

Program Name: MBA Pharma Tech (B.Pharm+MBA)

Program Outcomes:

- 1. Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.
- 2. Planning Abilities:** Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.
- 3. Problem analysis:** Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.
- 4. Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.
- 5. Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfilment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.
- 6. Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).
- 7. Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.
- 8. Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.
- 9. The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.
- 10. Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- 11. Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Course Outcomes:

Semester	Course Name	Course Outcomes	
I	Human Anatomy and Physiology I	CO-1	Determine the various levels of structural organization of human body and its functions.
		CO-2	Correlate the different types of skeletal tissues and their significance in the body functions.
		CO-3	Interpret the concepts of various body fluids such as blood, lymph and assess the related disorders.
		CO-4	Integrate the coordinated working pattern of physiological systems such as the nervous system and circulatory system with other body systems.
	Pharmaceutical Analysis	CO-1	Prepare volumetric solutions of specific strength and apply the concept of standardization
		CO-2	Apply the principles of volumetric and electrochemical analysis
		CO-3	Compare different types of titrations and titrimetric methods
		CO-4	Practice the concept of assay and calculation of titration factor
	Pharmaceutical Inorganic Chemistry	CO-1	Know the sources of impurities in pharmaceuticals and Classify methods to determine the impurities in inorganic drugs and pharmaceuticals
		CO-2	Analyze medicinal and pharmaceutical inorganic compounds using different assay techniques
		CO-3	Understand about medicinal and pharmaceutical inorganic compounds importance and apply the knowledge of tonicity, osmosis and pH to prepare formulation
		CO-4	Understand the radiopharmaceuticals aspects in pharmaceutical and its application and justify role of buffer in pharmaceutical usage
	Pharmaceutics I	CO-1	Describe the basics of pharmacy profession with reference to history, current scope, pharmacopoeias, prescription and pharmaceutical calculations
		CO-2	Differentiate between types of dosage forms and types of pharmaceutical incompatibilities
		CO-3	Explain advantages, disadvantages, excipients and techniques required for formulating different monophasic and biphasic liquid dosage forms.

Semester	Course Name	Course Outcomes	
		CO-4	Explain advantages, disadvantages, excipients and techniques required for formulating dosage forms for topical and rectal administration
	Communication Skills	CO-1	Make use of verbal, vocal & visual elements in presentations
		CO-2	Express opinions assertively
		CO-3	Apply communication techniques to create high impact messages
		CO-4	Express business decisions and outcomes at levels with great clarity and confidence.
	Remedial Biology	CO-1	Illustrate the characteristics of five kingdoms of life and basis of classification.
		CO-2	Determine the morphology of flowering plants & anatomy of root, stem, leaf.
		CO-3	Integrate structural & functional aspects of cells and tissues, circulation, digestion, respiration, excretion, neural control and reproduction.
		CO-4	Assess the roles of mineral nutrition, process of photosynthesis, plant respiration, growth and development.
	Remedial Mathematics	CO-1	Apply mathematical concepts to derive and understand the different theories and principles in pharmacy.
		CO-2	Analyse and solve the numerical problems in pharmacy using mathematics.
		CO-3	Use mathematical concepts to compute and analyse pharmacokinetic parameters.
		CO-4	Compute and analyse analytical related problems in pharmacy by applying mathematical concepts.
	Human Anatomy and Physiology I - Practical	CO-1	Explain the gross morphology, structure and functions of various tissues of the human body.
		CO-2	Illustrate the various models such as Inali arm, Jaipur foot technology to resolve pathological issues of skeletal system.
		CO-3	Perform various hematological experiments, analyze the normal range levels of each hematological parameter and interpret the negative and positive feedback mechanism of homeostasis.
		CO-4	Justify the deviation in the normal parameters and their correlation with disorders.
	Pharmaceutical Analysis - Practical	CO-1	Prepare volumetric solution of specific strength
		CO-2	Explain the principles of volumetric and electrochemical analysis

Semester	Course Name	Course Outcomes	
		CO-3	Perform standardization and assay using volumetric and electrochemical titrations
		CO-4	Calculate titration factor and percentage purity
	Pharmaceutics I – Practical	CO-1	Understand different excipients and their roles in formulations
		CO-2	Differentiate between types of dosage forms.
		CO-3	Calculate the quantities of ingredients for preparing formulations
		CO-4	Prepare various conventional dosage forms.
	Pharmaceutical Inorganic Chemistry – Practical	CO-1	Determine the impurities in drugs and pharmaceuticals
		CO-2	Illustrate the medicinal and pharmaceutical importance of inorganic compounds
		CO-3	Perform test for purity
		CO-4	Predict known and unknown inorganic compounds
	Communication Skills – Practical	CO-1	Communicate effectively, displaying the understanding of importance of verbal, vocal & visual elements in presentations
		CO-2	Express opinions assertively
		CO-3	Experiment with different communication techniques to create high impact messages
		CO-4	Articulate business decisions and outcomes with great clarity and confidence.
II	Pharmaceutical Organic Chemistry I – Theory	CO-1	Identify and differentiate, organic compounds based on structure and structural isomerism.
		CO-2	Illustrate the chemical properties and predict the product of reactions based on methods of preparations and chemical properties of alkanes, alkenes, aldehydes, ketones, alcohols, amines, alkyl halides and carboxylic acids
		CO-3	Explain and apply mechanism of nucleophilic substitution reactions, elimination reactions, nucleophilic addition reactions of aldehydes and ketones, electrophilic addition reactions of

Semester	Course Name	Course Outcomes	
			alkenes, free radical reactions and name reactions.
		CO-4	Discuss applications of compounds belonging to different classes.
	Biochemistry - Theory	CO-1	Understand classification and role of various biomolecules in human body and concept of bioenergetics
		CO-2	Understand anabolic and catabolic pathways of various biomolecules with their bioenergetics
		CO-3	Understand metabolic disorders and targets for treatment of disease
		CO-4	Understand the role of enzymes kinetics and know significance of abnormality in organ function tests
		Pathophysiology – Theory (722PH0C014)	CO-1
	CO-2		Predict aetiology and discuss pathogenesis of diseases of various physiological systems such as cardiovascular, respiratory and renal diseases, hematological, endocrine, nervous diseases, as well as understand the contributing factors.
	CO-3		Evaluate the clinical significance of the morphologic and functional changes in GIT, cancer, hepatic, joint related disorders.
	CO-4		Summarize the diagnosis, prognosis, treatment and prevention strategy for common infectious diseases
	Human Anatomy and Physiology II – Theory (722PH0C011)		CO-1
		CO-2	Explain the mechanism of digestion and metabolism and discuss the role of various digestive secretions in digestive process.
		CO-3	Categorize various hormones of endocrine gland, their functions and discuss the action and regulation of endocrine secretions.

Semester	Course Name	Course Outcomes	
		CO-4	Explain structure of male and female reproductive system and discuss spermatogenesis, menstrual cycle, oogenesis, and role of various hormones in reproduction.
	Computer Applications in Pharmacy – Theory (722PH0C015)	CO-1	Explain the basic working of a computer processor and a software
		CO-2	Compare the different web technologies and database management systems used to store and retrieve pharmaceutical information
		CO-3	Choose and apply relevant bioinformatics databases, software and healthcare technology in the various applications in pharmaceutical industry
		CO-4	Explain the use of computers and computer software to store and manage data in analytical laboratories
	Environmental Sciences – Theory (722PH0C016)	CO-1	Create awareness towards environmental issues and climate change
		CO-2	Analyze the different environmental issues and recommend corrective measures
		CO-3	Describe the different components of the environment and the nature
	Human Anatomy and Physiology II – Practical	CO-1	Illustrate the anatomy of human body parts and the physiological relationship involved between the body systems.
		CO-2	Explain the visual acuity test, analysis of neurological status, sensory functions of a person and testing of reflexes, along with interpretation for the same.
		CO-3	Relate various types of medical devices (diagnosis and medical aids) and diagnostic tests with their underlying principles of working.
		CO-4	Justify the deviation in the normal parameters and their correlation with disorders.
	Pharmaceutical Organic Chemistry I – Practical	CO-1	Classify unknown organic compounds by solubility and preliminary tests such as: Color, odour, aliphaticity/aromaticity, saturation and unsaturation.
		CO-2	Explain and measure melting and boiling points of organic compounds.

