1. Course Outcomes of B. Pharmacy First Year – First Semester

S.No	Course Name with code	Co Number	Course Outcome
I YEAR I SEMESTER			
1	Human Anatomy and Physiology I–Theory (BP101T)	CO1	Demonstrate human body, Cellular level of organization, Tissue level of organization. (UNDERSTAND)
		CO2	Explain Integumentary system, Skeletal system & joints. (UNDERSTAND)
		CO3	Describe about Blood components. (Remember)
		CO4	Discuss about the lymphatic system. (UNDERSTAND)
		CO5	Explain about Peripheral nervous system & Special senses. (UNDERSTAND)
		CO6	Describe about Cardiovascular system. (UNDERSTAND)
2	Pharmaceutical Analysis I – Theory (BP102T)	CO1	Identify the unknown impurities in the sample by performing the Limit Tests of Chlorides, Sulphates, Iron, Arsenic (REMEMBER)
		CO2	Demonstrate the preparation and standardization of Sodium hydroxide, Sulphuric acid, Sodium thiosulfate, Potassium permanganate, Ceric ammonium sulphate (UNDERSTAND)
		CO3	Analyse unknown samples by Acid- Base titrations. (EVALUATE)
		CO4	Analyse unknown samples by Cerimetry, Iodometry, complexometric titrations. (EVALUATE)
		CO5	Analyse the concepts of Permangometry, non-aqueous titration, precipitation, back titrations. (EVALUATE)
		CO6	Determination of Normality by electro-analytical methods (APPLY)
3	Pharmaceutics I – Theory (BP103T)	CO1	Explain the history of profession of pharmacy, different dosage forms , professional way of handling the prescription (understand)
		CO2	Compute dose calculation for paediatrics based on different factors (Apply)
		CO3	Explain the basics of pharmaceutical calculations , excipients used indifferent dosage forms and solubility enhancing techniques (Understand)
		CO4	Illustration of various conventional dosage forms and their stability studies (Understand)
		CO5	Design the Preparation of semisolid dosage forms for body cavity, evaluations and pharmaceutical incompatibilities. (Create)
		CO6	Discuss the dermal penetration mechanisms of drugs, excipients used in semisolids, various factors effecting drug absorption their preparation methods and evaluation studies .(Understand)

4	Pharmaceutical Inorganic Chemistry – Theory (BP104T)	CO1	Discuss the sources of impurities and methods to determine the impurities in inorganic drugs and pharmaceuticals.
		CO2	Major extra and intracellular electrolytes: Functions of major physiological ions.
		CO3	Summarize the concept of buffers and Functions of major physiological ions.
		CO4	Classify the gastrointestinal agents, cathartics and anti microbial agents.
		CO5	Characterize - Expectorants, Emetics, Poison and Antidote and Astringents.
		CO6	Explain the Radio activity, Measurement of radioactivity, Storage conditions, precautions & pharmaceutical application of radioactive substances.
5	Communication skills – Theory * (BP105T)	CO1	Make use of the concepts to communicate confidently and competently in English Language in all spheres.
		CO2	Make effective use of non-verbal communication in all situations and contexts to enhance effective communication in all aspects.
		CO3	Use listening skills to create more effective, productive professional and personal relationships.
		CO4	Illustrate the importance of interview skills for personal and professional growth.
		CO5	Make use of effective delivery strategies for giving oral presentations.
		CO6	Understand the key skills and behaviour required to facilitate a group discussion.
6	Remedial Biology/ Remedial Mathematics – Theory* (BP106T)	CO1	Apply (Apply) the fractions, logarithms, functions.
		CO2	Determine (Apply)the regarding matrices and determinants
		CO3	Solve (Apply) about calculus and differentiation
		CO4	Solve (Apply) the analytical geometry, straight line and integration
		CO5	Integrate (Create)the differential equations.
		CO6	Explain (Understand)the definition, properties of Laplace transform
7	Human Anatomy and Physiology – Practical (BP107P)	CO1	Demonstration about microscope . (UNDERSTAND)
		CO2	Demonstration about tissues and bones. (UNDERSTAND)
		CO3	Demonstration about hemocytometry. (UNDERSTAND)
		CO4	Calculation of WBC, RBC Count. (APPLY)
		CO5	Determination of bleeding time, clotting time, hb content, ESR. (APPLY)
		CO6	Assess of heart rate, pulse rate and B.P. (EVALUATE)

8	Pharmaceutical Analysis I – Practical (BP108P)	CO1	Identify the unknown impurities in the sample by performing the Limit Tests of Chlorides, Sulphates, Iron, Arsenic (REMEMBER)
		CO2	Demonstrate the preparation and standardization of Sodium hydroxide, Sulphuric acid, Sodium thiosulfate, Potassium permanganate, Ceric ammonium sulphate (UNDERSTAND)
		CO3	Analyse unknown samples by Acid- Base titrations. (EVALUATE)
		CO4	Analyse unknown samples by Cerimetry, Iodometry, complexometric titrations. (EVALUATE)
		CO5	Analyse the concepts of Permangometry, non-aqueous titration, precipitation, back titrations. (EVALUATE)
		CO6	Determination of Normality by electro-analytical methods (APPLY)
9	Pharmaceutics I – Practical (BP109P)	CO1	Explains the preparation of monophasic liquid dosage forms for internal use (Understand)
		CO2	Explains the preparation of monophasic liquid dosage forms for external use (Understand)
		CO3	Explains the preparation of Biphasic liquid dosage forms for internal & external use (Understand)
		CO4	Set up the preparation and dispensing methods for solid dosage forms like various powders (Create)
		CO5	Formulate the preparation of effervescent powders (Create)
		CO6	Design the various semisolid dosage forms (ointments, creams, gels, suppositories) (Create)
10	Pharmaceutical Inorganic Chemistry – Practical (BP110P)	CO1	Determine the source of impurities and methods to determine the impurities in inorganic formulations
		CO2	Justify the medicinal and pharmaceutical importance of inorganic compounds ,drugs and pharmaceuticals.
		CO3	Differentiate physiological ions.
		CO4	Categorize inorganic pharmaceuticalsas gastrointestinal agents
		CO5	Elaborate the importance of as an antidotes
		CO6	Support the importace of radiopharmaceuticals in medicine
11	Communication skills – Practical* (BP111P)	CO1	Demonstrate Basic communication covering the topics like Meeting People Asking Questions
		CO2	Demonstrate Basic communication covering the topics like Making Friends What did you do? Do's and Dont's
		CO3	Explain nouns, Pronunciations like Consonant and vowel Sounds
		CO4	Describe Listening Comprehension / Direct and Indirect Speech and Figures of Speech
		CO5	Demonstrate Effective Communication Writing Skills Effective Writing
		CO6	Develop Interview Handling Skills E-Mail etiquette Presentation Skills

