1. Course Outcomes (COs)

Course Name	Course Code	Course Outcomes	
B. Pharm 5th Sem			
Medicinal Chemistry II Theory	BP501T	**C501.1**	Classify antihistaminic (H1& H2 antagonist), anticancer drugs as well as write chemical structures, synthesis, MOA, & Correlate Chemical Structure with Biological Activity (SAR). *(Level 2)*
		C501.2	Describe general aspects of cardiovascular agents like antihypertensive, antianginal, diuretics, anti-arrhythmic CHF drugs, & classify the cardiovascular agents and explain their chemistry, Nomenclature, SAR, Mode of action, and chemical synthesis of important drugs. *(Level 3)*
		C501.3	Explain general aspects of Antihyperlipidemic drugs, coagulants anticoagulants and illustrate the stereochemistry, nomenclature general aspects of steroids; explain the need of synthetic steroids and their chemistry, SAR, metabolism and outline the synthesis of important drugs from Steroid and related classes. *(Level 3)*
		C501.4	Illustrate & Classify Diabetes mellitus and local anesthetic drugs, Describe the chemistry, Nomenclature, SAR, mode of action &synthesis of important drugs. *(Level 3)*
Industrial Pharmacy I Theory	BP502T	**C502.1**	Explain significance of physical and chemical properties of drug in design of dosage forms. To formulate and evaluate Liquid oral dosage forms. *(Level 2)*
		C502.2	Design and develop Tablet and Capsule dosage forms. Illustrate In-processing problems, perform IPQC testing and evaluation of Tablets & Capsules. *(Level 3)*
		C502.3	Illustrate the process of palletization technique. Explain the method of preparation and evaluation of Parenteral and Ophthalmic dosage forms. *(Level 3)*
		C502.4	Select propellant and other additives for design of Aerosol and Cosmeceutical products. Explain about the materials and stability aspects of packaging materials of

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			pharmaceutical products. *(Level 4)*
Pharmacology II Theory	BP503T	**C503.1**	Predict therapeutic targets based on the pathophysiology of cardiovascular diseases like CHF, angina pectoris, atherosclerosis, MI and arrhythmia, and recommend various drugs as therapeutic interventions in accordance with their pharmacological properties. *(Level 5)*
		C503.2	Explain the pharmacology of drugs affecting BP (antihypertensives and diuretics), blood coagulation, hemoglobin synthesis, plasma volume and nociception (NSAIDs and antiarthritic drugs). *(Level 5)*
		C503.3	Explain various types of bioassays and the pharmacology of drugs affecting autocoids. *(Level 5)*
		C503.4	Explain the pharmacology of drugs used for the disorders associated with the endocrine system. *(Level 5)*
Pharmacognosy and Phytochemistry II Theory	BP504T	**C504.1**	Illustrate the underlying mechanism of biosynthesis of plant secondary metabolites and applications of radioactive isotopes in biogenetic study. *(Level 2)*
		C504.2	Summarize and classify the composition, chemistry, bio-sources, therapeutic uses and commercial applications of secondary metabolites. *(Level 3)*
		C504.3	Select the methods of Isolation and Identification of Phytoconstituents. *(Level 4)*
		C504.4	Explain the modern methods of Industrial production, estimation and utilization of phytoconstituents. *(Level 3)*
Pharmaceutical Jurisprudence Theory	BP505T	**C505.1**	Describe the provisions and administration of the Drug and Cosmetics Act 1940 and its rules. *(Level 2)*
		C505.2	Explain the objectives, functions, composition, legislations and offences in the Pharmacy Act and Medicinal and Toilet Preparation Act. *(Level 3)*
		C505.3	Explain the objectives, functions, composition, legislations and offences in the Narcotic Drugs and Psychotropic Substances Act, Drugs and Magic Remedies Act, Prevention of Cruelty to Animals Act and National Pharmaceutical Pricing Authority (DPCO). *(Level 3)*
		C505.4	Illustrate the significance of core principles and