Semester	Course Name	Course Outcomes	
		CO-3	Identify unknown compound by determining the presence of elements, functional groups and derivative preparation.
		CO-4	Construct molecular models of organic compounds using software for 2D and 3D structure drawing.
	Biochemistry – Practical	CO-1	Perform tests and interpret the results to identify and quantify various biomolecules
		CO-2	Calculate the quantity of salts for preparing buffer solutions and measure the pH of same
		CO-3	Examine enzyme activity and understand the effect of various parameters on enzyme activity
		CO-4	Determine parameters like saponification, iodine and acid value of lipids and understand their significance
	Computer Applications in Pharmacy – Practical	CO-1	Apply MS Word, MS Excel and MS Access to store and manage data in pharmaceuticals
		CO-2	Design a webpage to display basic information and store data
		CO-3	Choose the appropriate online database/tools to retrieve information
	Inventions in Science	CO-1	Understand the concept of invention.
CO-2		Explain various inventions in science, medicine and pharmaceutical sciences	
III	Pharmaceutical Organic Chemistry II	CO-1	Illustrate structure and predict the reactivity and reaction products for benzene and its derivatives, polynuclear hydrocarbons and cycloalkanes
		CO-2	Explain the chemistry, reactions and analytical constants of fats and oils.
		CO-3	Explain applications of compounds belonging to different classes
		CO-4	Differentiate five membered and six membered heterocycles containing up to two heteroatoms
	Pharmaceutical Engineering	CO-1	Summarize the concepts of flow of fluids, know the role of size analysis and size reduction in pharmaceutical manufacturing.
		CO-2	Apply principles of heat transfer to various heat processes like evaporation and distillation.

Semester	Course Name	Course Outcomes	
			Measure humidity in Air and know its significance in pharma manufacturing and understand principles of drying and mixing with examples of equipment.
		CO-3	Relate the theories and concepts of Filtration, Centrifugation and crystallization to their applications in pharmaceutical industry.
		CO-4	Select material for plant construction, classify them and understand various types of corrosion, their prevention and theories of corrosion.
	Pharmaceutical Microbiology	CO-1	Explain the importance of the isolation, growth and culture techniques to observe and identify microbial and animal cells.
		CO-2	Compare different methods of sterilization for their application in Sterility testing of official products.
		CO-3	Evaluate the potency of pharmaceutical products using microbial assays.
		CO-4	Corelate the concept of aseptic and clean area in pharmaceutical operations and the importance of preservatives used to prevent spoilage and microbial contamination.
	Physical Pharmaceutics I	CO-1	Compare different properties of material and select right material on the basis of its physiochemical properties for manufacture of effective pharmaceutical product.
		CO-2	Apply knowledge of solubility in pharmaceutical preparations and select suitable parameters for modification of solubility of a pharmaceutical substance.
		CO-3	Relate interfacial phenomena and adsorption to pharmaceutical sciences and connect the use of surfactants in designing various pharmaceutical products.
CO-4		Explore the applications of complexation, protein binding, pH, buffers and isotonicity in the field of pharmacy.	
Pharmaceutical Organic Chemistry II – Practical	CO-1	Apply laboratory techniques such as recrystallization and steam distillation for purification of aromatic compounds from reaction mixtures.	
	CO-2	Determine the acid value, iodine value and saponification values of fats and oils.	
	CO-3	Synthesize and characterize new organic molecules by electrophilic aromatic substitution reactions such as halogenation, nitration, Fridel-Crafts acylation, diazotization and coupling reactions on aromatic compounds such as phenol and aniline.	

Semester	Course Name	Course Outcomes	
		CO-4	Synthesize and characterize the compounds based on oxidation, hydrolysis of ester, Claisen-Schmidt and Perkin reactions.
	Physical Pharmaceutics I – Practical	CO-1	Develop skill of determining solubility of drugs and mastered ability to estimate distribution co-efficient of substances
		CO-2	Understand multi-component systems and partial miscibility of substances
		CO-3	Understand complexation and can use it in formulation development
		CO-4	Determine HLB of surfactants
	Pharmaceutical Microbiology – Practical	CO-1	Differentiate the methods of identification, cultivation and preservation of various microorganisms
		CO-2	Illustrate the importance and implementation of sterilization in pharmaceutical processing and industry
		CO-3	Experiment the sterility testing of pharmaceutical products.
		CO-4	Practice the microbiological standardization of Pharmaceuticals.
	Pharmaceutical Engineering – Practical	CO-1	Experiment with various heat processes applicable to pharma industry such as Steam distillation, drying, crystallization. Measure the moisture content, loss on drying, Air humidity knowing their role in pharma manufacturing.
		CO-2	Experiment with the working and applications of rotary tablet machine and de-humidifier, fluidized bed coater, fluid energy mill, colloid mill, planetary mixer, fluidized bed dryer and freeze dryer.
		CO-3	Examine the role of size analysis and size reduction in pharmaceutical manufacturing. Study the factors affecting Filtration, Evaporation and Crystallization.
		CO-4	Integrate the concept of efficiency of mixing and role of centrifugation in stability evaluation of emulsion
	Principles of Management	CO-1	Apply different management approaches
		CO-2	Demonstrate and evaluate planning techniques
		CO-3	Evaluate work dynamics and be able to work in dynamic teams within organizations
		CO-4	Analyze different processes in staffing and controlling

Semester	Course Name	Course Outcomes	
	Introduction to Research I	CO-1	Understand the concept of research
		CO-2	Describe process of research
		CO-3	Explain various types of research
IV	Medicinal Chemistry I – Theory	CO-1	Determine the pharmacokinetic and pharmacodynamics fate of drug molecules based on the physico-chemical properties of drug, predict phase-I and phase-II metabolism, apply the concept of bioisosterism in drug design and explain the importance of stereochemistry in drug action.
		CO-2	Classify drugs on the basis of chemical structure and mechanism of action, summarize indications and predict toxicity of drugs acting on Cholinergic, Adrenergic and central nervous system, NSAIDs and Central analgesics (Opioids)
		CO-3	Analyze Structure-Activity Relationship and predict effect of structure modification on activity.
		CO-4	Design synthesis of certain molecules acting on Central Nervous System, Autonomic Nervous system, NSAIDs and Opioids.
	Pharmaceutical Organic Chemistry III – Theory	CO-1	Explain in detail the concepts of stereochemistry, meso compounds, stereoisomerism and their nomenclature.
		CO-2	Determine the optical activity on the basis of elements of symmetry. Able to suggest suitable method for separation of optical and geometrical isomers.
		CO-3	Illustrate structures and compare the reactivity of monoheteroatomic ring systems like furan, pyrrol, thiophene, indole, quinolone, isoquinoline etc and multiheteroatomic ring system like pyrazole, imidazole, oxazole, pyrimidine etc. Explain various reactions of compounds from these categories.
		CO-4	Explain applications of heterocyclic ring containing drugs from different classes of diseases.
	Pharmacognosy and Phytochemistry I – Theory	CO-1	Discuss the concepts of pharmacognosy to classify, differentiate, evaluate and identify the crude drugs based on quality control techniques
		CO-2	Explain the current and modern techniques of cultivation and collection practices with the important factors affecting quality of plant growth, development and quantity of phytoconstituents

Semester	Course Name	Course Outcomes	
		CO-3	Distinguish between different types of primary and secondary metabolites and point out their therapeutic significance and pharmaceutical use based on their chemical nature
		CO-4	Indicate the role of pharmacognosy for use of therapeutic agents and pharmaceutical aids in traditional systems of medicine and modern pharmaceutical industry
	Pharmacology I – Theory	CO-1	Explain general concepts of Pharmacology and explain factors affecting pharmacokinetic and pharmacodynamic behavior of drug, and apply these factors in Pharmacology of drugs and drug discovery.
		CO-2	Relate the receptor mediated actions of drugs, Adverse drug reactions, Drug interaction and Drug discovery process.
		CO-3	Explain the receptor mediated actions of drugs and neurohumoral transmission through Autonomic nervous system. Use these principles to suggest suitable drugs, in management of disorders, related to Autonomic nervous system.
		CO-4	Compare and contrast drugs used in the management of various CNS disorders to suggest suitable drugs in the management of anesthesia, muscular disorders, insomnia, epilepsy, and alcoholism. Additionally, justify their usage and associated complications like dependence, addiction, and tolerance.
	Physical Pharmaceutics II – Theory	CO-1	Correlate various properties as well as theories for evaluation of colloids. Also develop understanding of evaluation and stability of colloidal dispersions.
		CO-2	Classify flow behavior of liquids and the influence of thixotropy in pharmaceutical formulations. Also will be able to define Viscosity as a concept and evaluate viscosity using different instruments.
		CO-3	Correlate the aspects of identification, formulation components and evaluation of suspension and emulsion along with stability measures.
		CO-4	Demonstrate effect of Particle size on properties of dosage forms and will be well-informed about measurement of particle size and surface area and apply this knowledge in development of solid dosage forms. Also, learn to apply principles of chemical kinetics on pharmaceutical products and its application in stability testing.