12	Remedial Biology – Practical* (BP112P)	CO1	Demonstrate understanding of the basic components of anatomy & physiology of plant
		CO2	Demonstrate understanding of the basic components of anatomy & physiology of animals
		CO3	Demonstrate understanding of the basic components of anatomy & physiology of animals with reference to humans
		CO4	Detailed study on frog
		CO5	Demonstrate T.S. of Senna, Cassia, Ephedra, Podophyllum
		CO6	Demonstrate Computer based tutorials

2. Course Outcomes of B. Pharmacy First Year – Second Semester

S.No	Course Name with code	Co Number	Course Outcome
I YEAR II SEMESTER			
13	Human Anatomy and Physiology II – Theory (BP201T)	CO1	Demonstrate Nervous system. (UNDERSTAND)
		CO2	Explain about digestive system and energetic. (UNDERSTAND)
		CO3	Explain about respiratory system. (UNDERSTAND)
		CO4	Describe about urinary system. (REMEMBER)
		CO5	Describe about endocrine system. (REMEMBER)
		CO6	Explain about reproductive system and genetics. (UNDERSTAND)
14	Pharmaceutical Organic Chemistry I – Theory (BP202T)	CO1	Explain Nomenclature Alkanes, Alkenes, Dienes, Alkynes, Alcohols, Aldehydes, Ketones, Amides, Amines, Phenols, Alkyl Halides, Carboxylic Acid, Esters, Acid Chlorides And Cycloalkanes.Structural isomerism
		CO2	Enumerate Some important physical properties of organic compounds, Alkanes, Alkenes and Conjugated dienes.
		CO3	SP3 hybridization in alkanes, Stabilities of alkenes, SP2 hybridization in alkenes Saytzeffs orientation, Ozonolysis, conjugated dienes
		CO4	Explain Free radical/ nucleophilic [alkyl/ acyl/ aryl] / electrophilic substitution, free radical/ nucleophilic / electrophilic addition, elimination, oxidation and reduction reactions with mechanism, orientation of the reaction, order of reactivity, stability of compounds.
		CO5	Develop knowledge on some named organic reactions with Mechanism of aldol condensation, claisen condensation, cannizzaro reaction, crossed aldol condensation, crossed cannizzaro reaction, benzoin condensation, perkin condensation
		CO6	Qualitative tests , reactions, acidity ,bacicity of mentioned classess Organic Structure and important medicinal uses of some important organic compounds.

15	Biochemistry – Theory (BP203T)	CO1	Summarise Cell and its biochemical organization.
		CO2	Characterise the catalytic activity of enzymes and importance of isoenzymes in diagnosis of diseases.
		CO3	State the metabolic process of bio molecules in health and illness (metabolic disorders).
		CO4	Justify the genetic organization of mammalian genome, protein synthesis, replication, mutation and repair mechanism.
		CO5	I llustrate the biochemical principles of organ function tests of kidney, liver and endocrine gland.
		CO6	Describe the qualitative analysis and determination of bio molecules in the body fluids.
16	Pathophysiology – Theory (BP204T)	CO1	Discuss basic principal of cell injury and Adaptation (UNDERSTAND)
		CO2	Describe about the inflammation and repair (REMEMBER)
		CO3	Explain the cardiovascular system (UNDERSTAND)
		CO4	Summarize the Haematological diseases (UNDERSTAND)
		CO5	Describe the bone diseases (REMEMBER)
		CO6	Explain the Infectious diseases (UNDERSTAND)
17	Computer Applications in Pharmacy – Theory * (BP205T)	CO1	Illustrate the concept of number system in computers.
		CO2	Describe use of web technologies such as HTML, XML, CSS, Programming languages, Web servers and pharmacy drug database.
		CO3	Discuss about different types of databases, applications of computers And databases in pharmacy.
		CO4	Appraise the applications of computers in pharmacy such as drug information services, pharmacokinetics, mathematical model in drug design, hospital and clinical pharmacy etc.,
		CO5	Explain about bioinformatics and its impact in vaccine discovery and database.
		CO6	Analyses computers as data analysis in preclinical development.
18	Environmental sciences – Theory * (BP206T)	CO1	Explain (Understand) The Multidisciplinary nature of environmental studies Natural Resources Renewable and non-renewable resources: Natural resources and associated problems a) Forest resources; b) Water resources
		CO2	Explain (Understand) Mineral resources; d) Food resources; e) Energy resources; f) Land resources: Role of an individual in conservation of natural resources.
		CO3	Analyse (Analyse) Concept of an ecosystem, Structure and function of an ecosystem, Introduction, types, characteristic features, structure and function of the ecosystems: Forest ecosystem; Grassland ecosystem;
		CO4	Analyse (Analyse) Desert ecosystem; Aquatic ecosystems (ponds, streams, lakes, rivers, oceans,
		CO5	Analyse (Analyse) about Environmental Pollution: Air pollution
		CO6	Analyse (Analyse) about Water pollution; Soil pollution

