



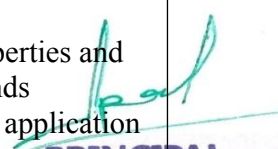
JEYPORE COLLEGE OF PHARMACY

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Pharmacy Council of India, New Delhi, & Affiliated to BijuPatnaik University of Technology

UG COARSE OUTCOME

Course code	Name of the course	Course Outcome
BP101T	Human Anatomy and Physiology I – Theory	<ul style="list-style-type: none">Identify the morphology, structure and function of various organs of the human body.Describe cellular level of organisation of different systems of human body.Describe different homeostatic mechanism and their imbalances.Understand co-ordinated working pattern of different organs of each system.
BP102T	Pharmaceutical Analysis I – Theory	<ul style="list-style-type: none">Describe the principles of volumetric / gravimetric and geometric analytical techniques.Minimize the sources of errors and minimizing techniques.Describe the preparation and standardization of various normal and molar solutions.Describe different electrochemical methods of analysis
BP103T	Pharmaceutics I – Theory	<ul style="list-style-type: none">Analyse/articulate the history of profession of Pharmacy in India & Pharmacopeia and its development.Explain the parts and handling of prescription, posology & dose calculation of drug in children. Different types of dosage form.Evaluate different pharmaceutical calculation involved in formulation.Explain the basic requirement and formulation of powder and liquid (monophasic & biphasic) dosage form.Evaluate the basic requirement, formulation and evaluation of suppositories and pessaries.Explain the mechanisms of drug penetration and also the factors influencing permeation through transdermal route.Apply the formulation and evaluation of semisolid preparation such as ointment, gel cream etc.
BP104T	Pharmaceutical Inorganic Chemistry – Theory	<ul style="list-style-type: none">Explain the sources of impurities and methods to determine the impurities in inorganic pharmaceuticalsDescribe the method of preparation, assay, properties, and medicinal uses of acids, bases, buffers, extra and intracellular electrolytesIdentify the method of preparation, assay, properties and medicinal uses of different inorganic compoundsCompare the properties, storage condition and application of Radiopharmaceuticals
BP105T	Communication	


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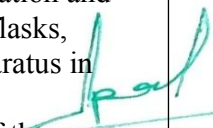


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	skills – Theory *	
BP106RBT BP106RMT	Remedial Biology/ Remedial Mathematics – Theory*	<ul style="list-style-type: none">• Demonstrate the classification and salient features of five kingdoms of life.• Explain basic knowledge of anatomy and Physiology of different parts of plant.• Outline the basic concepts of anatomy and Physiology of animal and human.• Apply mathematical theory and principles for computations of Pharmaceutical Sciences.• Demonstrate and analyze mathematical representations and mathematical relationships.• illustrate mathematical knowledge and understanding to help in the field of Pharmacy
BP107P	Human Anatomy and Physiology – Practical	<ul style="list-style-type: none">▪ identify and name the parts of compound microscope.▪ Identify and name the different types of tissues and bones▪ Record different haematological parameters▪ Read and interpret common cardiovascular signs heart rate, pulse rate and blood pressure
BP108P	Pharmaceutical Analysis I – Practical	<ul style="list-style-type: none">▪ Perform the limit test for chloride, Sulphate, iron, heavy metal and lead▪ Demonstrate the preparation and standardization of different inorganic compounds▪ Demonstrate assay of different components by various titration methods▪ Interpret the normality by the electro analytical method
BP109P	Pharmaceutics I – Practical	<ul style="list-style-type: none">▪ Compare different types of dosage form and its use and Compound of some conventional solid, liquid and semisolid dosage forms.▪ Apply different types of Excipients (Colouring agents, Flavouring agents, Preservatives) used in different kind of formulation preparation.▪ Analyse the weigh and measurements of samples.▪ Evaluate the size of the powders and granules by using different sieve number.▪ Describe the use of mortar and pestle in Trituration and the use of Bottles, glass rod, breaker, conical flasks, measuring cylinder and other appropriate apparatus in different pharmaceutical formulation.▪ Demonstrate the design, layout and purpose of the labeling in pharmaceuticals.▪ Evaluate different Pharmaceutical calculations involved in


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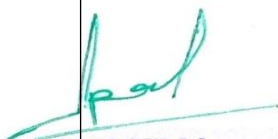
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		formulation.
BP110P	Pharmaceutical Inorganic Chemistry – Practical	<ul style="list-style-type: none"> ▪ Explain the Preparation of inorganic pharmaceutical like Boric acid, Potash Alum and Ferrous sulphate ▪ Perform the Test of purity of inorganic compounds ▪ Demonstrate for the Limit test of Chloride, Sulphate, Iron, Lead, Arsenic, Heavy metals ▪ Describes the Identification test for Sodium bicarbonate, Calcium gluconate, Calcium sulphate, ferrous sulphate
BP111P	Communication skills – Practical*	
BP112RBP	Remedial Biology – Practical*	<ul style="list-style-type: none"> ▪ Demonstrate skill of plant material sectioning, staining, mounting & focusing. ▪ Identify the parts of plants from its morphological & microscopical features ▪ Draw morphological, microscopical diagrams of different parts of plant . ▪ Identify the type and functions of bone in human skeletal system. ▪ Explain methods for collection and identification of different blood test

Course code	Name of the course	Course Outcome
BP201T	Human Anatomy and Physiology II – Theory	<ul style="list-style-type: none"> ▪ Identify the morphology, structure and function of various organs of the human body. ▪ Describe cellular level of organisation of different systems of human body. ▪ Explain the co-ordinated working pattern of different organs of each system. ▪ Explain role of ATP, creatinine phosphate and BMR. ▪ Describe chromosomes, genes and DNA and genetic pattern of inheritance
BP202T	Pharmaceutical Organic Chemistry I – Theory	<ul style="list-style-type: none"> ▪ Explain the classification and nomenclature of organic compounds ▪ Describe the general methods of preparation and reaction of organic Compounds to be explained ▪ Compare isomerism, structural isomerism and Explain hybridisation in alkenes, alkenes and stabilities of Alkenes, conjugated dienes ▪ Illuminate the mechanism, orientation of elimination, Electrophilic, free radical and Nucleophilic addition


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		<p>reaction</p> <ul style="list-style-type: none"> Describe the application, qualitative test and structure of Organic compounds of medicinal importance
BP203T	Biochemistry – Theory	<ul style="list-style-type: none"> Explain the biomolecules in context to pharmacy Explain the concept of bioenergetics Describe metabolic reactions of carbohydrates, lipids and amino acids Demonstrate the concept of nucleic acid metabolism and genetic information transfer Summarize the role of enzymes and their inhibitors
BP204T	Pathophysiology – Theory	<ul style="list-style-type: none"> Outline Basic principles of the Cell injury and Adaptation as well as mechanism that involves in inflammation and repair Classify various cardiovascular, respiratory and renal diseases and interpret its pathophysiology Illustrate pathophysiology of Haematological Diseases, Endocrine Diseases, Nervous system diseases and gastrointestinal diseases Explain the cause, sign and symptom of diseases and diagnostic process. Describe pathophysiology of Infectious diseases and Sexually transmitted diseases
BP205T	Computer Applications in Pharmacy – Theory *	
BP206T	Environmental sciences – Theory *	<ul style="list-style-type: none"> Explain the environmental issues in pharmacy manufacturing and disposal. Demonstrate an attitude of concern for the environment. Participate in an environment protection and environment improvement. Demonstrate the skills to help the concerned individuals in identifying and solving environmental problems.
BP207P	Human Anatomy and Physiology II – Practical	<ul style="list-style-type: none"> Demonstrate activities related to special sense Explain different systems using specimen and models Describe family planning devices and pregnancy diagnostic test Record body temp. and body mass index
BP208P	Pharmaceutical Organic Chemistry	<ul style="list-style-type: none"> Demonstrate the purity test of different organic compounds


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	I- Practical	<ul style="list-style-type: none">Identify the presence of functional groups like Phenol, Amide, Carbohydrates, Amines, Carboxylic acid, Aldehydes & ketoneExplain the Preparation of suitable solid derivatives from organic compoundsIdentification of the unknown compounds from the Literature using melting point and boiling point
BP209P	Biochemistry – Practical	<ul style="list-style-type: none">Describe the qualitative analysis of carbohydrates, proteins and urineEstimate biochemical parameters in bloodPrepare buffer solution along with measurement of pHDemonstrate salivary amylase activity
BP210P	Computer Applications in Pharmacy – Practical*	

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BP301T	Pharmaceutical Organic Chemistry II – Theory	<ul style="list-style-type: none">Describe the structure, nomenclature & the general methods of preparation of some of the basic organic compounds.Illustrate the different chemical reaction mechanism of organic compounds.Different the medicinal uses of different organic compounds.Explain the basic concept & significance of fatty acids and oils.
BP302T	Physical Pharmaceutics I – Theory	<ul style="list-style-type: none">Explain the mechanisms of solute-solvent interactionsDescribe the preparation of pharmaceutical buffers and their importance.Interpret the use of physicochemical properties in formulation research and development.Describe the concept of surface and interfacial phenomena.Demonstrate the various intermolecular forces involved in the formation of complexes and their applications.
BP303T	Pharmaceutical Microbiology – Theory	<ul style="list-style-type: none">Describe the methods of identification, cultivation and preservation of various microorganismsExplain the importance of sterilization in pharmaceutical processing industries


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		<ul style="list-style-type: none">▪ Illustrate the sterility testing of pharmaceutical products▪ Demonstrate the cell culture technology and application in pharmaceutical industry▪ Report microbiological standardization of pharmaceutical
BP304T	Pharmaceutical Engineering – Theory	<ul style="list-style-type: none">▪ Describe or discuss various unit operations used in pharmaceutical industry▪ Describe or discuss various unit operations used in pharmaceutical industry▪ Demonstrate processes Involved in pharmaceutical manufacturing process▪ Explain the test to prevent environmental pollution▪ Illustratethe significance of plant layout design for optimum use of resources
BP305P	Pharmaceutical Organic Chemistry II – Practical	<ul style="list-style-type: none">▪ Illustrate the preparation of different organic chemical compounds.▪ Describe the practical methods or technique required for standardization of chemical reagents.▪ Estimate the different oil values like acid value, saponification value & Iodine value.▪ Demonstrate the laboratory techniques like recrystallization and steam distillation.
BP306P	Physical Pharmaceutics I – Practical	<ul style="list-style-type: none">▪ Estimate the solubility and pKa value of the drug.▪ Identify partition co-efficient of Benzoic acid and iodine.▪ Interpret the surface tension of a given liquid by different methods.▪ Compute the stability constant and donor-acceptor ratio of the complex
BP307P	Pharmaceutical Microbiology – Practical	<ul style="list-style-type: none">▪ Describe the use of different equipments used in experimental microbiology▪ Summarize sterilization method of glassware and culture media▪ Identify microorganisms using staining methods▪ Demonstrate isolation of pure culture of microorganisms▪ Record microbiological essay of antibiotics
BP 308P	Pharmaceutical Engineering – Practical	<ul style="list-style-type: none">▪ Describe construction working and application of pharmaceutical machinery▪ Practise size analysis by sieving▪ Describe the laws of size reduction and equipment used▪ Demonstrate factors affecting rate of filtration and evaporation▪ Identify moisture content and loss of drying of


