Chandigarh College of Pharmacy

Vision of Chandigarh College of Pharmacy	
"To emerge as the most preferred educational institution with global recognition, developing competent and socially sensitive pharmaceutical professionals committed to excellence"	
Mission of Chandigarh College of Pharmacy	
M1	To create facilities and ambience for advance level of pharmaceutical teaching and practical skills.
M2	To constantly strive for research, development & innovation in pharmaceutical sciences, thereby providing the faculty & students the right platform to showcase their talent &achieve laurels.
M3	To collaborate with industry, academia, and healthcare organizations that ensures the best placement opportunities, promote entrepreneurial development activities, and also provides international exposure.
M4	To make students socially vibrant and committed pharmaceutical professionals.

CHANDIGARH COLLEGE OF PHARMACY
Building Careers. Transforming Lives.

Chandigarh College of Pharmacy

Programme Outcomes (POs) for B. Pharmacy

PO1.	**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.
PO2.	**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.
PO3.	**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.
PO4.	**Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.
PO5.	**Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well-being.
PO6.	**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).
PO7.	**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.
PO8.	**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.
PO9.	**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.
PO10.	**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.
PO11.	**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-access and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Programme Specific Outcomes (PSOs) for B. Pharmacy

PSO1	To provide students with theoretical and practical knowledge across various pharmaceutical science disciplines, including Pharmaceutics, Pharmacology, Pharmacognosy, and Pharmaceutical Chemistry.
PSO2	To produce pharmacy graduates with employable skills and high technical competence in pharmaceutical industry and healthcare sector.
PSO3	To inculcate research activity and develop passion for discovery and innovations.
PSO4	To develop entrepreneurship qualities that support growth of pharmaceutical intellectual property and contribute for economic development throughout the world.

Course Outcomes (B. Pharmacy)

B. Pharmacy 1st Semester	
After the completion of the course, students will be able to	
Human Anatomy and Physiology I–Theory (BP101T) :C101	
Course Code	**Course Outcomes**
C101.1	explain the gross morphology, structure and functions of various organs of the human body
C101.2	identify various tissues and organs of different systems of human body.
C101.3	describe the various homeostatic mechanisms and their imbalances.
C101.4	analyze the importance of blood, lymphatic system and immunity in human body.
C101.5	elaborate the coordinated working pattern of different organs of each system.
C101.6	determine the anatomy and physiology of heart and blood vessels.
	Pharmaceutical Analysis I –Theory (BP102T) : C102
C102.1	identify the different types of errors and minimizing errors methods.
C102.2	describe the theory of volumetric and electrochemical analysis.
C102.3	summarize the methods for preparation and standardization of various solutions.
C102.4	explain the importance of assay in analytical chemistry.
C102.5	apply various types of analytical techniques.
	Pharmaceutics I – Theory (BP103T) :C103
C103.1	summarize the historical background and profession of pharmacy and basics of pharmaceutical dosage forms.
C103.2	utilize the importance of prescription and posology.
C103.3	solve pharmaceutical calculations and understand the formulation of powders and liquid dosage forms.
C103.4	analyze monophasic and biphasic liquid dosage forms.
C103.5	explain the concepts of suppositories and pharmaceutical incompatibilities.
C103.6	evaluate semi-solid dosage form for various marketed preparations.
	Pharmaceutical Inorganic Chemistry –Theory (BP104T) : C104
C104.1	summarize the concept of pharmacopeia and its editions.
C104.2	identify the sources of impurities and methods to determine the impurities in inorganic pharmaceuticals.
C104.3	build knowledge on limit tests of different pharmaceutical inorganic compounds.
C104.4	evaluate the methods to prepare inorganic pharmaceuticals.
C104.5	justify the medicinal importance of acidifiers, antacids, cathartics and antimicrobial agents as gastrointestinal agents.
C104.6	explain the handling and applications of radiopharmaceuticals.
	Communication skills – Theory (BP105T) : C105
C105.1	explain the behavioral needs for a pharmacist to function effectively in the areas of pharmaceutical operation.