19	Human Anatomy and Physiology II –Practical (BP207P)	CO1	Demonstration about integumentary system, nervous system, endocrine system and cranial nerves. UNDERSTAND
		CO2	Analyse different types of taste, visual activity. ANALYSE
		CO3	Determination of reflex activity, body temperature and feedback mechanism. APPLY
		CO4	Determination of tidal and vital capacity, BMI. APPLY
		CO5	Demonstration on family planning and pregnancy diagnosis. UNDERSTAND
		CO6	Analyse organ slides observation, total blood count by cell analyser. ANALYSE
20	Pharmaceutical Organic Chemistry I– Practical (BP208P)	CO1	Demonstrate various laboratory techniques.
		CO2	synthesis of organic compounds
		CO3	Identification of acidic compounds by using the qualitative compound analysis
		CO4	Identification of Basic compounds by using qualitative compound analysis
		CO5	Identification of Neutral compounds by using qualitative compound analysis
		CO6	Construct and also use of stereo models
21	Biochemistry – Practical (BP209P)	CO1	Determine the Qualitative analysis of normal and abnormal constituents of urine.
		CO2	Categories the urine creatinine by Jaffe's method and calcium by precipitation method.
		CO3	Assess the blood sugar by Folin-Wu tube method.
		CO4	Identification of SGOT and SGPT in serum.
		CO5	Estimation of Urea, Proteins and serum bilirubin
		CO6	Predic sodium, calcium and potassium in serum.
		CO1	Demonstrate and make use of MS Word suite and concepts of information systems and software.
		CO2	Summarize the report and to design a web page Using HTML and drug information system..
		CO3	Explain the adverse effects using online tools and paradigms of program languages and be exposed to at least one database(SQL)
	Computer Applications in Pharmacy – Practical* (BP210P)	CO4	Create and make use of MS Access suite and bioinformatics
		CO5	Determine the knowledge of computers in pharmacy, web and XML pages
		CO6	Design and make use of MS Excel and Power point suite and preclinical development.

3. Course Outcomes of B. Pharmacy Second Year – First Semester

S.No	Course Name with code	Co Number	Course Outcome
II YEAR I SEMESTER			
18	Pharmaceutical Organic Chemistry II – Theory (BP301T)	CO1	Explain (Understand)Benzene and its derivatives A. Analytical, synthetic and other evidences in the derivation of structure of benzene, Orbital picture, resonance in benzene, aromatic characters, Huckel's rule B. Reactions of benzene - nitration, sulphonation, halogenation reactivity, Friedel crafts alkylation- reactivity, limitations, Friedelcrafts acylation.
		CO2	Classify (Analyse)study and Phenols, Acidity of phenols, effect of substituents on acidity, qualitative tests, Structure and uses of phenol, cresols, resorcinol, naphthols
		CO3	Classify (Analyse) Aromatic amines, Aromatic acids
		CO4	Explain (Understand) Hydrolysis, Hydrogenation, Saponification and Rancidity of oils, Drying oils. c. Analytical constants – Acid value, Saponification value, Ester value, Iodine value, Acetyl value, Reichert Meissl (RM) value – significance and principle involved in their determination Synthesis (Create) Polynuclear hydrocarbons: Synthesis, reactions Structure and medicinal uses of Naphthalene, Phenanthrene, Anthracene, Diphenylmethane, Triphenylmethane and their
		CO5	Explain (Understand) Cyclo alkanes* Stabilities – Baeyer's strain theory, limitation of Baeyer's strain theory, Coulson and Moffitt's modification, Sachse Mohr's theory (Theory of strainless rings), reactions of cyclopropane and cyclobutane
		CO6	Explain (Understand)Benzene and its derivatives A. Analytical, synthetic and other evidences in the derivation of structure of benzene, Orbital picture, resonance in benzene, aromatic characters, Huckel's rule B. Reactions of benzene - nitration, sulphonation, halogenationreactivity, Friedelcrafts alkylation- reactivity, limitations, Friedelcrafts acylation.
19	Physical Pharmaceutics I – Theory (BP302T)	CO1	Explain the Definitions, solubility terms, principle of diffusion, Types of solutions (UNDERSTAND)
		CO2	Describe the States of matter and properties of matter, Physico chemical properties of drug molecules (REMEMBER)
		CO3	Tell about the Surface and interfacial phenomenon (REMEMBER)
		CO4	Classify Complexation and Recall Complexation and protein binding (ANALYSE)
		CO5	Assess the methods of analysis (EVALUATE)
		CO6	Relate pH, buffers and isotonic solutions with the pharmaceutical applications (ANALYSE)

20	Pharmaceutical Microbiology – Theory (BP303T)	CO1	Explain Microbiology Compare prokaryotes and eukaryotes and describe ultra-structure, morphology, nutritional requirement of bacteria, raw materials used for culture media and physical parameters for growth, growth curve, isolation and preservation methods for pure cultures. Explain cultivation of anaerobes, quantitative measurement of bacterial growth, different types of phase constrast microscopy, dark field microscopy and electron microscopy **(UNDERSTAND)**
		CO2	Identify bacteria using staining techniques (simple, Gram's &Acid fast staining) and biochemical tests Explain principle, procedure, merits, demerits and applications of methods of sterilization and evaluate efficiency of sterilization methods. Demonstrate understanding of equipments employed in large scale sterilization and Classify and describe Sterility indicators **(REMEMBER)**
		CO3	Explain morphology, classification, reproduction/replication and cultivation of Fungi and Viruses. Explain classification, mode of action, factors affecting and evaluation of disinfection and antiseptics. Describe and evaluate bacterio static and bactericidal actions. Explain Sterility testing of Pharmaceutical products according to IP, BP and USP **(UNDERSTAND)**
		CO4	Demonstrate designing of aseptic area and laminar flow equipments. Explain different sources of contamination and methods of prevention of an aseptic area and classify microbiological clean area. Explain Principles and methods of different microbiological assay, methods for standardization of antibiotics, vitamins and amino acids. Demonstrate understanding of standardization and assessment of a new antibiotic **(UNDERSTAND)**
		CO5	Explain types, sources, factors affecting and assessment of microbial contamination and spoilage of pharmaceutical products **(UNDERSTAND)**
		CO6	Describe Preservation of pharmaceutical products using antimicrobial agents and evaluation of microbial stability of formulations **(REMEMBER)**
21	Pharmaceutical Engineering – Theory (BP304T)	CO1	Describe basics about study of flow of fluids and various unit operations in industries like size reduction and separation. Size reduction objectives and mechanisms
		CO2	Size separation objectives, mechanism, applications, official standards of powders Summarize the various laws and mechanisms of heat transfer and different procedures , equipments for evaporation & distillation
		CO3	Evaporation objectives, applications, factors influencing and mechanism Distillation principles methodology and types
		CO4	Drying objectives applications mechanism Classify about the material handling techniques like mixing. Filtration objectives, applications, theories and factors influencing
		CO5	Explain the importance of various laws and mechanisms of filtration and centrifugation
		CO6	Describe significance of plant lay out design for optimum use of resources. various and preventive methods used for corrosion control in pharmaceutical industries
		CO1	Perform (Create) the experiments involving laboratory techniques, Recrystallization

