



MAHATMA GANDHI VIDYAMANDIR'S PHARMACY COLLEGE


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Recognized by : Director of Technical Education, Mumbai and Govt. of Maharashtra,
Permanently Affiliated to : Savitribai Phule Pune University, Pune (CPHN017660)
NBA Accredited (B.Pharmacy), AISHE Code - C - 41939

Course outcomes of B. Pharm., Pharm D and M. Pharm. Programme

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PRINCIPAL
MGV's Pharmacy College
Panchavati, Nasik-422 003

**Course Outcomes (COs) of
All Courses of
B. Pharm. Program**



Course Outcomes of All Courses of B. Pharm. Program:

Course outcomes (CO) are drafted covering syllabus of respective courses based on skills and knowledge gained by students. This was done by using objectives given in university syllabus and CO framed as per Blooms revised taxonomy.

Following are the finalized CO for all courses of B. Pharm. program

- **Term I**

First year B. Pharm Sem I:**Subject:** Human Anatomy and Physiology- I (Theory)**Subject code:** BP101T

Course code/ Course title	Course Outcomes Student will be able to
BP101T Human Anatomy and Physiology-I	CO101T. 1. Understand basic life processes, various homeostatic mechanisms and their imbalances.
	CO101T. 2. Explain anatomy and physiology of various body systems and understand their coordinated working.
	CO101T. 3. Understand composition and functions of body fluid and blood
	CO101T. 4. Explain various axial, appendicular bones of body and joints they formed.

Subject: Pharmaceutical Analysis-I (Theory)**Subject code:** BP102T

Course code/title	Course Outcomes Student will be able to
BP102T Pharmaceutical Analysis-I	CO102T.1 Understand different terms like Normality, Molarity etc and Preparation of different Molar and Normal solutions.
	CO102T.2 Illustrate sources of error in analytical techniques, methods to minimize errors and calibration of analytical methods.
	CO103 T.3 Describe principle and theory of different titrimetric and electrochemical methods of analysis.
	CO103T.4 Memorize different assay procedures and its application in Pharmacy.



Subject: Pharmaceutics I (Theory)

Subject code: BP103T

Course code/title	Course Outcomes Student will be able to
BP103T Pharmaceutics I	CO103T.1: Know the history of profession of pharmacy
	CO103T.2: Understand the basics of different dosage forms, pharmaceutical incompatibilities and pharmaceutical calculations
	CO103T.3: Understand the professional way of handling the prescription
	CO103T.4: Understand Preparation of various conventional dosage forms

Subject: Pharmaceutical Inorganic Chemistry (Theory)

Subject code: BP104T

Course code/ title	Course Outcomes Students will be able to
BP104T Pharmaceutical Inorganic Chemistry	CO 104T.1. Understand the Pharmacopoeia and the sources of impurities and methods to control it.
	CO104T. 2 Define and Classify inorganic compounds as per their medicinal applications
	CO 104T.3 Understand medicinal and pharmaceutical importance of inorganic compounds
	CO 104T.4 Understand the concept of buffers used in Pharmaceutical system

Subject: Communication and soft skill development (Theory)

Subject code: BP105T

Course code/ Course title	Course Outcomes Students will be able to
BP105T Communication and Soft skill development	CO105T.1 Understand interpersonal relations and communicate effectively
	CO105T.2 Illustrate and choose the career and make appropriate decisions
	CO105T.3 Reflect and improve use of body language – posture, gesture, facial expression, tone.
	CO105T.4 Utilize and apply relevant soft skills.

Subject: Remedial Mathematics (Theory)

Subject code: BP106RMT

Course code/ Course title	Course outcomes Student will able to
BP106RMT Remedial Mathematics	CO106T.1. Know the theory and their application in Pharmacy
	CO106T.2. Solve the different types of problems by applying theory
	CO106T.3. Appreciate the important application of mathematics in Pharmacy
	CO106T.4. Apply mathematical formula in pharmacy



Subject: Remedial Biology (Theory)

Subject code: BP106RBT

Course code/ Course title	Course Outcomes Student will be able to
BP106RBT Remedial Biology	CO106RBT.1 Classify five kingdom of life and understand their salient features.
	CO106RBT.2 Understand the basic components of anatomy and physiology of plants
	CO106RBT.3 Understand the basic components of anatomy and physiology of animals
	CO106RBT.4 Understand neuronal and chemical coordination in animals

Subject: Human Anatomy and Physiology- I (Practical)

Subject code: BP107P

Course code/ Course title	Course Outcomes Student will be able to
BP107P Human Anatomy and Physiology-I	CO107P.1 Identify bones of axial and appendicular skeleton
	CO107P.2 Clarify process, mechanisms and significance of various haematological parameters
	CO107P.3 Study of permanent histological slides of various tissue
	CO107P.4 Determine blood pressure and understand its significance

Subject: Pharmaceutical Analysis-I (Practical)

Subject code: BP108P

Course code/title	Course Outcomes Student will be able to
BP108P Pharmaceutical Analysis-I	CO108P.1 Understand different apparatus, glassware and instruments used in analytical chemistry.
	CO108P.2 Know calibration method for apparatus and instruments.
	CO108P.3 Describe principle, reaction conditions involved in estimation of analyte by titrimetric and electro analytical methods of analysis.
	CO108P.4 Calculate factor, analyse data and computing the results.



Subject: Pharmaceutics I (Practical)

Subject code: BP109P

Course code/ Course title	Course Outcomes Student will be able to
BP109P Pharmaceutics I	CO109P.1 Know and understand General instructions of Laboratory i.e., Do's and Don't
	CO109P.2 Understand and Perform Preparation and Evaluation of Liquid Dosage forms
	CO109P.3 Understand and Preparation and Evaluation Solid Dosage forms like Powders and Granules
	CO109P.4 Know and understand Preparation and Evaluation Semi - Solid Dosage forms

Subject: Pharmaceutical Inorganic Chemistry (Practical)

Subject code: BP110P

Course code/ Course title	Course Outcomes Students will be able to
BP110P Pharmaceutical Inorganic Chemistry	CO110P.1. Understand the concept of quality control tests in limiting traces of impurities present in pharmaceuticals by performing limit tests.
	CO 110P.2. Understand various chemical reactions through the preparation of inorganic compounds and Calculate Theoretical , Practical and % yield
	CO110P.3. Perform identification tests on inorganic compounds
	CO110P.4. Predict swelling power, acid neutralizing capacity, adsorption property of various inorganic compounds.

Subject: Communication and soft skill development (Practical)

Subject code: BP111P

Course code/ Course title	Course Outcomes Students will be able to
BP111P Communication and Soft skill development	CO111P.1 Understand interpersonal relations and communicate effectively
	CO111P.2 Illustrate and choose the career and make appropriate decisions
	CO111P.3 Reflect and improve use of body language – posture, gesture, facial expression, tone
	CO111P.4 Utilize and apply relevant soft skills.



Subject: Remedial Biology (Practical)

Subject code: BP112RBP

Course code/ Course title	Course Outcomes Student will be able to
BP112RBP Remedial Biology	CO112RBP.1 Perform and Develop skill in section cutting, mounting, staining techniques and permanent slide preparation
	CO112RBP.2 Understand the morphology and microscopy of different parts of flowering plant
	CO112RBP.3 Identify the bones of human skeletal system
	CO112RBP.4 Determine blood group, blood pressure and tidal volume in human subjects

Second year B. Pharm. Sem III:

Subject: Pharm.Organic Chem II (Theory)

Subject code: BP301T

Course code/ Course title	Course Outcomes Students will be able to
BP301T Pharm.Organic Chem II	CO301T.1 Understand and analyse chemical properties of some organic compounds.
	CO301T.2 Explain chemical reaction and justify products of chemical reaction of some organic compounds
	CO301T.3 Account for reactivity and comment on stability of some organic compounds.
	CO301T.4 understand concept of stereoisomers and construct structures of isomers.

Subject: Physical Pharmaceutics- I (Theory)

Subject code: BP302T

Course code/ Course title	Course Outcomes Students shall be able to
BP302T Physical Pharmaceutics- I	CO302T. 1. Understand the various physicochemical properties of drug molecules and their applications in designing the dosage form.
	CO302T. 2. Summarize the principles of physical properties such as solubility, partition coefficient, surface tension, complexation, pH and buffer in pharmaceutical practices.
	CO302T. 3. Explain the principles of states of matter like latent heat, vapour pressure, liquid complexes, amorphous, polymorphism, adsorption, protein binding and isotonic solutions.
	CO302T. 4. Relate the principles of protein binding, complexation and isotonicity in drug action.



Subject: Pharmaceutical Microbiology (Theory)

Subject code: BP303T

Course code/ Course Title	Course Outcomes Students will be able to
BP303T	CO303T.1. To summarize and classify structural features biology and characteristics of different Classes of microbes.
	CO303T.2. To describe the advanced isolation and counting techniques of micro-organisms along with comparison of sterilization techniques of pharmaceuticals.
	CO303T.3. To identify sources and types of microbial contamination and compare application of various tests like microbial limit test, preservative efficacy test and standardization process.
	CO303T.4. To understand cell culture technology and relate its applications in pharmaceutical industry.

Subject: Pharmaceutical Engineering (Theory)

Subject code: BP304T

Course code/ Course Title	Course Outcomes Students will be able to
BP304T Pharmaceutical Engineering	CO304T.1 Study principle, theory, mechanism, working and construction of equipments for different Pharmaceutical unit operations like drying, evaporation, heat transfer, crystallization, distillation.
	CO304T.2. To study and apply Pharmaceutical Engineering advanced modules that are relevant to the changing priorities of modern Pharmaceutical industries
	CO304T.3 To describe and design graphical representation of various equipments for Pharmaceutical unit operations.
	CO304T.4 To demonstrate principles involved in Flow of Fluids and can apply theories in Pharmaceutical unit operations.

Subject: Pharmaceutical Organic II (Practical)

Subject Code: BP305P

Course code/ Course title	Course Outcomes Students will be able to
BP305P Pharm.Organic Chem.II	CO305P.1. Understand and apply laboratory techniques like crystallisation and distillation
	CO305P.2. Apply tests based on physical /chemical properties for separation and identification of binary mixture
	CO305P.3. Estimate sap value of oils for standardisation of oil samples.
	CO305P.4. synthesis small organic compounds.



Subject: Physical Pharmaceutics- I (Practical)

Subject code: BP306P

Course code/ Course title	Course Outcomes Student shall be able to
BP306P Physical Pharmaceutics- I	CO306P. 1. Demonstrate different laboratory apparatus and instruments required to determine physical properties.
	CO306P. 2. Apply the principles and factors affecting physical properties in designing of dosage form.
	CO306P. 3. Determine the solubility, partition coefficient, pKa, surface tension, HLB, CMC and stability constants of the complexes.
	CO306P. 4. Interpret the principles of physical properties in drug action.