Semester	Course Name	Course Outcomes	
	Introduction to Research II- Theory	CO-1	Understand the concept of hypothesis, sampling and measurement in research.
		CO-2	Explain various types of scientific publications
		CO-3	Utilize various tools for effective literature search
	Medicinal Chemistry I – Practical	CO-1	Identify reactants required based on reaction scheme and accordingly set up assembly for synthesis of organic compounds having therapeutic use
		CO-2	Evaluate the progress of the reaction using visual observation as well as quantifying color, pH, concentration of products using TLC, NMR, IR spectra
		CO-3	Perform Isolation and re-crystallization of product from the reaction mixture using information about solubility of solvents and recrystallization procedures at the end of reaction to obtain pure compound
		CO-4	Determine percentage purity of APIs/dosage forms as depicted in the official pharmacopoeia
	Physical Pharmaceutics II – Practical	CO-1	Measure the particle size and flow properties of powders.
		CO-2	Predict the sedimentation of suspensions and evaluate effect of suspending agents on stability of suspension.
		CO-3	Analyze the order of reaction and apply it to drug stability determination.
		CO-4	Compute the viscosity of various formulations (Newtonian and Non-newtonian). Also learn to prepare colloids and evaluate them.
	Pharmacology I – Practical	CO-1	Apply the basic concepts, common laboratory techniques used in experimental pharmacology and understand concept of CPCSEA guidelines.
		CO-2	Demonstrate the preclinical pharmacologic experiments for determination of activities of drugs on microsomal enzymes, ciliary motility, skeletal muscles, pupils and locomotor activity.
		CO-3	Design and evaluate the preclinical pharmacological experiments on CNS and local anesthetic activity.
	Pharmacognosy and Phytochemistry I – Practical	CO-1	Identify and Evaluate various leaf constants of crude drugs by using compound & digital microscope
CO-2		Perform and Evaluate the Physical and chemical methods for identification and evaluation of adulterants using quality control tests specified by WHO	

Semester	Course Name	Course Outcomes	
	Marketing Management Concepts and Strategies	CO-3	Evaluate primary metabolites by using rganoleptic, physical & chemical tests
		CO-1	Formulate a market-oriented definition of business.
		CO-2	Analyze marketing environment
		CO-3	Apply concepts and tools relevant to segmentation, targeting and positioning and marketing mix.
		CO-4	Formulate a Marketing Plan for a chosen product or service.
V	Industrial Pharmacy I	CO-1	Understand preformulation studies to design pharmaceutical dosage forms and correlate drug properties according to BCS classification.
		CO-2	Design and evaluate tablets, capsules, pellets, syrups, elixirs, suspensions and emulsions with their packages.
		CO-3	Design and evaluate parenteral, ophthalmic and aerosol dosage forms and their packages.
		CO-4	Formulate cosmetic preparations such as lipsticks, shampoos, cream, toothpastes, hair dyes and sunscreens.
	Medicinal Chemistry II	CO-1	Compare and justify the uses of medicinal agents from anti histaminic and anti-cancer class based on the structure, classification, mode of action, SAR, chemical synthesis and applications to treat Hormonal disorders.
		CO-2	Compare and justify the uses of medicinal agents based on the structure, classification mode of action, SAR, chemical synthesis and uses to treat CVS disorders.
		CO-3	Compare and justify the uses of medicinal agents based on the structure, classification mode of action, SAR, chemical synthesis and applications to treat Hormonal disorders.
		CO-4	Compare and justify the uses of medicinal agents from anti hyperglycemic and local anesthetic class based on the structure, classification, mode of action, SAR, chemical synthesis and applications to treat Hormonal disorders
	Pharmaceutical Jurisprudence	CO-1	Explain the different pharmaceutical legislations and their implications in the development and marketing of pharmaceuticals
		CO-2	Describe the pharmaceutical education in India and its regulation by the regulatory bodies

Semester	Course Name	Course Outcomes	
		CO-3	Understand and inculcate the pharmacists oath and code of pharmaceutical ethics
		CO-4	Enumerate the various rules and the offences-penalties for contravention of the pharmaceutical legislations in during pharmaceutical practice
	Pharmacognosy and Phytochemistry II	CO-1	Discuss the basic metabolic pathways involved in the synthesis of different types of secondary metabolites groups
		CO-2	Explain chemistry, biosources, therapeutic and commercial applications of secondary metabolites containing crude drugs
		CO-3	Identify, compare and select isolation, identification & analysis of modern extraction techniques for industrial production and utilization of phytoconstituents
		CO-4	Understand the principles, procedures and use of various chromatographic, spectroscopic and electrophoresis techniques in identification and analysis of natural drugs in pharmacognosy
	Pharmacology II	CO-1	Justify the mechanism of action, therapeutic uses, adverse effects, and contradictions of drugs used in cardiovascular complications.
		CO-2	Adapt & justify the principles of pharmacotherapy in the management of disease and disorders of hematopoietic system, urinary system, and endocrine system including their pharmacokinetics and dynamics.
		CO-3	Explain autacoids and drugs used for inflammation and gout.
		CO-4	Compare various methods of bioassay, adapt & inculcate the principles of bioassay of different drugs.
	Pharma Environment	CO-1	Clearer understanding of the dynamics of pharma industry in particular and healthcare space in general both nationally and internationally.
		CO-2	This knowledge will help students to succeed in managing pharmaceutical business
	Industrial Pharmacy I – Practical	CO-1	Determine preformulation parameters of a given drug.
		CO-2	Formulate and evaluate tablet and capsule dosage form
		CO-3	Formulate and evaluate parenteral and ophthalmic dosage forms and their packages.
		CO-4	Prepare and evaluate of cosmetic formulations such as lipsticks and creams.

Semester	Course Name	Course Outcomes	
	Pharmacology II – Practical	CO-1	Apply and adapt the principles of in vitro experiments in cardiovascular pharmacology.
		CO-2	Compare and adapt the principles of experiments through dose response curve (DRC), different bioassay, PA2 value, PD2 value estimation, etc. using software.
		CO-3	Adapt & justify the various procedures with their principles of experiments meant for spasmogenic, spasmolytic, analgesic, and anti-inflammatory activities on different animal models.
	Pharmacognosy and Phytochemistry II – Practical	CO-1	Perform and evaluate the morphological and microscopical characters to identify the crude drugs with reference to the types of cells, tissue and cell inclusions
		CO-2	Extract, isolate and evaluate active principles from natural drug using modern tools & techniques and study the natural excipients used for formulation pharmaceutical industry
		CO-3	Chromatographic and spectroscopic techniques and perform the identification and estimation of active principles extracted
		CO-4	Identify, examine and compare the various crude drugs in based on the basis of organoleptic, physical and chemical characteristics using physical and chemical test.
	Statistics for Management with MS Excel	CO-1	Obtain clarity on basic fundamental concepts of statistics.
		CO-2	Be able to use various statistical tools for analyzing data to come to valid conclusions with certain degree of confidence.
		CO-3	Achieve basic expertise in MS Excel in line with the Industry requirements
VI	Biopharmaceutics and Pharmacokinetics – Theory (722PH0C053)	CO-1	Explain absorption, drug disposition and protein binding mechanism for the drug & predict its Pharmacokinetics.
		CO-2	Understand physicochemical, pharmaceutical and patient related parameters, and correlate this knowledge to the ADME of drug and differentiate the processes in linear and nonlinear type.
		CO-3	Explain compartment models and Compute pharmacokinetic parameters form given data.
		CO-4	Design BABE study for given formulation based on data given.

Semester	Course Name	Course Outcomes	
	Herbal Drug Technology – Theory (722PH0C052)	CO-1	Explain various processes related to herbal materials, various aspects of biodynamic agriculture & Indian systems of medicine
		CO-2	Acquire the knowledge of nutraceuticals and their regulatory aspects with its application and drug interactions in the management of various metabolic diseases
		CO-3	Utilize the knowledge of natural excipients in development of formulations and cosmetics, to explain various regulations related to ASU drugs and herbals
		CO-4	Explain drug discovery process using ethnopharmacology, role of herbal drug industry and relevant regulations
	Medicinal Chemistry III – Theory (722PH0C050)	CO-1	Explain and make use of the historical background, mechanism of action, Stereochemistry, degradation and important products of antibiotics like beta lactam, tetracycline, macrolide, aminoglycosides and miscellaneous
		CO-2	Compare and justify the use of medicinal agents based on the structure, classification, mode of action, SAR, chemical synthesis and uses to treat malaria, tuberculosis and urinary tract infections.
		CO-3	Compare and justify the use of medicinal agents from antifungal, anthelmintics, anti-viral and sulphonamides class based on the structure, classification, mode of action, SAR, chemical synthesis and uses thereof
		CO-4	Apply and propose the role of physiochemical parameters in drug design, prodrug, click and combinatorial synthesis.
	Pharmaceutical Biotechnology – Theory (722PH0C054)	CO-1	Understand the importance and use of microbial products via fermentation technology in Pharmaceutical Industry.
		CO-2	Acquire the knowledge of rDNA technology and Genetic engineering applications in production of pharmaceuticals
		CO-3	Understand the concept of immunity in production of Vaccine, Monoclonal antibodies and Immunoassay kits.
		CO-4	Discuss the biotransformation and microbial genetics.
Pharmaceutical Quality Assurance -	CO-1	Discuss QC and QA concepts and relate it to quality certifications and regulations applicable to pharmaceutical industries	