22	Pharmaceutical Organic Chemistry II – Practical (BP305T)	CO2	Perform (Create) the experiments involving laboratory techniques Steam distillation
		CO3	Determination (Apply) of following oil values (including standardization of reagents) Acid value
		CO4	Determination (Apply) of following oil values (including standardization of reagents) Saponification value, Iodine value
		CO5	Preparation (Create) of different compounds
		CO6	Preparation (Create) of different compounds
23	Physical Pharmaceutics I – Practical (BP306T)	CO1	Calculate the solubility of drugs at room temperature & pKa value by using Half Neutralization **(APPLY)**
		CO2	Determination of Partition Coefficient, Surface Tension of Given Liquid **(APPLY)**
		CO3	Determination of Critical Micellar Concentration of a surfactant, HLB number of surfactants **(APPLY)**
		CO4	Determine the % composition of sodium chloride in a solution **(APPLY)**
		CO5	Determination of adsorption by Freundlich and Langmuir's constant using activated charcoal **(APPLY)**
		CO6	Determination of Stability Constant and Donor Acceptor Ratio of PABA-Caffeine Complex by Solubility Method **(APPLY)**
24	Pharmaceutical Microbiology – Practical (BP307P)	CO1	Demonstrate different equipment's and processing, e.g., B.O.D. incubator, laminar flow, aseptic hood, autoclave, hot air sterilizer, deep freezer, refrigerator, microscopes used in experimental microbiology **(UNDERSTAND)**
		CO2	Prepare and sterilize culture media and perform Sterilization of glassware **(CREATE)**
		CO3	Prepare Sub culturing of bacteria and fungus on nutrient stabs and slants **(CREATE)**
		CO4	Develop different Staining methods (simple, Gram's & Acid fast staining) **(CREATE)**
		CO5	Explain Isolation of pure culture of micro-organisms by multiple streak plate technique and other techniques **(UNDERSTAND)**
		CO6	Analyze Microbiological assay of antibiotics by cup plate method and other methods **(ANALYSE)**
25	Pharmaceutical Engineering –Practical (BP308P)	CO1	Determination of radiation constant and calculate the efficiency of steam distillation
		CO2	Determination of heat transfer coefficient by heat exchanger and construction of drying rate curve
		CO3	Determination of moisture content and humidity of air
		CO4	Description of pharmaceutical machinery and size analysis by sieving
		CO5	Demonstration of major milling equipments and Factors affecting Rate of Filtration and Evaporation
		CO6	Determination of effect of time on the Rate of Crystallization calculate the uniformity Index

4. Course Outcomes of B. Pharmacy Second Year – Second Semester

S.No	Course Name with code	Co Number	Course Outcome
II YEAR II SEMESTER			
27	Pharmaceutical Organic Chemistry III– Theory (BP401T)	CO1	Explain the phenomenons of Optical isomerism, Optical activity, enantiomerism, diastereoisomerism, meso compounds, Elements of symmetry, chiral and achiral molecules with examples. Designate the type and existence of an optical isomer in space by applying concept of DL system of nomenclature, sequence rules, RS system of nomenclature of optical isomers.
		CO2	Outline chemical Reactions of chiral molecules, methods and types of approaches involved in the synthesis of asymmetric compounds and illustrate different methods of resolution of racemic mixture.
		CO3	Illustrate and explain the phenomenons Geometrical isomerism, Conformational isomerism in Ethane, n-Butane and Cyclohexane, Stereo isomerism in biphenyl compounds (Atropisomerism) and conditions for optical activity, Methods of determination of configuration of geometrical isomers.Designate the type and existence of an geometrical isomer by applying concept of Nomenclature of geometrical isomers (Cis Trans, EZ, Syn Anti systems).Outline the types of Stereospecific and stereoselective reactions with examples.
		CO4	Name and classify heterocyclic compounds. Outline the Synthetic,chemical reactions and medicinal uses of Pyrrole, Furan, and Thiophene and their derivatives. Explain the Relative aromaticity and reactivity of Pyrrole, Furan and Thiophene.
		CO5	Outline Synthetic,chemical reactions and medicinal uses of Pyrazole, Imidazole, Oxazole, Thiazole, Pyridine, Quinoline, Isoquinoline, Acridine and Indole, Pyrimidine, Purine, azepines and their derivatives. Illustrate the Basicity of pyridine.
		CO6	Outline the reaction mechanisms of Metal hydride reduction (NaBH4 and LiAlH4), Clemmensen reduction, Birch reduction, Wolff Kishner reduction, Oppenauer-oxidation and Dakin reaction, Beckmanns rearrangement, Schmidt rearrangement, Claisen-Schmidt condensateion and utilize those concepts in different types of chemical conversions.
28	Medicinal Chemistry I – Theory (BP402T)	CO1	Describe the history of profession of pharmacy, fundamental knowledge on the structure, chemistry and therapeutic value of drugs.
		CO2	Compose the structure activity relationships of drugs, importance of physicochemical properties and metabolism of drugs.
		CO3	Classify the chemistry of drugs with respect to their pharmacological activity metabolic pathways, adverse effect and therapeutic value of drugs
		CO4	Elaborate the Structural Activity Relationship (SAR) of different class of drugs
		CO5	Characterise Phenothiazeines and its SAR
		CO6	Justify the techniques involved in the synthesis of drugs, purification methods applied.