C105.2	utilize communication effectively (Verbal and Non-Verbal).
C105.3	build effectively manage the team as a team player.
C105.4	explain Do's and Don'ts of an interview.
C105.5	analyze communication skills and other interpersonal skills.
C105.6	develop Leadership qualities and essentials.
	Remedial Biology– Theory (BP106RBT) :C106
C106.1	identify the characters of living organisms and classification of kingdom.
C106.2	utilize basic knowledge on morphology and functions of various plant parts such as root, stem, leaf, flower, fruit and seed.
C106.3	analyze functions of organs in the cardiovascular, digestive and respiratory systems of the human body.
C106.4	explain the physiology of brain and spinal cord and role of kidney in regulation of body fluids along with process of Excretion.
C106.5	examine the role of hormones in regulation of various organs functioning in the body and process of oogenesis and spermatogenesis.
C106.6	evaluate cardiovascular system and blood flow to various organs.
	Remedial Mathematics –Theory (BP106RMT) : C107
C107.1	explain logramithic function, classification and limit of a function.
C107.2	solve the system of linear equation by matrics algebra.
C107.3	find the derivative of functions and its various applications.
C107.4	inspect the straight line using analytical geometry.
C107.5	evaluate the integral of functions and its various applications.
C107.6	apply laplace Transform to solve linear differential equations.
	Human Anatomy and Physiology I–Practical (BP107P) :C108*
C108*.1	demonstrate handling of compound microscopes and identify various animal tissues.
C108*.2	determine the characteristics of different bones (skeletal system).
C108*.3	identify the bleeding/clotting time and blood group.
C108*.4	analyze the blood cells using hemocytometry.
C108*.5	estimate the haemoglobin concentration of human blood and blood pressure.
C108*.6	predict the erythrocyte sedimentation rate of human blood and heart rate/ pulse rate.
	Pharmaceutical Analysis I –Practical (BP108P) : C109*
C109*.1	explain the importance of calibration, calibration of weights, pipette and burette in pharmaceutical analysis.
C109*.2	determine the principle of limit tests for various impurities.
C109*.3	demonstrate Preparation and standardization of solutions with different strengths.
C109*.4	evaluate volumetric analysis such as Acid-base titration, Redox titration, iodometry, complexometric, precipitation, and non-aqueous titration.
C109*.5	analyze the given Compounds along with standardization of titrant.
C109*.6	analyze pharmaceuticals by electro-analytical methods.
	Pharmaceutics I –Practical (BP109P) :C110*
C110*.1	apply the principles used in the preparation of solid, liquid and semi solid dosage forms.

C110*.2	experiment with monophasic liquid dosage forms for internal and external administration.
C110*.3	evaluate and prepare biphasic liquid dosage forms.
C110*.4	demonstrate preparation of powders and granules.
C110*.5	explain the methods for preparation of semi solid dosage forms and suppositories.
	Pharmaceutical Inorganic Chemistry –Practical (BP110P) :C111
C111*.1	analyze the sources of impurities and perform limit test for various impurities.
C111*.2	demonstrate different identification test as per pharmacopeia.
C111*.3	explain the different methods for analysis of inorganic compounds.
C111*.4	summarize the pharmaceutical importance of inorganic compounds.
C111*.5	evaluate the method of preparation, assay, properties and medicinal uses of inorganic compounds.
C111*.6	determine monograph of inorganic compounds.
	Communication skills – Practical (BP111P) : C112
C112*.1	explain the behavioral needs for a pharmacist to function effectively in the areas of pharmaceutical operation.
C112*.2	utilize the practical skills for effective communication (Verbal and Nonverbal).
C112*.3	distinguish pronunciation of vowel and consonant sounds.
C112*.4	explain about advanced learning on comprehension direct and indirect speech.
C112*.5	develop the interview handling skills.
C112*.6	explain and improve in email etiquette.
	Remedial Biology– Practical (BP112RBP) : C113
C113*.1	explain the concept of handling of microscope and permanent slide preparation techniques.
C113*.2	develop knowledge about the structure of cell and its inclusions.
C113*.3	identify various plant parts, and to organize their modifications.
C113*.4	categorize the physiology of frog by using computer model.
C113*.5	explain about microscopical study and identification of tissues pertinent to stem, root, leaf, seed, fruit and flower.
C113*.6	compile information about the bones their identification, blood group, blood pressure and tidal volume determination.