Semester	Course Name	Course Outcomes	
	Theory (722PH0C055)	CO-2	Understand the cGMP and GLP aspects, and Quality control of packaging materials in a pharmaceutical industry
		CO-3	Illustrate the importance of documentation in Pharmaceutical Industry
		CO-4	Explain calibration and validation in Pharmaceutical Industry
	Pharmacology III – Theory (722PH0C051)	CO-1	Justify the uses of drugs and adapt the principles of pharmacotherapy in Respiratory and Gastrointestinal tract complications.
		CO-2	Hypothesize & explain the principles of chemotherapy and drug mechanism in the management of infectious disease and cancer.
		CO-3	Discuss the various phases of pharmacokinetics, pharmacodynamics of immunostimulants & immunosuppressants.
		CO-4	Understand ethical principles adopted by CPCSEA, principles of toxicology & chronopharmacology including drug mechanism causing toxicity.
	Medicinal Chemistry III – Practical	CO-1	Demonstrate the Synthesis of the intermediates and drug molecules and characterize them with the available methods
		CO-2	Apply the analytical techniques for assay of drugs for quantifying their purity by using volumetric and instrumental analytical techniques.
		CO-3	Compare the synthesis of the Organic compounds by using conventional & Green Chemistry approaches.
		CO-4	Predict the Drug likeness and perform the simulation studies for understanding the pharmacological activity of chemical compounds.
	Pharmacology III – Practical	CO-1	Determine human dose from animal dose data and animal dose from human dose data in pharmacological experiments.
		CO-2	Design the preclinical pharmacologic experiments for determination of activities of drugs like anti-allergic, anti-ulcer & gastrointestinal motility, saline purgative, insulin hypoglycaemic effects & test for pyrogens.
		CO-3	Identify, illustrate & demonstrate experimentally, the effects of agonist and antagonists on isolated tissues like guinea pig ileum.
		CO-4	Test a drug for acute skin and eye toxicity, treating biochemical and experimental data for determination of its statistical significance.

Semester	Course Name	Course Outcomes		
	Herbal Drug Technology – Practical	CO-1	Evaluate herbal drug excipients as per pharmacopoeial monograph	
		CO-2	Prepare, standardize, and evaluate herbal and ayurvedic formulations using pharmacopoeial standards	
		CO-3	Estimate the content of secondary metabolite in herbal drugs	
	Operations Research (722MN0C006)	CO-1	Analyze practical situations and identify the variables involved.	
		CO-2	Develop models using these variables suitable for applying studied OR tools.	
		CO-3	Apply tools such as LPP, Assignment, Queuing Transportation, Game Theory, Replacement etc on various industrial applications.	
		CO-4	Analyze the outcomes and draw inferences.	
	Pharma Selling Process, PSS & KAM (722MN0C005)	CO-1	Students will get clear understanding of how to manage selling process of both individual doctors and key accounts in pharma business.	
	VII	Industrial Pharmacy II	CO-1	Know the process of pilot plant and scale up of pharmaceutical dosage forms
			CO-2	Understand the process of technology transfer from lab scale to commercial batch
CO-3			Illustrate different Laws and Acts that regulate pharmaceutical industry	
CO-4			Explain the approval process and regulatory requirements for drug products	
Novel Drug Delivery Systems		CO-1	Apply the concept of various controlled release and targeted drug delivery mechanisms in developing novel formulations & Identify suitable polymers for developing novel drug delivery systems.	
		CO-2	Demonstrate the desirable properties and mechanism of various novel drug delivery systems.	
		CO-3	Design various novel and targeted drug delivery systems and evaluate their suitability by in vitro characteristics.	
		CO-4	Conceptualize the delivery of protein, peptide and macromolecules.	
Pharmacy Practice		CO-1	Illustrate the concept of Hospital, Hospital pharmacy organizations, Community pharmacy, Pharmacy & Therapeutics Committee, Drug information services and Clinical pharmacy.	

Semester	Course Name	Course Outcomes	
		CO-2	Organize & assess the drug distribution system in a hospital, Hospital formulary, Therapeutic drug monitoring, medication adherence and patient counselling.
		CO-3	Formulate & evaluate drug store management & inventory control, Investigational use of drugs, Interpretation of clinical laboratory tests.
		CO-4	Demonstrate education & training program in a hospital, prescribed medication order & communication skills.
	Instrumental Methods of Analysis	CO-1	Understand the interaction of matter with electromagnetic radiations and its applications in drug analysis.
		CO-2	Demonstrate the chromatographic separation and analysis of drugs.
		CO-3	Apply principles of spectrophotometric and chromatographic analysis in quantifying analyte in solutions of unknown concentrations and formulations.
		CO-4	Understand instrumentation and applications of various spectroscopic and chromatographic techniques.
	Instrumental Methods of Analysis – Practical	CO-1	Determine the absorption maxima of an organic compound; Perform estimation of various compounds by UV-visible spectrophotometry and fluorimetry.
		CO-2	Analyze the elements such as sodium and potassium and radicals such as chloride and sulphate in the given sample by the applications of Flame photometry and Nepheloturbidometry respectively.
		CO-3	Execute separation of various amino acids, sugars, plant pigments by paper/thin layer/Column Chromatography.
		CO-4	Illustrate the working of an HPLC & GC.
	Practice School	CO-1	Understand the use of various in-silico techniques for drug discovery and working of sophisticated analytical instruments
		CO-2	Illustrate the need of scope of in-vitro assays, pre-clinical and clinical studies
CO-3		Use of “design of experiments” approach to develop different novel drug delivery systems (NDDS) and understand working of instruments used for their preparation and evaluation	
CO-4		Apply knowledge of regulatory guidelines for registration of herbal products	
Career Initiation Skills	CO-1	Understand job search and interview process	
	CO-2	Prepare appropriate resume reflecting their skills	

Semester	Course Name	Course Outcomes		
		CO-3	Practice effective communication and office etiquette	
		CO-4	Develop interpersonal and networking skills	
	Financial Management I	CO-1	Understand basics of accounting.	
		CO-2	Read and understand financial statements like P & L and Assets and Liabilities statements.	
	Marketing Management	CO-1	Formulate a market oriented definition of business	
		CO-2	Analyze marketing environment	
		CO-3	Apply concepts and tools relevant to Segmentation, Targeting and Positioning	
		CO-4	Should be able to discuss the concept and elements of the Marketing Mix.	
		CO-5	Demonstrate the application of the elements of the marketing mix for a chosen P/S	
		CO-6	Explore the linkages between the Marketing Mix and the Marketing Strategy comprising of S-T-P.	
	Business Economics	CO-1	What is an economy and how does it function	
		CO-2	What are the key economic variables or micro and macroeconomic aggregates which suggest the performance of the economy	
		CO-3	How do they influence each other and the economy as a whole	
	Health Insurance and Hospital Management	CO-1	To make students aware of the importance, procedures and current practices in the Health Insurance industry	
		CO-2	To provide students hospital management concepts, starting with a focus on the issues and challenges in delivering good quality hospital services. To equip the future hospital managers to satisfactorily address the concerns on customer satisfaction.	
	VIII	Biostatistics and Research Methodology - Theory (7281BPB002)	CO-1	Analyse and solve pharmaceutical problems by applying statistical concepts.
			CO-2	Design experiments by using the concept of DoE and analyse them using statistical methods.
			CO-3	Inculcate ideals of ethical research and discourage plagiarism.
			CO-4	Compare the different software that can be used for statistical analysis and design and analysis of experiments.

Semester	Course Name	Course Outcomes	
	Cosmetic Science – Theory (7281BPC003)	CO-1	Demonstrate the use of key cosmetic ingredients to develop cosmetics and cosmeceuticals.
		CO-2	Examine the requirements of sunscreen products and the role of herbs in cosmetics.
		CO-3	Prepare cosmetics or cosmeceutical products with desired safety, stability, and efficacy for skin, hair, nail, lip and oral care. Summarize the analysis of cosmetic products.
		CO-4	Analyze the problems associated with hair, skin, oral cavity, nail and lip and provide cosmetic remedies for the same.
	Dietary Supplements and Nutraceuticals - Theory (7281BPD001)	CO-1	Discuss importance of nutraceuticals and nutrition
		CO-2	Explain the relationship between free radicals, diseases and nutraceuticals
		CO-3	Explain regulatory aspects related to nutraceuticals
	Social and Preventive Pharmacy - Theory (7281BPS001)	CO-1	Integrate knowledge of Pharmacy with public health system.
		CO-2	Correlate current healthcare development with public health issues.
		CO-3	Propose alternative ways of solving problems related to individuals and public health issues.
		CO-4	Articulate the concept of community services in rural, urban , and school health.
	Pharmaceutical Product Development – Theory(7281BPP041)	CO-1	Design preformulation and stability studies for different types of dosage forms
		CO-2	Select and evaluate various Pharmaceutical excipients suitable for different types of dosage forms
		CO-3	Apply QbD concept to design and optimize pharmaceutical formulations
		CO-4	Select and propose the quality control tests of pharmaceutical packaging materials as per regulatory guidelines.