29	Physical Pharmaceutics II – Theory (BP403T)	CO1	Define about the coarse and colloidal dispersions (Remember)
		CO2	Assess the rheological properties and apply them in pharmaceutical sciences. (Evaluate)
		CO3	Explain the deformation of Solids (Understand)
		CO4	Demonstrate use of physicochemical properties in the formulation development and evaluation of dosage forms. (Understand)
		CO5	Discuss about the micromeritic properties of drug molecules (Understand)
		CO6	Characterize the principles of chemical kinetics for stability testing (Analyse)
30	Pharmacology I – Theory (BP404T)	CO1	Describe the history and scope of pharmacology, general pharmacology, pharmacokinetics, and pharmacodynamics.(Remember)
		CO2	Explain the procedure involved in preclinical and clinical studies.(Understand)
		CO3	Explain the mechanism of drug action at organ system/sub cellular/macromolecular levels theory, Sampling technique, Parametric tests and Non Parametric tests.(Understand)
		CO4	Apply the basic pharmacological knowledge in the prevention and treatment of various diseases.(Apply)
		CO5	Explain the pharmacology of drugs acting on Central Nervous System.(Understand)
		CO6	Apply the basic pharmacological knowledge in the prevention and treatment of various CNS disorders.(Apply)
31	Pharmacognosy and Phytochemistry I– Theory (BP 405 T)	CO1	Define Pharmacognosy, organized and unorganized drugs and describe the history, scope and development of Pharmacognosy.
		CO2	Describe the methods of quality control of crude drugs.
		CO3	Application of methods for the cultivation and collection of medicinal plants, plant hormones.
		CO4	Characterize plant tissue culture and classify types of plant tissue culture.
		CO5	Appraise the role of traditional systems of medicine in India.
		CO6	Preparation of various plant products from natural sources.
32	Medicinal Chemistry I – Practical (BP406 T)	CO1	Understand the chemistry of drugs with respect to their pharmacological activity.
		CO2	Determination of Partition Coefficient, of Immiscible drugs
		CO3	Elaborate the Structural Activity Relationship (SAR) of different class of drugs
		CO4	Preparation and characterisation of various medicinal molecules
		CO5	Determination of percentage purity of medicinal molecules.
		CO6	Characterisation of medicinal molecules by using soft ware tools.

33	Physical Pharmaceutics II – Practical (BP407P)	CO1	Discuss the various methods for the determination of particle size and distribution (Understand)
		CO2	Explain the determination methods for physical properties of a drug (Understand)
		CO3	Characterize the viscosity by using different viscometers (Understand)
		CO4	Demonstrate the effect of suspending agent on sedimentation volume (Analyse)
		CO5	Calculate the rate constants for order of reactions (Apply)
		CO6	Evaluate the accelerated stability studies (Evaluate)
34	Pharmacology I – Practical (BP408P)	CO1	Relate in handling common laboratory animals used in pharmacological testing(Analyze)
		CO2	Explain the Maintenance of laboratory animals as per CPCSEA guidelines(Understand).
		CO3	Explain the Enzyme inducers and Enzyme inhibitors(Understand)
		CO4	Show of performing common methods of anesthesia, (Apply)
		CO5	Relate in withdrawing blood and administration of drugs via different routes(Analyze)
		CO6	Lable the effect of drugs on animals by simulated experiments(Remember)
35	Pharmacognosy and Phytochemistry I – Practical (BP409P)	CO1	Qualitative identification of crude drugs by macroscopical, microscopical and chemical tests
		CO2	Demonstration of Camera Lucida and eyepiece micrometer and determination of leaf constants of crude drugs.
		CO3	Determination of phytochemical constituents of crude drugs.
		CO4	Analysis of physical constants of crude drugs.
		CO5	Evaluate the number of starch grains present by Lycopodium spore method.
		CO6	Design the calibration of eyepiece micrometer with stage micrometer.

5. Course Outcomes of B. Pharmacy Third Year – First Semester

S.No	Course Name with code	Co Number	Course Outcome
III YEAR I SEMESTER			
36	Medicinal Chemistry II – Theory (BP501T)	CO1	Describe (Remember)) the chemistry of antihistaminic agents with respect to pharmacological activity. To understand the concept of cancer and anti neoplastic agents chemistry
		CO2	Explain (Understand)the drug metabolic pathways, adverse effect and therapeutic value of anti anginal drugs, vasodilators and calcium channel blockers. Diuretics classification, MOA and SAR of anti hypertensive agents.
		CO3	Classify (Analyse) about cardiovascular diseases and drugs to treat

			cardiovascular problems.