Note : * stands for practical

B. Pharmacy 2nd Semester	
Human Anatomy and Physiology II–Theory (BP201T) :C201	
After the completion of the course, students will be able to	
Course Code	**Course Outcomes**
C201.1	utilize the basic knowledge about central nervous system including nervous tissue, brain and spinal cord.
C201.2	explain the structure and functions of gastrointestinal tract and to learn about adenosine triphosphate and body mass ratio
C201.3	elaborate about structure and functions of respiratory system and various mechanisms involved in regulation of respiration.
C201.4	discuss the anatomy of urinary system and physiology of urine formation.
C201.5	examine the essentiality of endocrine glands and their hormones.
C201.6	determine the physiology of male and female reproductive organs and concepts of genetics.
	Pharmaceutical Organic Chemistry I – Theory (BP202T) :C202
C202.1	identify the nomenclature, properties, reactions and uses of organic compounds.
C202.2	determine the reaction, name the reaction and orientation of the reactions.
C202.3	utilize the knowledge for the identification of organic compounds.
C202.4	summarize the chemistry and reactions of various organic compounds.
C202.5	explain the reactivity and stability of compounds.
C202.6	illustrate the applications of pharmaceutical organic compounds.
	Biochemistry – Theory (BP203T) :C203
C203.1	utilize the significance of carbohydrates, lipids, nucleic acids, proteins and amino acids.
C203.2	explain the metabolism of nutrient molecules in physiological and pathological conditions.
C203.3	identify the catalytic role of enzymes, importance of enzyme inhibitors in design of new drugs.
C203.4	determine the genetic organization of mammalian genome and functions of DNA in the synthesis of RNAs and proteins.
C203.5	evaluate the causes, manifestations and diagnosis of metabolic disorders.
C203.6	analyze chemical laboratory methods to diagnose various diseases.
	Pathophysiology – Theory (BP204T) :C204
C204.1	identify basic principles of cell injury and inflammation.
C204.2	illustrate the concept of hypersensitivity reactions.
C204.3	explain pathophysiology involved in Cardiovascular System, Respiratory system, Renal system diseases.
C204.4	assess etiology, pathogenesis and sign symptoms of diseases associated with bone liver and cancer.
C204.5	determine various diseases which cover endocrine, nervous and GI system.
C204.6	evaluate pathophysiology of various infectious diseases.
	Computer Applications in Pharmacy – Theory (BP205T) :C205