Semester	Course Name	Course Outcomes	
	Pharmaceutical Regulatory Science – Theory (7280BPP035)	CO-1	Analyze the process of drug discovery and development and generic product development and design regulatory submission strategy for dossier submissions based on regulatory requirements in different countries
		CO-2	Create and assemble the regulatory submissions as per the requirements of various agencies and correlate the same with India
		CO-3	Analyze the clinical trials and different types and phases of clinical trials as per GCP guidelines and write the drafts of clinical trial protocols for clinical trials based on regulatory requirements
		CO-4	Design various documents pertaining to drugs in pharmaceutical industry with special emphasis to regulatory submission strategy
	Pharmacovigilance – Theory - (7280BPP036)	CO-1	Analyze & justify the pharmacovigilance, drug monitoring and adverse drug reaction management practices.
		CO-2	Integrate drug dictionaries, disease classifications and vaccine safety surveillance.
		CO-3	Organize safety data generation, ICH guidelines for pharmacovigilance.
		CO-4	Determine pharmacogenomics of adverse drug reactions & drug safety evaluation in special population.
	Pharmaceutical Marketing Management - Theory (7280BPP034)	CO-1	Devise a market oriented plan of a Pharmaceutical business and analyse the marketing environment
		CO-2	Apply concepts and tools relevant to Segmentation, Targeting and Positioning
		CO-3	Illustrate the concept and elements of the Marketing Mix and demonstrate its application for a chosen P/S
		CO-4	Analyse the linkages between the Marketing Mix and the Marketing Strategy comprising of S-T-P.
	Organizational Behaviour	CO-1	Will be able to analyze a business situation from the perspective of individual behavior.
		CO-2	Will be able to apply organizational behavioral theories / frameworks /models to reflect critically on specific business context.

Semester	Course Name	Course Outcomes		
		CO-3	Will result in comprehending of personality traits and implications on organizational working.	
		CO-4	Will result in comprehending about the importance of teams and team building in organization and its performance.	
	Brand Plan for Pharma Products	CO-1	Appreciate the process of analyzing the market and the competition	
		CO-2	Put into practice tools like SWOT/PEST and STP	
		CO-3	Evaluate the impact of various variables on the brand's performance	
		CO-4	Formulate various cost and expense scenarios to finalise the optimum P&L statement	
	Project Management	CO-1	After the successful completion, of course student would:	
		CO-2	Apply tools such as WBS, Gantt chart, Project networks, CPM and PERT to the project at hand and arrive at the optimum duration for the project in terms of project completion days, Total cost targets and probability attached to it.	
		CO-3	Analyze any online project data to calculate various indices to check and then control the project proceedings to ultimately comply with the given duration, performance and cost at completion targets.	
		CO-4	Apply the knowledge to carry out effective risk management in the ongoing project and prioritize various risks the project face and monitor them accordingly.	
	Marketing Research Methodology including Advanced Statistical Tools	CO-1	Be able to identify different types of research and their application in different business situations.	
		CO-2	Understand the importance of zeroing down on the research problem before going about finding solutions to it.	
		CO-3	Develop research instrument suitable for the research objectives at hand.	
		CO-4	Collect data and analyze it using apt statistical technique and arrive at the conclusions.	
		CO-5	Know important agencies providing market research services to pharmaceutical industry and their USPs.	
		CO-1	The concepts and understanding of Operation Management and strategy	

Semester	Course Name	Course Outcomes	
	Operations Management & Strategy	CO-2	How to sustain business excellence and derive competitive advantage by using the principles of Operation Management and strategy in contemporary Business environment.
		CO-3	Understanding and managing the key business operations effectively and efficiently through ethical practices and total employee involvement and other stake holders.
		CO-4	Creating and managing a World class organization through 'Operation Management Principles'
	Quality Management Systems and Practices (7281Q001)	CO-1	Be able to understand the importance of having strong QMS in an organization.
		CO-2	Can play an active part in adoption and maintenance of adopted QMS in the organization.
	Life Skills	CO-1	Practice verbal & non-verbal communication effectively
		CO-2	Identify & develop professional goals
		CO-3	Implement self-management skills
		CO-4	Develop presentation, listening, problem solving skills
	IX	Customer Relationship Management	CO-1
CO-2			Define the IDIC Model and describe both B2B and B2C examples of personalization
CO-3			Discuss the comparative advantages leading vendors of CRM technology
CO-4			Develop a CRM programme for a business
Financial Analysis Planning & Control		CO-1	To create an awareness about the importance and usefulness of the accounting concepts and their managerial implications
		CO-2	To develop an understanding of the financial statements and the underlying principles and learn to interpret financial statements
		CO-3	To create an awareness about cost accounting, different types of costing and cost management

Semester	Course Name	Course Outcomes	
	Capstone	CO-1	Analyze the Competition and comprehensive decision-making processes in a business so as to ensure that the firm remains competitive.
		CO-2	Identify the impact of micro and macro environment esp. W.r.t the P&L and Cash Flows in the context of business and the concerns and consequences of the decisions made from different business functional areas.
		CO-3	Generate and read the business scenarios and outcomes and can critically evaluate his own decision-making skills.
		CO-4	Work cohesively in a team and will understand the importance of each and every individual team member in the business decisions and business productivity.
	Indian Ethos and Business Ethics in Pharma	CO-1	Understand the essence of Indian Management.
		CO-2	Develop a holistic view towards business management and its impact of society.
		CO-3	Appreciate the Regulatory framework for ethical standards
	Patient - Doctor Communications – Tech Enabled	CO-1	Develop an ability to evaluate and decide on the tools which are appropriate by segment of doctors and by therapy area
		CO-2	Appreciate the impact of digital initiatives in maximizing depth and breadth of physician coverage
		CO-3	Understand the importance of measuring effectiveness of digital programs and the need to frame appropriate and relevant Key Performance Indicators (KPIs)
	Digital Strategy in Pharma Industry	CO-1	At the end of this course students will learn about the overall importance of Digital Strategies in the Pharmaceutical Industry.
		CO-2	Students will also learn how to appreciate marketing transformation due to digital marketing.
CO-3		The students will also learn how to demonstrate understanding of various digital media tools & Analyze which tool suits best with a communication objective	
Health Technology Assessment	CO-1	The students will learn the fundamental concepts of Health Technology Management and its interface with Regulations, Policy and Management.	

Semester	Course Name	Course Outcomes	
		CO-2	The students will also learn why some treatments are made available to patients while others are not.
		CO-3	The students will also learn about improving and integrating regulation of Drugs, Medical Devices, Diagnostic tests and Surgical Innovations for better HTA.
		CO-4	The students will learn the Cost Benefit Analysis of HTA
	Brand and Product Management	CO-1	Clarity on what is a brand and what comprises brand equity.
		CO-2	Various Brand Models of depiction as well as measurement.
		CO-3	History of Brand Thinking & Crafting Brand Ideas.
		CO-4	Brand Plans and IMC – Integrated Marketing Communication.
		CO-5	Brand Strategies of Extensions vs. House of Brands.
	Business Strategy Management	CO-1	Understand the contours of Strategy and the Strategic Management Framework/Process.
		CO-2	Diagnose and map the key elements of external environment as key input to strategy formulation.
		CO-3	Assessing the resources and capabilities of internal environment of an organization for strategy formulation.
		CO-4	Evaluate approaches to strategy choice at the Business Level and Corporate level
		CO-5	Understand the contemporary concepts on Blue Ocean Strategy, Value Innovation, Business Models etc.
		CO-6	Understand the dynamic capabilities and ambidexterity in strategy execution so as to exploit existing businesses and explore new businesses
		CO-7	Understand the performance measurement through Balanced Scorecard
	Business Analytics (Visual)	CO-1	Be able to use SAS Visual analytics to prepare the raw data.
		CO-2	Be able to load the data, analyze the data using different graphical visualizations.'
		CO-3	Be able to make interactive reports to be used by different users.
	Leading Digital – Turning Technology into Business	CO-1	Students will learn engage better with their customers
		CO-2	They will learn how to digitally enhance operations
CO-3		They will learn how to create a digital vision	