		CO4	Explain (Understand) the nomenclature, stereochemistry and metabolism of steroids and drugs acting on endocrine system
		CO5	Classify (Analyse) and the anti diabetic agents and explain the preparation of drugs
		CO6	Synthesis (Create) of anti diabetic agents and SAR of local anaesthetics.
37	Industrial PharmacyI– Theory (BP502T)	CO1	Illustrate Preformulation (UNDERSTAND)
		CO2	Interpret pharmaceutical dosage forms and their manufacturing techniques (UNDERSTAND)
		CO3	Develop pharmaceutical dosage forms (CREATE)
		CO4	Formulate solid, liquid and semisolid dosage forms and evaluate them for their quality (CREATE)
		CO5	Formulate cosmetics, pharmaceutical aerosols and (CREATE)
		CO6	Evaluate the packaging materials (EVALUATE)
38	Pharmacology II – Theory (BP503T)	CO1	Write the fundamentals of regulatory processes, pathophysiology in relation to CVS illnesses and disorders, and the pharmacology of drugs used to treat CVD.
		CO2	Illustrate the drugs acting on hematopoietic system, shock, diuretics and anti diuretics.
		CO3	Discuss the synthesis, metabolism, and pharmacology of autocoids.
		CO4	Explain the pharmacology and rational use of drugs used for the treatment of various endocrine disorders.
		CO5	Appraise the physiological role of sex hormones and to assess the effects of oral contraceptives and drugs acting on the Uterus
		CO6	Describe the principles, applications and types of bioassay, Evaluate the potency of unknown compound with reference to standard
39	Pharmacognosy and Phytochemistry II– Theory (BP504T)	CO1	Describe the general metabolic pathways in higher plants and their study.
		CO2	Explain the composition, chemistry, chemical classes, chemical constituents and therapeutic &commercial uses of crude drugs.
		CO3	Experimental isolation and identification tests of chemical classes of crude drugs
		CO4	Analyze the various classes of phytochemical constituents present in crude drugs.
		CO5	Evaluation and estimation of phytochemical constituents and their industrial production.
		CO6	Design various modern methods of extraction.
40	Pharmaceutical Jurisprudence – Theory (BP505T)	CO1	Discuss about Drugs act, Import, Manufacture of drugs, and its license.(Understand).
		CO2	Demonstrate Various Schedules, labelling and packing, offences and penalties. (Understand).
		CO3	Illustrate the Pharmacy Act, Medicinal and Toilet Preparation Act . (Understand).
		CO4	Demonstrate Narcotic Drugs and Psychotropic substances Act. (Understand).
		CO5	Demonstrate the Salient Features of Drugs and Magic Remedies Act, Prevention of Cruelty acts and National Pharmaceutical Pricing Authority. (Understand).
		CO6	Discuss Various Pharmaceutical legislation, code, Medical termination and Intellectual property rights. (Understand).

41	Industrial Pharmacy I – Practical (BP506P)	CO1	Analyse Preformulation studies of paracetamol/aspirin/or any other drug (ANALYSE)
		CO2	Preparation and Evaluation of Solid dosage forms and coating of tablets (CREATE)
		CO3	Formulate and Evaluate the capsules and parenteral dosage forms (CREATE)
		CO4	Evaluation tests (Quality control tests (as per IP)) for marketed tablets and capsules (EVALUATE)
		CO5	Formulate the Eye drops/ and Eye ointments, Creams (cold / vanishing cream) (CREATE)
		CO6	Evaluation of Glass containers (as per IP) (EVALUATE)
42	Pharmacology II – Practical (BP507P)	CO1	Explain in-vitro pharmacological studies, importance of physiological salt solutions and to find out effect of various drugs isolated frog heart, BP & heart rate in laboratory animals
		CO2	Illustrate the diuretic activity of drugs in mice/rats
		CO3	Demonstrate the Dose Response Relationship, effect of drugs DRC and find out concentrations of drugs various Bioassay methods
		CO4	Determine the $PA_{2\ \&}$ PD_2 value of drugs using rat anococcygeus muscle and guinea pig ileum
		CO5	Interpret the effect of spasmogens and spasmolytics using rabbit jejunum
		CO6	Predict various screening models for analgesic and anti-inflammatory activities
43	Pharmacognosy and Phytochemistry II – Practical (BP508P)	CO1	Qualitative identification of morphology, histology and powder characteristics.
		CO2	Explain the extraction of crude drugs and detection of crude drugs by chemical tests.
		CO3	Determination of phytochemical constituents of crude drugs crude drugs by Chromatographic techniques.
		CO4	Analysis of crude drugs by chemical tests
		CO5	Evaluation of volatile oils by Chromatographic techniques.
		CO6	Design the method of extraction of volatile oils

6. Course Outcomes of B. Pharmacy Third Year – Second Semester

S.No	Course Name with code	Co Number	Course Outcome
III YEAR II SEMESTER			
45	Medicinal Chemistry III – Theory (BP601T)	CO1	Characterise the importance of drug design and different techniques of drug design.
		CO2	Elaborate the chemistry of drugs with respect to their biological activity.
		CO3	Justify the metabolism, adverse effects and therapeutic value of drugs.
		CO4	Describe the importance of SAR of drugs.
		CO5	Justify the Synthetic anti tubercular agents and Urinary tract anti-infective agents.
		CO6	Explain Various approaches used in drug design and Pharmacophore modeling and docking techniques.
46	Pharmacology III – Theory (BP602T)	CO1	Describe the pharmacological management of Respiratory & Gastrointestinal problems.
		CO2	Explain various infectious agents, mechanisms, sensitivity, and resistance of different anti-infective agents.
		CO3	List the different antiviral drugs, antitubercular, antileprotics, antimalarial and antiamoebics.
		CO4	Classify anticancer drugs, Immunosupressants, drugs used to treat UTI & STD
		CO5	Assess various types of toxicity studies, principles of treatment and management of various poisoned conditions.
		CO6	Explain about chronopharmacology and chronotherapy.
47	Herbal Drug Technology – Theory (BP603T)	CO1	Describe herbal raw materials as source of herbal drugs from cultivation to herbal products.
		CO2	Explain Good Agricultural practices and Indian systems of medicine.
		CO3	Use of herbs and herbal products as health food and nutraceuticals and determine herb-food and herb-drug interactions.
		CO4	Classify herbal cosmetics and categorize herbal excipients used in herbal formulations.
		CO5	Evaluate and assess the herbal drugs and their stability according to WHO&ICH guidelines.
		CO6	Design Good manufacturing practices for the herbal drugs used in Indian systems of medicine.