C205.1	utilize different types of databases, applications of computers and databases in pharmacy.
C205.2	explain the concept of number system in computers.
C205.3	make use of web technologies such as HTML, XML, CSS, programming languages Web servers and pharmacy drug database.
C205.4	assess the applications of computers in pharmacy such as lab diagnostic system, patient monitoring system and pharma information system.
C205.5	influence of bioinformatics in vaccine discovery.
C205.6	elaborate the applications of computers for data analysis in preclinical drug development.
	Environmental sciences – Theory (BP206T) : C206
C206.1	explain basic knowledge on environment and its allied problems.
C206.2	identify the natural, renewable and non-renewable resources and the problems associated with them.
C206.3	build the learners to participate in environment protection and improvement.
C206.4	analyze the concepts of eco system including structure and functions.
C206.5	determine skills in identifying and solving environmental problems.
C206.6	develop an attitude of concern for the environment.
	Human Anatomy and Physiology II –Practical (BP207P) : C207*
C207*.1	demonstrate about the physiology of special senses using specimens.
C207*.2	explain coordinating working of organs of various systems with the help of models, charts and specimens.
C207*.3	analyze the functions of cranial nerves by various sensory and motor functions.
C207*.4	evaluate temperature and body mass index of human body.
C207*.5	analyze tidal volume and vital capacity of given subject.
C207*.6	demonstrate about family planning devices, pregnancy diagnostic tests, tissues of vital organs and gonads.
	Pharmaceutical Organic Chemistry I– Practical (BP208P) :C208*
C208*.1	explain the qualitative preliminary test for unknown pharmaceutical organic compounds.
C208*.2	identify the presence of elements in the pharmaceutical organic compounds.
C208*.3	interpret the presence of several functional groups in pharmaceutical organic compounds.
C208*.4	construct Stereo Models of different compounds.
C208*.5	analyze unknown pharmaceutical organic compounds by determining their melting point and boiling point.
C208*.6	characterize the derivatives of organic compounds.
	Biochemistry – Practical (BP209P) : C209
C209*.1	analyze the qualitative behaviour of carbohydrates and proteins.
C209*.2	illustrate the preparation and measurement of pH of given buffer solution.
C209*.3	identify the amount of reducing sugars by DNSA method and proteins by Biuret method.
C209*.4	examine the constituents present in Urine and their clinical significance.
C209*.5	determine the effect of temperature and substrate concentration on salivary amylase activity.
C209*.6	elaborate the clinical significance of creatinine, sugar and cholesterol in blood.
	Computer Applications in Pharmacy – Practical (BP210P) :C210*

C210*.1	explain about MS Office, MS Word, MS Excel, MS Access and MS Power point.
C210*.2	develop the paradigms of program using languages C and SQL.
C210*.3	summarize and printing the report from patient database.
C210*.4	design a questionnaire using a word processing package to gather information about a particular disease.
C210*.5	create HTML web page to show personal informationandmailing labels in MS WORD using Label Wizard.

Note : * stands for practical

B. Pharmacy 3rd Semester	
Pharmaceutical Organic Chemistry II – Theory (BP301T): C301	
After the completion of the course, students will be able to	
Course Code	**Course Outcomes**
C301.1	explain aromaticity, method of preparation, chemistry and reactions of aromatic compounds.
C301.2	identify the structure, name and the type of isomerism of the organic compound.
C301.3	analyze the name and orientation of reactions.
C301.4	determine the stability and classification of the organic compounds.
C301.5	assess the chemistry of phenols, aromatic amines and aromatic acids.
C301.6	evaluate the concept of hydrolysis, hydrogenation, saponification and rancidity of oils.
	Physical Pharmaceutics I – Theory (BP302T): C302
C302.1	identify various physiochemical properties of drug molecule to design dosage forms.
C302.2	explain about pH and buffers including their use in the stabilization of pharmaceutical formulations.
C302.3	determine the principle of interfacial tension and the applications of surface-active agents in drug solubilization.
C302.4	discuss the principles of diffusion in biological systems.
C302.5	apply the concepts of complexation and protein binding in pharmacy.
C302.6	evaluate the significance of physical properties of drug molecules.
	Pharmaceutical Microbiology – Theory (BP303T): C303
C303.1	explain the scope of microbiology and its classification.
C303.2	illustrate the importance and implementation of sterilization in pharmaceutical processing and industry.
C303.3	utilize the knowledge in identification, cultivation and preservation of various microorganisms.
C303.4	analyze the microbiological standardization of pharmaceuticals.
C303.5	choose the cell culture technology and microbial characters for the pharmaceutical industry.
C303.6	assess the microbiological testing protocols.
	Pharmaceutical Engineering – Theory (BP304T): C304
C304.1	illustrate various unit operations used in pharmaceutical industries.
C304.2	explain the material handling techniques.
C304.3	categorize various processes involved in the pharmaceutical manufacturing process.
C304.4	evaluate various tests to prevent environmental pollution.
C304.5	analyze significance of plant layout design for optimum use of resources.
C304.6	apply various preventive methods used for corrosion control in pharmaceutical industries.
	Pharmaceutical Organic Chemistry II – Practical (BP305P): C305
C305*.1	demonstrate recrystallization of organic compounds.
C305*.2	compare two immiscible liquids for solubility.
C305*.3	explain Synthesis of organic compounds by using different mechanisms.