Semester	Course Name	Course Outcomes	
	Transformation (incl. AI in Healthcare)	CO-4	They will learn how to govern the digital activities
		CO-5	They will learn about the transformational power of Artificial Intelligence.
		CO-6	Students will become familiar with how to follow an extensive step-by-step transformation playbook
	Sales Management including Data Analytics	CO-1	To help develop the ability to handle pharma sales management responsibilities
		CO-2	Understand choices available in the selling process of products or services and how to select the best alternatives including the right channels
		CO-3	Build and nourish sales teams and marketing channels
		CO-4	Understand any limitations under which sales people operate
		CO-5	Develop a pragmatic approach for selection, growth and evaluation of channel partners
	Human Resource Management	CO-1	Understand the role of HRM in management and examine the human resource plan for an organization
		CO-2	Apply the knowledge of recruitment and selection process by - understanding the role requirement and source of labor along with using selection tests and employment interviews
		CO-3	Assess training needs, conduction and evaluation of training programs.
		CO-4	Analyze the performance management system by setting goals, evaluating performances and conducting appraisal interviews.
	Consumer Behaviour	CO-1	Appreciate variations in consumer choice and usage phenomena and its impact on marketing strategy.
CO-2		Develop ability to use qualitative research tools to understand Psychological and Socio- Cultural Factors influencing consumer behavior.	
CO-3		Analyze influence of these factors on choice, usage and adoption of brands.	
CO-4		Formulate Marketing Programs in the light of the above understanding and analysis.	
X	Financial Management II	CO-1	Students will be able to understand and apply the core concepts of Financial Management to various type of Financial Decisions

Semester	Course Name	Course Outcomes	
		CO-2	Student will be able to learn and apply various tools, evaluation criteria to Investment, Capital structure and Financing Decisions
		CO-3	Students will be able to understand the role of prudent Capital Management, Methods to optimize cost of capital in multiple business situations
	Predictive Analytics	CO-1	Be able to demonstrate proficiency in developing analytical models such as Linear Regression, Logistics Regression , Decision Tree and Neural Networks
		CO-2	Be able to interpret and communicate the outcome of the model in a succinct and organized way
	Logistics & Supply Chain Management incl. Analytics & E-pharmacies	CO-1	Apply basic knowledge of supply chain in the areas of logistics & supply chain, with special emphasis on processes in supply chain and their overall impact.
		CO-2	Apply the basic concepts of inventory management, its implication on overall profits, set up process of distribution and various channels in order to assist sales and marketing.
		CO-3	Can carry out various activities at strategic and operational levels both efficiently and effectively.
		CO-4	Capable to address problems arising in areas such as network, inventory management, information management etc.
	Introduction to Management Consulting Practice	CO-1	It will introduce the student to the nature of professional consulting.
		CO-2	It will impart knowledge of organizational principles of management consulting.
		CO-3	Students will learn the behavioral rules of management consulting
		CO-4	It will also make the student aware of the various learning and development practices in management consulting.
		CO-5	Students will also learn specifically about Pharma and Healthcare Consulting opportunities and challenges.
	Entrepreneurship & New Ventures in Healthcare	CO-1	Analyse the importance of innovation and creativity as a core business process and its management.
		CO-2	In-depth understanding of opportunities and challenges associated with starting a new venture in healthcare sector
		CO-3	Understand key factors that influence the adoption and scaling up of different types of healthcare innovations

Semester	Course Name	Course Outcomes	
		CO-4	Evaluate & assess opportunities and constraints for new business ideas.
		CO-5	Designing & Formulating Strategy to screen & implement a business idea into product.
		CO-6	Develop a robust and implementable business plan.
	Corporate Social Responsibility	CO-1	Evaluating the various dimensions of Corporate Social Responsibility.
		CO-2	Analyse and evaluate the emerging issues in corporate sustainability with regards to its performance, reporting and assurance.
		CO-3	Develop a responsible business for sustainability
	Marketing of Diagnostics	CO-1	Appreciate dynamics of diagnostic industry and its marketing implications.
		CO-2	Analyze influence of important stakeholders in diagnostic industry
		CO-3	Formulate Marketing Programs in the light of the above understanding and analysis.
	International Marketing	CO-1	Develop a deeper understanding of the international pharma marketing in general and strategies in particular
		CO-2	Demonstrate the use of various concepts to ensure that appropriate balance is maintained between different types of marketing strategies in the innovative ways
		CO-3	Clearly identify, acquire and hone new skill sets in the international scenarios.
		CO-4	Apply basic skills in the preparation of the marketing plans and the entry strategies in different countries
Marketing of Biosimilars & Specialty Products	CO-1	The prime learning outcome of this course is to provide the theoretical knowledge of how biologics and Biosimilars are different from small chemical molecules	
	CO-2	The student needs to have a working knowledge of the regulatory guidelines for biologics and Biosimilars	
	CO-3	The mechanics of selling and promoting Biosimilars are distinctly different from those of conventional drugs and students need to be familiar with the various tools of KOL and patient engagement	
Marketing of Medical Devices	CO-1	Students will understand the basic difference between Medical Devices & Pharmaceutical market segment.	

Semester	Course Name	Course Outcomes	
		CO-2	Strategies that companies adopt in different product segment of Medical Devices
		CO-3	Hospital Sales
		CO-4	Challenges in Regulatory
		CO-5	Importance of Branding in Preventing Price Erosion
	Quantitative Techniques for Forecasting & Decision Making	CO-1	Learning of various advanced quantitative techniques in different challenging business situations.
		CO-2	Learn to use different forecasting techniques and compare them to choose the best for the given data
	Marketing of Active Pharmaceutical Ingredients	CO-1	Students will learn how to create differentiation - building value propositions since APIs are basically unbranded.
		CO-2	Students will learn how to forecast and estimate demand to ensure uninterrupted supplies
		CO-3	Students will pick up competencies and skill sets required to become a successful API sales and marketing professional
		CO-4	Students will also learn the Key Account Management (KAM) Model of API Marketing. Students will also learn Digital tools in API Marketing

CO-PO Mapping

Semest	Subject Name	CO No.	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	
I	Human Anatomy and Physiology I	CO-1	H		L			L	M	L	M			
		CO-2	H		M			L	M	L	M			
		CO-3	H		H	L			M	M	M	M		
		CO-4	H		H	M			M	M	M	M		
	Pharmaceutical Analysis	CO-1	H	L	H	H	L	H	H	H	M	H	L	H
		CO-2	H	L	H	L	L	H	H	H	M	L	L	H
		CO-3	H	L	H	H	L	H	H	H	M	H	L	H
		CO-4	H	L	H	L	L	H	H	H	M	L	L	H
	Pharmaceutical Inorganic Chemistry	CO-1	H	M	H	H	L	H	H	H	M	M	L	M
		CO-2	H	L	H	H	L	H	M	M	M	M	L	M
		CO-3	H	L	H	H	L	H	M	M	M	H	L	M
		CO-4	H	M	H	H	L	M	H	M	M	H	L	M
	Pharmaceutics I	CO-1	H	L	M	M	M	M	M	H		H	M	M
		CO-2	H	L	L	L						M	H	M
		CO-3	H	L	L	H	L					M	H	M
		CO-4	H	L	L	H	L					M	H	M
	Communication Skills	CO-1						H	M		H			M
		CO-2						H	M		H			M
		CO-3						H	M		H			M
		CO-4						H	M		H			M
	Remedial Biology	CO-1	H	L	L	M	L	L	L	L	M	L	M	H
		CO-2	H	L	L	L	L	L	L	L	L	L	M	L
		CO-3	H	M	L	M	L	M	M	M	L	H	M	M
		CO-4	H	L	L	M	L	L	L	L	L	L	H	M
	Remedial Mathematics	CO-1	H	M	H	L								
		CO-2	H	M	H	L								
		CO-3	H	M	H	L								
		CO-4	H	M	H	L								
	Human Anatomy and Physiology I - Practical	CO-1	H	L	H	M			H	L	H	M	L	M
		CO-2	H	M	H	M			H	L	H	M	L	M
		CO-3	H	M	M	M			H	H	H	H	L	M
		CO-4	H	L	M	M			H	H	H	H	L	M
Pharmaceutical Analysis – Practical	CO-1	H	L	H				M					M	
	CO-2	H	M	H				M					M	
	CO-3	H	M	H				M		L	M		M	