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			applicability of Indian pharmaceutical legislation, Code of Pharmaceutical ethics, Medical Termination of Pregnancy Act, Rights to Information and the Intellectual Property Rights. *(Level 4)*
Industrial Pharmacy I Practical	BP506P	**C506.1**	Relate the physicochemical properties of materials to dosage form characteristics. *(Level 3)*
		C506.2	Prepare formulations of various dosage forms as per the batch formula. *(Level 3)*
		C506.3	Evaluate different dosage forms by performing quality control tests. *(Level 4)*
		C506.4	Evaluate packaging systems for parenteral dosage form. *(Level 4)*
Pharmacology II Practical	BP507P	**C507.1**	**CO 507.1:** Evaluate the effects of drugs on cardiovascular system. *(Level 5)*
		C507.2	Evaluate the effects of drugs affecting cholinergic system using isolated tissues. *(Level 5).*
		C507.3	Estimate concentrations of drugs using various types of bioassays. *(Level 5)*
		C507.4	Evaluate analgesic, anti-inflammatory and spasmolytic activities of drugs. *(Level 5)*
Pharmacognosy and Phytochemistry II –Practical	BP508P	**C508.1**	Examine the morphology, histology and powder characteristics of the given crude drugs. *(Level 3)*
		C508.2	Extract, isolate and estimate the active constituents from the given crude drug. *(Level 4)*
		C508.3	Establish and employ TLC profile for he given phytoconstituents. *(Level 3)*
		C508.4	Experiment the distillation of volatile oil from the given crude drug & evaluate unorganised crude drugs on the basis of chemical test. *(Level 5)*
B. Pharm 6th Sem			
Medicinal Chemistry III Theory		**C601.1**	Reviewing historical background, nomenclature, stereochemistry, structure activity relationships, chemical degradation, development and modifications of drugs included in anti-microbials and their classes *(Level 5)*
		C601.2	Reviewing the therapeutic activity of agents in accordance to chemistry, structure activity relationships, chemical modification and synthesis of

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	BP601T		drugs for the diseases caused by microscopic causative agents. *(Level 5)*
		C601.3	Reviewing and predicting structural and therapeutic potentials of anti-infective agents in accordance to chemistry, structure activity relationships and synthesis. *(Level 5)*
		C601.4	Reviewing, predicting and designing the therapeutically active agents using computational approaches in perspective of antimicrobials. *(Level 5)*
Pharmacology III Theory	BP602T	**C602.1**	Predict therapeutic targets based on the pathophysiology of respiratory conditions like asthma, COPD, cough, and nasal congestion, and recommend various drugs as therapeutic interventions in accordance with their pharmacological properties. *(Level 5)*
		C602.2	Explain the basic principles of chronopharmacology, immunopharmacology and toxicology. *(Level 5)*
		C602.3	Explain the pharmacology of antiparasitic (antimalarial, antiamoebics and anthelmintics), antifungal, and antiviral drugs. *(Level 5)*
		C602.4	Explain the pharmacology of antibiotics, sulfonamides, fluoroquinolones, antimycobacterial agents, and anticancer drugs. *(Level 5)*
Herbal Drug Technology Theory	BP603T	**C603.1**	Reflect, enlist and identify differences between various types of preparations of plant origin besides their identification, authentication and processing steps through various quality control guidelines; evaluate good agricultural practices and classical systems of medicine like Ayurveda, Unani and Homeopathy and formulations thereof. *(Level 5)*
		C603.2	Reflect basic understanding and analysis of commercially available nutraceuticals (in general and also for major lifestyle related disorders like diabetes, CVS, cancer, IBS, GIT ailments) and herbal cosmetics (skin, hair and oral care), also their market share, raw material used to formulate these types of preparations; analyze and conclude various types of interactions involving herbs and food. *(Level 5)*
		C603.3	Grade and develop various conventional herbal formulations using optimum and compatible herbal