C305*.4	demonstrate use of various laboratory techniques used in handling of glassware.
C305*.5	explain standardization of different reagents.
C305*.6	apply knowledge of different electrophilic aromatic substitutions reactions like bromination, nitration in monosubstituted aromatic compounds.
	Physical Pharmaceutics I – Practical (BP306P): C306
C306*.1	interpret the significance of physicochemical properties in the design of dosage forms.
C306*.2	determine Freundlich-Langmuir constant using activated charcoal.
C306*.3	apply Henderson – Hasselbalch equation for interpretation of pKa value of drugs.
C306*.4	determine the surface tension of sample liquids by drop count and drop weight methods.
C306*.5	deduct the HLB value and critical micellar concentration of a surfactant.
C306*.6	evaluate the stability constants of complexes by solubility and pH titration methods.
	Pharmaceutical Microbiology – Practical (BP307P): C307*
C307*.1	explain different techniques of sterilization.
C307*.2	demonstrate various staining methods – simple, gram staining and acid-fast staining.
C307*.3	interpret the results of microbial testing.
C307*.4	test for possible microbial contaminants.
C307*.5	evaluate the amount of biomass in the given sample.
C307*.6	apply the correct method used to test microbes.
	Pharmaceutical Engineering – Practical (BP308P): C308*
C308*.1	explain the concept of radiation and heat transfer.
C308*.2	describe the detailed concept of filtration and centrifugation.
C308*.3	examine the crystallization and humidification techniques.
C308*.4	interpret the significance of material handling for industrial hazard.
C308*.5	estimate moisture content, loss on drying and drying curves for calcium carbonate and starch.

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B. Pharmacy 4th Semester	
Pharmaceutical Organic Chemistry III– Theory (BP401T) : C401	
After the completion of the course, students will be able to	
Course Code	**Course Outcomes**
C401.1	apply the methods of preparation of organic compounds.
C401.2	explain the stereochemical aspects of organic compounds.
C401.3	illustrate the applications for organic molecules in medicine and other fields.
C401.4	discover the knowledge of stereo chemical reactions.
C401.5	analyze the mechanism of various synthetic reactions.
C401.6	evaluate the reactions and mechanism of heterocyclic compounds.
	Medicinal Chemistry I –Theory (BP402T) : C402
C402.1	identify the chemistry of drugs concerning their pharmacological activity.
C402.2	examine the drug metabolic pathways, adverse effect and therapeutic value of drugs.
C402.3	analyze the Structural Activity Relationship (SAR) of different classes of drugs.
C402.4	classify the drugs based on their mechanism of action and clinical uses.
C402.5	illustrate the chemical synthesis of some drug.
C402.6	apply the knowledge of medicinal uses of compounds for treatment of diseases.
	Physical Pharmaceutics II –Theory (BP403T) : C403
C403.1	examine various physicochemical properties of drug molecules in designing colloidal dispersions
C403.2	discover the concept of flow of fluids and deformation of solids.
C403.3	utilize the micromeritics methods for determining surface area & derived properties of powders.
C403.4	analyze the basic coarse dispersion medium through (suspension and emulsion).
C403.5	evaluate surface tension, viscosity, specific surface area and particle size distribution of given drug.
C403.6	apply principles of chemical kinetics for stability testing and determination of expiry date of formulations.
	Pharmacology I – Theory (BP404T) : C404
C404.1	identify the pharmacological actions of different categories of drugs.
C404.2	explain the mechanism of drug action at organ system/sub cellular/ macromolecular levels.
C404.3	apply the basic pharmacology in the prevention and treatment of various diseases.
C404.4	analyze the effect of drugs on animals by simulated experiments.
C404.5	identify correlation of pharmacology with other bio medical sciences.
C404.6	determine the pharmacology of Psychopharmacological agents.
	Pharmacognosy and Phytochemistry I– Theory (BP405T) : C405
C405.1	identify the basic concept of crude drugs along with its classification and quality control parameters.
C405.2	utilize the basic technique of cultivation, collection processing and storage of crude drugs.