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		pharmaceutics
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Course code	Name of the course	Course Outcome
BP401T	Pharmaceutical Organic Chemistry III– Theory	<ul style="list-style-type: none">Describe the methods of preparation and properties of organic compoundExplain the stereo-chemical aspects of organic compounds and stereo-chemical reactionExplain the medicinal uses and other applications of organic compoundsExplain the properties of heterocyclic compoundDescribe the basic terminologies in stereochemistry and organic reactions
BP402T	Medicinal Chemistry I – Theory	<ul style="list-style-type: none">Describe the chemistry of different drugs with respect to their pharmacological activityExplain the drug metabolic pathways, adverse effect and therapeutic value of drugsDescribe the structural activity relationship of different class of drugsCompare the different chemical synthesis of selected drug
BP403T	Physical Pharmaceutics II – Theory	<ul style="list-style-type: none">Explain the various physio-chemicals preparation of drug molecules in the designing the dosage formAnalyse the principles of chemical kinetics and their use in stability testing and determination of expiry date of formulationDemonstrate the use of physio-chemical properties in the Formulation development and evaluation of dosage formDescribe colloidal and coarse dispersionDescribe micromeritics of drug molecule
BP404T	Pharmacology I – Theory	<ul style="list-style-type: none">Describe the history and scope of Pharmacology.Differentiate the different categories of drug.Record the drug action in micro level and organ level.Differentiate in between ph.co kinetic and ph.co dynamic.Explain receptor based drug action system.Explain the basic ph.cological action of drugs particularly on nervous system.Describe the relation of Ph. Cology with bio medical science.
BP405T	Pharmacognosy and Phytochemistry I– Theory	<ul style="list-style-type: none">Classification of medicinal Plants, Phytochemistry, Carbohydrates, Lipids.Explain Terpenes, Polyphenols, Alkaloids, Pharmacology,


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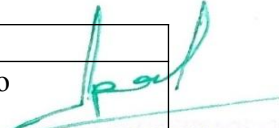
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		<p>Toxicity, Formulation and Preparation of Herbal Medicines.</p> <ul style="list-style-type: none"> ▪ Explain the influence of herbs on Physiology. ▪ Identify/Recognition of Medicinal Plants, Identification of Adulteration and contaminations. ▪ Compare Ethnobotany and Ethnopharmacology in drug discovery Process.
BP406P	Medicinal Chemistry I – Practical	<ul style="list-style-type: none"> ▪ Demonstrate the methods of preparation for various organic compounds ▪ Examine the percentage purity of various drugs as per pharmacopoeia ▪ Examine partition coefficient of drugs
BP407P	Physical Pharmaceutics II – Practical	<ul style="list-style-type: none"> ▪ Compute particle size and its distribution using different methods ▪ Describe the methods used for different viscosity of pharmaceutical formulation ▪ Report bulk density, true density and porosity ▪ Analyse the angle of repose and influence of lubricant on angle of repose ▪ Interpret reaction rate constant of first order
BP408P	Pharmacology I – Practical	<ul style="list-style-type: none"> ▪ Explain the effect of drug to animals by simulated experiments. ▪ Identify the instrument used in experimental Ph. Cology. ▪ Demonstrate the common laboratory technique used for animal studies. ▪ Explain the effect of drug on sensorium.
BP409P	Pharmacognosy and Phytochemistry I – Practical	<ul style="list-style-type: none"> ▪ Analysis of crude drugs by Chemical tests. ▪ Determine Stomatal no and stomatal Index. ▪ Determine vein islet number, vein islet termination and palisade ratio. ▪ Determine size of starch grains, calcium oxalate crystals by eye piece micrometer. ▪ Determine Fiber length and width. ▪ Determine Ash value.

Course code	Name of the course	Course Outcome
BP501T	Medicinal Chemistry II – Theory	<ul style="list-style-type: none"> ▪ Illustrate the chemistry of drugs with respect to pharmacological activities ▪ Differentiate the drug metabolic pathways and therapeutic value of drugs


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		<ul style="list-style-type: none"> ▪ Compare the SAR of different classes of drugs ▪ Outline the chemical synthesis of selected drugs
BP502T	Industrial PharmacyI– Theory	<ul style="list-style-type: none"> ▪ Apply concept of preformulation studies in development of dosage forms. ▪ Demonstrate the manufacturing,evaluation of different pharmaceutical dosage forms. ▪ Evaluate the product using quality control procedure and identify product defects capsule and pellets. ▪ Explain the components of aerosols, classify the aerosol product, understand evaluation. ▪ Describe the principles and formulations of cosmetics
BP503T	Pharmacology II – Theory	<ul style="list-style-type: none"> ▪ Explain mechanism of drug action at macro & micro level. ▪ Illustrate use of drugs in the treatment of different diseases. ▪ Demonstrate the various receptor actions at cellular level. ▪ Differentiate the types of bioassays. ▪ Explain the correlation of Pharmacology with related medical sciences.
BP504T	Pharmacognosy and Phytochemistry II– Theory	<ul style="list-style-type: none"> ▪ Demonstrate the basic concepts of biopharmaceutics and pharmacokinetics and their significance. ▪ Analyse plasma drug concentration-time data to calculate the pharmacokinetic parameter. ▪ Evaluate various pharmacokinetic parameters for compartment modelling and model independent methods. ▪ Describe Bioavailability and Bioequivalence studies of new drugs or dosage forms.
BP505T	Pharmaceutical Jurisprudence – Theory	<ul style="list-style-type: none"> ▪ Described India pharmaceutical act and laws ▪ Identify implication of ph.ceuticals lagislation in development and marketing of ph.ceutical ▪ Demonstrate the role of regulatory Authorities governing import,manufacture and sale of drugs ▪ Practice code of ethics during his professional carrier
BP506P	Industrial PharmacyI – Practical	<ul style="list-style-type: none"> ▪ Explain formulation procedure, equipments, and evaluate the dosage form using quality control procedures for tablets and liquid oral dosage forms. ▪ Formulate ingredients and explain their use of production facilities and controls; perform filling and sealing operations and quality control for various injectables.
BP507P	Pharmacology II – Practical	<ul style="list-style-type: none"> ▪ Explain the preparation and use of physiological salt solutions in different isolated tissue preparation


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		<p>experiments.</p> <ul style="list-style-type: none"> ▪ Express the effect of drugs on animals by simulated experiments. ▪ Demonstrate isolation of different organs / tissues from laboratory animals by simulated experiments. ▪ Differentiate various receptor actions using isolated tissue.
BP508P	Pharmacognosy and Phytochemistry II – Practical	<ul style="list-style-type: none"> ▪ Differentiate morphological, microscopical and powder characteristics of crude drugs along with extraction and isolation of phytoconstituents ▪ Analyse the active principle of crude drugs by different method of isolation and detection ▪ Demonstrate distillation of various volatile oil and detection of their phytoconstituents by TLC methods ▪ Examine crude drugs by different chemical test

Course code	Name of the course	Course Outcome
BP601T	Medicinal Chemistry III – Theory	<ul style="list-style-type: none"> ▪ Explain the importance of drug design and different techniques ▪ Illustrate the chemistry of drugs with respect to pharmacological activities ▪ Differentiate the drug metabolic pathways and therapeutic value of drugs ▪ Compare the SAR of different classes of drugs <p>Outline the chemical synthesis of selected drugs</p>
BP602T	Pharmacology III – Theory	<ul style="list-style-type: none"> ▪ Explain mechanism of drug action at macro & micro level. ▪ Illustrate use of drugs in the treatment of different infectious diseases. ▪ Demonstrate the various receptor actions at Cellular level. ▪ Identify the principles of toxicology and treatment of poisoning. ▪ Explain the significance of biological clock & circadian rhythm for an effective treatment of a patient.
BP603T	Herbal Drug Technology – Theory	<ul style="list-style-type: none"> ▪ Analyse raw materials as sources of herbal drug ▪ Demonstrate the concept of WHO and ICH guidelines for the evaluation of herbal drugs including stability testing ▪ Evaluate the marketed formulations (cosmetics and nutraceuticals) ▪ Explain herbal excipients and formulations

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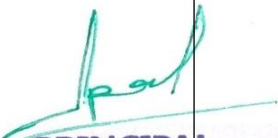


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BP604T	Biopharmaceutics and Pharmacokinetics – Theory	<ul style="list-style-type: none">Translate the knowledge for patenting of herbal drugsDemonstrate the basic concepts of biopharmaceutics and pharmacokinetics and their significance.Analyse plasma drug concentration-time data to calculate the pharmacokinetic parameter.Evaluate various pharmacokinetic parameters for compartment modelling and model independent methods.Describe Bioavailability and Bioequivalence studies of new drugs or dosage forms.
BP605T	Pharmaceutical Biotechnology – Theory	<ul style="list-style-type: none">Explain the importance of immobilized enzymes in pharmaceutical industriesDescribing the Genetic engineering applications in relation to production of pharmaceuticalsExplain application of immunization in biotechnologicalImportance of monoclonal Antibodies in IndustriesAnalyse the use of micro-organism in process of fermentation
BP606T	Quality Assurance – Theory	<ul style="list-style-type: none">Describe the GMP aspects in a pharmaceutical industryDemonstrate the importance of documentationIdentify the scope of quality certification application to pharmaceutical industriesIllustrate the responsibility of QA & QC managementDemonstrate the calibration of instrument & method analysis
BP607P	Medicinal chemistry III – Practical	<ul style="list-style-type: none">Demonstrate the method of preparation of drug and intermediates and calculation of yieldDemonstrate the assay of drugsDemonstrate the preparation of medicinally important compounds by Microwave irradiation techniqueDetermine different physiochemical properties using software Drug likeness screening
BP608P	Pharmacology III – Practical	<ul style="list-style-type: none">Explain the effect of drugs on animals by simulated experiments.Differentiate various receptor actions using isolated tissue Preparations.Illustrate dose calculations in pharmacological experiments.Apply principles of toxicology for study of determination of acute toxicity of a drug.


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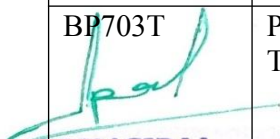
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		<ul style="list-style-type: none"> ▪ Demonstrate use of biostatistics in experimental Pharmacology.
BP609P	Herbal Drug Technology – Practical	<ul style="list-style-type: none"> ▪ Demonstrate preliminary phytochemical screening of crude drugs by qualitative analysis ▪ Evaluate herbal drugs and excipients according to standard monograph ▪ Illustrate incorporation of extracts in formulations and their evaluation ▪ Outline the standard methods to determine the total alkaloids, aldehyde and phenol content of herbal drugs

Course code	Name of the course	Course Outcome
BP701T	Instrumental Methods of Analysis – Theory	<ul style="list-style-type: none"> ▪ Demonstrate the instrumentation of basic instruments used for spectroscopy studies ▪ Illustrate the use of electrophoresis technique for analysis of drugs ▪ Differentiate application of various chromatographic techniques for organic, inorganic and natural products ▪ Describe the interaction of matter with electromagnetic radiation & its application in drug analysis
BP702T	Industrial PharmacyII – Theory	<ul style="list-style-type: none"> ▪ Describe the process of pilot plant scale-up of pharmaceutical dosage forms. ▪ Demonstrate the practice and the process of technology transfer from lab scale to commercial. ▪ Explain the different laws and acts that regulate the pharmaceutical industry. ▪ Describe the approval process and regulatory requirements of drug products. ▪ Describe the common measure used in quality. ▪ Describe the role and responsibility of regulatory agencies in the approval of drugs. ▪ Describe the organization and responsibilities of national and state licensing authorities. ▪ Discuss the guidelines for technology transfer.
BP703T	Pharmacy Practice – Theory	<ul style="list-style-type: none"> ▪ Demonstrate drug distribution methods in a hospital. ▪ Organize drug / pharmacy store including inventory control. ▪ Plan patient counselling and medication history interview skills to identify the problems.