Subject: Pharmaceutical Microbiology (Practical)

Subject code: BP307P

Course code / Course title	Course Outcomes Students will be able to
BP307P Pharmaceutical Microbiology	CO307P.1. To use practices and skills required for maintaining aseptic condition while performing microbiology practicals.
	CO307P.2. To conduct tests for sterility of pharmaceuticals, bacteriological test, microbiological assay etc. and understand their significance.
	CO307P.3. To apply basic principle of sterilization during practical.
	CO307P.4. To illustrate morphology of bacteria by applying various staining techniques.

Subject: Pharmaceutical Engineering (Practical)

Subject code: BP308P

Coursecode/ Course title	Course Outcomes Student will be able to
BP308P Pharmaceutical Engineering Practical	1. To know various unit operations used in Pharmaceutical industries.
	2. To demonstrate effect of various factors on rate of processes like Filtration, Crystallization etc.
	3. To understand importance of Size reduction and size separation and also practice the same.
	4. To understand and implement the concept of LOD and % Moisture content, by calculating the same for various samples.

Third year B. Pharm. Sem V:

Subject: Medicinal Chemistry II (Theory)

Subject code: BP501T

Coursecode/ Course title	Course Outcomes Student will be able to
BP501T Medicinal	CO501T.1. Understand the chemistry of drugs with respect to their pharmacological activity.



Chemistry II	CO501T.2 Understand drug metabolic pathways, adverse effect and therapeutic value of drugs.
	CO501T.3. Know the Structural Activity Relationship of different class of drugs
	CO501T.4. Study the chemical synthesis of selected drugs.

Subject: Industrial Pharmacy-I (Theory)

Subject code: BP502T

Course code/ Course title	Course Outcomes Students will able to
BP502T Industrial Pharmacy-I	CO502T.1 Understand and illustrate the concepts of dosage form design and formulation strategies
	CO502T.2 Illustrate tablets as a dosage form, physico-chemical principles of tablet formulation, various tablet additives, manufacture and evaluation, equipment's, defects in tableting and remedies
	CO502T.3 Understand and describe orally administered drugs, injectables, aerosol and semisolid preparations with standard protocols
	CO502T.4 Describe and elaborate various factors to be considered in development of pharmaceutical dosage forms

Subject: Pharmacology-II (Theory)

Subject code: BP503T

Course code/ Course title	Course Outcomes Students will be able to
BP 503T Pharmacology II	CO503T.1 Study pharmacology of drugs and appreciate the rational approach in the clinical management of CVS disorders
	CO503T.2 Classify and explain pharmacology of autacoids and their antagonist in relevance to clinical applications
	CO503T.3 Summarize the hormones of endocrine system and define their role in the maintenance of the homeostasis
	CO503T.4 Study the principles, applications and types of bioassay of various drugs

Subject: Pharmacognosy and Phytochemistry-II (Theory) **Subject code:** BP504T

Course code/ Course title	Course Outcomes Students will be able to
BP504T Pharmacognosy and Phytochemistry- II	CO504T.1 Understand and comprehend the basic metabolic pathways in formation of secondary metabolites and utilization of tools and techniques for investigation of biogenetic pathways in plants.
	CO504T.2 Explain different secondary metabolites composition, chemistry and chemical classes with commercial applications and pharmacognosy of related crude drugs.
	CO504T.3 Describe isolation, identification, analysis, industrial production, estimation and utilization of Phytoconstituents specified.



	CO504T.4 Outline conventional and modern extraction techniques and application of latest techniques like Spectroscopy, chromatography, non-chromatographic and electrophoresis in isolation, Purification and identification of crude drugs.
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Subject: Pharmaceutical Jurisprudence (Theory)

Subject Code: BP505T

Course code/ Course title	Course Outcomes Students will be able to
BP505T Pharmaceutical Jurisprudence	CO505T.1 Understand the pharmaceutical legislations and their implications in the development and marketing of pharmaceuticals.
	CO505T.2 Apply various Indian pharmaceutical Acts and Laws
	CO505T.3 Discover regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals
	CO505T.4 Apply the code of ethics during the pharmaceutical practice

Subject: Industrial Pharmacy-I (Practical)

Subject code: BP506P

Course code/ Course title	Course Outcomes Students will able to
BP506P Industrial Pharmacy-I	CO506P.1 Illustrate the correct use of various equipment's in Pharmaceutics laboratory relevant to tablets, capsules and coating
	CO506P.2 Describe, elaborate formulation and evaluation of tablets and capsules
	CO506P.3 Understand rational behind use of formulation ingredients
	CO506P.4 Prepare and use labels to suit regulatory requirements

Subject: Pharmacology-III (Practical)

Subject code : BP507P

Course code/ Course title	Course Outcomes Students will be able to
BP507P Pharmacology III	CO507P.1 Study OECD guidelines and apply its ethical principles in the determination of toxicity of test substances
	CO507P.2 Compare and calculate the effect of agonist and antagonist in different bioassay methods using softwares and videos
	CO507P.3 Interpret the serum biochemical parameters and summarize the



	effect of drugs in various pre-clinical evaluation methods using softwares and videos
	CO507P.4 Practice biostatistical methods and choose appropriate method for biostatistical analysis

Subject: Pharmacognosy and Phytochemistry-II (Practical)

Subject code: BP508P

Course code/ Course title	Course Outcome Students will be able to
BP508P Pharmacognosy and Phytochemistry-II	CO508P.1 Illustrate morphological, microscopical parameter and skilled for sectioning, microchemical staining, extraction and chemical test of the crude drug as evaluation parameter.
	CO508P.2 Practice isolation and detection techniques of specified active phytoconstituents from crude drugs.
	CO508P.3 Exercise paper and thin layer chromatographic techniques for extracts and phytoconstituents.
	CO504P.4 Analyse unorganized powder crude drugs using chemical tests.

Final year B.Pharm. Sem VII:

Subject: Instrumental Methods of Analysis (Theory)

Subject Code: BP701T

Course code / Course title	Students outcomes Students will be able to
BP701T Instrumental Methods of Analysis	CO701T.1 Understand the principles and theory of spectroscopic technique. UV- Visible, Infrared, Fluorimetry, Flame and atomic absorption, Nepheloturbidometry
	CO702T.2 Elaborate instrumentation and utilize knowledge of spectroscopic technique. UV- Visible, Infrared, Fluorimetry, Flame and atomic absorption, Nepheloturbidometry
	CO702T.2 Understand the principles and theory of chromatographic technique. Thin layer, Paper, GC, HPLC, ionexchange, gel affinity chromatography, gel electrophoresis
	CO702T.3 Elaborate methodology and utilize knowledge of chromatographic technique. Thin layer, Paper, GC, HPLC, ionexchange, gel affinity chromatography, gel electrophoresis

Subject: Industrial Pharmacy II (Theory)

Subject Code: BP702T

Course code/Course title	Students outcomes Students will be able to
BP702T	CO702T.1 Know and understand Pilot Plant Scale up techniques



Industrial Pharmacy II	CO702T.2 Understand and perform Technology development and Transfer
	CO702T.3 Know and understand Regulatory requirement for drug
	CO702T.4 Know and adapt Quality management system in Pharmaceutical Industry

Subject: Pharmacy Practice (Theory)

Subject code: BP703T

Course code/Course title	Course Outcomes Students will be able to
BP703T Pharmacy Practice	CO703T.1 To understand the organisational structure of hospital and to outline the drug distribution methods in a hospital
	CO703T.2 To detect and assess adverse drug reactions and appreciate the concept of rational drug therapy.
	CO703T.3 To study the contents of hospital formulary and appreciate the role of pharmacist in patient counselling and community pharmacy management
	C703T.4 To understand pharmaceutical care services and appreciate the pharmacy stores management and inventory control.
	C703T.5 To assess and interpret clinical laboratory data of specific disease states.

Subject: Novel Drug Delivery System (Theory)

Subject code: BP704T

Course code/ Course title	Course Outcomes Students will be able to
BP 704 T Novel Drug Delivery System	CO704T.1 Describe the fundamental Concept of Controlled Drug Delivery system.
	CO704T.2 Explain selection of Drugs and polymers for development of Novel Drug Delivery Systems.
	CO704T.3 Illustrate various approaches for development of Novel Drug Delivery Systems
	CO704T.4 Elaborate formulation techniques and Evaluation of various of Novel Drug Delivery Systems.

Subject: Instrumental Methods of Analysis (Practical)

Subject Code: BP705P

Course code / Course title	Course outcomes Students will be able to
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BP705P Instrumental Methods of Analysis	CO705P.1 Make use of various analytical instruments to operate and calibrate independently for the separation/isolation and assay of various APIs and formulations as per pharmacopoeial standards
	CO705P.2 Analyze API and Formulation by different analytical methods
	CO705P.3 To interpret the data obtained through experimentation and report the results
	CO705P.4 Discuss safety measures while handling instruments, chemicals and apparatus.

• **Term II**

First Year B. Pharm. Sem II:

Subject: Human Anatomy and Physiology- II (Theory)

Subject code: BP201T

Course code / Course title	Course Outcomes Student will be able to
BP201T Human Anatomy and Physiology- II	CO201T.1. Study of anatomy and physiology of components of CNS and summarize the electrophysiology and reflex activity
	CO201T.2. Illustrate the various tissues and organs of different system of human body and recognize their coordinated working
	CO201T.3. Understand formation and role of ATP and summarize genes, DNA and genetic pattern of inheritance
	CO201T.4. Classify hormones and relate their normal and abnormal role with physiology

Subject: Pharmaceutical Organic Chemistry- I (Theory)

Subject code : BP202T

Course code/ Course title	Course Outcomes Students will be able to
BP202T Pharmaceutical organic chemistry- I	CO202T.1 Understand and write the classification ,Nomenclature , structure and the type of isomerism of the organic compounds.
	CO202T.2 Understand and explain hybridization concept, methods of preparation reactivity and stability of organic compounds.
	CO202T.3. Explain different elimination and addition reactions and orientation.
	CO202T.4 Explain different qualitative tests and uses of organic compounds.

Subject: Biochemistry (Theory)

Subject Code: BP203T

Course code/ Course title	Course Outcomes Student will be able to
BP203T	CO203T.1 Understand classification, metabolism, diseases related to metabolism of different biomolecules like carbohydrates, proteins, fats.



Biochemistry	CO203T .2 Remember the genetic organization of mammalian genome and functions of DNA in the synthesis of RNAs and proteins.
	CO203 T.3 Understand the catalytic role of enzymes and importance of enzyme in biochemical process.
	CO203 T.4 Summarize the biological oxidation and bioenergetics

Subject: Pathophysiology (Theory)

Subject Code: BP204T

Course code/ Course title	Course Outcomes Student will be able to
BP204T Pathophysiology	C204T. 1 Outline basics of pathophysiology and to understand origin of diseases by studying its etiology and pathogenesis of cell injury.
	C204T. 2 Outline etiology, clinical manifestations and pathogenesis of various diseases and disorders of body systems and to plan a line of treatment.
	C204T. 3 Outline etiology, clinical manifestations and pathogenesis of various infectious diseases and to plan a line of treatment.
	C204T. 4 Classify tumors, to understand its etiology, pathogenesis and to develop a line of treatment.

