

**RAJ KUMAR GOEL INSTITUTE OF TECHNOLOGY (PHARMACY),
GHAZIABAD**

B.PHARM 1ST SEMESTER COURSE OUTCOMES, 2019-2020

COURSE	COURSE CODE	COURSE OUTCOMES
Human Anatomy and Physiology	BP101T	<p>Upon completion of the course, the students will be able to –</p> <ol style="list-style-type: none"> 1. Demonstrate various anatomical positions and explain the levels of organization of human body and illustrate the contributions of organ systems to the maintenance of homeostasis with the use of feedback system. 2. Discuss in depth the components & physiology of musculoskeletal system. 3. Discuss the body fluid of human body like lymph & blood. 4. List the components and functions of peripheral nervous system and sense organs. 5. Recognize the major organs and blood vessels of the cardiovascular system and understand their functions.
Pharmaceutical Analysis I	BP102T	<p>Upon completion of the course, the students will be able to –</p> <ol style="list-style-type: none"> 1. Illustrate the scope and applications of techniques of pharmaceutical analysis, pharmacopoeia, limit tests and the methods for expressing concentrations and describe the sources, types and methods for minimizing errors. 2. Explain the theories and principles related to acid base, non-aqueous, precipitation, complexometric, gravimetric, diazotization titrations. 3. Classify and describe the redox and electrochemical methods of analysis. 4. Formulate, calculate, prepare and standardize various molar and normal solutions
Pharmaceutics I	BP103T	<p>Upon completion of the course, the students will be able to –</p> <ol style="list-style-type: none"> 1. Describe historical aspects and prospects of Pharmacy profession and Pharmacopoeias. 2. Compute the doses of drugs and solve problems related to percentage solutions, alcohol dilutions, proof spirits and isotonicity adjustments. 3. Recognize various parts of prescriptions; describe procedure for compounding and dispensing of a typical prescription and; explain various types of incompatibilities involved along with their remedial actions. 4. Classify various pharmaceutical dosage forms and; define them. 5. Explain the advantages, limitations, classification, formulation and evaluation of Powders, monophasic liquids, suspensions, emulsions, suppositories and semi-solid dosage forms

Pharmaceutical Inorganic Chemistry	BP104T	<p>Upon completion of the course, the students will be able to –</p> <ol style="list-style-type: none"> 1.Explain Principle involved in Limit test for detecting Impurities present in pharmaceuticals. 2.Discuss pharmaceutical applications of Buffers, Electrolytes and Dental products. 3.Classify various antacids, cathartics and antimicrobial agents. 4.Illustrate the importance of Miscellaneous compounds like Expectorants, Emetics, Haematinics, Antidotes and Astringents. 5.Describe use of Radiopharmaceuticals as diagnostic aid and in treatment of various diseases
Communication Skills	BP105T	<p>Upon completion of the course, the students will be able to –</p> <ol style="list-style-type: none"> 1.Understand the basic objective of the course by being acquainted with specific dimensions of Communication skills i.e. Reading, Writing, Listening, Thinking and Speaking 2.Apply it for practical and oral presentation purposes by being honed up in presentation skills and voice-dynamics. They will apply techniques for developing inter-personal communication skills and positive attitude leading to their professional competence 3.Apply it at their work place for writing purposes such as presentation/official Drafting/administrative communication and use it for document /project /report. 4. Recognize learning aspects of communication for better performance in recruitment process and prospective jobs. 5. Assess, comprehend , converse, interact and participate at multinational levels in day-to –day events and situation
Remedial Biology	BP106RBT	<p>Upon completion of the course, the students will be able to –</p> <ol style="list-style-type: none"> 1.Describe living systems including their nature, organization and evolution. 2. Explain the structure and functions of cells, tissues and describe processes by which cells replicate and generalize how organisms obtain and use matter and energy to live and grow. 3. Describe how different organ systems carry out specific functions in multicellular organisms.
Remedial Maths	BP106RMT	<p>Upon completion of the course, the students will be able to –</p> <ol style="list-style-type: none"> 1. Understand Partial fraction, Logarithm, function and Limits and continuity with their application in Pharmacy. 2. Analyze Matrices and Determinant with Application of Matrices in solving Pharmacokinetic equations. 3. Solve different equations of Differentiation. 4. Solve problems of Analytical Geometry and Integration with their application in Pharmacy. 5. Understand and analyze Differential Equations , Laplace Transform with their Application in solving Pharmacokinetic equations

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Human Anatomy and Physiology	BP107P	<p>Upon completion of the course, the students will be able to –</p> <ol style="list-style-type: none"> 1. Demonstrate the working of compound microscope & identify the different types of bones & other tissues using microscope. 2. Estimate hematological parameters like hemoglobin, RBCs count, WBCs count, bleeding time & clotting times etc. 3. Record blood pressure, pulse rate.
Pharmaceutical Analysis I	BP108P	<p>Upon completion of the course, the students will be able to –</p> <ol style="list-style-type: none"> 1. Distinguish and Calibrate various glasswares and Analytical Balance also demonstrate the electro chemical methods of titration. 2. Prepare standardized solutions of 0.1N Hydrochloric acid, 0.1N Sulphuric acid, 0.1N Sodium hydroxide, 0.1N Perchloric acid, 0.1N Potassium permanganate and 0.1M Ceric ammonium sulphate. 3. Perform the Assay of Ferrous sulphate, Copper sulphate, Hydrogen peroxide, Calcium gluconate and Sodium chloride.
Pharmaceutics I	BP109P	<p>Upon completion of the course, the students will be able to –</p> <ol style="list-style-type: none"> 1. Refer and retrieve information from official books. 2. Use various glassware, weighing and measuring operations used in compounding and dispensing of a variety of dosage forms. 3. Define, differentiate and Formulate various dosage forms listed in official compendia. 4. Explain the roles and examples of various additives used in dosage forms. 5. Label the compounded formulation as per legal and patient requirements.
Pharmaceutical Inorganic Chemistry	BP110P	<p>Upon completion of the course, the students will be able to –</p> <ol style="list-style-type: none"> 1. Identify impurities present in salts by performing Limit-tests. 2. Recognize Inorganic pharmaceuticals by performing Identification tests. 3. Examine purity of various inorganic pharmaceuticals by performing purity tests. 4. Prepare and calculate Theoretical, Practical and % yield of Inorganic pharmaceuticals.
		<p>Upon completion of the course, the students will be able to –</p> <ol style="list-style-type: none"> 1. Perform better in their academic and professional scenario such as economic, environmental, social, political and ethical scenario 2. Utilize phonetic dictionary symbols to continue to improve pronunciation 3. Recognize, explain, and use the formal elements of specific genres of