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		<ul style="list-style-type: none"> ▪ Interpret selected laboratory results. ▪ Detect and assess adverse drug reactions. ▪ Illustrate the concept of Rational drug use.
BP704T	Novel Drug Delivery System – Theory	
BP705P	Instrumental Methods of Analysis – Practical	<ul style="list-style-type: none"> ▪ Demonstrate the instrumentation of basic instruments used for spectroscopy studies ▪ Examine qualitative analysis of drugs using various analytical instruments ▪ Illustrate quantitative analysis of drugs using various ▪ Apply various chromatographic techniques for separation of components/componds
BP706PS	Practice School*	

Course code	Name of the course	Course Outcome
BP801T	Biostatistics and Research Methodology	<ul style="list-style-type: none"> ▪ Test various statistical methods to solve different types of problems ▪ Illustrate the different methods for presentation of data ▪ Appraise statistical analysis software ▪ Distinguish the importance of research methodology for testing hypothesis ▪ Appreciate the statistical technique in solving the pharmaceutical problems
BP802T	Social and Preventive Pharmacy	<ul style="list-style-type: none"> ▪ Explain current issues related to health. ▪ Demonstrate suitable use of drugs & preventive measures to contain the spread of communicable / non-communicable diseases. ▪ Analyse health related policies and problems in our country and worldwide. ▪ Recommend alternative ways of solving problems related to health and pharmaceutical issues.
BP806ET	Quality Control and Standardization of Herbals	
BP809ET	Cosmetic Science	<ul style="list-style-type: none"> ▪ Classify and define Cosmetics and Cosmeceuticals as per Indian and EU regulations ▪ Describe the role of cosmetic excipients and building


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		<p>blocks in the formulation of cosmetics</p> <ul style="list-style-type: none">▪ Explain the structure and function of the skin, hair, teeth, and gums▪ Describe the fundamentals of sun protection and the formulation of Sunscreens, antiperspirants, and deodorants▪ Formulate cosmetics for skin care and hair care as well as dental and oral care▪ Design herbal cosmetics for skin care, hair care, and oral care▪ Evaluate cosmetics for various physicochemical properties.▪ Design cosmetics and cosmeceuticals that address the problems of dry skin, acne, dermatitis, prickly heat, wrinkles, blemishes, hair fall, dandruff, body odor, bleeding gums, mouth odor, teeth discoloration, and sensitive teeth.
BP813PW	Project Work	

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Ref No.:

PG COURSE OUTCOME

Date:

COURSE OUTCOME PHARMACEUTICAL TECHNOLOGY

MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES

CO1: Determine the role of various drug excipients interaction.

CO2: Apply the knowledge to undertake various analytical instrumental studies such as spectroscopic, separation science, thermal, biotechnological and crystallography-based studies

CO3: Evaluate interpretations of such instrumental for existing problems.

CO4: Develop newer analytical methods by instrumental techniques.

DRUG DELIVERY SYSTEMS

CO1: Students can able and knowledge of novel drug delivery systems

CO2: Students can implement for selection of drugs and polymers for the development of novel drug delivery systems.

CO3: Students can be able to evaluate various novel drug delivery systems.

MODERN PHARMACEUTICS

CO1: Apply the preformulation parameter through an optimized approach for designing a viable pharmaceutical product.

CO2: Review the policies of good manufacturing practice and implement the concept of total management.

CO3: Apply statistical tools for determining the stability of pharmaceutical tablets.

the preformulation parameter through an optimized approach for designing a viable
the policies of good manufacturing practice and implement the concept of total quality
statistical tools .

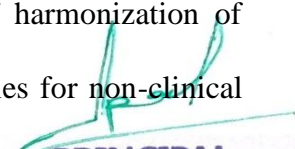
REGULATORY AFFAIR

CO1: Apply the significance of regulatory guidelines in documentation and fulfilling of regulatory criteria for drug product approval and registration.

CO2: Understand the regulatory framework of different countries and concept of harmonization of regulatory guidelines.

. CO3: Evaluate strategies for nondevelopment in the regulatory framework. strategies for non-clinical drug development in the regulatory framework.

. CO4: Student can able to after getting the proper approval from the regulatory method.


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PHARMACEUTICS PRACTICAL I PHARMACEUTICS PRACTICAL I

CO1: Students will be able to identify the method of the supplied sample by various analytical instrumentation methods.

CO2: Students will be able to perform formulation studies and implement their knowledge to develop various novel drug delivery systems.

CO3: Students can utilize to formulate and evaluate various novel drug delivery systems

SEMINAR

CO1: Students can be able to identify relevant information, defining and explaining Topics under discussion.

CO2: Students can be able to communication and presentation skill.

CO3: Students can engage widely held to be significant in the field of pharmaceutical research.

Students can be able to show competence in identifying relevant information, defining and explaining

Students can be able to improve their communication and presentation skill

MOLECULAR PHARMACEUTICS (NANO TECHNOLOGY & NANO TECHNOLOGY & TARGETED DDS)

CO1: Students can be able to knowledge on various approaches of novel drug delivery system.

CO2: Students can be able to know drug and formulation components required for designing novel drug delivery systems.


CO3: Students can utilize to fabricate targeted drug delivery systems.

CO4: Students can be able to implement their approaches of novel drug delivery

ADVANCED BIO PHARMACEUTICS & PHARMACOKINETICS

CO1: Understand the mechanism of drug absorption and the various factors affecting the movement of the drug in the body.

CO2: Students can be able to significance of dissolution testing and their mathematical validation for optimization of drug bioavailability.


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CO3: Students can able design and derive pharmacokinetic models for quantitative study of drug ADME (drug absorption, distribution, metabolism and elimination).

CO4: Students can able evaluate the role of bioavailability and bioequivalence studies using biopharmaceutic and pharmacokinetic parameters.

COMPUTER AIDED DRUG AIDED DRUG DELIVERY SYSTEM

CO1: Optimize the biopharmaceutical characteristics of a drug or pharmaceutical product through virtual simulations.

CO2: Review the various protocols for management of clinical data and adherence to regulatory guidelines.

CO3: Nurture the idea of artificial intelligence and its applications in the automation in pharmaceutical industry.

COSMETIC AND COSMECEUTICALS

CO1: Utilize the knowledge of regulatory requirement for the manufacturing of cosmetics.

CO2: Prepare different cosmetics and cosmeceuticals.

CO3: Evaluate the different formulation as per different official book utilize the knowledge of regulatory requirement for the manufacturing of cosmetics.

PHARMACEUTICS PRACTICAL PHARMACEUTICS PRACTICAL II

CO1: To prepare and characterize various polymer-based formulations for drug encapsulation.


CO2: To interpret the effect of formulation processing parameters on pharmacokinetic drugs.

CO3: To develop and evaluate different kinds of cosmeceutical products.

SEMINAR

CO1: Students can able to show competence in identifying relevant information, defining, and explaining topics under discussion.

CO2: Students can able to improve their communication and presentation skill.


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CO3: Students can engage with works that are widely held to be significant in the field of pharmaceutical research.

JOURNAL CLUB

CO1: To search articles from various scientific databases.

CO2: To prepare a technical presentation for a small audience.

CO3: To deliver a presentation and address related queries.

RESEARCH METHODOLOGY & BIOSTATISTICS

CO1: Discuss and explain technologies used to carry out research work

CO2: Assess the basic principles and working of analytical instrument in carrying out research work.

CO3: Implement the regulatory requirements and follow ethics while conducting clinical trials.

CO4: Demonstrate expertise in carrying out statistical analysis of the research findings.

explain different methods and technologies used to carry out research work.

DISCUSSION/ PRESENTATION (PROPOSAL)

DISCUSSION/ PRESENTATION

CO1: Students will be able to provide information for defining and explaining presentation.


CO2: In terms of summarizing whole methodology, students will be able to structure their oral work and composing information.

CO3: Students will be able to use vocabularies with voice modulation, voice projection and pacing.

RESEARCH WORK

CO1: Students can develop a structured presentation methodology to prepare presentation and effective visual aids

CO2: Students can be able to percolate his knowledge to the audiences.


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Date:

CO3: The students can be able to Determine and develop personal style.

JOURNAL CLUB

CO1: To search articles from databases.

CO2: To prepare a technical presentation for a small audience.

CO3: To deliver a presentation and address related queries.

FINAL PRESENTATION

CO1: Students will be able to information for defining and explaining presentation.

CO2: In terms of summarizing whole methodology, students will be able structure their oral work and composing information.

CO3: Students will be able to vocabularies with voice modulation, voice projection and pacing.

RESEARCH WORK

CO1: The students would be able to solving skills and execute them to research in the related fields

CO2: The students would be able to work, execute them and interpret the data to evaluate the work

CO3: The students would be able to research reports constituting Introduction, Experimental Methods, Results & Discussion, Conclusion and References

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COURSE OUTCOME PHARMACOGNOSY

SUBJECT : Advanced Pharmacognosy-I

:521


RATIONALE : This unit discusses recent advances in Pharmacognosy of plants having phytoconstituents. It details the advanced methods to identify and isolate the phytoconstituents from such plants and establish its activity. It also discusses Pharmacovigilance of herbal medicines & Basic principle of Ayurveda, Unani & Siddha and Homeopathy.

COURSE OBJECTIVES : At the end of the course students should be able to:

1. Know exhaustively list of plants having active constituents effective against advanced diseases.
2. Know Phytochemistry of these drugs.
3. Discuss phytopharmacology of these drugs.
4. Have knowledge about pharmaceutical adjuvants of plant origin.
5. Understand concept of Ethnopharmacognosy, Ethnomedicine.

LEARNING OUTCOMES: At the end of the course student will be able to:

1. Identify and isolate and characterize the active constituents against advanced diseases from plants.
2. Practice principles of Ayurveda and utilize in herbal medicine.
3. Apply pharmacovigilance in herbal therapy and establish authentic standards.


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SUBJECT : **Plant Biotechnology**

:522

RATIONALE : This unit discusses the plant tissue culture techniques in detail with its applications and also plant genomics.

COURSE OBJECTIVES : At the end of the course students should be able to:

1. Understand principles of plant tissue culture and laboratory procedures.
2. Discuss plant genetics for better herbal therapeutics.

LEARNING OUTCOMES: At the end of the course student will be able to:

1. Work in tissue culture area with understanding of all techniques.
2. Practice GLP in tissue culture laboratory.
3. Apply principles of plant genomics for development of therapeutically active herbs.

SUBJECT : **Chemistry of Medicinal Natural Products-I :523**

RATIONALE : This unit discusses the principles of Phytochemistry, isolation, estimation, structure elucidations, stereochemistry, therapeutic uses and economic importance of key actives. It also discusses general methods of extraction, isolation and purification of plant constituents of following classes: alkaloids, glycosides, flavonoids, tannins, volatile oils, fixed oils, etc

COURSE OBJECTIVES : At the end of the course students should be able to:

1. Understand classification of phytoconstituents and their chemical screening methods.
2. Identify and isolate similar active from plant.

LEARNING OUTCOMES: At the end of the course student will be able to:

1. Select correct and efficient method of screening of chemical content of plants.
2. Identify Phytopharmaceuticals.
3. Isolate and purify Phytopharmaceuticals.