Subject: Computer Application in Pharmacy (Theory)

Subject code: BP205T

Course code/ Course title	Course Outcomes Students are able to
Computer Applications in Pharmacy BP205T	CO205T.1 Understand working of hardware
	CO205T.2 Understand working of software
	CO205T.3 Guide for selection of appropriate hardware for pharmacy field
	CO205T.4 Know the various applications of databases in pharmacy

Subject: Environmental Sciences (Theory)

Subject code: BP206T

Course code/ Course title	Course Outcomes Students are able to
BP206T Environmental Sciences	CO206T.1 Create the awareness about environmental problems among society.
	CO206T.2 Illustrate and Impart basic knowledge about the environment and its allied problems.
	CO206T.3 Participate in environment protection and environment improvement.
	CO206T.4 Identify and solve pharmacy environmental problems. .

Subject: Human Anatomy and Physiology-II (Practical)

Subject code: BP207P

Course code/ Course title	Course Outcomes Student will be able to
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BP207P Human Anatomy and Physiology- II	CO207P.1: Study anatomy and physiology of various body system by using charts, models and specimen
	CO207P.2: Determine DLC, Arneth index, Platelet count and osmotic fragility of own blood sample
	CO207P.3: Demonstrate neurological examination, reflex activity, body temperature measurement and visual acuity.
	CO207P.4: Examine different type of tastes.

Subject: Pharmaceutical Organic Chemistry I (Practical)

Subject code: BP208P

Course code/ Course title	Course Outcomes Students will be able to
BP208P Pharmaceutical organic chemistry-I	CO208P.1 Understand the safety measures in pharmaceutical Chemistry laboratory.
	CO208P.2 Identify and confirm given organic compounds by performing qualitative analysis along with determination of physical constant (M.P/B.P.)
	CO208P.3 Able to understand derivatisation and synthesized derivatives of given organic compounds.
	CO208P.4 Able to Understand the concept and construct molecular models of various organic compounds. .

Subject: Biochemistry (Practical)

Subject code: BP209P

Course code/ Course title	Course Outcomes Student will be able to
BP209P Biochemistry	CO209 P.1 Identify Carbohydrates, proteins and amino acids in given sample and abnormal constituents in urine sample
	CO209 P.2 Estimate blood creatinine, blood sugar, total cholesterol in serum, proteins and reducing sugar.
	CO209.P.3 Understand the effect temperature and substrate concentration on salivary amylase activity.
	CO209.P.4 Prepare buffer solution and measure the PH of it.

Subject: Computer Applications in Pharmacy (Practical)

Subject code: BP209P

Course code/ Course title	Course Outcomes Students will be able to
BP209P Computer Applications in Pharmacy	CO209P.1 Understand working of hardware
	CO209P.2 Understand working of software related to Pharmacy field
	CO209P.3 Design and search webpage and website for Pharmacy field.
	CO209P.4 Know the various applications of databases in Pharmacy



Second year B. Pharm. Sem IV:

Subject: Pharmaceutical Organic Chemistry III (Theory) **Subject Code:** BP401T

Course code/ Course title	Course Outcomes Students will be able to
BP401T Pharmaceutical organic chemistry III	CO401T.1 Understand and apply Nomenclature and classification of few heterocyclic compounds.
	CO402T.2 Explain Chemistry, Synthesis, reactions and medicinal uses of few heterocyclic compounds.
	CO402T.3 Explain the stereochemical aspects of organic compounds and stereo chemical reactions.
	CO402T.4 Understand rearrangement reactions and justify products for the same.

Subject: Medicinal Chemistry I (Theory) **Subject Code:** BP402T

Course code/ Course title	Course Outcomes Students will be able to
BP402T Medicinal Chemistry I	CO402T.1 Understand the chemistry of drugs with respect to their pharmacological action.
	CO402T.2 Summarize drug metabolic pathway, ADRs and therapeutic values of drugs
	CO402T.3 Describe Structure , IUPAC, SAR of different classes of drugs
	CO402T. 4 Describe chemical synthesis of some drugs

Subject: Physical Pharmaceutics- II (Theory) **Subject code:** BP403T

Course code/ Course title	Course Outcomes Students will be able to
BP403T Physical Pharmaceutics- II	CO403T.1. Describe colloids, classification, properties, method of preparation and stability of colloidal formulations.
	CO403T.2. Elaborate the concept of rheology , types of flow, viscoelasticity, thixotropy and its measurement in formulations.
	CO403T.3. Illustrate the principles of micromeritics, properties of powders, determination of methods and importance of flow properties in pharmacy.
	CO403T.4. Illustrate the principles of chemical kinetics in stability and prediction of shelf life of pharmaceutical products.

Subject: Pharmacology I (Theory)

Subject code: BP404T



Course code/ Course title	Course Outcomes Student will be able to
BP 404 T Pharmacology-I	CO404T.1 Understand basics of pharmacokinetics and pharmacodynamics.
	CO404T.2 Understand the pharmacological actions of different categories of drugs.
	CO404T.3 Explain the mechanism of action at organ system/sub cellular/macromolecular levels
	CO404T.4 Apply the basic pharmacological knowledge in the prevention and treatment of various diseases.

Subject: Pharmacognosy and Phytochemistry I (Theory)

Subject Code: BP405T

Course code/ Course title	Course Outcome Students will be able to
BP405T Pharmacognosy and Phytochemistry-I	CO405T.1 Describe basics of pharmacognosy with cultivation, collection, processing, storage, quality control of drugs of natural origin and conservation of medicinal plants.
	CO405T.2 Explain plant tissue culture technique and its application along with edible vaccines.
	CO405T.3 Detail out various plant parts description, morphology and anatomy.
	CO405T.4 Describe primary metabolites chemistry and related crude drugs pharmacognosy and its commercial utility, introduction to secondary metabolites, infer plant products and novel medicinal agents from marine sources.

Subject: Medicinal Chemistry I (Practical)

Subject Code: BP406P

Course code/ Course title	Course Outcomes Students will be able to
BP406P Medicinal Chemistry I	CO406P.1 Understand the Synthesis and recrystallization of medicinally important compounds and drug intermediates
	CO406P.2 Monitoring synthesis of compounds by doing TLC
	CO406P.3 Develop skill of purification of synthesized compound by column chromatography
	CO406P.4 Determine partition coefficient and ionization constant of weak acids and bases

Subject: Physical Pharmaceutics- II (Practical)

Subject code: BP407P

Course code/	Course Outcomes
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Course title	Students shall be able to
BP407P Physical Pharmaceutics- II	CO407P.1. Determine various physical properties such as viscosity, flow properties and reaction rate constants of formulation.
	CO407P. 2. Calculate the particle size distribution by sieving, microscopy method and flow properties of pharmaceutical products.
	CO407P. 3. Determine the viscosity, effects of suspending agent and conc.of suspending agents on sedimentation volume of formulations.
	CO407P. 4. Interpret the principles of chemical kinetics in determination of first and second order rate constants and accelerated stability study of pharmaceuticals.

Subject: Pharmacology- I (Practical)

CODE: BP408P

Course code/title	Course Outcomes Student will be able to
BP408P Pharmacology-I	C408P.1: Understand the basics of Experimental Pharmacology
	CBP408P.2: Study commonly used instruments and laboratory animals in Experimental Pharmacology
	CBP408P.3: Illustrate CPCSEA Guidelines and common laboratory techniques
	CBP408P.4: Demonstrate the routes of drug administration in animals and study the effect of various category of drug on animals

Subject: Pharmacognosy and phytochemistry I(Practical)

Subject Code: BP409P

Course code/ Course title	Course Outcomes Students will be able to
BP409P Pharmacognosy and Phytochemistry-I	CO409P.1 Generate micrometric data as evaluation parameter for the crude drugs.
	CO409P.2 Perform quantitative microscopy for leaf constants as evaluation parameter for the crude drugs.
	CO409P.3 Analyze crude drugs as per WHO guidelines for quality control evaluation.
	CO409P.4 Identify unorganized powder crude drug of using organoleptic characteristics and chemical tests.

Third year B.Pharm. Sem VI:

Subject: Medicinal chemistry III (Theory)

Subject Code: BP601T



Course code/ Course title	Course Outcomes Student will be able to
BP601T Medicinal Chemistry III	CO601T.1 Understand general aspects of the drug design & different techniques of drug design.
	CO601T.2 Classify medicinal drugs, antibiotics, antimycobacterial agents, antiviral agents, antineoplastic agents.
	CO601T.3 Explain SAR & MOA of medicinal drugs, antibiotics, antimycobacterial agents, antiviral agents, antineoplastic agents.
	CO601T.4 List adverse effects, therapeutic uses, popular brand names of medicinal drugs, antibiotics, antimycobacterial agents, antiviral agents, antineoplastic agents.

Subject: Pharmacology-III (Theory)

CODE: BP602.T

Course code/ Course title	Course Outcomes Students will be able to
BP602T Pharmacology III	To study the pharmacology of drugs and outline their role in the management of GI tract and respiratory disorders
	To categorize drugs and justify the role in the treatment of various infectious diseases
	To explain the principles of toxicology and apply knowledge of poisoning in the health and safety management
	To explain the advantages and recent trends in the target specific drug treatment and impart the basic knowledge of chronopharmacology

Subject: Herbal drug Technology (Theory) **Subject code:** BP603T

Course code/ Course title	Course Outcome Students will be able to
BP603T Herbal drug Technology	CO603T.1 Understand and comprehend herbs as raw material, Good Agricultural Practices for cultivation and collection, processing, various aspects of biodynamic agriculture along with principles involved in traditional systems of medicines, preparation and standardization of ayurvedic formulations.
	CO603T.2 Discuss nutraceuticals for general aspect, types of products, health benefits in various ailments, briefs of various herbs, interpret possible side effects and herbal drug interaction.
	CO603T.3 Describe raw materials of herbal origin used in various herbal cosmetics, signify various herbal excipients and explain conventional and novel dosage formulations.
	CO603T.4 Infer herbal drug industry, schedule T, GMP aspects, regulatory requirements, regulatory issues and issues related to exports of herbals, WHO and ICH guidelines for evaluation of crude drugs and appreciate



	patenting of herbal drugs.
Subject: Biopharmaceutics and Pharmacokinetics (Theory) Subject Code: BP604T	

Course code/Course Title	Course Outcome: Students will be able to
BP604T Biopharmaceutics and Pharmacokinetics	CO604T.1 Understand and gain knowledge about the basic concepts in Biopharmaceutics and pharmacokinetics and their significance
	CO604T.2 Describe plasma drug concentration -time data to calculate the pharmacokinetics parameter to describe the kinetics of drug absorption, distribution, metabolism, excretion and elimination.
	CO604T.3 Correlate, connect and analyze the concept of bioavailability and bioequivalence of drug product and their significance.
	CO604T.4 Elaborate the concept of compartment modelling, dissolution and application of <i>IVIVC</i> in drug product development.