Communication Skills	BP111P	<p>organizational communication: white papers, 4.recommend and analyze reports, proposals, memorandums, web pages, wikis, blogs, business letters, and promotional documents.</p> <p>5.Understand professional writing by studying management communication contexts and genres, researching contemporary business topics</p>
Remedial Biology	BP112RBP	<p>Upon completion of the course, the students will be able to –</p> <ol style="list-style-type: none"> 1. Demonstrate various section cutting techniques and procedure for preparation of permanent slide. 2. Describe different parts of a plant, their modifications and identification of various plant tissues. 3. Determine blood groups, blood pressure and tidal Volume. 4. Recognize various cell inclusions, bones and parts of frog using computer models

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COURSE	COURSE CODE	COURSE OUTCOMES
Human Anatomy and Physiology II	BP201T	<p>Upon completion of the course, the students will be able to –</p> <ol style="list-style-type: none"> 1. Classify nerve fibers, list the events that generate action potential and describe structure and functions of central nervous system. 2. Illustrate anatomy and physiology of organs of the digestive system and understand the process of digestion in regulation of energy and metabolism. 3. Explain gross morphology, structure and function of respiratory and urinary system. Summarize role of these systems in acid-base homeostasis. 4. Classify hormones, outline the mechanism of hormones action and describe the location, functions and disorders of different endocrine glands. 5. Describe anatomy and physiology of male and female reproductive systems and understand the basic principles of gene.
Pharmaceutical Organic Chemistry I	BP202T	<p>Upon completion of the course, the students will be able to –</p> <ol style="list-style-type: none"> 1. Explain IUPAC rules of nomenclature to give correct names for organic compounds and structural isomerisms in organic compounds having up to 10 Carbons open chain structures with functional groups. 2. Synthesize the organic compounds belonging the category of Alkanes, Alkenes, Conjugated Dienes, Alkyl halides, Alcohols, carbonyl compounds, carboxylic acids and aliphatic amines by their general methods of preparation. 3. Explore elimination (E1&E2), electrophilic addition, free radical substitution and addition, nucleophilic substitution(SN1 &SN2), nucleophilic addition reactions, orientation of reactions and various name reactions with their mechanisms. 4. Apply knowledge of hybridization, rearrangement of carbocations, stabilities of alkenes and conjugated dienes, order of reactivity of alkyl halides, electromeric effect, acidity of carboxylic acids and basicity of aliphatic amines in problem solving of organic chemistry. 5. Identify the organic compounds by their qualitative tests and memorize the structure and uses of organic compounds of paraffins, alkyl halides, alcohols, carbonyl compounds, carboxylic acids and aliphatic amines.
Biochemistry	BP203T	<p>Upon completion of the course, the students will be able to –</p> <ol style="list-style-type: none"> 1. Describe the principles and mechanisms of biological oxidation, energetics and regulation of enzymes and isoenzymes with their application in biological processes. 2. Explain the biological pathways and processes of carbohydrates, lipids, amino acids and nucleic acid. 3. Identify the structure and functions of Nucleotides, DNA, RNA and explain the diseases related to mutations.

Pathophysiology	BP204T	<p>Upon completion of the course, the students will be able to –</p> <ol style="list-style-type: none"> 1. Describe the etiology, sign & symptoms, & pathophysiology of various diseases. 2. Outline & explain the basic mechanism involved in the inflammation & repair. 3. Explain basic principles, causes, pathogenesis, and morphology of cell injury & categorize various adaptation mechanism of cell.
Computer Applications in Pharmacy	BP205T	<p>Upon completion of the course, the students will be able to –</p> <ol style="list-style-type: none"> 1. Student know the introduction of Number system, Concept of Information Systems and Software. 2. Student know the introduction of Web technologies with Introduction to databases, MYSQL, MS ACCESS, Pharmacy Drug database. 3. Student know the introduction of Application of computers in Pharmacy. 4. Student know the introduction of Bioinformatics, Impact of Bioinformatics in Vaccine Discovery. 5. Student know the introduction of Computers as data analysis in Preclinical development.
Environmental Sciences	BP206T	<p>Upon completion of the course, the students will be able to –</p> <ol style="list-style-type: none"> 1. Demonstrate a general understanding of the scope and interdisciplinary nature of environmental issues. Student know the introduction of Web technologies with Introduction to databases, MYSQL, MS ACCESS, Pharmacy Drug database. 2. Understand complex relationships between natural and human systems. 3. Student know the introduction of Bioinformatics, Impact of Bioinformatics in Vaccine Discovery.