PREREQUISITES: Basic Pharmacognosy and chemistry.

TEACHING AND EVALUATION SCHEME:

SUB CODE	TITLE OF SUBJECT	TEACHING SCHEME			CREDITS	EVALUATION SCHEME				TOTAL MARKS
		T	P	TOTAL HRS		INTERNAL		EXTERNAL		
						Theory	Practical	Theory	Practical	
523	Chemistry of Medicinal Natural Products-I	3	--	3	4	20	--	80	--	100

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Date:

523 Chemistry of Medicinal Natural Products-I

1	Phytochemical screening: Classification of medicinally active constituents and phyto-chemical study including general chemical tests to identify plant constituents such as alkaloids, glycosides, flavonoids, tannins, volatile oils, fixed oils, steroids, etc.	15
2	General methods of extraction, isolation and purification of plant constituents of following class alkaloids, glycosides, flavonoids, tannins, volatile oils, fixed oils, etc.	20
3	Review of various Phyto-constituents used as prototypes for therapeutically active constituents.	15
4	Study of sources, isolation, estimation, structure elucidations, stereochemistry, therapeutic uses and economic importance of following Phytopharmaceuticals: Alkaloids Atropine, morphine, ephedrine, reserpine, quinine, ergot Glycosides diosgenin, digitoxin, sennoside. Volatile oils (terpenoids) Menthol, thymol, citral. Flavonoids Rutin Coumarin Psoralea Triterpenes Glycyrrhizin Lignan Podophyllum General methods of estimation, analysis for alkaloids, steroids, terpenoids and flavonoids, tannins	50

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SUBJECT : **Chemistry of Medicinal Natural Products- II**

:524

RATIONALE : This unit discusses principles of Dereplication for natural products, Stereochemistry and Drug Action, biogenetic pathways of plant chemicals.

COURSE OBJECTIVES : At the end of the course students should be able to:

1. Discuss role of stereochemistry in plant constituents.
2. Understand importance of Dereplication process in plant constituent's chemistry.
3. Understand how biogenetic pathways affect ADME of plant actives.

LEARNING OUTCOMES: At the end of the course students should be able to:

1. Use principles of chirality to identify and develop more effective plant constituents.

PREREQUISITES: Basic Pharmacology and chemistry.

TEACHING AND EVALUATION SCHEME:

SUB CODE	TITLE OF SUBJECT	TEACHING SCHEME			CREDITS	EVALUATION SCHEME				TOTAL MARKS
		T	P	TOTAL HRS		INTERNAL		EXTERNAL		
						Theory	Practical	Theory	Practical	
524	Chemistry of Medicinal Natural Products-II	3	--	3	4	20	--	80	--	100

524 Chemistry of Medicinal Natural Products-II

1	Dereplication for natural products: Concept of Dereplication, importance of Dereplication, development of Dereplication protocols with examples.	15
2	Stereochemistry and Drug Action: Chirality and molecular symmetry, Nomenclature and representations. Role of chirality in selective and specific therapeutic agents. Case studies. Enantioselectivity in drug absorption, metabolism, distribution and elimination.	15
3	Methods of investigation of biogenetic pathways and their techniques: Biogenetic pathways for the production of Phytopharmaceuticals, such as Alkylamine (Ephedra), Pyridine-Piperidine (Lobelia), Tropane (Datura, Belladonna), Quinoline (Cinchona), Isoquinoline (Opium), Indole (Ergot), Cardiac glycosides (Digitalis), Coumarins (Psoralea) and Flavones (Rutin)	40
4	Industrially important volatile oils: Natural occurrence, their chemistry, oncogenic variation and trade.	30

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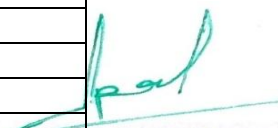
SUBJECT : Pharmacognosy & Phytochemistry Practical – II : 525

TEACHING AND EVALUATION SCHEME:

SUB CODE	TITLE OF SUBJECT	TEACHING SCHEME			CREDITS	EVALUATION SCHEME				TOTAL MARKS
		T	P	TOTAL HRS		INTERNAL		EXTERNAL		
						Theory	Practical	Theory	Practical	
525	Pharmacognosy & Phytochemistry Practical – II	--	18	18	6	--	20	--	80	100

525 PHARMACOGNOSY & PHYTOCHEMISTRY PRACTICAL – II

	Isolation of
1	Introduction to clavengers, Soxhlet and isolation of volatile oil.
2	Piperine from Piper species
3	Caffeine from Tea leaves,
4	Vasicine isolated by column chromatography from vasaka leaves,
5	Quinine sulfate from Cinchona bark,
6	Nicotine picrate from tobacco leaf,
7	Berberine from Berberis aristata,
8	Diosgenin from fenugreek seeds
9	Strychnine and brucine from nuxvomica seed
10	Reserpine from Rauwolfia root powder
11	Myristicine from nutmeg.
12	Ca-citrate and pectin from lemon Spp.
13	Podophyllum resin from podophyllum
14	Ammonium glycyrrizinate from glycyrrhiza root.
15	Sennoside from senna pod
	Estimation and Determination of
16	Anthracycline derivatives in Senna by spectrophotometric method
17	Reserpine in Rauwolfia by photometric method,
18	Quinine in Cinchona bark by photometric method
19	Carvone content in Dill oil
20	Estimation of total tannins from Triphal churna, amala, baheda, hardae.
21	Estimation of total alkaloids from vasaka leaf
22	Estimation of total phenols
23	TLC study of different volatile oil samples


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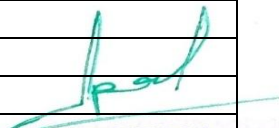
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BOOKS RECOMMENDED

1.	Bhat SV, ChemistryOfNatural Products, Narosa PublishingHouse
2.	O.P. Agrawal, ChemistryOfNatural Products
3.	Chatwal Gurdeep R., OrganicChemistryOfNatural Products, HimalayaPublication
4.	Finar, Organic ChemistryVol.II, ChemistryOfNatural Products, ElbsPublication
5.	WickeryAnd Wickery, SecondaryPlant Metabolites
6.	Medicinal Natural Products, Paul And Devick
7.	Anasari, PharmacognosyTextbook OfNatural Products, Latest Edition.
8.	Ashutosh Kar, PharmacognosyAndPharmacobiotechnology,
9.	Rangari&Rangari, Text Book OfPharmacognosy
10.	Edwin And Edwin, Textbook OfPharmacognosyAnd Phytochemistry, CBS Publication
11.	Cultivation And Utilization OfMedicinal Plants ByC.K. Atal,R.R.L. Jammu.
12.	Ciddhiverasan, Plant Cell&TissueCulture-Bio Technology
13.	Mohmad Ali, Techniquesin terpenoid identification
14.	Paridhavi, Herbal DrugTechnology,
15.	Scheuer, MarineNaturalProducts, AcademicPress, London
16.	Paul And Devick, MedicinalNatural Products
17.	Wickeryand Wickery, SecondaryPlant metabolites
18.	Kalia, IndustialPharmacognosy
19.	Stall, Thin layerchromatography
20.	BrunetonJean, Pharmacognosy:PhytochemistryMedicinal Plants, LavoisierPublishing
21.	Ayurvedic PharmacopoeiaOfIndia
22.	Herbal Pharmacopoeia 1-2 (IDMA)
23.	TheWealthOfIndia, RawMaterials (All Volumes) CouncilOfScientificAndIndustrialResearch (CSIR), New Delhi.
24.	Who Monographs On Selected Medicinal Plants Vol-1-2
25.	AyurvedicFormularyofIndia, ByGovt ofIndia.
26.	Nadkarni and Satyavati, Indian Medicinal Plants by
27.	Longman, Indian Medicinal Plants
28.	Qualitycontrol ofIndianMedicinal Plants by ICMR
29.	Purohit, Plant CellAnd TissueCultureby
30.	Narayanaswami S., PlantCellAndTissueCulture, by
31.	Prakash M., CellAnd TissueCulture,
32.	HenryThomas Anderson, ThePlant Alkaloids


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33.	Harborne JB, Phytochemical Methods, Chapman And Hall, International Edition, London
34.	Wagner, Plant Drug Analysis, Springer Verlag Publication.
35.	Remington: The Science & Practice of Pharmacy, by Gennaro Ar (2000), Lippincott Williams & Wilkins, Philadelphia.
36.	Anees A Siddiqui, Natural Product Chemistry Practical Manual, 2008, CBS Publishing House.


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Ref No.:

Date:

SUBJECT

:Subject Seminar / Term assignment

:526

RATIONALE

: This unit is complementary to compensate the boundaryless content of theory syllabus. It includes all aspects of core subject specialization which tangentially touch the content of syllabus. (It does not include routine syllabus topics) All research and reviewed articles along with reference books are taken as basis for preparing a seminar. Innovative topics are ensured in each session.

COURSE OBJECTIVES: At the end of the course the students should be able to:

1. Develop knowledge to refer literature for given topic. Literature search include keywords, Library use and internet use.
2. Develop presentation skills.
3. Get peripheral knowledge of the subject with current perspective.


LEARNING OUTCOMES: At the end of the course the student will be able to:

1. Find any reference related to the theme.
2. Have presentation skills in terms of precise and contented, relevant presentation.
3. Identify current perspectives related to the subject.

PREREQUISITES: None

TEACHING AND EVALUATION SCHEME:

SUB CODE	TITLE OF SUBJECT	TEACHING SCHEME			CREDITS	EVALUATION SCHEME				TOTAL MARKS
		T	P	TOTAL HRS		INTERNAL		EXTERNAL		
						Theory	Practical	Theory	Practical	
526	Subject Seminar/ Term assignment	6	--	6	3	----	100	----	----	100


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Date:

PHARMACOGNOSY AND PHYTOCHEMISTRY M. PHARM SEMESTER-III SCHEME OF TEACHING

SUB CODE	NAME OF SUBJECT	CONTACT HOURS PER WEEK		CREDITS	
		T	P	T	P
531	Advanced Pharmacognosy -II	3	---	3	---
532	Advanced Phytopharmacology	3	---	3	---
533	Advanced Analytical Techniques	3	---	3	---
534	Standardization of Traditional Herbal Drugs	3	---	3	---
535	Pharmacognosy & Phytochemistry Practical- III	---	18	---	6
536	Synopsis (Introduction to Dissertation) & Viva voce	---	---	3	---
537	Subject Seminar	6	---	---	3
TOTAL		18	18	15	9

SCHEME OF EXAMINATION

SUB CODE	NAME OF SUBJECT	DURATION OF EXAM (HRS)	MARKS			
			THEORY		PRACTICAL	
			University level evaluation	Institute level evaluation	University level evaluation	Institute level evaluation
531	Advanced Pharmacognosy -II	3	80	20	---	---
532	Advanced Phytopharmacology	3	80	20	---	---
533	Advanced Analytical Techniques	3	80	20	---	---
534	Standardization of Traditional Herbal Drugs	3	80	20	---	---
535	Pharmacognosy & Phytochemistry Practical- III	12	---	---	80	20

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536	Synopsis (Introduction to Dissertation) & Viva voce	---	80	20	---	---
537	Subject Seminar	---	---	---	---	100
	TOTAL		400	100	80	120

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Ref No.:

Date:

SUBJECT : **Advanced Pharmacognosy-II**

:531

RATIONALE : This unit discusses development of Phytopharmaceuticals. Principles of development process involving marine natural actives, Actives of microbial origin, Toxins and venoms of plant origin, etc.