48	Biopharmaceutics and Pharmacokinetics – Theory (BP604T)	CO1	Describe about the concepts, factors and study models of absorption, distribution and protein binding.
		CO2	Describe about the concepts, factors and study models of elimination.
		CO3	Discuss about protocols of the bioavailability and bioequivalence studies
		CO4	Explain about the various pharmacokinetic models, assessment of parameters using one compartment model and their significance.
		CO5	Explain about the two-compartment model, assessment of parameters and understand the calculation of loading dose, maintenance dose and describe the clinical setting.
		CO6	Describe about the concepts of non-linear pharmacokinetics and assessment of parameters.
49	Pharmaceutical Biotechnology – Theory (BP605T)	CO1	Describe basics of biotechnology including genetic engineering, Pro Production of Enzymes, enzymes immobilization and biosensors. **(REMEMBER)**
		CO2	Summarize the concept of Genetic engineering, Study of Recombina PCR and production of biotechnological products. **(UNDERSTAND)**
		CO3	Classify about the immune system, Hypersensitivity reactions, Monoclonal antibodies and vaccines. **(ANALYSE)**
		CO4	Explain the importance of various immunological techniques i.e., Mic genetics, Microbial biotransformation and Mutation. **(UNDERSTAN**
		CO5	Describe fermentation technology, production of various pharmaceuti products. **(REMEMBER)**
		CO6	Discuss about the Collection, Processing and Storage of Blood Produc **(UNDERSTAND)**
50	Quality Assurance – Theory (BP606T)	CO1	Discuss Quality Assurance and Total Quality management, Qbd
		CO2	Demonstrate - ISO 9000 &ISO14000, NABL Accreditation, Principles and procedures.
		CO3	Compose-organization and Personnel including responsibilities, training, i.e Manufacturing practices, Equipment's and raw materials.
		CO4	Explain quality control test for packaging and Good laboratory Practices.
		CO5	Evaluate complaints of return goods and document maintenance.
		CO6	Reproducibility of analytical instruments and analytical validation methods.

51	Medicinal chemistry III – Practical (BP607P)	CO1	Understand the preparation techniques drugs
		CO2	Understand the assay methods of drugs
		CO3	Justify the microwave assisted synthesis of drugs
		CO4	Understand the usage of chemdraw software in drug design
		CO5	Importance of Log P values in drug characterization
		CO6	Understand the importance of hydrogen bond donors and acceptors in drug design.
52	Pharmacology III – Practical (BP608P)	CO1	Recall dose calculations in pharmacological experiments and to relate the antiallergic activity and anti-ulcer activity in animals
		CO2	Demonstrate the effect of drugs on gastrointestinal motility and the agonistic/antagonistic effect on guinea pig ileum
		CO3	Analyze serum biochemical parameters by using semi- autoanalyser
		CO4	Determine the effect of saline purgative on frog intestine, hypoglycemic effect and test for pyrogens using Rabbits
		CO5	Determine LD_{50}, acute skin irritation & acute eye irritation
		CO6	Predict the pharmacokinetic parameters and adapt the biostatistical methods in experimental pharmacology
53	Herbal Drug Technology – Practical (BP609P)	CO1	Qualitative identification of extracts of crude drugs.
		CO2	Summarize the standard parameters of Ayurvedic preparations.
		CO3	Summarize the standard parameters of herbal formulations.
		CO4	Quantitative analysis of extracts of crude drugs.
		CO5	Evaluate the crude drugs by monographic analysis
		CO6	Design and formulate the herbal product preparations and evaluate them.

7. Course Outcomes of B. Pharmacy Fourth Year – First Semester

S.No	Course Name with code	Co Number	Course Outcome
IV YEAR I SEMESTER			
54	Instrumental Methods of Analysis – Theory (BP701T)	CO1	Demonstrate and Explain the Principle, Theory, Instrumentation and Working of UV - Visible Spectroscopy and Fluorimetry along with its applications. (UNDERSTAND)
		CO2	Describe the Introduction, Principle, Types of vibrations and factors affecting them, Instrumentation and Working of Infra-red Spectroscopy, Flame Photometry along with its applications. (REMEMBER)
		CO3	Enumerate the Introduction, Principle, Types of vibrations and factors affecting them, Instrumentation and Working of Atomic Absorption Spectroscopy and Nepheloturbidometry along with its applications. (REMEMBER)
		CO4	Discuss about the definition, Introduction, Principle and Methodology of Various Types of Chromatography like Column and Paper. (UNDERSTAND)
		CO5	Develop the definition, Introduction, Principle and Methodology of TLC and Electrophoresis. (CREATE)
		CO6	Illustrate the Principles, Instrumentation & Applications of Gas Chromatography, and High-Performance Liquid Chromatography. (UNDERSTAND)
		CO7	Summarize the Introduction, Theory, Classification, Instrumentation & Applications of Ion – Exchange Chromatography, Gel and Affinity Chromatography. (UNDERSTAND)
55	Industrial PharmacyII – Theory (BP702T)	CO1	Identify various concept of Pilot plant general considerations, scale up considerations for solids, liquid orals, semi solids, SUPAC guidelines, platform technology (Remember)
		CO2	Demonstrate the guidelines for Technology Transfer, Commercialization - practical aspects, Technology Transfer agencies, MoUs. (Understand)
		CO3	Assess historical overview , Role & responsibilities of Regulatory Affairs & Regulatory authorities (Evaluate)
		CO4	Explains the bio-equivalence studies and data submission for FDA (Understand)
		CO5	Discuss various key concepts to develop Quality management & Certifications and Quality by Designs. (Understand)
		CO6	Explain the Indian Regulatory requirements. (Understand)