Semest	Subject Name	CO No.	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	
	Human Anatomy and Physiology II – Practical	CO-1	H	M	H	M		H	L	H	M	L	M	
		CO-2	H	M	H	M		H	L	H	M	L	M	
		CO-3	H	M	H	M		H	L	H	M	L	M	
		CO-4	H	L	M	M		H	H	H	M	L	M	
		CO-5	H	M	H				M	L	M	L	L	M
	Pharmaceutical Organic Chemistry I – Practical	CO-1	M								L	M	L	M
		CO-2	M				M				L	M	L	M
		CO-3	M				M				L	M	L	M
		CO-4	M				H				L	M		M
	Biochemistry – Practical	CO-1	H	H	H	M	M	M	M	M	M	H	L	M
		CO-2	H	H	H	H	M	M	M	L	M	H	L	L
		CO-3	H	H	H	H	L	M	M	L	M	H	L	M
		CO-4	H	H	H	M	L	M	M	L	M	H	L	L
	Computer Applications in Pharmacy – Practical	CO-1	M	M			M							H
		CO-2	M	M			M							H
		CO-3	M	M			M							H
		CO-4												
	Inventions in Science	CO-1	M											L
		CO-2	M											L
		CO-3												
CO-4														
III	Pharmaceutical Organic Chemistry II	CO-1	H	L	H	L	M	H	M	H	M	H	H	
		CO-2	M	M	H	M	M	M	H	H	L	H	H	M
		CO-3	H	L	L	M	M	M	H	H	M	M	M	H
		CO-4	M	M	H	L	L	L	M	L	M	M	H	M
	Pharmaceutical Engineering	CO-1	H	M	M	M	M	L	H	M	M	M	L	H
		CO-2	H	M	M	M	M	L	H	M	M	M	L	H
		CO-3	H	M	M	M	M	L	H	M	M	M	L	H
		CO-4	H	M	M	M	M	L	H	M	M	M	L	H
	Pharmaceutical Microbiology	CO-1	M	L	M	M				L			M	L
		CO-2	M	L	M	M				L			M	L
		CO-3	H	L	M	M				L			M	L
		CO-4	H	L	M	M				L			M	L
	Physical Pharmaceutics I	CO-1	H			M	M						H	
		CO-2	H			H	M							
		CO-3	M			L	L							
		CO-4	H			L	M							

Semest	Subject Name	CO No.	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	
	Pharmaceutical Organic Chemistry II – Practical	CO-1	H	H	H	M	L	M	M	M	M	L	M	
		CO-2	H	H	H	M	L	M	M	M	M	L	M	
		CO-3	H	M	H	M	L	M	M	M	M	L	M	
		CO-4	H	H	M	M	L	M	M	M	M	L	M	
		CO-5	H	H	M	M	L	M	M	M	M	L	M	
	Physical Pharmaceutics I – Practical	CO-1	H	L	H	H	L	L	L	L	L	L	L	
		CO-2	H	L	H	H	L	L	L	L	L	L	L	
		CO-3	H	L	L	M	L	L	L	L	L	L	L	
		CO-4	H	L	L	H	L	L	L	L	L	L	L	
	Pharmaceutical Microbiology – Practical	CO-1	H	H	M	M	M			H	H	M	H	M
		CO-2	H	H	M	M	M			H	H	M	H	M
		CO-3	H	H	M	M	M			H	H	M	H	M
		CO-4												
	Pharmaceutical Engineering – Practical	CO-1	H	H	H	H	M		H	L	L	L	L	M
		CO-2	H	M	M	H	L		H	L	L	L	L	M
		CO-3	H	H	H	H	M		H	L	L	L	L	M
		CO-4	H	H	H	H	M		H	L	L	L	L	M
	Introduction to Research I	CO-1	H	L	L	L			M		L	M		M
		CO-2	H	L		L			M		L	M		M
		CO-3	H	L	L	L			M		L	M		M
Principles of Management	CO-1		H					H					H	
	CO-2		H											
	CO-3						H						H	
	CO-4			M				M					H	
IV	Medicinal Chemistry I – Theory	CO-1	H	H	H	M	L	M	M	M	M	L	M	
		CO-2	H	H	H	M	L	M	M	M	M	L	M	
		CO-3	H	M	H	M	L	M	M	M	M	L	M	
		CO-4	H	H	M	M	L	M	M	M	M	L	M	
		CO-5	H	H	M	M	L	M	M	M	M	L	M	
	Pharmaceutical Organic Chemistry III – Theory	CO-1	H	M	M	M	L	H	M	M	H	L	M	
		CO-2	M	M	H	M	M	M	M	L	M	M	M	
		CO-3	H	H	H	M	L	H	M	L	M	M	M	
		CO-4	H	M	M	M	H	H	M	M	H	M	H	
	Pharmacognosy and Phytochemistry I – Theory	CO-1	H	M	L	M	L	M	L	M	H	M	M	
		CO-2	H	M	L	M	L	M	L	H	M	H	M	
		CO-3	H	M	L	M	L	M	L	L	M	H	M	
		CO-4	H	M	M	M	L	M	L	L	M	H	M	

Semest	Subject Name	CO No.	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11
	Pharmacology I – Theory	CO-1	H		L	L		M					M
		CO-2	H		L	L		M					M
		CO-3	H	L	L			M		L	M		M
		CO-4	H	L	L			M		L	M		M
	Physical Pharmaceutics II – Theory	CO-1	H	M	H	M	L	H	M	M	M	L	M
		CO-2	H	M	H	M	L	H	M	M	M	L	M
		CO-3	H	M	H	M	L	H	M	M	M	L	M
		CO-4	H	M	H	M	L	H	M	M	M	L	M
	Introduction to Research II- Theory	CO-1	H	M	L	L		L	M	L	M		M
		CO-2	H	L	L	L		M	M	L	M		M
		CO-3	H	L	L	H		M	M	L	M		M
		CO-4											
		CO-5											
	Medicinal Chemistry I – Practical	CO-1	H	L	M	M		M	H	L	L	M	H
		CO-2	H	L	M	L		M	H	L	L	L	H
		CO-3	H	L	M	M		M	H	L	L	M	H
		CO-4	H	L	L	L		M	H	L	L	M	H
	Physical Pharmaceutics II – Practical	CO-1	H	H	H	M	L	H	M	M	M	L	M
		CO-2	H	H	H	M	L	H	M	M	M	L	M
		CO-3	H	H	H	M	L	H	M	M	M	L	M
		CO-4	H	H	H	M	L	H	M	M	M	L	M
	Pharmacology I – Practical	CO-1	H	L	M	L		M	H	M	L		H
		CO-2	H	H	M	H		M	L	M	L		H
		CO-3	H	H	H	H		M	L	M	L		H
	Pharmacognosy and Phytochemistry I – Practical	CO-1	H	L	M	M	L	M	L	M	L	M	M
		CO-2	H	L	L	M	L	M	L	M	L	M	M
		CO-3	H	L	M	M	L	M	L	M	M	M	M
		CO-4	H	L	M	M	L	M	L	M	M	M	M
Marketing Management Concepts and Strategies	CO-1		H				H	H				H	
	CO-2			M								H	
	CO-3			H			H					M	
	CO-4		H					H					
V	Industrial Pharmacy I	CO-1	H	M	M	M	L	L		L	L		M
		CO-2	M	M	L	L	L	L		L	L		M
		CO-3	H	L	M	L	L	L		L	L		M
		CO-4	H	L	M	L	L	L		L	L		M
	Medicinal Chemistry II	CO-1	H	H	H	M	L	M	M	M	M	L	M

Semest	Subject Name	CO No.	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	
		CO-2	H	H	H	M	L	M	M	M	M	L	M	
		CO-3	H	M	H	M	L	M	M	M	M	L	M	
		CO-4	H	H	M	M	L	M	M	M	M	L	M	
		CO-5	H	H	M	M	L	M	M	M	M	L	M	
	Pharmaceutical Jurisprudence	CO-1	M	L	L	L	L	L	L	L	L	L	L	L
		CO-2	H	L	L	L	L	H	L	L	L	L	L	L
		CO-3	M	L	L	L	L	M	H	L	M	L	L	L
		CO-4	H	L	L	L	L	L	L	L	H	L	L	L
	Pharmacognosy and Phytochemistry II	CO-1	H	L	M	L	L	M	L	M	M	L	M	M
		CO-2	H	L	L	M	L	L	L	M	L	M	M	M
		CO-3	H	L	M	H	L	M	L	L	M	M	M	M
		CO-4	H	L	M	H	L	M	L	L	M	M	M	M
	Pharmacology II	CO-1	H	L	H	M			H	L	H	M	L	M
		CO-2	H	L	H	M			H	L	H	M	L	M
		CO-3	H	L	H	M			H	L	H	M	L	M
		CO-4	H	L	M	M			H	L	H	M	L	M
	Pharma Environment	CO-1		H	H				H					H
		CO-2			H			M	M					H
		CO-3												
		CO-4												
	Industrial Pharmacy I – Practical	CO-1	H	M	M	M	L			M		H	M	M
		CO-2	H	M	M	H				L		M	M	M
		CO-3	H	M	M	H	L			L		M	M	M
		CO-4	H	M	M	H	L			L		M	M	
	Pharmacology II – Practical	CO-1	H	M	M	M	M	M	M	M	M	M	L	M
		CO-2	H	M	M	H	M	M	M	M	H	M	M	M
		CO-3	M	M	M	M	M	M	M	M	M	M	L	M
		CO-4												
Pharmacognosy and Phytochemistry II – Practical	CO-1	H	L	M	M	L	M	L	L	L	M	M	M	
	CO-2	H	L	L	M	L	M	L	L	L	L	M	M	
	CO-3	H	L	M	M	L	M	L	M	M	M	M	M	
	CO-4	H	L	M	L	L	M	L	L	L	L	M	M	
Statistics for Management with MS Excel	CO-1													
	CO-2			M										
	CO-3			M	H			H						
	CO-4													
VI	Biopharmaceutics and Pharmacokinetics –	CO-1	H	L	H	H		L	M		H	H	M	