COURSE OBJECTIVES : At the end of the course students should be able to:

1. Discuss natural products of marine, microbial and plant origin.
2. Describe drug product development of natural products.
3. Know the role of immunological from plant origin.

LEARNING OUTCOMES: At the end of the course students should be able to:

1. Develop effective drug delivery system of natural products.
2. Prepare necessary documents for natural product development.
3. Know procedures for clinical trials of herbal products.

PREREQUISITES: basic Pharmacognosy.

TEACHING AND EVALUATION SCHEME:

SUB CODE	TITLE OF SUBJECT	TEACHING SCHEME			CREDITS	EVALUATION SCHEME				TOTAL MARKS
						INTERNAL		EXTERNAL		
		T	P	TOTAL HRS		Theory	Practical	Theory	Practical	
531	Advanced Pharmacognosy-II	3	--	3	3	20	--	80	--	100

531 Advanced Pharmacognosy-II

1	Approach available for drug development, role of natural products in new drug development	20
2	Importance of marine natural products chemistry in drug development. Chemistry and biology of marine natural products	15
3	Recent developments in natural product chemistry of microbial sources.	15
4	Drug discovery in area of toxin and venoms	10
5	Plant bodies (immunoglobins) from plants.	10
6	Clinical Trial of Herbal Drugs	10

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7	Preparation of DMF for herbal medicines.	10
8	Insecticides and pesticides from natural sources	10

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Date:

SUBJECT : **Advanced Phytopharmacology**

:532

RATIONALE : This unit discusses biological evaluation of phytoconstituents. It also includes details of biopharmaceutical and toxicological studies of drugs derived from plants.

COURSE OBJECTIVES: At the end of the course students should be able to:

1. Understand general principles of biological screening of plant derived chemicals.
2. Know different methodology to establish bioactivity of phyto constituents.
3. In vitro in vivo screening methods of bioactive.

LEARNING OUTCOMES: At the end of the course students should be able to:

1. Discriminate different methods of estimation of biological activity of plant derived constituents.

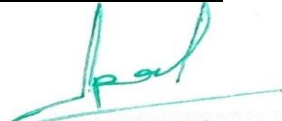
PREREQUISITES: Chemistry and analysis.

TEACHING AND EVALUATION SCHEME:

SUB CODE	TITLE OF SUBJECT	TEACHING SCHEME			CREDITS	EVALUATION SCHEME				TOTAL MARKS
		T	P	TOTAL HRS		INTERNAL		EXTERNAL		
						Theory	Practical	Theory	Practical	
532	Advanced Phytopharmacology	3	--	3	3	20	--	80	--	100

532 Advanced Phytopharmacology

1	General principles of screening, correlations between various animal models and human situations and animal ethics (CPCSEA)	10
2	Bioactivity: Activity versus toxicity, rapid screening methods, correlation between enzyme inhibition and pharmacological activity, general screening of enzyme, inhibitors, radioligand receptor binding assays (adrenoreceptors, opiate, benzodiazepine, ion channels, 5HT, dopamine, adenosine, muscarinic, histamine, ATPase, GABA), cytotoxicity tests	20


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Date:

3	Invitro andin vivo screening models forevaluation ofdrugs havinganti-cancer, antidiabetic, antifertility, anti-inflammatory, anti-arthritic, anti-asthmatic, anti-hyperlipidemic,anti-pyretic, hepatoprotective, nephroprotective, immuno-modulatory, adaptogenic, diuretic, lithotriptic, antimicrobial, antiviral,anti-acne, antimalarial, anti-oxidant,antiparasitic, wound-healing, anti-mutagenic,antiulcer, memory-enhancer, anti-depressant, anti-psychotic and epileptic activities.	40
4	Bioavailabilityand pharmacokinetic aspectforherbaldrugs withexamplesofwell-known documented, clinicallyused herbaldrugs AndPhytoequivalenceand pharmaceutical equivalence.Techniquesforenhancementofbioavailabilityofherbaldrugs.	20
5	Toxicitystudies and dose calculation	10

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Date:

SUBJECT : **Advanced Analytical Techniques**

:533

RATIONALE : This unit discusses analytical techniques, its principles of working, instrumentation and result interpretation of plant-derived drugs.

COURSE OBJECTIVES : At the end of the course students should be able to:

1. Know the principles of different analytical methods for herbal drugs.
2. Know the methods of UV, IR, NMR and Mass spectroscopy for structural elucidation of selected natural products.

LEARNING OUTCOMES: At the end of the course students should be able to:

1. Apply and select correct method of estimation of herbal drugs.

PREREQUISITES: **Pharmaceutical Analysis.**

TEACHING AND EVALUATION SCHEME:

SUB CODE	TITLE OF SUBJECT	TEACHING SCHEME			CREDITS	EVALUATION SCHEME				TOTAL MARKS
		T	P	TOTAL HRS		INTERNAL		EXTERNAL		
						Theory	Practical	Theory	Practical	
533	Advanced Analytical Techniques	3	--	3	3	20	--	80	--	100

533 Advanced Analytical Techniques

1	Applications of Spectroscopic techniques: UV, IR, NMR and Mass spectroscopy for structural elucidation of selected natural products.	40
2	Application of chromatographic techniques: Column chromatography, paper chromatography, TLC, HPTLC, GLC, HPLC, UPLC, and flash chromatography in the isolation, purification and analysis of Phytopharmaceuticals.	50
3	Applications of Spectrofluorimetry in herbal drug analysis	10


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Date:

SUBJECT : **Standardization of Traditional Herbal Drugs**

:534

RATIONALE : This unit discusses a comparative study of Ayurvedic and modern dosage form, Standardization of herbal drug, Importance of monographs of standards of medicinal plants their parts, Stability testing of natural products, Strategy for identification of adulteration and QC of herbal drugs.

COURSE OBJECTIVES : At the end of the course students should be able to:

1. Discuss Ayurvedic products with classification and standardization.
2. Understand strategies for QC methods and result analysis of herbal drugs.
3. Know regulatory aspects of QC and QA aspects of herbal drugs.

LEARNING OUTCOMES: At the end of the course students should be able to:

1. Select and implement QC methods for batch to batch control of herbal products.
2. Prepare stability testing protocols and QC protocols for herbal product standardization.

PREREQUISITES: Basic Pharmacognosy, Phytochemistry, Drug laws for herbals.

TEACHING AND EVALUATION SCHEME:

SUB CODE	TITLE OF SUBJECT	TEACHING SCHEME			CREDITS	EVALUATION SCHEME				TOTAL MARKS
		T	P	TOTAL HRS		INTERNAL		EXTERNAL		
						Theory	Practical	Theory	Practical	
534	Standardization of Traditional Herbal Drugs	3	--	3	3	20	---	80	--	100

534 Standardization of Traditional Herbal Drugs

1	A comparative study of Ayurvedic and modern dosage form: classification, different stages of Ayurvedic formulations and dosage forms; Modernization of some Ayurvedic formulations.	20
2	Standardization of herbal drug: Formulation of single/compound drug and their quality, safety and efficacy assessment and intended use for acceptance by regulatory authorities. Factors affecting quality, documentation and preservation of herbs and herbal products.	20
3	Importance of monographs of standards of medicinal plants their parts, comparative study as per different pharmacopoeias. WHO guideline for manufacturing and standardization of herbal drugs and their formulations. Current good manufacturing practices for herbal medicines (schedule T).	20
4	Concept of natural product marker compounds/extract library as a tool as a solution towards present problems of standardization of natural products.	10

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5	Stability testing of natural products, procedures, predictable chemical and galenic changes, technical limitations, testing methods and combination products.	10
6	Quality control of various types of official formulations including Ayurvedic preparations	10
7	Strategy for identification of adulteration of synthetic drug in herbal formulation	10

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Ref No.:

Date:

SUBJECT : Pharmacognosy & Phytochemistry Practical-III
:535

TEACHING AND EVALUATION SCHEME:

SUB CODE	TITLE OF SUBJECT	TEACHING SCHEME			CREDITS	EVALUATION SCHEME				TOTAL MARKS
		T	P	TOTAL HRS		INTERNAL		EXTERNAL		
						Theory	Practical	Theory	Practical	
535	Pharmacognosy & Phytochemistry Practical-III	--	18	18	6	--	20	--	80	100

535 Pharmacognosy & Phytochemistry Practical-III

1	Determination of cardiac glycosides in digitalis leaves.
2	Determination of Ascorbic acid (vitamin C) in Lemon and Orange.
3	UV Determination of Caffeine Content in Selected Soft Drinks
4	Estimation of resin content in sample of Podophyllum (B.P.C. Method)
5	Isolation of andrographolide from Kalmegh
6	Isolation of lutein from marigold flower petals Extraction
7	Introduction of Paper chromatography.
Standardization of Formulation	
8	To characterize & analysis of VICCO Turmeric cream
9	Evaluation of Herbal Shampoo
10	Evaluation of Hair oil
11	Evaluation of Syrup
12	Standardization of Trikatu Churna. (Market/Laboratory formulation)
13	Standardization of Triphla Churna. (Market/Laboratory formulation)
Physicochemical analysis	
14	Determination of foaming index of given drug samples.
15	Determination of moisture (Loss on Drying) of given drug samples.
16	Determination of swelling index of given drug sample.
17	Determination of Ash Value of given Drug samples.
18	Determination of Extractive Value of given Drug samples.

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19	Determination of Bitterness Value of given Drug samples.
20	Determination of hemolytic index of given Drug samples.
21	Determination of foreign organic matter/purity by Wallis's Lycopodium Spore Method.
22	Phytochemical analysis of sample drug.
23	Demonstrations of Experimental animal models
24	Introduction, handling and Application of HPTLC
25	Effect of Edge cutting, chamber saturation, Multiple run in the same mobile phase on chromatographic separation.
26	Effect of stored mobile phase, prewashing, and impregnation with EDTA on chromatographic separation.


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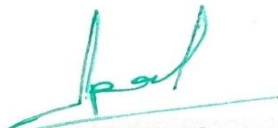
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SUB CODE	TITLE OF SUBJECT	TEACHING SCHEME			CREDITS	EVALUATION SCHEME				TOTAL MARKS
		T	P	TOTAL HRS		INTERNAL		EXTERNAL		
						Theory	Practical	Theory	Practical	
537	Subject Seminar	6	--	6	03	-----	100	-----	-----	100


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SPECIALISATION: PHARMACOGNOSY AND PHYTOCHEMISTRY SEMESTER-IV

SCHEME OF TEACHING

SUB CODE	NAME OF SUBJECT	CONTACT HOURS PER WEEK	CREDITS
541	Dissertation (Project Work)	36	12
542	Viva-Voce	---	12

SCHEME OF EXAMINATION

SUB CODE	NAME OF SUBJECT	UNIVERSITY LEVEL EVALUATION
541	Dissertation	100
542	Viva-Voce	100
	TOTAL	200


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COURSE OUTCOME PHARMACOLOGY

PO1

Research

Ability

An ability to independently carry out research and development work utilising modern tools and employing problem analysis skills to solve practical problems

PO2

Technical

Communication

An ability to write and present substantial technical documents / reports and communicate effectively

PO3

Expertise

Demonstration

An ability to demonstrate a degree of mastery over the area of specialization in terms of pharmaceutical knowledge, learning aptitude, managerial and administrative skills, computational and informatics skills in academia, manufacturing, clinical and allied sectors

PO4

Professional

Leadership


An ability to lead in terms of team building, planning, motivating and ethically executing professional responsibilities and establish professional identity in the society

PO5

Environment &

Sustainability

An ability to comprehend the impact of solutions in societal and environmental contexts, and explore the knowledge of and need for sustainable development and apply



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the knowledge to solve such problems.