56	Pharmacy Practice – Theory (BP703T)	CO1	Describe Hospital organization and detect and assess adverse drug reactions, reporting and its management. (REMEMBER)
		CO2	Explain various drug distribution methods system in the hospital, and monitor drug therapy of patient, role pharmacist in medication adherence and community pharmacy management. (REMEMBER)
		CO3	Explain how to obtain medication history interview, Pharmacy and Therapeutic committee, information services, counselling. (REMEMBER)
		CO4	Explain Education and training program in the hospital, Prescribed medication order and communication skills. (REMEMBER)
		CO5	Describe medication of management, budget preparation and its implementation, and also help in rational use of common over the counter medication. (REMEMBER)
		CO6	Explain pharmacy stores and inventory control management and able to interpret selected laboratory results of specific disease states and controlling of investigational use of drug. (REMEMBER)
57	Novel Drug Delivery System – Theory (BP704T)	CO1	Demonstrate and Explain about CONRTROLLED DRUG DELIVERY by maintenance of drug levels within a desired range, the need for fewer administrations, optimal use of the drug in question, and increased patient compliance. to confirm safety and to improve the efficiency of drugs as well as patient compliance. Understand various structures of POLYMERS and their effect on different properties of polymers. (understand)
		CO2	Describe the POLYMERS concentration, solubility of polymer in solvent, rate of solvent removal, solubility of organic solvent in water, spray drying technique. MUCOSAL DRUG DELIVERY prolong the residence time of the dosage form at the site of application or absorption (remember)
		CO3	Enumerate IMPLANTABLE targeted local delivery of drugs at a constant rate, less drug required to treat the disease state, minimization of possible side effects, and enhanced efficacy of treatment. TRANSDERMAL effective Transdermal drug delivery system, the drugs are easily able to penetrate the skin and easily reach the target site (remember)
		CO4	Discuss on GASTRO RETENTIVE DRUG DELIVERY and prolong the gastric retention time and controlled/sustained release of a drug. By using of NASO PULMONARY improved dosing, simpler, less invasive administration, enhanced patient adherence, and product lifecycle management. (understand)
		CO5	Develop TARGETED DRUG DELIVERY systems drug targeting results in increased efficacy, modulated pharmacokinetics, controlled bio-distribution, increased specificity of localization, decreased toxicity, reduced dose, and improved patient compliance. by preparation of liposome's, niosomes, nanoparticles, monoclonal antibodies. (create)
		CO6	Summarize OCULAR DRUG DELIVERY of sterilization, ease of eye drop formulation, less irritation, increase pre corneal residence time and enhancement in ocular bioavailability of drugs which are insoluble in tear fluid. INTRA UTERINE object that is placed inside the uterus above the endometrium and is active or medicated when it contains a therapeutic agent. (understand)

58	Instrumental Methods of Analysis – Practical (BP705P)	CO1	Illustrate the Calibration of UV – Visible Spectrophotometer. (UNDERSTAND)
		CO2	Determination of Absorption Maxima of Potassium Permanganate and effect of solvent on absorption spectrum of Phenol using UV – Visible Spectrophotometer. (APPLY)
		CO3	Calculation of the Quality and Quantity of the various drug substances by using UV – Visible Spectrophotometer. (APPLY)
		CO4	Computation of the Quality and Quantity of the various drug substances by using Fluorimetry, Nephelometry and Flame Photometry. (APPLY)
		CO5	Characterization and Separation of Amino acids and sugars by various techniques of chromatography like Column, Paper and TLC. (ANALYSE)
		CO6	Demonstration on HPLC and GC. (UNDERSTAND)

8. Course Outcomes of B. Pharmacy Fourth Year – Second Semester

S.No	Course Name with code	Co Number	Course Outcome
IV YEAR II SEMESTER			
62	Biostatistics and Research Methodology (BP801T)	CO1	Discuss the applications of Biostatics such as Correlation, Mean, Median, Mode, Range and standard deviation.
		CO2	Discuss the applications of Biostatics in Pharmacy such as Regression, Probability-theory, Sampling technique, Parametric tests and non-Parametric tests
		CO3	Design the experiments for Phases of clinical trials and observational and experimental studies.
		CO4	Apply the M.S. Excel, SPSS, R and MINITAB®, DoE (Design of experiment) in statistical analysis
		CO5	Explain the statistical techniques in Design of experiments
		CO6	Explain the statistical techniques in analysis of experiments.
63	Social and Preventive Pharmacy (BP802T)	CO1	Explain the concepts of health and diseases, Social and health education, Health and hygiene. **(Understand).**
		CO2	Discuss about Prevention and control of diseases**. (Understand).**
		CO3	Discuss about National health programs for HIV AND AIDS, TB, Integrated disease surveillance program (IDSP) & leprosy. **(Understand).**
		CO4	Discuss about mental health, deafness, Universal immunization programme, blindness, Pulse polio programme. **(Understand).**
		CO5	Demonstrate about National health intervention programs for mother and child, family welfare, tobacco control, Malaria Prevention Programmes. **(Understand).**
		CO6	Discuss about Community services and Functions of PHC, Improvement in rural, urban sanitation, Health promotion and education in school. **(Understand).**

64	Cosmetic Science (BP809ET)	CO1	Identify the key ingredients used in cosmetics and cosmeceuticals. (Remember)
		CO2	List out various formulations of cosmetics and cosmeceuticals, Determine Principles of formulation and building blocks of skin, hair, oral care products (Remember)
		CO3	Determine current technologies, mechanisms in the market for selection and developing cosmetics and cosmeceuticals. (Apply)
		CO4	Categorize key ingredients, Analytical cosmetics and basic science to develop cosmetics and cosmeceuticals. (Analyse)
		CO5	Construct Scientific knowledge to develop cosmetics and cosmeceuticals, Principles of Cosmetic Evaluation. (Create)
		CO6	Discuss Cosmetic problems associated with Hair and scalp, skin. (Understand)
65	Advanced Instrumentation Techniques (BP811ET)	CO1	Describe the Principle, Theory, Instrumentation and Working of Nuclear Magnetic Resonance Spectroscopy and Mass Spectroscopy along with its applications. (REMEMBER)
		CO2	State about Introduction, Principle, Theory, Instrumentation and Thermal Method of Analysis. (REMEMBER)
		CO3	Explain about X – Ray Diffraction Methods – origin of X- Rays and its concept, crystallography along with its applications. (UNDERSTAND)
		CO4	Summarize about Calibration and Validation as per ICH and USFDA guidelines. (UNDERSTAND)
		CO5	Demonstrate the calibration of Instruments like Electronic balance, UV – Visible Spectrophotometer, IR, Fluorimeter, Flame Photometer, HPLC and GC. (UNDERSTAND)
		CO6	Classify about the importance, concepts, Principle and different methods, limitations and types of Radio Immuno Assays and Extraction Techniques. (ANALYSE)