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Human Anatomy and Physiology II- Practical	BP207P	<p>Upon completion of the course, the students will be able to –</p> <ol style="list-style-type: none"> 1. Identify various body system and family planning devices with the help of charts & models. 2. Record body mass index, body temperature, lungs volume & capacity & blood count. 3. Demonstrate the various activities like visual acuity, reflex activity and general neurological examination.
Pharmaceutical Organic Chemistry I- Practical	BP208P	<p>Upon completion of the course, the students will be able to –</p> <ol style="list-style-type: none"> 1. Identify the unknown organic compounds by preliminary test (colour, odour, aliphatic/aromatic nature, saturation and unsaturation) and solubility tests. 2. Detect the elements like Nitrogen, Sulphur and Halogen in organic compounds by Lassigne's Test. 3. Analyze functional groups (Phenols, Carboxylic Acids, Carbohydrates, Aldehydes/Ketones, Nitro Compounds, Amines, Amides, Alcohol) by performing various qualitative tests. 4. Determine the melting and boiling point of given compound and confirm the synthesized derivatives by melting / boiling point methods. 5. Construct a molecular model of some organic compounds using molecular model Kit.
Biochemistry- Practical	BP209P	<p>Upon completion of the course, the students will be able to -</p> <ol style="list-style-type: none"> 1. Identify various body system and family planning devices with the help of charts & models. 2. Record body mass index, body temperature, lungs volume & capacity & blood count. 3. Demonstrate the various activities like visual acuity, reflex activity and general neurological examination.
Computer Applications in Pharmacy- Practical	BP210P	<p>Upon completion of the course, the students will be able to –</p> <ol style="list-style-type: none"> 1. Design a questionnaire using a word processing package to gather information about a particular disease. Retrieve the information of a drug and its adverse effects using online tools Create a HTML web page to show personal information 2. Creating mailing labels Using Label Wizard, generating label in MS WORD. 3. Create a database in MS Access to store the patient information with the required fields using access. Design a form in MS Access to view, add, delete and modify the patient record in the database. 4. Generating report and printing the report from patient database, Creating invoice table Drug information storage and retrieval using MS Access. 5. Exporting Tables, Queries, Forms , XML pages , and Reports to web pages.



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COURSE	COURSE CODE	COURSE OUTCOMES
Pharmaceutical Organic Chemistry II	BP301T	<p>Upon completion of the course, the students will be able to –</p> <ol style="list-style-type: none">1.Explain analytical, synthetic and other derivation of structure of Benzene and write the structure, name and uses of different organic compounds.2.Classify and synthesize the organic compounds belonging to benzene derivatives, phenols, aromatic amines, aromatic acids, polynuclear hydrocarbons and cycloalkanes by their general methods of preparation.3.Explore reactions of nitration, sulphonation, halogenation of benzene, orientation of reactions and various name reactions with their mechanisms, fatty acid reactions and qualitative tests of phenols.4.Apply knowledge of substituents effect on reactivity of benzene, acidity of phenols and aromatic acids and effect of substituents on basicity of aromatic amines.5.Determine analytical constants of fats and oils such as Acid value, Saponification value, Ester value, Iodine value, Acetyl value, Reichert Meissl (RM) value and explain various stabilities theory of cycloalkanes.
Physical Pharmaceutics I	BP302T	<p>Upon completion of the course, the students will be able to –</p> <ol style="list-style-type: none">1.Understand various physicochemical properties of drug molecules in the designing the dosage forms.2.Know the principles of chemical kinetics & to use them for stability testing and determination of expiry date of formulations.3.Demonstrate use of physicochemical properties in the formulation development and evaluation of dosage forms

Pharmaceutical Microbiology	BP303T	<p>Upon completion of the course, the students will be able to –</p> <ol style="list-style-type: none"> 1. Describe the microbiology with their history and importance, bacteria cell, virus, electron microscopy, and methods of cultivation and isolation of microorganisms. 2. Classify various methods of identification, staining, sterilization, equipments used for sterilization and methods to evaluate and validate. 3. Classify fungi and viruses and their cultivation and reproduction and describe various types of disinfectants and methods to evaluate according to IP, BP and USP. 4. Describe the design of clean and aseptic area and classify clean area and describe the various methods of microbiological assay and standardization of vitamins/amino acids/antibiotics. 5. Identify microbial spoilage of pharmaceutical products and describe the general procedure of cell culture and their applications.
Pharmaceutical Engineering	BP304T	<p>Upon completion of the course, the students will be able to –</p> <ol style="list-style-type: none"> 1. Recognize types of fluid flow, Bernoulli's theorem, Reynolds's number and its significance, energy losses, orifice meter, venture meter, Pitot tube, Rotometer and classify manometers. 2. Distinguish the concept of size reduction and size separation, centrifugation their objectives, applications and define principle, construction, working, uses, advantages, disadvantages of different industrial equipments. 3. Describe objectives, applications, principle, construction, working, uses, merits, demerits of industrial evaporators, distillation system and heat exchanger, also discuss different modes of heat transfer, related law's and factors effecting evaporation. 4. Explain the perception of mixing and drying with moisture, rate of drying and drying calculations, classification of dryers and mixing equipments and their utilization in pharmaceutical industries. 5. Outline the concepts of filtration, factors influencing, filter aids and medias, and study different types of filters used in manufacturing plants. 6. Differentiate between the Metal-Non metal Material of construction with their composition, corrosion theories and types, preventive methods and applications in pharmaceutical industries and study the applications and techniques of material handling in pharmaceutical industries

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Pharmaceutical Organic Chemistry II	BP305P	<p>Upon completion of the course, the students will be able to –</p> <ol style="list-style-type: none"> 1. Perform experiments involving laboratory techniques (Recrystallization and Steam distillation). 2. Determine different oil values like Acid value, Saponification value and Iodine value. 3. Prepare organic compounds by acylation, halogenation (Bromination), nitration, oxidation, hydrolysis, diazotization, Claisen Schmidt and Perkin reaction.
Physical Pharmaceutics I	BP306P	<p>Upon completion of the course, the students will be able to –</p> <ol style="list-style-type: none"> 1. Determine the solubility of drug, pKa value, Partition co- efficient. 2. Determine surface tension, HLB number of a surfactant and critical micellar concentration of surfactants 3. Determine stability constant
Pharmaceutical Microbiology	BP307P	<p>Upon completion of the course, the students will be able to –</p> <ol style="list-style-type: none"> 1. identify glassware, equipments and instruments used in various experiments of microbiology. 2. Prepare various types of culture media for identification, isolation and sub-culturing of microbes. 3. Perform sterilization, evaluation of disinfectants/antibiotics and staining techniques for identification and differentiation of microorganisms.