PSO1

Discovery

Pharmacology

Building core concept on mechanism, toxicities and evaluation of drugs through pharmacological and toxicological models via comprehensive understanding of cellular and molecular pharmacology based pharmacotherapy for drug discovery and development.

PSO2 Design and Analysis

Understand the principles of pharmaceutical analysis and apply the modern instruments, computational and informatics tools, and techniques for target and lead optimization in quantification of drugs.

PSO3 Pharmacovigilance

Apply and appraise regulatory and ethical concepts in preclinical and clinical research for pharmaceutical and healthcare domain in relation to society.

PSO4

Research

Methodology


Understand, apply and appraise concepts of research methodology & biostatistics, as well as apply computational and informatics tools in clinical and pharmacovigilance research.

PSO5

Scientific

Communication

Ability to create an inquisitive mind thorough appraisal of journals and develop technical communication skills to able to interact with broad scientific audience through scientific writing in



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form of reports/thesis or presentations.

MPT 108 (1)

General Pharmacology

MPT 108 (1). CO1: Understand the pharmacodynamics and pharmacokinetics of a drug and its correlation in pharmacotherapy.

MPT 108 (1). CO2: Propose different categories drugs in treatment of a disease and execute its management.

MPT 108 (1). CO3: Explain side effects, adverse effects contradictions and the clinical uses in the treatment.

MBS 101

Biostatistics

MBS 101.CO1: Identify data relating to different variables and select samples.

MBS 101. CO2: Discuss the basic concept and importance of statistical analysis.

MBS 101.CO3: Arrange the results using biostatistical knowledge and make statistical decisions in pharmaceutical research.

MPT 101

Modern Pharmaceutical Analytical
Techniques

MPT101. CO1: Design various spectroscopic characterization techniques as well as spectra for characterization of compounds.


MPT101. CO2: Apply knowledge of separation science to separate and identify various pharmaceutical and biological ingredients from their mixture

MPT101. CO3: Utilize various thermal and thermogravimetric techniques for characterization of pharmaceutical compounds and their combinations.

MPT101. CO4: Develop various bioassays and herbal methods for separation and characterization of biological and/or phytopharmaceutical entities.

MPT 108 (2)

Advanced Pharmacology



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Date:

MPT 108 (2). CO1: Students will be expertise themselves inanalyzing and interpretation of various involvement and cellular changes at molecular level ofhormone action, inflammation, immune responses &antimicrobial resistance.

MPT 108 (2). CO2: Students will develop the skill inassessment of effectiveness of drugs action, sidevarious contraindications in various disease cases.

MPT 108 (2). CO3: Students will be able to Evaluate theeffects of drugs vary with biological timing in variousdiseases like cardiovascular disease, diabetes, asthma andpeptic ulcer.

MPT 108 (2). CO4: Students will be able to interpret role offree radicals in aetiology of chronic health problem, anddemonstrate antioxidant action.

MPT 181

Seminar

MPT 181. CO1: Students can able to show competence inidentifying relevant information, defining and explainingtopics under discussion.

MPT 181. CO2: Students can able to improve theircommunication and presentation skill.

MPT 181. CO3: Students can engage with works that arewidely held to be significant in the field of pharmaceuticalresearch.

MPT 198

Pharmacology Lab

MPT 198.CO1: Analyze various formulation or its components using the analytical techniques.

MPT 198.CO2: Develop skills in working techniques used in cellular and molecular biology.

MPT 198.CO3: Develop skill in administration of drugs through various routes and withdrawal of blood.


MPT 198.CO4: Developing skills in In vivo assay of various pharmacological activities.

MPT191

Pharmaceutical Analysis Lab

MPT191. CO1: The students would be able to different spectroscopic analysis, their theory and application range based on their functions.

MPT191. CO2: The students would be able to knowledge in method development and results interpretation



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of various spectroscopic analysis.

MPT191. CO3: The students will be able to microbiological assays involving Vitamins and Antibiotics.

MPT191. CO4: The students will be able to various pharmacological assays depending upon the drug of choice.

MPT 208 (1)

Clinical Pharmacology

MPT 208 (1). CO1: Explain the regulatory requirements for conducting clinical trials.

MPT 208 (1). CO2: Demonstrate the types of clinical trial designs.

MPT 208 (1). CO3: Execute safety monitoring, reporting and close out activities.

MPT 208 (1). CO4: Execute reporting of adverse drug reaction.

MPT 209

Pharmaceutical Bio-technology

MPT 209. CO1: Understand the various stages of drugdiscovery and understand the various targets for drugdiscovery and its validation along with techniques for leadidentification and optimization.

MPT 209. CO2: Understand the role of genomics, proteomicsand bioinformatics in drug discovery

MPT 209. CO3: Apply computer aided drug designing in theprocess of drug discovery.

MPT 212


MPT212. CO1: Students will be able to understand the neand application validation in pharmaceutical industry.

Process validation & CGMP

MPT212. CO2: Students will be able to concepts of quality practices for certification standards inpharmaceutical industry.

MPT212. CO3: Students will develop the knowledge aboutthe various regulatory agencies and their role.

MPT212. CO4: Students will learn to apply and guidelines for drug registration and approval process.


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MPT 208 (2)

Molecular Pharmacology

MPT 208 (2). CO1: Explain the receptor signal transduction process and their molecular pathway.

MPT 208 (2). CO2: Develop skills in r DNA in gene therapy.

MPT 208 (2). CO3: Explain genetic variation and its role in pharmacology.

MPT 208 (2). CO4: Develop skills in preparing and handling cell culture media.

MPT 281

Seminar

MPT 281. CO1: Students shall be able to interact with the scientific community in a confident manner.

MPT 281. CO2: Student shall be able to identify societal issues related to healthcare, analyse

MPT 281. CO3: Students shall be proficient in interpreting scientific data to defend the relevant topic.

MPT 281. CO4: Students shall be able to use computational tools for presentation.

MPT314

(Research Methodology and Clinical Trials)

MPT 314. CO1: Students will be able to implement the regulatory requirements and follow clinical trials.

MPT 314. CO2: Students will be able to design and manage clinical trial coordination process.

MPT 314. CO3: Students shall appreciate statistical techniques in solving the problems

MPT 314. CO4: Students shall be able to communicate the adverse drug reactions.

MPT391

(Synopsis)

MPT 391. CO1: Students will be able to use information for defining and explaining presentation.

MPT 391. CO2: In terms of summarizing whole methodology, students will be able to structure their oral work and composing information.

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Date:

MPT 391. CO3: Students will be able to vocabularies with voice modulation, voice projection and pacing.

MPT392

(Presentation)

MPT 392. CO1: Students can develop a structured presentation methodology to prepare presentation material and effective visual aids.

MPT 392. CO2: Students can able to percolate his knowledge to the audiences.

MPT 392. CO3: The students can be able to Determine and develop personal style.

MPT 493 (1)

Thesis

MPT 493 (1). CO1: The students would be able to different types of scholarly sources and

MPT493 (1). CO2: The students would be able to gaps and evaluate them.

MPT 493 (1). CO3: The students would be able to problem solving skills and execute related fields.

MPT 493 (1). CO4: The students would be able to plan of work, execute them and interpret the work.

MPT 493 (2)

Defence of Thesis

MPT 493 (2). CO1: Students can presentation methodology to prepare presentation material and effective visual aids.

MPT 493 (2). CO2: Students can able to percolate his knowledge to the audiences.


MPT 493 (2). CO3: The students can be able to determine and develop personal style.

MPT 1081

(Modern Pharmaceutical Analytical Techniques)

MPT 1081. CO1: Determine the role of various drug excipients interaction.

MPT 1081. CO2: Apply the knowledge to undertake various analytical instrumental studies such as spectroscopic, separation science, thermal, biotechnological and crystallography-based studies.


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MPT 1081. CO3: Evaluate

interpretations of such instrumental techniques, solve any existing problems.

MPT 1081. CO4: Develop newer analytical methods by instrumental techniques.

MPT 1082

(Advanced Pharmacology-I)

MPT 1082. CO1: Understand the pharmacodynamics and pharmacokinetics of a drug and its correlation in pharmacotherapy.

MPT 1082. CO2: Propose different categories of drugs in the treatment of a disease and execute its management.

MPT 1082. CO3: Explain side effects, contradictions and the clinical uses in the treatment.

MPT 1083

(Pharmacological screening and toxicological methods I)

MPT 1083. CO1: Appreciate ethical use of animals in research.

MPT 1083. CO2: Design, construct and validate animal models in context to a particular disease and use it for screening of drugs.

MPT 1083. CO3: Evaluate the various methods in vivo and in vitro screening methods used in pharmacological evaluations.

MPT 1084

Cellular and Molecular Pharmacology


MPT 1084. CO1: Explain the receptor signal transduction process and their molecular pathway.

MPT 1084. CO2: Develop skills in rDNA in context to gene therapy.

MPT 1084. CO3: Explain genetic variation and its role in pharmacology.

MPT 1084. CO4: Develop skills in preparing and handling cell culture media.

MPT 1985. CO1: Analyze various formulations or its components using analytical techniques.


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MPT 1985

Pharmacology Practical I

MPT 1985.CO2: Develop skills in working techniques used in cellular and molecular biology.

MPT 1985.CO3: Develop skill in animal handling, administration of drugs through various routes and withdrawal of blood.

MPT 1985.CO4: Developing skills in In vivo assay of various pharmacological activity

MPT 1986

Seminar/ Assignment

MPT 1986. CO1: Students can able to show competence in identifying relevant information, defining and explaining topics under discussion.

MPT 1986. CO2: Students can able to improve their communication and presentation skill.

MPT 1986. CO3: Students can engage with works that are widely held to be significant in the field of pharmaceutical research.

MPT 2081

(Advance Pharmacology II)

MPT 2081. CO1: Students will be expertise themselves analyzing and interpretation of various biochemical involvement and cellular changes at molecular level of hormone action, inflammation, immune responses & antimicrobial resistance.

MPT 2081. CO2: Students will develop the skill in assessment of effectiveness of drugs action, side effects & various contraindications in various disease cases.


MPT 2081. CO3: Students will be able to Evaluate the effects of drugs vary with biological timing in various diseases like cardiovascular disease, diabetes, asthma and peptic ulcer.

MPT 2081. CO4: Students will be able to interpret role of free radicals in aetiology of chronic health problem, and demonstrate antioxidant action.

MPT 2082

(Pharmacological and Toxicological Screening Methods – II)

MPT 2082. CO1: Evaluate and estimate different types of toxicity studies in regulatory toxicology and its importance in drug development.



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MPT 2082. CO2: Interpret and justify ethical and safety aspects of regulatory requirements for toxicity studies in association with investigational new drug application.

MPT 2082. CO3: Interpret the importance of toxicokinetic and alternative methods to animal toxicity testing in association with drug discovery and assessment.

MPT 2083

(Principles of Drug Discovery)

MPT 2083. CO1: Understand the various stages of drug discovery and understand the various targets for drug discovery and its validation along with techniques for lead identification and optimization.

MPT 2083. CO2: Understand the role of genomics, proteomics and bioinformatics in drug discovery.

MPT 2083. CO3: Apply computer aided drug designing in the process of drug discovery.

MPT 2084

(Clinical Research and
Pharmacovigilance)

MPT 2084. CO1: Explain the regulatory requirements for conducting clinical trials.