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			excipients depending on the need (like colorants, binders etc.) for formulating herbal syrups, tablets, mixtures and NDDS like phytosomes; reflect the importance and implementation of various federal guidelines (WHO & ICH) for evaluation and stability testing of herbal drugs. *(Level 6)*
		C603.4	Measure and evaluate the general and commercial aspects of herbal products in terms of IPR with some famous legal battles involving turmeric and neem; GMP related and other regulatory guidelines for manufacturing of products belonging to Indian system of medicine. *(Level 5)*
Biopharmaceutics and Pharmacokinetics Theory	BP604T	**C604.1**	Understand the concept of Pharmacokinetic Parameters (ADME) of drug in human body. *(Level 2)*
		C604.2	Apply the various regulations related to developing BA -BE study protocol for the new drug molecule. *(Level 3)*
		C604.3	Select the correct pharmacokinetic model that best describes the process of drug absorption, distribution, metabolism and elimination. *(Level 4)*
		C604.4	Determine various pharmacokinetic parameters from plasma and urinary excretion data applying compartment modelling and model independent methods. *(Level 6)*
Pharmaceutical Biotechnology Theory	BP605T	**C605.1**	Define biotechnology and state its importance in pharmaceutical sciences. Illustrate the basic techniques of enzyme immobilization, protein engineering, enzyme production, iosensors, and their applications in pharmaceutical sciences. *(Level 3)*
		C605.2	Explain the basic principles of recombinant DNA technology and polymerase chain reaction (PCR), and their applications in production of pharmaceuticals. Illustrate about the structure and functions of immunoglobulins, major histocompatibility complex, hypersensitivity reactions, immune stimulation and immune suppression. (*Level 3)*
		C605.3	Explain the production of vaccines and monoclonal antibodies. Describe and differentiate between various immunoblotting techniques, microbial genetics, biotransformation reactions, genetic organization of the

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			prokaryotes and eukaryotes, and various mutations and mutants. *(Level 4)*
		C605.4	Explain about fermentation technology, its applications in pharmaceutical industry, and the process of collection, processing, and storage of blood products and plasma substitutes. *(Level 3)*
Quality Assurance –Theory	BP606T	**C606.1**	CO 606.1: Describe the different aspects of Quality assurance viz. QMS, GMP, QbD, TQM, NABL, ISO with special emphasis on ICH stability testing guidelines. *(Level 2)*
		C606.2	Elaborate in detail about premises, personnel training and responsibilities, purchase and maintenance of equipment and raw material with QC testing of container, closures, and packaging material. *(Level 2)*
		C606.3	Elucidate the process, principle, scope and importance of GLP and Calibration, Qualification and validation along with demonstration on instrument. *(Level 3)*
		C606.4	Explain the documentation in pharma industry, warehousing practices, material management, drug recall and evaluation of complaints. *(Level 2)*
Medicinal chemistry III Practical	BP607P	**C607.1**	To Synthesize, recrystallize and understand reaction mechanisms involved in synthesis of medicinally important organic compound. Synthesize medicinally important organic compounds using microwave assisted organic synthesis. *(Level 3)*
		C607.2	To the assay of drug and drug products and calculate the % purity of the same. *(Level 4)*
		C607.3	To Draw structures and reactions using chem draw®. *(Level 3)*
		C607.4	To understand and calculate physiochemical properties of drug molecule by using (Lipinski's RO5). *(Level 3)*
Pharmacology III Practical		**C608.1**	Explain the basic principles and applications of the toxicity studies, pharmacokinetic studies, and bioassays conducted to test the effect of drugs on the gastrointestinal system, respiratory system and blood parameters after precisely calculating the dose of a drug. *(Level 5)*
		C608.2	Calculate the dose of a drug for the experiments, and test the effects of drugs on the gastrointestinal system,

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	BP608P		respiratory system and blood parameters as well as the toxic effects. *(Level 5)*
		C608.3	Evaluate and interpret the effects of drugs on the gastrointestinal system, respiratory system and blood parameters as well as the toxic effects. *(Level 5)*
		C608.4	Explain the in-depth understanding of the experiments related to the dose calculation, effect of drugs on the gastrointestinal system, respiratory system and blood parameters, pharmacokinetic studies, toxicity studies and biostatistics methods. *(Level 5)*
Herbal Drug Technology Practical	BP609P	**C609.1**	In position to evaluate various herbal/Ayurvedic preparations besides evaluation of herbal excipients and herbal cosmetics. *(Level 5)*
		C609.2	Able to analyze and detect presence or absence of various primary and secondary metabolites in given samples of herbal origin through preliminary phytochemical screening. *(Level 5)*
		C609.3	To perform quantitative analysis of various markers like phenolics, alkaloids and aldehydes. *(Level 5)*
		C609.4	To formulate and evaluate herbal syrups, mixtures and tablets as per procedure prescribed in official books. *(Level 5)*

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