Pharmaceutical Engineering	BP308P	<p>Upon completion of the course, the students will be able to –</p> <ol style="list-style-type: none">1. Explain construction, working and application of various equipment used for pharmaceutical operations such as Ball mill, Fluid energy mill, Hammer mill, Sieve shaker, Tray dryer, Double cone blender, Planetary mixer, Ribbon blender.2. Evaluate different factors affecting rate of filtration & evaporation and analyze size distribution by sieve shaker.3. Estimate efficiency of steam distillation, define factor affecting rate of drying such as surface area, concentration and temperature and calculate % drying rate, % loss on drying and perform stability testing using centrifuge.4. Assess different equipment their working and application of such as tablet punching machine, Sealing machine & Reynolds's apparatus
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COURSE	COURSE CODE	COURSE OUTCOMES
Pharmaceutical Organic Chemistry III – Theory	BP401T	<p>Upon completion of the course, the students will be able to –</p> <ol style="list-style-type: none"> 1. Describe the stereo chemical aspects of organic compounds in terms of Optical isomerism, Geometrical isomerism and Conformational isomerism. 2. Write the nomenclature of DL system, RS system, Cis-Trans, E-Z and Syn-Anti systems alongwith nomenclature and classification of heterocyclic compounds. 3. Understand the methods of preparation, reactions and properties of heterocyclic compounds. 4. Memorize the medicinal uses and other applications of heterocyclic compounds. 5. Explain name reactions of synthetic importance with their mechanisms.
Medicinal Chemistry I – Theory	BP402T	<p>Upon completion of the course, the students will be able to –</p> <ol style="list-style-type: none"> 1. Explain basic pharmacophore and structure of medicinal agents. 2. Describe the concept of physicochemical aspects of drug. 3. Explain stereochemistry, bioisosters, concept of prodrugs, drug metabolism. 4. Discuss concept about classification, synthesis and mechanism of action of various class of drugs e.g. Acetylcholine, benzocain etc. 5. Describe structure activity relationship of various classes of medicinal agents.
Physical Pharmaceutics II – Theory	BP403T	<p>Upon completion of the course, the students will be able to –</p> <ol style="list-style-type: none"> 1. Classify and compare various Colloidal Dispersions and describe their optical, kinetic and colloidal properties. 2. Describe and distinguish Newtonian and non Newtonian systems and explain the concepts of Thixotropy, viscosity with their measurement. 3. Describe the types, formulation procedure and stability problems associated with Coarse Dispersions. 4. Explain and apply the concepts of Micromeritics and powder rheology in order to identify and thereafter choose correct powder sample for the formulation of solid dosage forms. 5. Describe various degradative pathways, means of stabilization of medicinal agents and the guidelines regarding Accelerated stability testing and expiration dating.

Pharmacology I – Theory	BP404T	<p>Upon completion of the course, the students will be able to –</p> <ol style="list-style-type: none"> 1. Explain the basic principles of pharmacology, sources of drugs, essential drugs, routes of drug administration, phases of drug discovery & clinical trial. 2. Understand the principles of absorption, distribution, metabolism, excretion and factors affecting pharmacokinetics of drug. 3. Demonstrate the molecular and biochemical aspects of drug action, receptors, drug interaction, and adverse drug reaction and factors that modify drug effect. 4. Classify and explain the pharmacology of drugs acting on autonomic nervous system. 5. Explain the pharmacological basis of drugs acting on central nervous system.
Pharmacognosy I – Theory	BP405T	<p>Upon completion of the course, the students will be able to –</p> <ol style="list-style-type: none"> 1. Recognize the history, modern concept and scope of pharmacognosy and know various adulteration & evaluation techniques for herbal drugs from various sources. 2. Describe the techniques adopted for cultivation, collection processing and applications of plant. hormones, polyploidy, mutation and hybridization to medicinal plants along with their conservation 3. Explain various types of plant tissue culture, their maintenance and applications in pharmacognosy. 4. Summarize the role of Pharmacognosy in allopathy and traditional systems of medicine and Introduction to various phytoconstituents. <p>5. Identify primary metabolites of plants based on their chemistry, source, preparation, evaluation, storage and therapeutic uses, along with chemical nature and uses of natural fibres, hallucinogens, teratogens and natural allergens.</p>

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Medicinal Chemistry I – Practical	BP406P	<p>Upon completion of the course, the students will be able to –</p> <ol style="list-style-type: none"> 1. Synthesize selected medicinal agents by one OR multiple steps in laboratory. 2. Perform the pharmacopoeial standard of selected medicinal agents in laboratory. 3. Analyze physical properties like colour, odour, nature of synthesized medicinal agents. 4. Analyze chemical properties like boiling point or melting point of synthesized medicinal agents.
Physical Pharmaceutics II – Practical	BP407P	<p>Upon completion of the course, the students will be able to –</p> <ol style="list-style-type: none"> 1. Determine particle size distribution for powders using different methods 2. Determine derived properties of powders like density, porosity, compressibility and angle of repose. 3. Determine Sedimentation volume for a variety of Suspensions. 4. Determine Viscosity for Newtonian and Non Newtonian Fluids. 5. Apply the concepts of Chemical Kinetics on Drug product stability.
Pharmacology I – Practical	BP408P	<p>Upon completion of the course, the students will be able to -</p> <ol style="list-style-type: none"> 1. Understand the general principles of experimental pharmacology. 2. Perform Screening of drugs on animals by simulated experiments. 3. Work cooperatively in a small group setting, consider ethical issues while using animals and demonstrate the drug profile of clinically important drugs.
Pharmacognosy I – Practical	BP409P	<p>Upon completion of the course, the students will be able to -</p> <ol style="list-style-type: none"> 1. Analyse the crude drugs by performing chemical tests for them. 2. Differentiate between crude drugs powders by determining the size of their microscopic characters like calcium oxalate crystals, length of fibres and leaf constants using camera lucida. 3. Report the size of starch grains of crude drugs using camera lucida and lycopodium spore method. 4. Evaluate the physical standards for crude drugs like extractive values, ash values, moisture content, swelling index and foaming index.