Subject: Pharmaceutical Biotechnology (Theory) **Subject Code:** BP605T

Course code/ Course title	Course outcomes Student will be able to
BP605T Pharmaceutical Biotechnology	CO605T.1 Understand basic principles of Biotechnology and its potential and scope in Pharmacy.
	CO605T.2 Interpret and outline the various genetic engineering techniques like genetic and C-DNA libraries, gel electrophoresis, blotting techniques, DNA fingerprinting.
	CO605T.3 Illustrate the importance of r-DNA technology like gene cloning along with blotting techniques and their applications also to understand basics of Immunology.
	CO605T.4 Correlate biotechnology principles in preparation of Monoclonal antibodies, Fermentation technology, antibiotics and vitamins and manufacturing storage and stability of whole blood and blood products.

Subject: Pharmaceutical Quality Assurance (Theory) **Subject Code:** BP606T

Course code/ Course title	Course outcomes Student will be able to
BP606T Pharmaceutical Quality Assurance	CO606T.1 Understand QA and QC aspect and responsibility in pharma industry
	CO606T.2 Appreciate importance of GMP and QC test
	CO606T.3 Understand importance of documentation in pharma industry
	CO606T.4 Understand scope of quality certification in pharma industry
	CO606T.5 Understand regulatory requirement in pharmaceuticals

Subject: Medicinal chemistry-III (Practical)

Subject code: BP607.P



Course code/ Course title	Course Outcomes Student will be able to
BP607P Medicinal Chemistry III	CO607P.1 Plan and synthesise medicinally important drugs/drug intermediates.
	CO607P.2 Plan and synthesise medicinally important drugs using microwave.
	CO607P.3 Develop skills to utilise software for drawing structures and reactions.
	CO607P.4 Develop skills to utilise software for determination of properties of drugs.

Subject: Pharmacology-III (Practical)

Subject code: BP608.P

Course code/ Course title	Course Outcomes Students will be able to
BP608P Pharmacology III	CO608P.1 To study OECD guidelines and apply its ethical principles in the determination of toxicity of test substances
	CO608P.2 To compare and calculate the effect of agonist and antagonist in different bioassay methods using softwares and videos
	CO608P.3 To interpret the serum biochemical parameters and summarize the effect of drugs in various pre-clinical evaluation methods using softwares and videos
	CO608P.4 To practice biostatistical methods and choose appropriate method for biostatistical analysis

Subject: Herbal Drug Technology (Practical)

Subject code: BP609P

Course code/ Course title	Course Outcomes Students will be able to
BP609P Herbal drug Technology	CO609P.1 Identify metabolites in extract by phytochemical screening method and determine alcohol content of Ayurvedic formulations.
	CO609P.2 Evaluate excipients of natural origin and analyze herbal drugs as per monographs.
	CO609P.3 Prepare and evaluate herbal cosmetics and herbal dosage forms as per pharmacopoeial requirement.
	CO609P.4 Determine aldehyde, phenol and total alkaloid content of herbal extracts.

Final year B. Pharm. Sem VIII:

Subject: Biostatistics and Research Methodology (Theory)

Subject code: BP801T



Course code/ Course title	Course Outcomes Student will be able to
BP801T Biostatistics and Research Methodology	CO801T. 1. Assessing statistical techniques in solving problems
	CO801T. 2. Implementing operations of MS, Excel, SPSS, R and MINITAB, DOE
	CO801T. 3. Solving the statistical problems
	CO801T. 4. Understanding research methodology including study design and statistical analysis

Subject: Social and Preventive Pharmacy (Theory)

Subject code: BP802T

Course code/ Course title	Course Outcomes Students will able to
BP802T Social and Preventive Pharmacy	CO802T.1 Acquire realization of the current issues related to health problems within country and worldwide
	CO802T.2 Understand and develop critical way of consciousness based on current healthcare development
	CO802T.3 Acquire understanding of current issues related to Pharmaceutical problems within the country
	CO802T.4 Evaluate alternative ways of solving problems they related to health and Pharmaceutical issues

Subject: Pharmaceutical Marketing Management (Theory)

Subject Code: BP803ET

Course code/ Course title	Course Outcomes Students will able to
BP803ET Pharmaceutical Marketing Management	CO803ET.1 Know and understand marketing concepts
	CO803ET.2 Understand Marketing Technique
	CO803ET.3 Apply marketing concept and Technique in the pharmaceutical industry for selling

Subject: Pharmaceutical Regulatory Science (Theory)

Subject Code: BP804ET

Course code/ Course title	Course Outcomes Students will able to
BP804ET Pharmaceutical	CO804ET.1 Understand, appreciate and able to explain the Concepts of innovator and generic drugs, drug development process.



Regulatory Science	CO804ET.2 Understand and explain the regulatory guidances and guidelines for filing and approval process for IND, NDA and ANDA
	CO804ET.3 Understand and explain the Post approval regulatory requirements for actives and drug products and Submission of global documents in CTD/ eCTD formats.
	CO804ET.4 Explain Clinical trials requirements for approvals, conducting and monitoring clinical trials

Subject: Cosmetic Science (Theory)

Subject code: BP809ET

Course code/ Course title	Course Outcomes Students will able to
BP809ET Cosmetic Science	CO809ET.1 Understand and explain the concepts of cosmetics, general excipients used in cosmetics
	CO809ET.2 Illustrate formulation of cosmetics for skin, manufacturing, equipment's and evaluation of cold cream, vanishing cream
	CO809ET.3 Able to Illustrate formulation of cosmetics for hair, manufacturing and evaluation of hair shampoos
	CO809ET.4 Describe the concept of cosmeceuticals, difference between cosmetics and cosmeceuticals

Subject: Project Work

Subject Code: BP812PW

Course code/ Course title	Course Outcomes Students will be able to
BP812PW Project work	CO812PW .1. Understand hypothesis of research and plan aim and objectives of the research.
	CO812PW.2. Select and apply appropriate methods to fulfil the objectives of research.
	CO812PW.3. Evaluate data, draw the proper conclusion from observed results and discuss rational behind it.
	CO812PW .4 Communicate, present and publish the research data.



**Course Outcomes (COs) of
All Courses of
Pharm. D. Program**



Course Outcomes of All Courses of Pharm. D. Program:

Course outcomes (COs) are drafted covering syllabus of respective courses based on skills and knowledge gained by students. This was done by using objectives given in university syllabus and CO framed as per Blooms revised taxonomy.

Following are the finalized CO for all courses of Pharm. D. program

• **First year Pharm. D.:**

Subject: Human Anatomy and Physiology (Theory)

Subject code: 1.1

Course code/ Course title	Course Outcomes Student will be able to
1.1 Human Anatomy and Physiology	CO1.1.T.1. Understand basic terminologies in anatomy and physiology and describe structure and functions of cells and tissues.
	CO1.1.T.2. Understand coordinated working pattern of different organs of each system and their interlinked mechanism to maintain homeostasis.
	CO1.1.T.3. Explain Composition and functions of body fluid and blood.
	CO1.1.T.4. Explain various axial, appendicular bones of body and joints they form and understand sports physiology.

Subject: Human Anatomy and Physiology (Practical)

Subject code: 1.1

Course code/title	Course Outcomes Student will be able to
1.1 Human Anatomy and Physiology	CO1.1.P.1. Identify bones of axial and appendicular skeleton
	CO1.1.P.2. Perform the haematological tests and understand its significance and determine blood pressure.
	CO1.1.P.3. Identify various tissues and organs of the different systems of human body with the help of permanent slides, models and charts.
	CO1.1.P.4. Study family planning devices and pregnancy diagnosis test.



Subject: Pharmaceutics (Theory)

Subject code: 1.2

Course code/title	Course Outcomes Student will be able to
1.2 Pharmaceutics	CO1.2.T.1. Know the History and development of profession of pharmacy.
	CO1.2.T.2. Explain the basics and formulation aspects of different dosage forms, pharmaceutical incompatibilities and pharmaceutical calculations
	CO1.2.T.3. Understand the professional way of handling the prescription
	CO1.2.T.4. Describe preparation of various conventional dosage forms and study surgical aids.

Subject: Pharmaceutics (Practical)

Subject code: 1.2

Course code/ Course title	Course Outcomes Students will be able to
1.2 Pharmaceutics	CO1.2.P.1. Know & understand general instructions of Laboratory i.e. Do's and Don'ts.
	CO1.2.P.2. Understand and perform Preparation and evaluation of various liquid dosage forms.
	CO1.2.P.3. Understand and perform Preparation and evaluation of different solid dosage forms like powders, insufflations.
	CO1.2.P.4. Understand and perform Preparation of various Semi-solid dosage forms and study incompatibilities.

Subject: Medicinal Biochemistry (Theory)

Subject code: 1.3

Course code/ Course title	Course Outcomes Students will be able to
1.3 Medicinal Biochemistry	CO1.3.T.1. Summarize classification mechanism of action and application of enzyme
	CO1.3.T.2. Explain the metabolic process of biomolecules in health and illness
	CO1.3.T.3. Describe biochemical principles of organ function test of kidney, liver and endocrine gland
	CO1.3.T.4. Justify immunochemical techniques for determination of biomolecules in the body fluids



Subject: Medicinal Biochemistry (Practical)

Subject code: 1.3

Course code/ Course title	Course outcomes Student will able to
1.3 Medicinal Biochemistry	CO1.3.P.1. Analyze the normal and abnormal constituents of urine
	CO1.3.P.2. Understand and apply the principle of lipid profile test
	CO1.3.P.3. Study the enzymatic hydrolysis of biomolecules
	CO1.3.P.4. Prepare buffer solution at given pH

Subject: Pharmaceutical Organic Chemistry (Theory)

Subject code: 1.4

Course code/ Course title	Course Outcomes Student will be able to
1.4 Pharmaceutical Organic Chemistry	CO1.4.T.1. Understand the physical properties of organic compounds
	CO1.4.T.2. Explain various organic reactions with mechanisms
	CO1.4.T.3. Summarize various reactions with orientation, order of reactivity, stability of organic compounds
	CO1.4.T.4. Explain uses of organic compounds in pharmacy

Subject: Pharmaceutical Organic Chemistry (Practical)

Subject code: 1.4

Course code/ Course title	Course Outcomes Student will be able to
1.4 Pharmaceutical Organic Chemistry	CO1.4.P.1. Determine some of the important physical properties of known and unknown organic compounds
	CO1.4.P.2. Synthesize organic compounds by applying various principles
	CO1.4.P.3. Identify the organic compounds by qualitative analysis
	CO1.4.P.4. Demonstrate different stereo models to understand configuration



Subject: Pharmaceutical Inorganic Chemistry (Theory)

Subject code: 1.5

Course code/title	Course Outcomes Student will be able to
1.5 Pharmaceutical Inorganic Chemistry	CO1.5.T.1. Understand the principles and procedures for analysis of inorganic pharmaceuticals and their applications
	CO1.5.T.2. Explain the medicinal importance of inorganic pharmaceuticals
	CO1.5.T.3. Explain various impurities in pharmaceuticals and understand the methods of limit tests to control common impurities in pharmaceuticals
	CO1.5.T.4. Describe the domain of radiopharmaceuticals used in the diagnostics and therapy

Subject: Pharmaceutical Inorganic Chemistry (Practical)