MPT 2084. CO2: Demonstrate the types of clinical trial designs.

MPT 2084. CO3: Execute safety monitoring, reporting and close out activities.

MPT 2084. CO4: Execute reporting of adverse drug reaction.

MPT 2985

(Pharmacology Practical II)

MPT 2985. CO1: Understand the principles of bioassay and its importance.

MPT 2985. CO2: Execute toxicity study in accordance with the guidelines like OECD, ICH and determine the lethal doses of drugs.

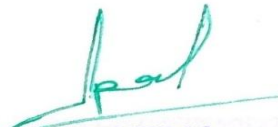
MPT 2985. CO3: Analyse the various monitoring safety and reporting of ADRs

MPT 2985. CO4: Using Bioinformatics for drug designing

MPT 2986

(Seminar)

MPT 2986. CO1: Students can able to show competence in



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identifying relevant information, defining and explaining topics under discussion.

MPT 2986. CO2: Students can able to improve their communication and presentation skill.

MPT 2986. CO3: Students can engage with works that are widely held to be significant in the field of pharmaceutical research.

MPT 381

(Journal Club)

MPT 381. CO1: To search articles from various scientific databases.

MPT 381. CO2: To prepare a technical presentation for a small audience.

MPT 381. CO3: To deliver a presentation and address related queries.

MPT 384

(Research methodology & Biostatistics)

MPT 384.CO1: Discuss and explain different methods and technologies used to carry out research work

MPT 384.CO2: Assess the basic principles and working of analytical instrument in carrying out research work.

MPT 384.CO3: Implement the regulatory requirements and follow ethics while conducting clinical trials.

MPT 384. CO4: Demonstrate expertise in carrying out statistical analysis of the research findings

MPT 391

(Discussion/ Presentation) (Proposal)

MPT 391. CO1: Students will be able to information for defining and explaining presentation.


MPT 391. CO2: In terms of summarizing whole methodology, students will be able structure their oral work and composing information.

MPT 391. CO3: Students will be able to vocabularies with voice modulation, voice projection and pacing.

MPT392

(Research Work)

MPT 392. CO1: Students can develop a structured


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presentation methodology to prepare presentation
effective visual aids.

MPT 392. CO2: Students can able to percolate his knowledge
to the audiences.

MPT 392. CO3: The students can be able to Determine and
develop personal style.

MPT 481

(Journal club)

MPT 481. CO1: To search articles
databases.

MPT 481. CO2: To prepare a technical presentation for a
small audience.

MPT 481. CO3: To deliver a presentation and address related
queries.

MPT 491

(Final presentation)

MPT 491. CO1: Students will be able to
information for defining and explaining
presentation.

MPT 491. CO2: In terms of summarizing
whole methodology, students will be able structure their oral
work and composing information.

MPT 491. CO3: Students will be able to
vocabularies with voice modulation, voice projection and
pacing.


MPT 492

(Research work)

MPT 492. CO1: The students would be able to
solving skills and execute them to research in the
fields.

MPT 492. CO2: The students would be able to
work, execute them and interpret
work

MPT 492. CO3: The students would be able to
research reports constituting Introduction, Experimental
Methods, Results & Discussion, Conclusion and References.



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Sr.No.	REGNO	NAME	BP701T			BP702T			BP703T			BP704T			BP705P	BP706PS	SGPA
			INT MARK	SEM GRADE	SEM MARK	INT MARK	SEM GRAD E	SEM MARK	INT MARK	SEM GRAD E	SEM MARK	IN T	SEM GRADE	SEM MARK			
1	1603268060	SOMYA RANJAN MOHAPATRA	18	A	75	20	C	55	16	A	75	19	B	65	E	O	8.08
2	1703268001	ROSHAN KUMAR MALLICK	19	E	85	22	A	75	18	E	85	20	A	75	E	O	8.92
3	1703268003	DINABANDHU SARKAR	23	A	75	20			16	C	55	16			E	O	8.38
4	1703268004	AAKRAM ALLI	21	E	85	23	A	75	20	A	8	20	B	65	E	O	8.58
5	1703268005	BIKRAM SINGH	19	C	55	23	B	65	20	C	55	19			E	O	7.7
6	1703268006	SUNIL KUMAR PRADHAN	17	A	75	23	A	75	16	B	65	18	B	65	E	O	8.25
7	1703268007	RAM KRISHNA PANGI	18	A	75	21	B	65	19	B	65	18	C	55	E	O	7.92
6	1703268008	TRILOCHAN PRADHAN	20	E	85	23	A	75	18	E	85	20	B	65	E	O	8.75
7	1703268009	PRIYADARSHINI MAHARATHA	20	A	75	22	B	65	18	A	75	20	B	65	E	O	8.25
10	1703268010	SRITAM PATTNAIK	17	A	75	18	B	65	16	B	65	16	C	55	E	E	7.67
8	1703268011	SUCHITRA MALI	19	B	65	21	B	65	17	B	65	18	C	55	E	O	7.75
12	1703268012	AMIR MALI	18	B	65	23	B	65	20	A	75	20	B	65	E	O	8.08
13	1703268013	SIDHARTH MALLICK	18	C	55	22	C	55	17	B	65	19			E	E	7.4
9	1703268014	PAWAN KUMAR PANDA	21	A	75	21	B	65	19	E	85	18	B	65	E	O	8.42
10	1703268015	ANANYA TRIPATHY	19	A	75	23	A	75	20	A	75	21	C	55	E	O	8.25
16	1703268016	PARTHA MANDAL	18	B	65	21	B	65	19	B	65	18	C	55	E	O	7.75
11	1703268017	LAXMIKANT RATH	20	A	75	22	B	65	21	A	75	20	B	65	E	O	8.25
18	1703268018	NITESH AGRAWAL	17	B	65	18	C	55	17	A	75	18	F	F	A	O	7
19	1703268019	ALIVA GIRI	18	E	85	23	A	75	20	A	75	21	C	55	E	O	8.42
19	1703268020	PRABIN KUMAR SWAIN	20	B	65	21	C	55	20	B	65	19	C	55	E	O	7.58
21	1703268022	SANTOSH KUMAR PARIDA	17	A	75	19	B	65	16	B	65	17			E	O	8.3
22	1703268023	SUBHAMSHREE SIKUN MOHANTY	17	B	65	21	C	55		B	65	16	C	55	E	E	7.33
23	1703268024	MONTU KHOSLA	21	E	85	21	B	65	20	A	75	19	B	65	E	O	8.42
24	1703268026	SUBHENDU BAGCHI	14	B	65	18	C	55	16	B	65	16			E	E	7.6
25	1703268027	NAREN BEHERA	21	A	75	22	A	75	19	E	85	20	B	65	E	O	8.58
26	1703268028	DINESH KUMAR PADHI	19			21	C	55	19	A	75	19			E	E	8
27	1703268029	RAHUL PAUL	18	A	75	21	C	55	16	B	65	19	C	55	E	E	7.42

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28	1703268030	SIBANI PALO	20	E	85	22	B	65	21	E	85	20	B	65	E	O	8.58
29	1703268031	AMIT KUMAR NAYAK	19	C	55	22	C	55	20	A	75	20	B	65	E	E	7.5
30	1703268032	HEMASARA PUJARI	16			18	C	55	16	C	55	19	C	55	A	O	7.4
31	1703268033	SANATANA SAHU	19	A	75	22	C	55	19	B	65	19	C	55	E	O	7.75
32	1703268034	TAPASWINI BARIK	18	C	55	19			17	C	55	19	C	55	E	O	7.5
33	1703268035	AKSHAYA PRASAD RATH	17	C	55	23			16	B	65	19			A	O	8
34	1703268036	ABHISHEK MOHAPATRA	22	E	85	23	A	75	20	A	75	21	B	65	E	O	8.58
35	1703268037	BISWAJEET SAHU	22	A	75	22	A	75	20	E	85	20	B	65	E	O	8.58
36	1703268038	NANDI SAHU	18	B	65	22	C	55	19	B	65	18	C	55	E	O	7.58
37	1703268039	TANUJA MONDAL	17			23			16	B	65	20			E	O	8.83
38	1703268040	SUNIL KUMAR JENA	17	C	55	22			17	C	55	18			E	E	7.5
39	1703268041	ALISA PANIGRAHI	19	B	65	22	B	65	22	A	75	20	C	55	E	O	7.92
40	1703268043	CHUDAMANI SAHU	18	B	65	22	C	55	19	A	75	19	C	55	E	O	7.75
41	1703268045	UTTAPAL DEBNATH	19	A	75	21	B	65	19	B	65	19	C	55	A	O	7.83
42	1703268046	ABHISEK DOLAI	16	C	55	18			16	C	55	16			E	O	7.88
43	1703268048	ABHIJEET SRIKANT RAUT	18			22	C	55	18	A	75	17	C	55	E	O	7.9
44	1703268049	ALOK TAPAN PRADHAN	20	A	75	19	B	65	16	B	65	19	C	55	E	O	7.92
45	1703268050	BIKRAM BHADRA	19	B	65	21	A	75	20	B	65	19	B	65	E	O	8.08
46	1703268051	MANAS RANJAN SAHU	18	A	75	22	C	55	19	A	75	20	C	55	E	O	7.92
47	1703268052	ADITYA BHATT	20	E	85	22	B	65	19	B	65	20	C	55	E	O	8.08
48	1703268053	PRAMOD KUMAR ASHA	18	A	75	22	C	55	20	A	75	20	C	55	A	O	7.83
49	1703268056	SANKAR PRASAD MOHPATRA	16	A	75	19	B	65	16	B	65	16	C	55	E	O	7.92
50	1703268057	CHANDRA SEKHAR SAHU	20	E	85	22	A	75	21	E	85	21	B	65	E	O	8.75
51	1703268058	NARAYAN GUNTHA	21	A	75	21	A	75	22	A	75	20	A	75	E	O	8.58
52	1703268059	PRATYUSH PANDA	17	C	55	22			22	C	55	18			E	O	7.88
53	1703268060	SAMBHU PRADHAN	21	A	75	21	B	65	21	A	75	19	C	55	A	O	8
54	1703268061	TEJASWINI MISHRA	19			23	B	65	22	A	75	20	C	55	E	O	8.1
55	1703268062	DEEPAK JODDAR	18			18	C	55	18	C	55	16			A	O	7.75
56	1703268063	PRIYANKA RANI SAHU	22	E	85	23	A	75	20	E	85	20	B	65	E	O	8.75
57	1703268064	DAMU SISA	17			18	C	55	18	B	65	18	B	65	E	O	7.9
58	1703268065	SIDHANT KUMAR PATRA	17	B	65	19			16	C	55	17			E	O	7.75

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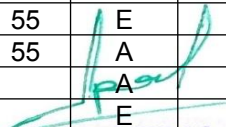