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COURSE	COURSE CODE	COURSE OUTCOMES
Medicinal Chemistry II – Theory	BP501T	<p>Upon completion of the course, the students will be able to –</p> <p>C.O.1. Describe the basic pharmacophore of medicinal agents.</p> <p>C.O.2. Discuss concept about chemical classification of various classes of drugs.</p> <p>C.O.3. Discuss synthesis and mechanism of action of various classes of drugs.</p> <p>C.O.4. Describe about structure activity relationship (SAR) of various classes of medicinal agents.</p>
Industrial Pharmacy I– Theory	BP502T	<p>Upon completion of the course, the student will be able to –</p> <p>CO.1. Explain different preformulation characteristics , their applications and affects on the formulation development.</p> <p>CO.2. Explain different tablet dosage form and different granulation methods with suitable excipients and identify evaluation characteristics and compression problems, explain coating composition, different methods of coating and coating problems.</p> <p>CO.3. Describe formulation, evaluation and packaging of liquid dosage form (syrups, elixirs, suspensions and emulsions) using suitable excipients</p> <p>CO.4. Describe formulation and evaluation of capsule dosage forms using different production methods with suitable excipients. Formulate pellets and their processes pelletization and equipments used for manufacture of pellets.</p> <p>CO.5. Explain formulation, equipments required, manufacturing procedure, containers & closures required and evaluation method of different cosmetic formulations, Pharmaceutical aerosols , ophthalmic and parenteral preparations</p>
Pharmacology II – Theory	BP503T	<p>Upon completion of the course, the students will be able to –</p> <p>CO.1. Explain pharmacology of drugs acting on cardiovascular system, blood and the urinary system</p> <p>CO.2. Outline synthesis, release, regulation and pharmacological actions of hormones and indicate clinical uses of drugs in various endocrine diseases and explain various methods of performing Bioassay of drugs</p> <p>CO.3. Outline key events involved in inflammation and demonstrate knowledge of basic pharmacology of drugs used in inflammation.</p>

Pharmacognosy II – Theory	BP504T	<p>Upon completion of the course, the students will be able to –</p> <p>CO.1. Explain various metabolic pathways leading to production of secondary metabolites and application of tracer technique to biogenetic studies.</p> <p>CO.2. Distinguish between various secondary metabolite containing crude drugs by their complete pharmacognostic study.</p> <p>CO.3. Describe isolation, identification and analysis of important phytoconstituents.</p> <p>CO.4. Outline production, estimation and utilization of various phytoconstituents.</p> <p>CO.5. Identify modern extraction methods and characterization techniques including chromatography and electrophoresis</p>
Pharmaceutical Jurisprudence – Theory	BP505T	<p>After completion of course , the students will able to</p> <p>CO.1. Discuss scope, objective and new drugs policy of pharmaceutical legislation along with principles and significance of code of pharmaceutical ethics drafted by PCI, and understand Right to information Act and Intellectual Property Rights.</p> <p>CO.2. Know and understand the rules and regulation and amendments made under pharmacy act 1948.</p> <p>CO.3. Discuss rules and regulation and amendments made under drugs and cosmetic act 1940</p> <p>CO.4. Discuss rules and regulation and amendments made under medicinal and toilet preparation act 1955, drugs and magic remedies (objectionable advertisement) act 1954, narcotic drugs and psychotropic substances , prevention of cruelty to animals 1960, national pharmaceutical pricing authority. medical termination of pregnancy act 1970 and consumer protection act , rules 1975</p>

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Industrial Pharmacy-I	BP506 P	<p>Upon completion of the course, the student will be able to –</p> <p>CO.1. Perform the preformulation study for different characteristics like dissolution, solubility, flow properties, etc.</p> <p>CO.2. Develop the formulation of different dosage form like tablets, capsules cream, ointment, etc., using different excipients.</p> <p>CO.3. Prepare and evaluate the parenteral preparations and perform the pull sealing method of ampoules. Perform the evaluation of glass container (ampoules) as per I.P.</p>
Pharmacology II	BP507P	<p>Upon completion of the course, the student will be able to –</p> <p>CO.1. Perform isolation of tissue and to analyze drug concentration/dose-response relationships using in-vitro models and animal simulated software</p> <p>CO.2. Evaluate the action of drugs in whole organisms, living tissues or model systems using a variety of pharmacological techniques (eg. Bioassays, animal models of disease).</p> <p>CO.3. Work cooperatively in a small group setting ,consider ethical issues using animals and write drug profiles of clinically important drugs</p>
Pharmacognosy II	BP508P	<p>Upon completion of the course, the students will be able to –</p> <p>CO.1. Identify various crude drugs by their morphological and microscopic characters.</p> <p>CO.2. perform isolation and detection(Chromatographic or chemical method) of active constituents like Caffeine. Sennosides, Diosgenin and Atropine.</p> <p>CO.3. Identify active chemical constituents of crude drugs by paper chromatography or TLC.</p> <p>CO.4.Analyse the specific crude drugs by performing their individual chemical tests.</p>

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COURSE	COURSE CODE	COURSE OUTCOMES
Medicinal Chemistry III – Theory	BP601T	<ol style="list-style-type: none"> 1. Discuss concept about basic structure and chemical classification of various classes of drugs. 2. Discuss synthesis and mechanism of action of various classes of drugs. 3. Describe about structure activity relationship (SAR) of various classes of medicinal agents. 4. Understand the importance of drug design and different techniques of drug design.
Pharmacology III – Theory	BP602T	<ol style="list-style-type: none"> 1. Classify and describe drugs used in gastrointestinal tract and respiratory diseases. 2. Demonstrate understanding of pharmacology of immunomodulators and chemotherapy. 3. Classify antimicrobial agents. Explain their complete pharmacology and discuss clinical uses in various infectious diseases (bacterial, viral, parasitic and fungal). 4. Explain pharmacological basis of drugs acting on urinary system and sexually transmitted disease including mechanism of action, therapeutic uses and adverse drug reactions. 5. Understand principles of general treatment of poisoning and poisoning caused by various drugs and heavy metals, significance of chronopharmacology.
Herbal Drug Technology – Theory	BP603T	<ol style="list-style-type: none"> 1. Describe raw material as source of herbal drugs from cultivation to herbal drug products including GAP and Pest management. 2. Explain various traditional systems of medicine, preparation and standardization of ayurvedic formulations. 3. Discuss the importance and market growth of nutraceuticals, herbal drugs&food interaction in daily life. 4. Identify the use of raw materials and excipients of natural origin in various herbal formulations. 5. Justify the use of WHO and ICH guidelines for evaluation, patenting and regulatory requirements of herbal products. 6. Summarize the scope, future prospects and schedule T applicable to herbal drug industry in India