Subject code: 1.5

Course code/ Course title	Course Outcomes Student will be able to
1.5 Pharmaceutical Inorganic Chemistry	CO1.5.P.1. Perform limit test for various types of impurities in inorganic pharmaceuticals
	CO1.5.P.2. Carry out the assay of various inorganic pharmaceuticals
	CO1.5.P.3. Estimate the inorganic mixture & identify as well as purify various inorganic pharmaceutical compounds
	CO1.5.P.4. Prepare various inorganic pharmaceuticals

Subject: Remedial Mathematics (Theory)

Subject code: 1.6

Course code/ Course title	Course Outcomes Students will be able to
1.6 Remedial Mathematics	CO1.6.T.1. Know the theory and their application in Pharmacy
	CO1.6.T.2. Solve the different types of problems by applying theory
	CO1.6.T.3. Appreciate the important application of mathematics in Pharmacy
	CO1.6.T.4. Apply mathematical formula in pharmacy



Subject: Remedial Biology (Theory)

Subject code: 1.6

Course code/ Course title	Course Outcomes Students will be able to
1.6 Remedial Biology	CO1.6.T.1. Classify five kingdom of life and understand their salient features
	CO1.6.T.2. Understand the basic components of anatomy and physiology of plants
	CO1.6.T.3. Understand the basic components of anatomy and physiology of animals
	CO1.6.T.4. Understand neuronal and chemical coordination in animals

Subject: Remedial Biology (Practical)

Subject code: 1.6

Course code/ Course title	Course Outcomes Student will be able to
1.6 Remedial Biology	CO1.6.P.1. Perform and Develop skill in section cutting, mounting, staining techniques and permanent slide preparation
	CO1.6.P.2. Understand the morphology and microscopy of different parts of flowering plant
	CO1.6.P.3. Identify the bones of human skeletal system
	CO1.6.P.4. Determine blood group, blood pressure and tidal volume in human subjects

• **Second year Pharm. D.:**

Subject: Pathophysiology (Theory)

Subject code: 2.1

Course code/ Course title	Course Outcomes Students will be able to
2.1 Pathophysiology	CO2.1.T.1. Describe the etiology and pathogenesis of the selected disease states
	CO2.1.T.2. Define the signs and symptoms of the diseases
	CO2.1.T.3. Enlist the complications of the diseases
	CO2.1.T.4. Understand the functions and diseases of immune system

Subject: Pharmaceutical Microbiology (Theory)

Subject code: 2.2

Course code/ Course title	Course Outcomes Students will be able to
	CO2.2.T.1. Understand the overall concept of microorganism



2.2 Pharmaceutical Microbiology	CO2.2.T.2. Understand Estimation and identification of DNA & RNA
	CO2.2.T.3. Explain various species of microorganisms
	CO2.2.T.4. Understand motility & behavioral characteristics of microorganisms

Subject: Pharmaceutical Microbiology (Practical)

Subject code: 2.2

Course code/ Course Title	Course Outcomes Students will be able to
2.2 Pharmaceutical Microbiology	CO2.2.P.1. Understand the various aspects of microorganisms, their classification, morphology study
	CO2.2.P.2. Know the laboratory cultivation, identification and maintenance of microorganisms
	CO2.2.P.3. Estimate the different methods of sterilization of pharmaceutical product, equipment and media
	CO2.2.P.4. Understand the immunological preparation, diseases, its transmission, diagnosis, control and immunological test

Subject: Pharmacognosy and Phytopharmaceuticals (Theory)

Subject code: 2.3

Course code/ Course Title	Course Outcomes Students will be able to
2.3 Pharmacognosy and Phytopharmaceuticals	CO2.3.T.1. Understand the basic principle of cultivation, collection and storage of crude drug
	CO2.3.T.2. Know the source, active constituents and uses of crude drug
	CO2.3.T.3. Appreciate the application of primary and secondary metabolites of the plant
	CO2.3.T.4. Explain the identification of the substitution and adulterants in pure crude drug

Subject: Pharmacognosy and Phytopharmaceuticals (Practical)

Subject Code: 2.3

Course code/ Course title	Course Outcomes Students will be able to
2.3 Pharmacognosy and Phytopharmaceuticals	CO2.3.P.1. Demonstrate the sectioning of various crude drugs and study their microscopy in detail
	CO2.3.P.2. Demonstrate the powder microscopy of crude drug
	CO2.3.P.3. Perform chemical tests to identify crude drug
	CO2.3.P.4. Analyze crude drugs through the different quality control tests



Subject: Pharmacology I (Theory)

Subject code: 2.4

Course code/ Course title	Course Outcomes Student will be able to
2.4 Pharmacology I	CO2.4.T.1. Understand the pharmacological aspects of drugs with respect to pharmacokinetics and Pharmacodynamics.
	CO2.4.T.2. Appreciate the importance of pharmacology subject as a basis of therapeutics
	CO2.4.T.3. Describe the pharmacology of drugs acting on ANS, CVS, CNS disorders
	CO2.4.T.4. Correlate and apply the knowledge in the prevention and treatment of respiratory diseases, hormones, autacoids and their antagonists

Subject: Pharmacology I (Practical)

Subject code: 2.4

Course code / Course title	Course Outcomes Students will be able to
2.4 Pharmacology I	CO2.4.P.1. Understand the basic instruments in Experimental Pharmacology
	CO2.4.P.2. Study the effects of Acetylcholine, Histamine, agonistic and antagonistic drugs on isolated tissue preparation
	CO2.4.P.3. Demonstrate various preclinical methods to study effects of drugs acting on central nervous system.
	CO2.4.P.4. Explain the effects of drugs on pesticide and heavy metal toxicities.

Subject: Community Pharmacy (Theory)

Subject code: 2.5

Coursecode/ Course title	Course Outcomes Student will be able to
2.5 Community Pharmacy	CO2.5.T.1. Relate the pharmaceutical care service & health screening services & patient counseling to public
	CO2.5.T.2. Memorise the knowledge in providing appropriate minor ailments & prevention of communicable diseases
	CO2.5.T.3. Summarize the concept of essential drugs & role of community pharmacist in rational drug therapy
	CO2.5.T.4. Understand the requirements of community pharmacy and practice the code of ethics in the profession of pharmacy



Subject: Pharmacotherapeutics I (Theory)

Subject code: 2.6

Course code/ Course title	Course Outcomes Student will be able to
2.6 Pharmacotherapeutics I	CO2.6.T.1. Understand the etiopathogenesis and therapeutic approach for CVS, RS, endocrine and ophthalmologic diseases.
	CO2.6.T.2. Appreciate the importance of general prescribing guidelines for specific population- pediatric, geriatric, pregnancy and breast feeding
	CO2.6.T.3. Emphasize the importance of preparation of individualised therapeutic plans based on diagnosis
	CO2.6.T.4. Identify the patient-specific parameters relevant in initiating drug therapy, and monitoring therapy

Subject: Pharmacotherapeutics I (Practical)

Subject code: 2.6

Course code/ Course title	Course Outcomes Students will able to
2.6 Pharmacotherapeutics I	CO2.6.P.1. Describe the etiopathogenesis and therapeutic approach for CVS, RS, Endocrine and ophthalmologic diseases.
	CO2.6.P.2. Execute the patient case-based assessment Skills
	CO2.6.P.3. Discuss controversies in drug therapies for CVS, RS, endocrine, ophthalmic disorders.
	CO2.6.P.4. Develop clinical skills in the therapeutic management of these conditions

• **Third Year Pharm D:**

Subject: Pharmacology-II (Theory)

Subject code: 3.1

Course code/ Course title	Course Outcomes Students will be able to
3.1 Pharmacology II	CO3.1.T.1. Understand the pharmacological aspects of drugs falling under the different types of diseases
	CO3.1.T.2. Appreciate the importance of pharmacology subject as a basis of therapeutics
	CO3.1.T.3. Correlate and apply the knowledge therapeutically
	CO3.1.T.4. Understand the basic principle of the gene at molecular level



Subject: Pharmacology-II (Practical)

Subject code: 3.1

Course code/ Course title	Course Outcomes Students will be able to
3.1 Pharmacology II	CO3.1.P.1. Understand the basics of experimental pharmacology
	CO3.1.P.2. Study commonly used instruments and laboratory animals in experimental pharmacology
	CO3.1.P.3. Illustrate CPCSEA Guidelines and common laboratory techniques
	CO3.1.P.4. Demonstrate the routes of drug administration in animals and study the effect of various category of drug on animals

Subject: Pharmaceutical Analysis (Theory)

Subject Code: 3.2

Course code/ Course title	Course Outcomes Students will be able to
3.2. Pharmaceutical Analysis	CO3.2.T.1. Summarize the principle, construction and working of various analytical instruments
	CO3.2.T.2. Understand QA and QC aspect and responsibility in pharma industry
	CO3.2.T.3. Describe the principle and theory of different electrochemical method of analysis
	CO3.2.T.4. Appreciate the importance of GMP and QC test

Subject: Pharmaceutical Analysis (Practical)

Subject code: 3.2

Course code/ Course title	Course Outcomes Students will be able to
3.2. Pharmaceutical Analysis	CO3.2.P.1. Understand and apply principle of chromatography for separation and identification of organic compound
	CO3.2.P.2. Illustrate sources of error in analytical techniques, methods to minimize errors and calibration of analytical methods
	CO3.2.P.3. Understand and apply photometric analysis for estimation of organic compound
	CO3.2.P.4. Appreciate and participate in demonstration modern analytical instruments of HPLC, HPTLC, GC-MS, DSC.



Subject: Pharmacotherapeutics II (Theory)

Subject code: 3.3

Course code/ Course title	Course Outcomes Students will be able to
3.3 Pharmacotherapeutics II	CO3.3.T.1. Describe the etiopathogenesis and pharmacotherapy of infectious, Musculoskeletal and renal diseases.
	CO3.3.T.2. Explain the etiopathogenesis and pharmacotherapy of dermatological conditions, breast cancer and leukaemia.
	CO3.3.T.3. Predict the controversies in drug therapy among infectious, musculoskeletal, renal, oncology and dermatologic disorders.
	CO3.3.T.4. Provide patient – centered care to diverse patients using the evidence based medicine.

Subject: Pharmacotherapeutics II (Practical)

Subject code: 3.3

Course code/ Course title	Course Outcome Students will be able to
3.3 Pharmacotherapeutics II	CO3.3.P.1. Describe the etiopathogenesis and pharmacotherapy of infectious, Musculoskeletal and renal diseases.
	CO3.3.P.2. Adapt the patient case-based assessment Skills for oncologic and dermatologic states.
	CO3.3.P.3. Predict the controversies in drug therapy among infectious, musculoskeletal, renal disorders.
	CO3.3.P.4. Develop clinical skills in the therapeutic management of oncology and dermatologic diseased conditions.