Semest	Subject Name	CO No.	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	
	Marketing Management	CO-4												
		CO-1		H	H	H							M	
		CO-2		H		M								
		CO-3		M							H			M
		CO-4									H			
		CO-5												H
	Business Economics	CO-6		M							M			
		CO-1				H	M		H					H
		CO-2				H	M							
		CO-3							H					H
	Health Insurance and Hospital Management	CO-4												
		CO-1		H			M	H						H
		CO-2		H			M	M						H
		CO-3												
	VIII	Biostatistics and Research Methodology - Theory	CO-4											
			CO-1	H	M	M	L	L	L		L	L		M
CO-2			H	M	M	L	L	L		L	L		M	
CO-3			H	M	M	M	L	M	M	L	L		M	
Cosmetic Science – Theory		CO-4	M	L	L	L	L	L		L	L		M	
		CO-1	H	L	L	L	L	L	L	L	L	M	L	M
		CO-2	H	L	L	H	L	L	L	L	L	M	L	M
		CO-3	H	H	L	L	L	L	M	L	L	M	M	M
Life Skills		CO-4	H	L	H	H	L	L	L			M	L	M
		CO-1						H	H	M	H	M		
		CO-2						H	H	M	H	M		
		CO-3						H	H	M	H	M		
Dietary Supplements and Nutraceuticals - Theory		CO-4						H	H	M	H	M		
		CO-1	H			M	M	M		L		L	M	L
		CO-2	H			L	L	M		L		L	M	M
		CO-3	H			L	L	M		H	L	M		M
Social and Preventive Pharmacy - Theory	CO-4													
	CO-1	H	M	M			L	H	L	L	H	L	L	
	CO-2	H	M	M			L	M	L	L	H	L	L	
	CO-3	H	M	H			M	M						
Pharmaceutical Product Development – Theory	CO-4	H	M	M			L	H	H		H	L	L	
	CO-1	H	H	H	M		L	L	L	L	L	M	L	
	CO-2	H	H	H	H		L	L	L	L	L	M	L	
	CO-3	H	H	H	H		L	L	L	L	L	M	L	

Semest	Subject Name	CO No.	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	
		CO-3	H	H	H	H	L	L	L	L	L	M	L	
		CO-4	H	H	H	M	L	L	L	L	L	M	L	
	Pharmaceutical Regulatory Science – Theory	CO-1	H	M	H	H	L	L	L	L	L	M	L	
		CO-2	H	H	H	H	M	L	L	L	L	M	L	
		CO-3	H	H	H	M	L	L	M	L	L	M	L	
		CO-4	H	H	M	H	L	L	L	M	L	H	L	
		CO-5	H	H	H	M	L	L	L	L	L	M	L	
		CO-6	H	H	H	M	L	L	L	L	L	M	L	
	Pharmacovigilance – Theory	CO-1	H	H	H	H	L	L	L	L	L	H	L	L
		CO-2	H	H	H	M	L	L	L	L	L	H	L	L
		CO-3	M	H	H	M	L	L	M	L	L	L	M	L
		CO-4	H	M	H	H	L	L	L	L	L	M	M	L
		CO-5	M	M	H	H	M	L	L	L	L	H	M	L
	Pharmaceutical Marketing Management - Theory	CO-1		H	H		H							H
		CO-2			H		H							H
		CO-3		H	H									M
		CO-4		H										M
	Organizational Behaviour	CO-1		M			M							
		CO-2		H						H				H
		CO-3					H			H				
		CO-4		H			M							L
	Brand Plan for Pharma Products	CO-1		H	H									M
		CO-2		H	H									M
		CO-3		H	H									M
		CO-4		H	H									
	Project Management	CO-1												
		CO-2		M	H				H					
		CO-3							H					
CO-4								H						
Marketing Research Methodology including Advanced Statistical Tools	CO-1		M											
	CO-2		M											
	CO-3			H										
	CO-4			H										
	CO-5							H						
Operations Management & Strategy	CO-1		H	M										
	CO-2			H										
	CO-3			H	H									
	CO-4		H	M	H	H								

Semest	Subject Name	CO No.	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11
	Quality Management Systems and Practices	CO-1											
		CO-2		H	H				H				
		CO-3											
		CO-4											
		CO-5											
IX	Customer Relationship Management	CO-1		H	H	H							
		CO-2		H		H							H
		CO-3		H	H	M							H
		CO-4		M	M	H							H
		CO-5											
	Financial Analysis Planning & Control	CO-1		H	H								
		CO-2		H	M								M
		CO-3		M	H			H					H
	Capstone	CO-1		H	H			H					H
		CO-2		H	H			H					H
		CO-3		H	M			M					M
		CO-4		H									H
		CO-5											
	Indian Ethos and Business Ethics in Pharma	CO-1	H						H				
		CO-2	H								H		
		CO-3							H		H		
	Patient - Doctor Communications – Tech Enabled	CO-1		H	H					H			
		CO-2			H	H				H			
		CO-3			H	H							
	Digital Strategy in Pharma Industry	CO-1		H	M								
		CO-2			H	M							M
		CO-3		M		H							M
	Health Technology Assessment	CO-1			H	M							
		CO-2				H							H
		CO-3			H								M
		CO-4				M							H
	Brand and Product Management	CO-1								H			
		CO-2											H
		CO-3									H		H
		CO-4									M		H
		CO-5									H		M
	Business Strategy Management	CO-1		H						M			H

Semest	Subject Name	CO No.	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	
		CO-2		H								H	M	
		CO-3		H	M									
		CO-4			H									
		CO-5			H	H								
		CO-6				H								
		CO-7				H								
		Business Analytics (Visual)	CO-1		H									
	CO-2				H				H					
	CO-3				H				H					
	Leading Digital –Turning Technology into Business Transformation (incl. AI in Healthcare)	CO-1		H										
		CO-2		H		H								M
		CO-3		H		M								
		CO-4		H		H								H
		CO-5		M		H								
		CO-6		H		H								M
	Sales Management including Data Analytics	CO-1		H										
		CO-2		M	H									
		CO-3			H			H						
		CO-4						H						
		CO-5		H	H			M						
	Human Resource Management	CO-1		H	M									
		CO-2			H						H			
		CO-3									H			M
		CO-4			H						M			
	Consumer Behaviour	CO-1		H	M									
		CO-2			H									
		CO-3			H									
CO-4			M	H										
X	Financial Management II	CO-1		H	H			H					M	
		CO-2		H	M			H					H	
		CO-3		H	H			M					M	
	Predictive Analytics	CO-1			H				H					
		CO-2			H	H			H					
	Logistics & Supply Chain Management incl. Analytics & E-pharmacies	CO-1		H	H	H	H				H			M
		CO-2		M	H	H	M				M			M
		CO-3			M		H							
		CO-4		H		H	M							

Semest	Subject Name	CO No.	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	
	Introduction to Management Consulting Practice	CO-1		M			M	M		M			H	
		CO-2						M	M		M			
		CO-3			H			H	H					
		CO-4									H			H
		CO-5			H			H	H		H			H
	Entrepreneurship & New Ventures in Healthcare	CO-1			H	H		H			H			H
		CO-2			H			H						
		CO-3				H					H			H
		CO-4			M	M					M			
		CO-5						H			H			H
		CO-6				H					M			
	Corporate Social Responsibility	CO-1			M	M		M						H
		CO-2				H		H						H
		CO-3						M			H			H
	Marketing of Diagnostics	CO-1			H	H		H						M
		CO-2				M		M						
		CO-3			H	H		H						H
	International Marketing	CO-1			H			H						H
		CO-2			H			H						H
		CO-3			H	H					H			
		CO-4				H		H			H			H
	Marketing of Biosimilars & Specialty Products	CO-1			M	M		M						M
		CO-2				M		M						
		CO-3			H									H
	Marketing of Medical Devices	CO-1			H	H		H	H					M
		CO-2			M			H	H					H
		CO-3				H		H						H
		CO-4			H				H					H
		CO-5				M		M						H
	Quantitative Techniques for Forecasting & Decision Making	CO-1			H	H								
CO-2						H		H						
Marketing of Active Pharmaceutical Ingredients	CO-1			H	M	M								
	CO-2			M			H							
	CO-3				H	H							H	
	CO-4			H			H						H	