Biopharmaceutics and Pharmacokinetics – Theory	BP604T	<ol style="list-style-type: none"> 1. Describe the factors influencing drug absorption/distribution, kinetics and clinical significance of protein binding of drugs. 2. Discuss the drug metabolism and elimination and also discuss the bioavailability and bioequivalence with their measures. 3. Describe the factors influencing pharmacokinetics parameters with their significance and applications. 4. Recognize the multi-compartment models their significance in clinical settings. 5. Describe the nonlinear pharmacokinetics and methods of estimation.
Pharmaceutical Biotechnology– Theory	BP605T	<p>Upon completion of the course, the students will be able to –</p> <ol style="list-style-type: none"> 1. Explain basic concepts, techniques and applications of immobilization of enzymes in Pharmaceutical Industries and Principles of Genetic and protein engineering. 2. Explain genetic and recombinant DNA technology and microbial transformation in industrial biotechnology for the production of insulin, Interferon , hepatitis- B 3. Understand principles of immunology as applied to drug development with emphasis on immunotherapeutic agents. 4. Recall the techniques of immunoassay and types of mutation. 5. Outline construction, type, working of fermentor and recovery of antibiotics and blood products from it.
Quality Assurance– Theory	BP606T	<p>Upon completion of the course, the students will be able to –</p> <ol style="list-style-type: none"> 1. Applying the Quality Assurance, TQM, ICH guidelines, QbD, ISO and NABL related principles and procedures in pharmaceutical industries for improving the quality. 2. Understand the different cGMP aspects like Organization and Personnel, Premises, Equipment and Raw materials related to pharmaceutical industries. 3. Applying the Quality Control and GLP concepts to decision making in pharmaceutical industries. 4. Prepare the different forms and documents related to pharmaceutical industries like; SOP, Batch Formula Record, Master Formula Record, documents related to complaint, Quality audit, Quality Review and Quality documentation, Distribution records, etc. 5. Understand the scope of Calibration, Validation and material management applicable to pharmaceutical industries.

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B.PHARM 6TH SEMESTER COURSE OUTCOMES 2019-2020

COURSE	COURSE CODE	COURSE OUTCOMES
Medicinal chemistry III – Practical	BP607P	<ol style="list-style-type: none">1. Synthesize selected medicinal agents by one OR multiple steps in laboratory2. Perform the pharmacopoeial standard of selected medicinal agents in laboratory3. Analyze physical and chemical properties of synthesized medicinal agents.
Pharmacology III – Practical	BP608P	<ol style="list-style-type: none">1. Perform isolation of tissue and to analyze drug concentration/dose-response relationships using in-vitro models and animal simulated software.2. Evaluate the action of drugs in whole organisms, living tissues, or model systems using a variety of pharmacological techniques (e.g. bioassays, receptor binding, animal models of disease) and toxicology of drugs.3. Work cooperatively in a small group setting, consider ethical issues while using animals and write drug profiles of clinically important drug.
Herbal Drug Technology – Practical	BP609P	<ol style="list-style-type: none">1. Demonstrate the preliminary phytochemical screening of crude drugs.2. Outline various standards for crude drugs and herbal formulations and prepare some herbal cosmetics.3. Perform monograph analysis of herbal drugs from recent Pharmacopoeias.4. Estimate the amount of fixed oils in crude drugs by carrying out their analysis.

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B.PHARM 7TH SEMESTER COURSE OUTCOMES 2019-2020

COURSE	COURSE CODE	COURSE OUTCOMES
Pharmaceutical Chemistry-VIII (Medicinal Chemistry-III)	RPH-733	<p>Upon completion of the course, the students will be able to –</p> <ol style="list-style-type: none"> 1. Describe stereochemistry and nomenclature of steroids. 2. Differentiate various antibacterial and antibiotic agents. 3. Discuss concept about classification, synthesis and mechanism of action of various classes of drugs e.g. penicillines, chloramphenicol etc. 4. Explain structure activity relationship (SAR) of various classes of medicinal agents.
Pharmaceutics-IX (Biopharmaceutics & Pharmacokinetics)	RPH-734	<p>Upon completion of the course, the students will be able to –</p> <ol style="list-style-type: none"> 1. Describe the factors influencing pharmacokinetics parameters with their role in formulation development. 2. Discuss the plasma drug concentration & Select dosage forms which affect the delivery of drug substances in Compartment Modeling and Non compartment modeling. 3. Recognize the drug interactions, which occur during absorption, distribution and elimination of drugs. 4. Conclude the interactions influence the therapeutic effects of particular drugs OR Dosage adjustment in patients. 5. Clarify the features for design and mechanisms of drug delivery via In Vitro In Vivo Correlations (IVIVC) abridge the ideas of bioavailability, bioequivalence and with their measures.
Pharmacology-III (Pharmacology & Pharmacovigilance)	RPH-735	<p>Upon completion of the course, the students will be able to –</p> <ol style="list-style-type: none"> 1. Outline synthesis, release, regulation and pharmacological actions of hormones and indicate clinical uses of drugs in various endocrine diseases. 2. Classify antimicrobial agents, explain pharmacology, clinical uses and development of resistance of antimicrobial agents in treating various infectious diseases (bacterial, viral, parasitic and fungal). 3. Describe history, mechanism and effects of hydrotherapy, mud therapy, chromotherapy, acupressure, aromatherapy and therapeutic massage. 4. Describe scope and aim of pharmacovigilance, classify and understand mechanism of adverse drug reactions and recognize role of clinical pharmacist in reporting, evaluation, monitoring, prevention and management of ADR. 5. Differentiate between epidemiological methods, develop study designs, calculate sample size and measures of association in identifying risk factors.