Subject: Pharmaceutical Jurisprudense (Theory)

Subject Code: 3.4

Course code / Course title	Course outcomes Students will be able to
3.4 Pharmaceutical Jurisprudense	CO3.4.T.1. Practice professional ethics and understand the concepts of pharmaceutical legislation and other laws as prescribed by PCI from time to time including international laws in India
	CO3.4.T.2. Illustrate various parameters in D & C act 1940 and rules, Drug policy, DPCO, Patent & design act
	CO3.4.T.3. Explain the legal requirements, constitution & functions of Pharmacy act 1948, Medicinal & toilet preparation act 1955, NDPS act 1985 and rules
	CO3.4.T.4. Differentiate the prescription & non-prescription products and the rules & regulations of drug & magic remedy act



Subject: Medicinal Chemistry (Theory)

Subject Code: 3.5

Course code/Course title	Course outcomes Students will be able to
3.5 Medicinal Chemistry	CO3.5.T.1. Correlate between pharmacology of a disease and its mitigation
	CO3.5.T.2. Memorize the structural activity relationship of different class of drugs
	CO3.5.T.3. Outline chemical synthesis of various drugs
	CO3.5.T.4. Explain the chemistry of drugs with respect to their pharmacological activity & side effects

Subject: Medicinal Chemistry (Practical)

Subject code: 3.5

Course code/Course title	Course Outcomes Students will be able to
3.5 Medicinal Chemistry	CO3.5.P.1. Perform the assay of various drugs
	CO3.5.P.2. Prepare various medicinally important compounds & their intermediates
	CO3.5.P.3. Perform monograph analysis of medicinally important drugs
	CO3.5.P.4. Determine the various physical constants of various drugs for their QSAR analysis

Subject: Pharmaceutical Formulations (Theory)

Subject code: 3.6

Course code/ Course title	Course Outcomes Students will be able to
3.6 Pharmaceutical Formulations	CO3.6.T.1. Understand the principle involved in formulation of various pharmaceutical dosage forms
	CO3.6.T.2. Understand and appreciate the concept of Parenteral formulations and ophthalmic preparations.
	CO3.6.T.3. Understand various aspects of controlled drug delivery system
	CO3.6.T.4. Understand various aspects of novel drug delivery system



Subject: Pharmaceutical Formulations (Practical)

Subject Code: 3.6

Course code / Course title	Course outcomes
3.6 Pharmaceutical Formulations	Students will be able to
	CO3.6.P.1. Prepare and evaluate various solid dosage forms
	CO3.6.P.2. Prepare and evaluate various parenteral formulations
	CO3.6.P.3. Prepare and evaluate various liquid dosage forms
	CO3.6.P.4. Prepare and evaluate various semi-solid dosage forms and study tablet coating.



**Course Outcomes (COs) of
All Courses of
M.Pharm. Program**



Course Outcomes of All Courses of M. Pharm. Program:

Course outcomes (COs) are written based on students acquired skills and knowledge and encompass the syllabus of the relevant courses.

This was accomplished utilising CO formulated in accordance with Bloom's updated taxonomy and objectives from the university syllabus.

The M. Pharm. program's finalised COs for all courses are listed below.

• Term I

First year M. Pharm Sem I: Common Subject

Subject: Modern Pharmaceutical Analytical Techniques (Theory) **Code:** MPAT101T

Course Code/ Course Title	Course Outcomes Students should be able to
MPAT101T Modern Pharmaceutical Analytical Techniques (Pattern: 2019)	C.MPAT101T.1 Understand and utilise instrumentation pattern of all modern spectroscopic and chromatographic techniques.
	C.MPAT101T.2 Apply Analytical techniques for identification, characterization and quantification of drugs.
	C.MPAT101T.3 Apply Theoretical and practical skills of instrument handling and use.
	C.MPAT101T.4 Determine Structural Elucidation of organic compounds using spectroscopic tools.

First year M. Pharm Sem I: Pharmaceutics

Subject: Drug Delivery System (Theory)

Code: MPH102T

Course Code/ Course Title	Course Outcomes Students should be able to
MPH102T Drug Delivery System (Pattern: 2019)	C.MPH102T.1 Describe the fundamental Concept of Controlled and Sustained Release Drug Delivery system and its applications in Personalised medicine.
	C.MPH102T.2 Exemplify various approaches for development of Novel Drug Delivery Systems
	C.MPH102T.3 Explain selection of Drugs and polymers for development of Novel Drug Delivery Systems.
	C.MPH102T.4 Elaborate formulation techniques and evaluation of various Novel Drug Delivery Systems like Gastro-retentive, Ocular, Transdermal and Vaccine drug delivery systems



First year M. Pharm Sem I: Pharmaceutics**Subject:** Modern Pharmaceutics (Theory)**Code:** MPH103T

Course Code/ Course Title	Course Outcomes Students should be able to
MPH103T Modern Pharmaceutics (Pattern: 2019)	C.MPH103T.1 Understand, appreciate and able to explain the elements of preformulation studies.
	C.MPH103T.2 Understand and explain the various criteria for API and Generic drug product Development, stability testing, sterilization techniques and Packaging of dosage form.
	C.MPH103T.3 Understand and explain the Industrial management and GMP Consideration.
	C.MPH103T.4 Explain optimization techniques and pilot plant scale up techniques.

First year M. Pharm Sem I: Pharmaceutics**Subject:** Regulatory Affairs (Theory)**Code:** MPH104T

Course Code/ Course Title	Course Outcomes Students should be able to
MPH104T Regulatory Affairs (Pattern: 2019)	C.MPH104T.1 Understand, appreciate and able to explain the Concepts of innovator and generic drugs, drug development process.
	C.MPH104T.2 Understand and explain the Regulatory guidance and guidelines for filing and approval process for IND, NDA and ANDA
	C.MPH104T.3 Understand and explain the Post approval regulatory requirements for actives and drug products and Submission of global documents in CTD/ eCTD formats.
	C.MPH104T.4 Explain Clinical trials requirements for approvals, conducting and monitoring clinical trials.

First year M. Pharm Sem I: Pharmaceutics**Subject:** Pharmaceutics Practical-I (Practical)**Code:** MPH105P

Course Code/ Course Title	Course Outcomes Students should be able to
MPH105P	C.MPH105P.1 Formulate & develop various sustained and controlled released drug delivery system.



Pharmaceutics Practical-I (Pattern: 2019)	C.MPH105P.2 Construct the experimental design in formulation development of novel dosage forms like gastro-retentive, mucoadhesive and transdermal formulations.
	C.MPH105P.3 Perform preformulation studies of Tablets and demonstrate effect of various added ingredients on Tablet properties and release.
	C.MPH105P.4 Analyze pharmacoepial compounds and their formulations by sophisticated techniques like UV, fluorimetry HPLC, GC etc.

First year M. Pharm Sem I: Pharmaceutical Chemistry

Subject: Advanced Organic Chemistry-I (Theory)

Code: MPC102T

Course Outcome:

Course Code/ Course Title	Course Outcomes Students should be able to
MPC102T Advanced Organic Chemistry-I (Pattern: 2019)	C.MPC102T.1 Recognizing the basic aspects of organic chemistry, and various type of reactions.
	C.MPC102T.2 Summarizing the chemistry, mechanism and synthetic application of various named reaction and also with respect to heterocyclic chemistry.
	C.MPC102T.3 Recalling and understanding the use of various synthetic reagents, catalysts protecting groups used in organic chemistry.
	C.MPC102T.4. Interpreting the concept of synthon approach, retrosynthesis and disconnection to develop synthetic routes for small target molecule.

First year M. Pharm Sem I: Pharmaceutical Chemistry

Subject: Advanced Medicinal Chemistry (Theory)

Code: MPC103T

Course Code/ Course Title	Course Outcomes Students should be able to
MPC103T Advanced Medicinal Chemistry (Pattern: 2019)	C.MPC103T.1 Explaining the various techniques and stages involve in drug discovery.
	C.MPC103T.2 Recalling the role of medicinal chemistry aspects of various classes of drugs in drug discovery and understanding the role of stereochemistry.
	C.MPC103T.3 Recognizing the design, modification and chemistry of peptidomimetics.



	C.MPC103T.4 Executing the various strategies to design and predicting the various ways to develop new drug like molecules for biological targets.
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First year M. Pharm Sem I: Pharmaceutical Chemistry

Subject: Chemistry of Natural Product (Theory)

Code: MPC104T

Course Code/ Course Title	Course Outcomes Students should be able to
MPC104T Chemistry of Natural Product (Pattern: 2019)	C.MPC104T.1 Understand and summarised the different types of natural compounds and their chemistry and medicinal importance.
	C.MPC104T.2 Recognise and apply the importance of natural compounds as lead molecules and Concept of rDNA for new drug discovery.
	C.MPC104T.3 Estimate the general methods of structural elucidation of compound of natural origin.
	C.MPC104T.4 Review and write isolation, Purification and characterization of simple chemical constituents from natural source.

First year M. Pharm Sem I: Pharmaceutical Chemistry

Subject: Pharmaceutical Chemistry Practical - I (Practical)

Code: MPC105P

Course Code/ Course Title	Course Outcomes Students should be able to
MPC105P Pharmaceutical Chemistry Practical – I (Pattern: 2019)	C.MPC105P.1 Expressing the analysis, simultaneous estimation of multi component formulations and interpretation of Pharmacopoeial compounds by spectroscopy.
	C.MPC105P.2 Categorizing and performing the various purification and characterization method for Pharmacopoeial compounds.
	C.MPC105P.3 Identifying the various organic compounds by using different analytical Instruments.
	C.MPC105P.4 Experimenting the synthesis of medicinally important organic compounds by using various types of reaction and analyse it.



First year M. Pharm Sem I: Pharmaceutical Quality Assurance**Subject:** Quality Management System (Theory)**Code:** MQA102T

Course Code/ Course Title	Course Outcomes Students should be able to
MQA102T Quality Management System (Pattern: 2019)	C.MQA102T.1 Describe the importance of quality and the basics of pharmaceutical quality management.
	C.MQA102T.2 Justify the design & process development parameter affect the quality.
	C.MQA102T.3 Explain Regulatory Compliance through Quality management and inspect the benchmarking process.
	C.MQA102T.4 Examine the statistical process control for quality & to plan for statistical process control.

First year M. Pharm Sem I: Pharmaceutical Quality Assurance**Subject:** Quality Control and Quality Assurance (Theory)**Code:** MQA103T

Course Code/ Course Title	Course Outcomes Students should be able to
MQA103T Quality Control and Quality Assurance (Pattern: 2019)	C.MQA103T.1 Understand the cGMP aspects in a pharmaceutical industry.
	C.MQA103T.2 Understand GLP and regulatory Affairs.
	C.MQA103T.3 Understand the importance of documentation
	C.MQA103T.4 Understand the responsibilities of QA & QC departments.

First year M. Pharm Sem I: Pharmaceutical Quality Assurance**Subject:** Product Development and Technology Transfer (Theory) **Code:** MQA104T

Course Code/ Course Title	Course Outcomes Students should be able to
MQA104T Product Development and Technology Transfer (Pattern: 2019)	C.MQA104T.1 Describe and understand the principles of new drug discovery and development.
	C.MQA104T.2 Explain role of preformulation, stability study and pilot plant scale up in drug product development.
	C.MQA104T.3 Explain role of packaging material in pharmaceutical dosage form and their quality control test.
	C.MQA104T.4 Discuss and apply various aspects of technology transfer from R&D to actual manufacturing.



