters from a given data Biostatistics methods in experimental pharmacology( student's t test, ANOVA) Biostatistics methods in experimental pharmacology (Chi square test, Wilcoxon Signed Rank test) |
| **BP609P Herbal Drug Technology (Practical)** | Upon completion of this course the graduate is able to | |
| | C609P1 | To interpret the Phyto chemicals and estimate secondary metabolites in crude drugs . |
| | C609P2 | To formulate and evaluate herbal cosmetics. |
| | C609P3 | To formulate and evaluate herbal formulations |
| | C609P4 | To evaluate herbal monographs. |
| | C609P5 | To analyse Ayurvedic formulations. |
| | C609P6 | To assess Quality of herbal excipients. |
| **BP701T Instrumental Methods of Analysis ( Theory)** | Upon completion of this course the graduate is able to | |
| | C701T1 | To learn how to use UV spectrophotometer and Flourimeter. |
| | C701T2 | To extend the knowledge regarding IR Spectroscopy, Flame Photometry, Atomic Absorption Spectroscopy, Nepheloturbidometry. |
| | C701T3 | To identify a specific compound from mixture of compounds by performing TLC, Paper Chromatography |
| | C701T4 | To know the functions of HPLC, GC |
| | C701T5 | To developed different chromatographic methods to determine drugs. |
| | C701T6 | To improve skills in handling instrumentation of Ion exchange chromatography, Gel chromatography , Affinity chromatography. |
| **BP702T Industrial Pharmacy II (Theory)** | Upon completion of this course the graduate is able to | |
| | C702T1 | To define pilot plant and tell the basic concepts of scale up considerations for various form and show the SUPAC guidelines s |
| | C702T2 | To understand the term quality in technology development and transfer according to WHO guidelines and interpret with existing facilities. |
| | C702T3 | To develop the TT related documentation and plan these to solve the practical aspects. Outline the approved regulatory bodies and TT agencies in India. Apply the theories of regulatory |
| | C702T4 | To list regulatory requirements for drug approval. Analyze the IND, NDA, Clinical research studies & FDA submissions. Take part in audition in industry |

| | | |
|---|---|---|
| | C702T5 | To justify how the quality management systems work to maintain quality. Explain the importance of various certification programmes |
| | C702T6 | To elaborate the requirements of Indian regulatory requirements |
| **BP703T Pharmacy Practice (Theory)** | Upon completion of this course the graduate is able to | |
| | C703T1 | To outline the hospital, hospital pharmacy & its organizations and and structure of community pharmacy and to build ability to design and run own community pharmacy |
| | C703T2 | To acquire the knowledge on various methods of drug distribution, hospital formulary and therapeutic drug monitoring and apply it in the practice of pharmacy |
| | C703T3 | To demonstrate the knowledge of medication adherence, patient medication history interview and apply the knowledge on drug related problems |
| | C703T4 | To categorize and evaluate the role of hospital pharmacist in pharmacy and therapeutic committee, drug information services, patient counselling, education and training programmes in hospital |
| | C703T5 | To know about the budget preparation and implementation and clinical pharmacy services, appreciate the concept of rational drug therapy in the hospital |
| | C703T6 | To explain the principles of drug store management and inventory control methods during practice and to interpret clinical laboratory testes to specific disease states to provide better patient centered services |
| **BP704T Novel Drug Delivery System (Theory)** | Upon completion of this course the graduate is able to | |
| | C704T1 | To select the approaches and polymers for controlled drug delivery systems depending on the physicochemical and biological properties of drugs. |
| | C704T2 | To explain the formulation aspects of microencapsulation and mucosal drug delivery systems. |
| | C704T3 | To identify the basic components of transdermal and implantable drug delivery systems. |
| | C704T4 | To analyze the various approaches for gastroretentive and nasopulmonary drug delivery systems. |
| | C704T5 | To evaluate the concepts, formulation approaches and applications of targeted drug delivery. |
| | C704T6 | To develop ocular and intrauterine drug delivery systems. |
| **BP705P Instrumental** | Upon completion of this course the graduate is able to | |
| | C705P1 | To know how to estimate drugs by Colorimetry, Flourimetry, U.V Spectrophotometry. |
| | C705P2 | To explain the quenching effect of flouroscence. |
| | C705P3 | To identify sodium, potassium by flame photometry |