Pharmacognosy-IV	RPH-736	<p>Upon completion of the course, the students will be able to –</p> <ol style="list-style-type: none"> 1.reproduce and rewrite the pharmacognostic detail of various alkaloidal drugs. 2.discuss and outline the production, economics, industrial significance phytoconstituents and biopharmaceutics of herbal drug interaction. 3.demonstrate and discuss the development and application of modern tools in herbals viz. HPTLC and plant tissue culture.
Pharmaceutical Analysis-III (Pharmaceutical Analysis & Quality Assurance)	RPH-737	<p>Upon completion of the course, the students will be able to –</p> <ol style="list-style-type: none"> 1 Appraise the general characteristics of the analytical methods used in drug analysis. 2 Explain the principles of the major techniques of instrumental drug analysis. 3 Identification, determination and interpretation of the structures of new compounds by all these techniques. 4 Apply instrumental techniques in both quantitative and qualitative drug analysis. <ol style="list-style-type: none"> 1. Demonstrate the documentation and interpretation of analytical data.

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COURSE	COURSE CODE	COURSE OUTCOMES
Pharmaceutics-IX (Biopharmaceutics & Pharmacokinetics) Practical	RPH-734P	<ol style="list-style-type: none"> 1. Apply In Vitro drug release study of formulations in various dissolution media by dissolution method also explain the passive diffusion of a drug using cellophane membrane & egg membrane. 2. Determine percent and the effect of protein binding on drug bioavailability. 3. Calculate various pharmacokinetics parameters from zero, first order drug release data by using various methods.
Pharmacology-III (Pharmacology & Pharmacovigilance) Practical	RPH-735P	<p>Upon completion of the course, the students will be able to –</p> <ol style="list-style-type: none"> 1. Recognize the fundamental principles of drug actions at their target sites (e.g receptors) and calculate PA2 value of atropine. 2. Perform different bioassays using animal simulator software and to generate, analyze and interpret experimental data. 3. Work cooperatively in a small group setting, consider ethical issues while using animals and write drug profiles of clinically important drugs.
Pharmacognosy-IV Practical	RPH-736P	<p>Upon completion of the course, the students will be able to –</p> <ol style="list-style-type: none"> 1. Study pharmacognostic details and identify the morphological character of the given drug. 2. Perform the transverse section and powder microscopy of given drugs without assistance. 3. Perform the chemical test for various alkaloidal drug without assistance. 4. Identify various tools used in plant tissue culture, tell the steps involved in plant tissue culture, describe the establishment and maintenance of a plant tissue culture. 5. Use various tools used in TLC and replicate the TLC test of the given crude drugs.
Pharmaceutical Analysis-III (Pharmaceutical Analysis & Quality Assurance) Practical	RPH-737P	<p>Upon completion of the course, the students will be able to –</p> <ol style="list-style-type: none"> 1. Report the assay & λ_{max} of different drugs in the given sample and also the effect of various factors on UV spectrophotometry. 2. Draw the calibration curve of various drugs and dosage forms by verifying Beer-Lambert's law and find out their unknown concentration on UV spectroscopy. 3. Analyze the drug concentration in solution by uv spectrophotometry. 4. Interpret the IR, NMR and mass spectra of different drugs e.g. Paracetamol, Aspirin etc. 5. Prepare and maintain different documents/ records formed by QA department.

Hospital Training-II	RPH-738P	Upon completion of the course, the students will be able to – <ol style="list-style-type: none">1. Learn about the First aid (wound dressing, artificial respiration etc.)2. Practice & learn administration by different routes of injection(IV, IM, SC)3. Able to comprehend the patient observation charts.4. Learn & manage about the prescriptions and dispensing of drugs with giving the proper instruction about to intake the medication.5. Learn about the diagnostic reports, blood reports.
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B.PHARM 8TH SEMESTER COURSE OUTCOMES 2019-2020

COURSE	COURSE CODE	COURSE OUTCOMES
Pharmaceutical Chemistry-IX (Chemistry of Natural Products)	RPH-839	<p>Upon completion of the course, the students will be able to –</p> <ol style="list-style-type: none"> 1. Appreciate the biogenesis of natural products, identify simple building blocks and draw structures of precursor, intermediates, secondary end product of the metabolic pathway in the formation of chemical class viz. Alkaloids from shikimates, terpenoid and steroids from acetate mevalonates. 2. Outline the key steps of biogenesis of atropine, morphine, quinine, reserpine, papaverine and discuss the investigation of biosynthetic pathways using various techniques with examples. 3. Write the list of instruments, its principle, advantages and disadvantages, methodologies used in extraction, isolation, separation for screening of secondary products from natural origin and outline Alkaloids, terpenoids, lignan, quassianoids, glycosides, flavonoid, purine). 4. Elucidate the structural constitution by outlining synthesis and stereochemistry of the specified drugs of key phytochemicals (viz. Alkaloids, terpenoids, lignan, quassianoids, glycosides, flavonoid, purine). 5. Identify and characterize the phytochemicals of key class using qualitative chemical tests, collate and interpret the spectral data of the key class of compounds of natural origin by using NMR, IR,UV, MS. 6. Explain the role of natural products in drug discovery processes as a lead and in recent development of natural products(viz. anti cancer, immunomodulatory, antidiabetics agent, antimalarials), collate and write an overview on allergens, photosensitizing agents, fungal toxins.
Pharmaceutics-X Pharmaceutical Biotechnology/	RPH-840	<p>Upon completion of the course, the students will be able to –</p> <ol style="list-style-type: none"> 6. Understand and recall the basic immunology, type of antigen antibody reaction, tolerance and their applications. 7. Extend the Recombinant DNA technology to genetic engineering, production of r-DNA and biotechnological production of products such as Insulin & Somatotropin. 8. Develop industrial processes for production of antibiotics, fermentors and also isolation of mutants with factors affecting mutation. 9. Describe the microbial transformation and its methodology with special reference to steroids. 10. Explain the source, techniques of biotechnological production and pharmaceutical applications of Enzyme immobilization such as penicillinase, α-galactosidase, amylase and proteases.