First year M. Pharm Sem I: Pharmaceutical Quality Assurance**Subject:** Quality Assurance Practical -I (Practical)**Code:** MQA105P

Course Code/ Course Title	Course Outcomes Students should be able to
MQA105P Quality Assurance Practical -I (Pattern: 2019)	C.MQA105P.1 Illustrate In process and finished product quality control tests for tablets, capsules, parenteral and semisolid dosage forms.
	C.MQA105P.2 Illustrate Estimation of drug in pharmaceutical by using modern analytical techniques.
	C.MQA105P.3 Describe Stability study protocol for pharmaceuticals.
	C.MQA105P.4 Perform pre formulation study for successful formulation of pharmaceuticals.

First year M. Pharm Sem I: Pharmacology**Subject:** Advanced Pharmacology-I (Theory)**Code:** MPL102T

Course Code/ Course Title	Course Outcomes Students should be able to
MPL102T Advanced Pharmacology-I (Pattern: 2019)	C.MPL102T.1 Appreciate and explain the concepts and general principles of Pharmacokinetics and Pharmacodynamics.
	C.MPL102T.2 Explain the general aspects of neurohumoral transmission of the neurotransmitters in nervous system.
	C.MPL102T.3 Select rational approach and appropriate management of patients with specific nervous and cardiovascular system disorders.
	C.MPL102T.4 Justify and interpret the adverse effects, contraindications and clinical uses of drugs in the treatment of various diseases.

First year M. Pharm Sem I: Pharmacology**Subject:** Pharmacological and Toxicological Screening Methods -I (Theory)**Code:** MPL103T

Course Code/ Course Title	Course Outcomes Students should be able to
MPL103T	C.MPL103T.1 Appreciate and agree to the regulations for Laboratory animal care and Ethical Requirements.



First year M. Pharm Sem I: Pharmacognosy**Subject:** Advanced Pharmacognosy-I (Theory)**Code:** MPG102T

Course Code/ Course Title	Course Outcomes Students should be able to
MPG102T Advanced Pharmacognosy-I (Pattern: 2019)	C.MPG102T.1 Implement advances in the cultivation and production of drugs various phyto-pharmaceuticals and their source, its utilization and medicinal value.
	C.MPG102T.2 Appraise various nutraceuticals/herbs and their health benefits.
	C.MPG102T.3 Summarize drugs of marine origin.
	C.MPG102T.4 Describe Pharmacovigilance of drugs of natural origin.

First year M. Pharm Sem I: Pharmacognosy**Subject:** Phytochemistry (Theory)**Code:** MPG103T

Course Code/ Course Title	Course Outcomes Students should be able to
MPG103T Phytochemistry (Pattern: 2019)	C.MPG103T.1 Explain different classes of phytoconstituents, their biosynthetic pathways, their properties, extraction.
	C.MPG103T.2 Illustrate general process of natural product drug discovery.
	C.MPG103T.3 Characterize phytochemical fingerprinting.
	C.MPG103T.4 Deduce structure elucidation of phytoconstituents.

First year M. Pharm Sem I: Pharmacognosy**Subject:** Industrial Pharmacognostical Technology (Theory) **Code:** MPG104T

Course Code/ Course Title	Course Outcomes Students should be able to
MPG104T Industrial Pharmacognostical Technology (Pattern: 2019)	C.MPG104T.1 Capable to know requirements for setting up herbal drug Industry with infrastructures, challenges, modernization, pilot scale up techniques, capital ventures, project reports and management aspects.
	C.MPG104T.2 Explain regulatory requirements and guidelines for assessment of quality of herbal drugs with monographs studies.
	C.MPG104T.3 Comprehend patent laws, it's all aspects for patent procurements with search & case studies.



	C.MPG104T.4 Competent to explain stability testing & clinical laboratory testing of herbals.
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First year M. Pharm Sem I: Pharmacognosy

Subject: Pharmacognosy Practical -I (Practical)

Code: MPG105P

Course Code/ Course Title	Course Outcomes Students should be able to
MPG105P Pharmacognosy Practical -I (Pattern: 2019)	C.MPG105P.1 Analyze the phytoconstituents by spectroscopical techniques.
	C.MPG105P.2 Skilled to develop fingerprint profile for phytoconstituents by chromatographical techniques & monograph analysis.
	C.MPG105P.3 Skilled to process various methods of extraction & phytochemical screening
	C.MPG105P.4 Formulate different dosage forms and their standardization for herbals

• **Term II**

First year M. Pharm Sem II: Pharmaceutics

Subject: Molecular Pharmaceutics (Theory)

Code: MPH201T

Course Code/ Course Title	Course Outcomes Students should be able to
MPH201T Molecular Pharmaceutics (Pattern: 2019)	C.MPH201T.1 Understand Various aspects various approaches for development of novel drug delivery systems.
	C.MPH201T.2 Know Criteria for selection of drugs and polymers for the development of NTDS.
	C.MPH201T.3 Formulate and evaluate Novel Drug delivery system.
	C.MPH201T.4 Understand Aptamer drug delivery System.

First year M. Pharm Sem II: Pharmaceutics

Subject: Advanced Biopharmaceutics and Pharmacokinetics (Theory)

Code: MPH202T

Course Code/ Course Title	Course Outcomes Students should be able to
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MPH202T Advanced Biopharmaceutics and Pharmacokinetics (Pattern: 2019)	C.MPH202T.1 Understand, appreciate and able to explain basic concepts in biopharmaceutics and pharmacokinetics.
	C.MPH202T.2 Understand and explain the use of raw data and derive the pharmacokinetic models and parameters the best describes the process of drug absorption, distribution, metabolism and elimination.
	C.MPH202T.3 Understand and explain the design and evaluation of dosage regimens of the drugs using pharmacokinetic and biopharmaceutic parameters.
	C.MPH202T.4 Explain the potential clinical pharmacokinetic problems and application of basics of pharmacokinetic

First year M. Pharm Sem II: Pharmaceutics

Subject: Computer Aided Drug Development (Theory)

Code: MPH203T

Course Code/ Course Title	Course Outcomes Students should be able to
MPH203T Computer Aided Drug Development (Pattern: 2019)	C.MPH203T.1 Understand, appreciate and able to explain History of Computers in Pharmaceutical Research and Development.
	C.MPH203T.2 Understand and explain the Computational Modelling of Drug Disposition and in preclinical development.
	C.MPH203T.3 Understand and explain the optimization Techniques in Pharmaceutical Formulation.
	C.MPH203T.4 Explain the use of computer in market analysis, clinical development and in artificial intelligence and Robotics.

First year M. Pharm Sem II: Pharmaceutics

Subject: Cosmetics and Cosmeceuticals (Theory)

Code: MPH204T

Course Code/ Course Title	Course Outcomes Students should be able to
MPH204T Cosmetics and Cosmeceuticals	C.MPH204T.1 Explicate key ingredients and basic science to develop cosmetics and cosmeceutical products.
	C.MPH204T.2 Elaborate formulation techniques and evaluation of cosmetics and cosmeceuticals with desired Safety, stability, and efficacy.



(Pattern: 2019)	C.MPH204T.3 Discuss regulatory requirements for labelling of cosmetics as well as regulatory provisions relating to import and manufacture of cosmetics.
	C.MPH204T.4 Exemplify Herbal ingredients used in Hair care, skin care and oral care.

First year M. Pharm Sem II: Pharmaceutics

Subject: Pharmaceutics Practical-II (Practical)

Code: MPH205P

Course Code/ Course Title	Course Outcomes Students should be able to
MPH205P Pharmaceutics Practical-II (Pattern: 2019)	C.MPH205P.1 Formulate & develop various novel microparticulate drug delivery systems like microspheres, beads, liposomes, spherules etc.
	C.MPH205P.2 Construct the experimental design for any formulation using Design Expert® Software and other statistical techniques.
	C.MPH205P.3 Elaborate methods to enhance solubility of poorly water-soluble drugs and can perform dissolution studies of various pharmaceutical dosage forms.
	C.MPH205P.4 Develop & evaluate various cosmetic products viz. Shampoo, Skin creams, Toothpaste etc.

First year M. Pharm Sem II: Pharmaceutical Chemistry

Subject: Advanced Spectral Analysis (Theory)

Code: MPC201T

Course Code/ Course Title	Course Outcomes Students should be able to
MPC201T Advanced Spectral Analysis (Pattern: 2019)	C.MPC201T.1 Recognizing the basic aspects of interpretation of IR, NMR, and Mass of organic compound.
	C.MPC201T.2 Summarizing the theoretical concept of different hyponated techniques.
	C.MPC201T.3 Understanding the theoretical concept of different hyponated techniques.
	C.MPC201T.4 Identifying the various organic compounds.

First year M. Pharm Sem II: Pharmaceutical Chemistry

Subject: Advanced Organic Chemistry-II (Theory)

Code: MPC202T

Course Code/ Course Title	Course Outcomes Students should be able to
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MPC202T Advanced Organic Chemistry-II (Pattern: 2019)	C.MPC202T.1 Recognizing the principle and application of green chemistry, peptide chemistry.
	C.MPC202T.2 Summarizing the concept of stereochemistry and asymmetric synthesis.
	C.MPC202T.3 Categorizing the basic principles, mechanism, types and applications of photochemical reaction and pericyclic reactions.
	C.MPC202T.4 Recalling and classifying the various catalysis process in organic chemistry and expressing the application of various catalysts in different reactions

First year M. Pharm Sem II: Pharmaceutical Chemistry

Subject: Computer Aided Drug Design (Theory)

Code: MPC203T

Course Code/ Course Title	Course Outcomes Students should be able to
MPC203T Computer Aided Drug Design (Pattern: 2019)	C.MPC203T.1 Understanding and memorizing the In-silico virtual screening protocols involving various strategies to design and develop new drug like molecules.
	C.MPC203T.2 Summarizing the concept, role, different techniques and applications of Computer Aided Drug Design.
	C.MPC203T.3 Implementing the concept of drug design by using molecular modelling software's to design new molecules.
	C.MPC203T.4 Recognizing the different techniques and application of Quantitative Structure Activity Relationships in Computer Aided Drug Design.

First year M. Pharm Sem II: Pharmaceutical Chemistry

Subject: Pharmaceutical Process Chemistry (Theory)

Code: MPC204T

Course Code/ Course Title	Course Outcomes Students should be able to
MPC204T Pharmaceutical Process Chemistry (Pattern: 2019)	C.MPC204T.1 Apply strategies of scale up process of APIs and intermediates.
	C.MPC204T.2 Examine the various unit operations.
	C.MPC204T.3 Apply various reactions in process chemistry.
	C.MPC204T.4 Determine all industrial unit operations.



First year M. Pharm Sem II: Pharmaceutical Chemistry**Subject:** Pharmaceutical Chemistry Practical - II (Practical)**Code:** MPC205P

Course Code/ Course Title	Course Outcomes Students should be able to
MPC205P Pharmaceutical Chemistry Practical – II (Pattern: 2019)	C.MPC205P.1 Organizing, comparing and implementing the designing, synthesis, interpreting different approaches for organic compounds.
	C.MPC205P.2 Determining the study of synthesis of APIs and regulatory requirements by different synthetic routes.
	C.MPC205P.3 Identifying and relating the various types of reaction and its various aspects of organic compounds.
	C.MPC205P.4 Recognizing the different ways for Computer Aided Drug Design approaches using software.