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59	1703268066	GANESH CHANDRA PADHY	18			22			20	B	65	20	C	55	E	O	8.13
60	1703268067	SUDESH PRASAD PALLI	22	A	75	20	C	55	18	B	65	19	C	55	E	O	7.75
61	1703268069	ROHIT KUMAR AGRAWAL	17	B	65	18	B	65	16			16			A	E	7.88
62	1703268071	DHIRAJ MISHRA	20	B	65	21			20	A	75	18			A	O	8.5
63	1703268072	ABINASH BANUA	18	B	65	22	B	65	18	A	75	19	C	55	E	O	7.92
64	1703268073	SUPRIYA GHARAMI	18	A	75	23	C	55	16	C	55	18	B	65	E	O	7.75
65	1703268074	PRASHNAJIT HALDAR	17	A	75	22	A	75	18	B	65	20	C	55	E	O	8.08
66	1703268075	MUKESH SARKAR	17	B	65	18			16	C	55	17			A	E	7.63
67	1703268076	SNEHALATA DASH	17	A	75	18			17	C	55	16			E	O	8.38
68	1703268077	NUTAN KUMAR PADHY	18	A	75	22	B	65	21	E	85	19	C	55	E	O	8.25
69	1703268078	SUMIT SADANGI	21	A	75	22	C	55	19	A	75	20	A	75	E	O	8.25
70	1703268079	HIMANSU SAHU	17			18			16	C	55	16	C	55	E	O	7.88
71	1703268080	MONALI MAHANKUDO	17			21	B	65	16	B	65	16			A	O	8.25
72	1703268082	SONALI GUPTA	20	A	75	22	B	65	18	B	65	20	C	55	E	O	7.92
73	1703268083	PRABHAT KUMAR SAHU	16	B	65	19	C	55	18	C	55	19	C	55	E	O	7.42
74	1703268084	FAKIR MOHAN NAYAK	16	C	55	18	C	55	16	C	55	16	C	55	E	O	7.25
75	1703268085	SUMIT KUMAR SADANGI	19			22	A	75	20	A	75	19	C	55	A	O	8.2
76	1703268086	JYOTI PRAKASH PRADHAN	20	A	75	21	B	65	19	E	85	19	C	55	E	O	8.25
77	1703268087	MOHAMMAD HUSSAIN	18	B	65	20	C	55	17	B	65	16	C	55	A	E	7.25
78	1703268088	SASHIDHAR BHUMIA	19	C	55	20	C	55	18	B	65	18	C	55	E	O	7.42
79	1703268089	DEVDAYAL PANDA	19	A	75	20	B	65	18	E	85	19	B	65	E	E	8.17
80	1703268090	NAKULA MAJHI	18	B	65	21	A	75	16	A	75	19	B	65	E	O	8.25
81	1703268091	DEBASISH BEHERA	21	E	85	21	B	65	20	A	75	18	B	65	E	O	8.42
82	1703268092	DEBASMITA SAI	23	E	85	22	A	75	20	E	85	21	B	65	E	O	8.75
83	1703268093	MANGAL KISHAN LENKA	20	A	75	21			16	C	55	16			E	O	8.38
84	1703268094	MINESH KUMAR PANDEY	18	A	75	18	B	65	16	A	75	17	C	55	E	O	8.08
85	1703268095	SHIBANI PANDA	19	A	75	21	B	65	17	A	75	19	C	55	A	O	8
86	1703268096	SHREETAM DAS	17	C	55	19			16	C	55	16			A	E	7.38
87	1703268097	SUMAN DAS	19	B	65	21	A	75	19	A	75	19			E	O	8.5
88	1703268098	HITESH KUMAR MAL	17	C	55	18			16			18	C	55	E	O	7.5
89	1703268099	RASHMI RANJAN ROUTARAY	21	O	95	22	A	75	19	E	85	19	E	85	E	O	9.25


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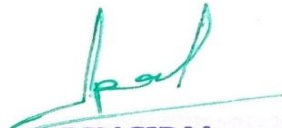


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90	1703268100	ANJALI SAHU	18	B	65	23	A	75	18	C	55	19	C	55	E	O	7.75
91	1703268101	SOM PRAKASH JOSHI	17	C	55	20	B	65	17	A	75	18			E	E	7.8
92	1703268102	SATYAJEET SIKDAR	20	A	75	22	C	55	18	E	85	20	C	55	E	E	7.83
93	1703268103	OM PRAKASH SHIT	20	A	75	23	A	75	19	A	75	20	C	55	E	O	8.25
94	1823268001	ABHISEKH PATNAIK	19	C	55	22			16	B	65	16			A	O	8
95	1823268002	BIBEK RANJAN PANDA	21	A	75	23	B	65	21	A	75	19	C	55	A	O	8
96	1823268003	DEBADATTA NAYAK	17	C	55	19	C	55	16	C	55	16			A	O	7.4
97	1823268004	KAMINI NAYAK	19	A	75	24	C	55	17	B	65	17			A	O	8
98	1823268005	N PRIYADARSHINI	18	B	65	18	B	65	17	C	55	16	C	55	A	O	7.5
99	1823268006	PRASUN KUMAR PARIDA	19	E	85	23	B	65	20	B	65	20	A	75	A	O	8.33
##	1823268007	SAURABH MOHAPATRO	19	C	55	18	B	65	17	A	75	20	C	55	A	O	7.67
##	1823268008	SUSHANT SADANGI	19	C	55	20	C	55	16	A	75	19	C	55	A	O	7.5
			18.7		70.4	21		64	18.2		68.6	19		59.5			


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UG SYLLABUS MAPPING

SUB CODE / Name of the Subject	CO Attentm ent	PO 0 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO1 1	PO1 Attenm ent	PO2 Attenm ent	PO3 Attenm ent	PO 4 AT	PO 5 AT	PO 6 AT	PO 7 AT	PO 8 AT	PO9 At	PO 10 At	PO 11 At	
BP101T Human Anatomy and Physiology I- Theory	2.8	3			2								2.8			1.8 7								
BP102T Pharmaceutic al Analysis I - Theory	0.4	3		3	3				3			3	0.4		0.4	0.4					0.4		0.4	
BP103T Pharmaceuti cs I - Theory	0.6	3		3	1		3		3	1		3	0.6		0.6	0.2		0.6		0.6	0.2		0.6	
BP104T Pharmaceutic al Inorganic Chemistry - Theory	0.6	3		3	1				1	2	1	3	0.6		0.6	0.2					0.2	0.4	0.2	0.6
BP105T Communicati on skills - Theory	3		3		1	3	3	2	3							1		3	2	3				
BP106RBT Remedial Biology	0.6	3									1		0.6											


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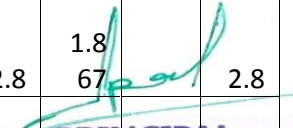
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BP106RMT Remedial Mathematics – Theory	0	3	3																		
BP201T Human Anatomy and Physiology II – Theory	1.4	3		2						1.4							0.9				3
BP202T Pharmaceutic al Organic Chemistry I – Theory	0.6	3	3	1				2		3	0.6		0.6	0.2				0.4			0.6
BP203T Biochemistry – Theory	0.6	3	3	1	2	2	2	2		3	0.6		0.6	0.2	0.4	0.4	0.4	0.4	0.4		0.6
BP204T Pathophysiol ogy – Theory	0.4	3	1	3	2	1	2	3		2	0.4		0.13	0.4	0.2	0.1	0.2	0.2	0.4		###
BP205T Computer Applications in Pharmacy – Theory	2.8		3	3	3		3	2		3			2.8	2.8	2.8		2.8	1.8			2.8
BP206T Environment al sciences –	2		2	3	3	2		3	3	2			1.33		2	2	1.3	3	2	2	###


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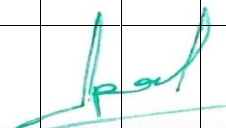
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Theory																					
BP301T Pharmaceutic al Organic Chemistry II – Theory	3	3		3	2					3	3				3	2				3	
BP302T Physical Pharmaceutic s I – Theory	2.2	3		3	2			2		3	2.2			2.2	1.4 7			1.4 7		2.2	
BP303T Pharmaceutic al Microbiology – Theory	2	3		2	3			2	2	3	2			1.33	2			1.3 3	1.3 33	2	
BP304T Pharmaceutic al Engineering – Theory	2.2	3	2	2	2	1	3	2		2	3	2.2	1.47	1.47	1.4 7	0.7 3	2.2	1.4 7		1.4 7	2.2
BP401T Pharmaceutic al Organic Chemistry III– Theory	0.6	3		3	2							3	0.6		0.6	0.4					0.6


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BP402T Medicinal Chemistry I – Theory	0	3		3	3		3		3	3	2	3											
BP403T Physical Pharmaceutic s II – Theory	0.6	3		3	2				2			3	0.6		0.6	0.4			0.4			0.6	
BP404T Pharmacolog y I – Theory	0.6	3		3	3		3	3	3	3	1	3	0.6		0.6	0.6		0.6	0.6	0.6	0.6	0.2	0.6
BP405T Pharmacogno sy and Phytochemist ry I– Theory	0.6	3			3				2	2	3	3	0.6			0.6			0.4	0.4	0.6	0.6	0.6
BP501T Medicinal Chemistry II – Theory	0.4	3		3	2							3	0.4		0.4	0.2							0.4
BP502T Industrial Pharmacy I– Theory	1	3	2	3	3	3	3	2	3	2	2	3	1	0.67	1	1	1	1	0.6	0.6	0.6		1
BP503T Pharmacolog y II – Theory	1.2	3		3	3		3	3	3	3	1	3	1.2		1.2	1.2		1.2	1.2	1.2	0.4	1.2	1.2

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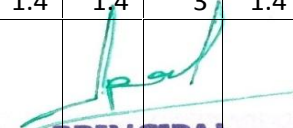
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BP504T Pharmacognosy and Phytochemistry II– Theory	2.8	3	2	3	3	2	3	2	2	3	3	3	2.8	1.87	2.8	2.8	1.87	2.8	1.87	1.87	2.8	2.8	2.8	
BP505T Pharmaceutical Jurisprudence – Theory	0.4	1					3	3		3			0.13					0.4	0.4		0.4			
BP601T Medicinal Chemistry III – Theory	2	3	2	3	3		3		3	3	1	3	2	1.33	2	2		2			2	2	0.67	2
BP602T Pharmacology III – Theory	2.8	3		3	3		3	3	3	3	1	3	2.8		2.8	2.8		2.8	2.8	2.8	2.8	2.8	0.93	2.8
BP603T Herbal Drug Technology – Theory	1.4	3	2	3	3	3	3	3	3	3	2	3	1.4	0.93	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	0.93	1.4
BP604T Biopharmaceutics and Pharmacokinetics – Theory	2.2	3	3	3	3		3	3	3	2		3	2.2	2.2	2.2	2.2		2.2	2.2	2.2	2.2	2.2	2.2	2.2


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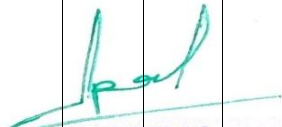


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BP605T Pharmaceutical Biotechnology – Theory	2.2	3	3	3	3	3	2	2	3	3	3	3	2.2	2.2	2.2	2.2	2.2	1.4 7	1.4 7	2.2	2.2	2.2	2.2
BP606T Quality Assurance – Theory	3	3	3	3	2	3	3	3	3	2	3	3	3	3	2	3	3	3	3	2			3
BP701T Instrumental Methods of Analysis – Theory	3	3	2	3	3		2	2	3	2	1	3	3	2	3	3		2	2	3	2	1	3
BP702T Industrial Pharmacy II – Theory	3	3	3	3	3	3	2	3	3	2	2	3	3	3	3	3	3	2	3	3	2	2	3
BP703T Pharmacy Practice – Theory	2.2	3	3	3		3	3	2	3	3	2	3	2.2	2.2	2.2		2.2	2.2	1.4 7	2.2	2.2	1.4 7	2.2
BP704T Novel Drug Delivery System – Theory	0.6	3	3	3	3	1	2	2	3	2	2	3	0.6	0.6	0.6	0.6	0.2	0.4	0.4	0.6	0.4	0.4	0.6


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