Pharmaceutics- XI Pharmaceutical Marketing & Management	RPH-841	<p>Upon completion of the course, the students will be able to –</p> <ol style="list-style-type: none"> 6. Describe administrative, operative management and entrepreneurship development. 7. Describe the principles of management and classify different levels of management and their responsibilities. 8. Recognize various level of functions in Pharmaceutical marketing, concepts of e-commerce and start up business. 9. Recognize various functions of sale promotion like advertising, product detailing, coordinating, training, recruitment and performance appraisal of sale force etc. 10. Describe the concept of demand and supply and Identify different segments of marketing analysis and their limitations.
Pharmaceutics- XII (Food &Nutraceuticals)	RPH-842	<p>Upon completion of the course, the students will be able to –</p> <ol style="list-style-type: none"> 4. Explain the importance and methods of food processing. 5. Classify various food packaging materials and their influence on food stuffs. 6. Outline the methods for food preservation. 7. Distinguish food supplements & nutraceuticals, packaging, labeling, regulatory aspects and their rational use. 8. Describe the development, testing and marketing of nutraceutical products and regulatory aspects in reference to Agmark, BIS and FSSAI in India.
Elective Good Manufacturing Practices	RPH-843 (B)	<p>Upon completion of the course, the students will be able to –</p> <ol style="list-style-type: none"> 6. Applying the knowledge related to regulatory requirements that control the manufacture and distribution of pharmaceutical, biological and medical devices. 7. Demonstrate that how knowledge of the regulations facilitate the efficient and cost effective production and problem resolution. 8. Applying the GMP, CGMP and WHO concepts to decision making in pharmaceutical industries. 9. Prepare the different dosage forms and arrange the different facility in the pharmaceutical industries according to the GMP and CGMP guidelines. 10. Prepare the different forms and documents related to pharmaceutical industries, new drug application (NDA), investigational new drug (IND) and abbreviated new drug application (ANDA).

Elective Clinical Pharmacy	RPH-843 (C)	<p>Upon completion of the course, the students will be able to –</p> <ol style="list-style-type: none"> 4. Understand scope of clinical pharmacy and identify the patient specific (elderly, pediatrics, pregnancy) parameters in drug monitoring to solve therapeutic problems. 5. Utilize communication skills for effective patient counselling and medication history interview. 6. Identify his role as a health care team member in reporting ADR, DUR, pharmaco-economic evaluation and recommend strategies to optimize safety and efficacy of medication. 7. Recognize the importance of literature review, meta-analysis, medical writing and outline the steps involved in writing research report/paper. 8. Identify the key strategies in designing different phase of clinical trials in relation to schedule Y, ethical issues and guidelines (GLP, GCP, and ICH) and interpret clinical data using statistical methods. 9. Relate the clinical significance of BA/BE studies to interpret plasma drug concentration profile curve and recognize the importance of sample size, types of errors in the power of a statistical test..
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B.PHARM 8TH SEMESTER COURSE OUTCOMES 2019-2020

COURSE	COURSE CODE	COURSE OUTCOMES
Pharmaceutical Chemistry-IX (Chemistry of Natural Products) Practical	RPH-839P	<p>Upon completion of the course, the students will be able to –</p> <ol style="list-style-type: none"> 5. Acquire the skills to extract from plants using basic scientific techniques and instruments viz. maceration, percolation, distillation, soxhlet, clavengers apparatus. 6. Acquire skills to separate, isolate and purify given simple products viz volatile oils, piperene etc. using basic techniques like filtration, precipitation, crystallization, chromatography. 7. Perform the routine analysis for the purpose of identification of these products. 8. Record and analyze the results of experiments related to herbal drug constituents of pharmaceutical importance. 9. Collate, communicate information in the written as well as oral format and realize his role in various disciplines.
Pharmaceutics-X Pharmaceutical Biotechnology Practical	RPH-840P	<p>Upon completion of the course, the students will be able to –</p> <ol style="list-style-type: none"> 1. Evaluate the screening of soil for antibiotics producing microorganisms. 2. Evaluate the immunological reaction (blood group etc.) 3. Estimate the assay of antibiotics with checking their sensitivity against micro-organism. 4. Evaluate the proteolytic activity of enzyme. 5. Prepare and sterilize the different culture media for preparing their plate and slant.
Pharmaceutics- XII (Food & Neutraceuticals) Practical	RPH-842P	<p>Upon completion of the course, the students will be able to –</p> <ol style="list-style-type: none"> 1. Explain the importance and methods of food processing. 2. Classify various food packaging materials and their influence on food stuffs. 3. Outline the methods for food preservation. 4. Distinguish food supplements & neutraceuticals, packaging, labeling, regulatory aspects and their rational use. 5. Describe the development, testing and marketing of neutraceutical products and regulatory aspects in reference to Agmark, BIS and FSSAI in India.
Elective Good Manufacturing Practices Project	RPH-843P (B)	<p>Upon completion of the course, the students will be able to –</p> <ol style="list-style-type: none"> 6. Prepare different type of SOP's (Standard Operating Procedure) like process SOP, Instrumental SOP, cleaning SOP. 7. Applying the GMP, cGMP and WHO requirements at industrial level. 8. Prepare Master Formula Record, Batch formula record according to the GMP guideline.

Elective Clinical Pharmacy Project	RPH-843P (C)	Upon completion of the course, the students will be able to – <ol style="list-style-type: none">1. Prepare traditional health products.2. Identify the equipments/instruments and additives used in various food products.3. Prepare various nutraceuticals like health drinks and food products.4. Perform testing of food products and packaging materials.5. Evaluate storage stability of food products.
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