First year M. Pharm Sem II: Pharmaceutical Quality Assurance**Subject:** Hazards and Safety Management (Theory)**Code:** MQA201T

Course Code/ Course Title	Course Outcomes Students should be able to
MQA201T Hazards and Safety Management (Pattern: 2019)	C.MQA201T.1 Creates the passage to understand, Determine, take control measures to eliminate or minimize the level of the risks.
	C.MQA201T.2 Ensure safety standards in pharmaceutical industry.
	C.MQA201T.3 Provide comprehensive knowledge on the safety management.
	C.MQA201T.4 Describe Hazard assessment, procedure, methodology for provide safe atmosphere.

First year M. Pharm Sem II: Pharmaceutical Quality Assurance**Subject:** Pharmaceutical Validation (Theory)**Code:** MQA202T

Course Code/ Course Title	Course Outcomes Students should be able to
MQA202T Pharmaceutical Validation	C.MQA202T.1 Describe various aspects of validation and IPR.
	C.MQA202T.2 Discuss and apply the concepts of validation of equipment and instruments, analytical methods and cleaning processes in pharmaceutical manufacturing.



(Pattern: 2019)	C.MQA202T.3 Discuss and Design validation documents, plant lay out of processing and testing area, check list for pharmaceutical manufacturing processes.
	C.MQA202T.4 Apply the concepts of validation of equipment and instruments, analytical methods.

First year M. Pharm Sem II: Pharmaceutical Quality Assurance

Subject: Audits and Regulatory Compliance (Theory)

Code: MQA203T

Course Code/ Course Title	Course Outcomes Students should be able to
MQA203T Audits and Regulatory Compliance(Pattern: 2019)	C.MQA203T.1 Explain the importance of auditing and plan out the audit process.
	C.MQA203T.2 Compose the auditing report and check list for auditing.
	C.MQA203T.3 Illustrate the methodology of auditing.
	C.MQA203T.4 Discuss the audit process.

First year M. Pharm Sem II: Pharmaceutical Quality Assurance

Subject: Pharmaceutical Manufacturing Technology (Theory)

Code: MQA204T

Course Code/ Course Title	Course Outcomes Students should be able to
MQA204T Pharmaceutical Manufacturing Technology (Pattern: 2019)	C.MQA204T.1 Appreciate and explain the Pharmaceutical Industry development, plant layouts and production planning.
	C.MQA204T.2 Explain the general aspects of principles and practices of Aseptic Process technology, non-sterile pharmaceutical technology and Packaging materials and technique.
	C.MQA204T.3 Select rational approach and appropriate management of better understanding of principles and implementation of Quality by Design (QBD) and Process Analytical Technology (PAT) in pharmaceutical manufacturing.
	C.MQA204T.4 Justify and interpret to impart the knowledge and skills required to perform Industrial activities during pharmaceutical manufacturing.



First year M. Pharm Sem II: Pharmaceutical Quality Assurance**Subject:** Quality Assurance Practical -II (Practical)**Code:** MQA205P

Course Code/ Course Title	Course Outcomes Students should be able to
MQA205P Quality Assurance Practical -II (Pattern: 2019)	C.MQA205P.1 Perform Validation of an analytical method for pharmaceuticals.
	C.MQA205P.2 Perform Qualification of Pharmaceutical Testing Equipment.
	C.MQA205P.3 Perform Identification & estimation of drug in pharmaceuticals & assess the impurities.
	C.MQA205P.4 Describe design of Sterile and non-sterile plant layout.

First year M. Pharm Sem II: Pharmacology**Subject:** Advanced Pharmacology-II (Theory)**Code:** MPL201T

Course Code/ Course Title	Course Outcomes Students should be able to
MPL201T Advanced Pharmacology-II (Pattern: 2019)	C.MPL201T.1 Summarize the hormones of endocrine system and define the role of their antagonist in relevance to clinical applications.
	C.MPL201T.2 Categorize antimicrobial drugs and justify their part in the treatment of various infectious diseases.
	C.MPL201T.3 Study the pharmacology of drugs and outline their role in the management of GI tract and respiratory disorders.
	C.MPL201T.4 Explain the advantages and recent trends in the clinical use of antioxidants and impart the basic knowledge of chronopharmacology.

First year M. Pharm Sem II: Pharmacology**Subject:** Pharmacological and Toxicological Screening Methods -II (Theory)**Code:** MPL202T

Course Code/ Course Title	Course Outcomes Students should be able to
MPL202T	C.MPL202T.1 Study and explain the various types of toxicity studies.



Pharmacological and Toxicological Screening Methods - II (Pattern: 2019)	C.MPL202T.2 Study the OECD principles of good laboratory practice and relate its significance in drug development process
	C.MPL202T.3 Appreciate the importance of ethical and regulatory requirements for toxicity studies.
	C.MPL202T.4 Appreciate the importance and applications of toxicokinetic studies.

First year M. Pharm Sem II: Pharmacology

Subject: Principles of Drug Discovery (Theory)

Code: MPL203T

Course Code/ Course Title	Course Outcomes Students should be able to
MPL203T Principles of Drug Discovery (Pattern: 2019)	C.MPL203T.1 Explain the various stages of drug discovery and appreciate the importance of the role of genomics, proteomics and bioinformatics in drug discovery.
	C.MPL203T.2 Explain various targets, biomarkers and invitro screening techniques for drug discovery.
	C.MPL203T.3 Understand the various approaches and techniques in rational drug design.
	C.MPL203T.4 Appreciate the importance of computer aided drug design and explain various invitro-screening systems.

First year M. Pharm Sem II: Pharmacology

Subject: Clinical Research and Pharmacovigilance (Theory)

Code: MPL204T

Course Code/ Course Title	Course Outcomes Students should be able to
MPL204T Clinical Research and Pharmacovigilance (Pattern: 2019)	C.MPL204T.1 Explain the types of clinical trial designs and regulatory and ethical requirements for conducting clinical trials.
	C.MPL204T.2 Execute safety monitoring, conducting, reporting and managing of clinical trials activities.
	C.MPL204T.3 Explain the principles of Pharmacovigilance and to detect new adverse drug reactions and their assessment.
	C.MPL204T.4 Perform adverse drug reaction reporting systems and communication in Pharmacovigilance



First year M. Pharm Sem II: Pharmacology**Subject:** Pharmacological Practical -II (Practical)**Code:** MPL205P

Course Code/ Course Title	Course Outcomes Students should be able to
MPL205P Pharmacological Practical -II (Pattern: 2019)	C.MPL205P.1 Determine the strength of the unknown sample by various bioassay methods by using suitable tissue preparation.
	C.MPL205P.2 Study the recording of rat BP, heart rate and ECG.
	C.MPL205P.3 Perform acute oral/dermal toxicity studies as per OECD guidelines
	C.MPL205P.4 Perform and appreciate insilco docking Studies / pharmacophore / QSAR studies.

First year M. Pharm Sem II: Pharmacogony**Subject:** Medicinal Plant Biotechnology (Theory)**Code:** MPG201T

Course Code/ Course Title	Course Outcomes Students should be able to
MPG201T Medicinal Plant Biotechnology (Pattern: 2019)	C.MPG201T.1 Know the process like genetic engineering in medicinal plants for higher yield of Phytopharmaceuticals.
	C.MPG201T.2 Use the biotechnological techniques for obtaining and improving the quality of natural products/medicinal plants.
	C.MPG201T.3 Discriminate applications of Fermentation technology.
	C.MPG201T.4 Discuss applications of gene transfer.

First year M. Pharm Sem II: Pharmacogony**Subject:** Advanced Pharmacogony-II (Theory)**Code:** MPG202T

Course Code/ Course Title	Course Outcomes Students should be able to
MPG202T Advanced Pharmacogony-II (Pattern: 2019)	C.MPG202T.1 Infer toxicity and regulations of herbal drugs.
	C.MPG202T.2 Explain adulteration and detection.
	C.MPG202T.3 Evaluate Impact of Ethnobotany in traditional medicine.
	C.MPG202T.4 Evaluate biological screening of herbal drugs



First year M. Pharm Sem II: Pharmacogony**Subject:** Indian System of Medicine (Theory)**Code:** MPG203T

Course Code/ Course Title	Course Outcomes Students should be able to
MPG203T Indian System of Medicine (Pattern: 2019)	C.MPG203T.1 Comprehend the principles, preparations of medicines of various Indian systems of medicine like Ayurveda, Siddha, Homeopathy, Unani including Naturopathy, Yoga & aromatherapies as practices and analysis of ayurvedic crude drugs & formulation as per Ayurvedic pharmacopoeia.
	C.MPG203T.2 Capable to understand functioning of apex body Central council for Research in Ayurveda, Siddha, Homeopathy and Unani.
	C.MPG203T.3 Comprehend various regulatory requirements under schedule T for Indian systems of medicines.
	C.MPG203T.4 Know standardization, Shelf life and Stability studies of ISM formulations.

First year M. Pharm Sem II: Pharmacogony**Subject:** Herbal Cosmetics (Theory)**Code:** MPG204T

Course Code/ Course Title	Course Outcomes Students should be able to
MPG204T Herbal Cosmetics (Pattern: 2019)	C.MPG204T.1 Understand the basic principles of various herbal/natural cosmetic preparations.
	C.MPG204T.2 Distinguish commonly used herbal cosmetics, raw materials.
	C.MPG204T.3 Formulate preparation and standardization of different cosmetics.
	C.MPG204T.4 Analyze quality control and toxicity studies as per Drug and Cosmetics Act.

First year M. Pharm Sem II: Pharmacogony**Subject:** Herbal Cosmetic Practicals (Practical)**Code:** MPG205P

Course Code/ Course Title	Course Outcomes Students should be able to
MPG205P Herbal Cosmetic Practicals (Pattern: 2019)	C.MPG205P.1 Demonstrate biotechnological methods, tissue culture.
	C.MPG205P.2 Estimate of total phenolic content, total flavonoids, total alkaloids in herbal raw materials.



	C.MPG205P.3 Prepare and standardize of various simple dosage forms from Ayurvedic, Siddha, Homoeopathy and Unani formulary.
	C.MPG205P.4 Formulate preparation of herbal cosmetic formulation such as lip balm, lipstick, facial cream, herbal hair and nail care products.

• **Second year M. Pharm Sem III: Common Subject**

Subject: Research Methodology and Biostatistics (Theory)

Code: MRM301T

Course Code/ Course Title	Course Outcomes Students should be able to
MRM301T Research Methodology and Biostatistics (Pattern: 2019)	C.MRM301T.1 Understand the behavioural needs for a Research operation.
	C.MRM301T.2 Summarizing and understanding the concept, different Problem solving.
	C.MRM301T.3 Implementing concepts and different techniques.
	C.MRM301T.4 Recognizing the different techniques, Communicate effectively Verbal and Non-verbal and application of required research Structure.


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