| | | |
|---|---|---|
| **Methods of Analysis ( Practical)** | C705P4 | To examine the separation of Amino acids, sugars, plant pigment by using Paper, column, TLC chromatographic techniques |
| | C705P5 | To determine chlorides, sulphates by nepheloturbidimetry. |
| | C705P6 | To develop methods for analyzing drugs by using HPLC,GC. |
| **BP706PS Practice School** | Upon completion of this course the graduate is able to | |
| | C706PS1 | Interpret knowledge in identifying the scope of research. |
| | C706PS2 | Apply theoretical principles to design experiments |
| | C706PS3 | Illustrate various practical procedures. |
| | C706PS4 | Differentiate the data available from various sources. |
| | C706PS5 | Operate various instruments through hands on training by professional skills. |
| | C706PS6 | Compile and conclude with meaningful results |
| **BP801T Biostatistics and Research Methodology (Theory)** | Upon completion of this course the graduate is able to | |
| | C801T1 | Describe basics of bio statistics, measures of central tendency , measures of dispersion and correlation |
| | C801T2 | Demonstrate the appropriate statistical methods required for a particular research design |
| | C801T3 | Make use of various available parameters for testing hypothesis and learn how to utilize statistical software in research methodology |
| | C801T4 | Understand various techniques of analysis of variance (ANOVA) |
| | C801T5 | Understand various techniques of non-parametric tests |
| | C801T6 | Explain about design and analysis of experiments |
| **BP802T Social and Preventive Pharmacy (Theory)** | Upon completion of this course the graduate is able to | |
| | C802T1 | CO1: Recognize the concepts and evaluation of public health and Illustrate sociocultural factors and its relation with health. |
| | C802T2 | Outline the principles on the prevention and control of communicable and non-communicable diseases. |
| | C802T3 | Utilize National health programs its objectives, functioning and outcomes in a community. |
| | C802T4 | List out the motives of various National Health Programs. |
| | C802T5 | Compare the community services in rural, urban and school health. |
| | C802T6 | Compile and plan to discuss the general measures and strategies to be<br>followed in social and preventive pharmacy. |
| **BP804ET Pharmaceutical Regulatory Science (Theory)** | Upon completion of this course the graduate is able to | |
| | C804ET1 | To define the concept of innovator and generic drug development, new drug discovery process in pharmaceutical industry |

| | | |
|---|---|---|
| | C804ET2 | To compare the filing/approval process for innovator and generic drug product |
| | C804ET3 | To identify the regulatory authorities/agencies of various countries, their organization and types of applications |
| | C804ET4 | To distinguish the regulatory guidelines required for registration of Indian drug product in overseas market |
| | C804ET5 | To evaluate clinical trial protocols and to know the importance of pharmacovigilance /process of monitoring in clinical trials |
| | C804ET6 | To eloborate the basic regulatory concepts |
| **BP811ET Advanced Instrumentation Techniques (Theory)** | Upon completion of this course the graduate is able to | |
| | C811ET1 | To recall the principle and instrumentation of NMR spectroscopy |
| | C811ET2 | To illustrate the ionization and analyzers in mass spectrometry |
| | C811ET3 | To explain principle, instrumentation and applications of X-RD |
| | C811ET4 | To examine the proper functioning of analytical instrumentation |
| | C811ET5 | To determine the biological samples |
| | C811ET6 | To maximize the knowledge of hyphenated techniques |
| **Project Work** | Upon completion of this course the graduate is able to | |
| | PW1 | Organize literature review and integrate the objective of the research work |
| | PW2 | Attribute resources required to perform the research |
| | PW3 | Implement the concepts of experimental procedures |
| | PW4 | Illustrate the experimental data by statistical analysis. |
| | PW5 | Report the findings of the research work. |
| | PW6 | Conclude the findings of research work |