C405.3	explain the meaning & significance of pharmacognostic parameters and scheme of study of crude drugs.
C405.4	evaluate the concept of crude drugs along with emphasis on PTC.
C405.5	apply primary and secondary metabolites for crude drug identification.
C405.6	examine various secondary metabolites along with plant products.
	Medicinal Chemistry I –Practical (BP406P) : C406
C406*.1	perform the synthesis of various medicinal compounds.
C406*.2	demonstrate assay procedures of selected drugs and medicinal compounds.
C406*.3	illustrate synthesis of drug intermediates.
C406*.4	estimate partition coefficient of drugs.
C406*.5	determine the melting point and recrystallisation of the drugs.
C406*.6	predict the basic requirements for synthesis and assay of drugs.
	Physical Pharmaceutics II – Practical (BP407P) : C407
C407*.1	choose a good suspending agent for the preparation of a stable suspension.
C407*.2	interpret the shelf life of a given formulation by accelerated stability studies.
C407*.3	make use of derived and flow properties of powders for stable solid formulation.
C407*.4	distinguish the rate constants as per the chemical reaction.
C407*.5	determine the viscosity using Ostwald's and Brookfield's viscometer.
C407*.6	evaluate of reaction rate constant first order and second order.
	Pharmacology I – Practical (BP408P) : C408*
C408*.1	apply CPCSEA guidelines for maintaining common laboratory techniques .
C408*.2	identify the different routes of drug administration in animals.
C408*.3	interpret the effects of various drugs on rabbit eye and ciliary motility of frog oesophagus in correlation with human.
C408*.4	analyze the effect of drugs acting as enzyme inducers, skeletal muscle relaxants and affecting locomotor activity in laboratory animals.
C408*.5	evaluate the stereotype and anticatatonic activity of drugs in rats/mice.
C408*.6	predict various screening models for anticonvulsant and anxiolytic activity.
	Pharmacognosy and Phytochemistry I – Practical (BP409P) : C409*
C409*.1	explain the concept of chemical test of herbal drugs.
C409*.2	apply the methodology involved in Lycopodium spore method.
C409*.3	demonstrate significance of extractive values in Pharmacognosy.
C409*.4	examine ash value of different drugs to determine purity.
C409*.5	estimate swelling index & foaming index by using different methods.
C409*.6	select different morphological and microscopical characteristic features of crude drugs.

Note : * stands for practical

B. Pharmacy 5th Semester	
Medicinal Chemistry II –Theory (BP501T) : C501	
After the completion of the course, students will be able to	
Course Code	**Course Outcomes**
C501.1	apply the chemistry of drugs for their pharmacological activity.
C501.2	explain the drug metabolic pathways, adverse effect and therapeutic value of drugs.
C501.3	determine the Structural Activity Relationship of different classes of drugs.
C501.4	categorized of drugs obtained by natural and synthetic route.
C501.5	illustrate the chemical synthesis of selected drugs.
C501.6	examine the significance, advantages and limitations of drugs.
	Industrial Pharmacy I– Theory (BP502T) : C502
C502.1	outline the various pharmaceutical dosage forms and their manufacturing techniques.
C502.2	identify various considerations in development of pharmaceutical dosage forms.
C502.3	explain the formulation, manufacturing, coating, and quality control tests of tablets.
C502.4	determine the various formulation and manufacturing considerations of liquid orals.
C502.5	analyze the preparation and quality control of parenterals and ophthalmic preparations.
C502.6	illustrate the pharmaceutical aspects of capsules and pellets.
	Pharmacology II – Theory (BP503T) : C503
C503.1	explain the relative pros and cons in the use of drugs for various cardiac complications.
C503.2	illustrate the drugs acting on hematopoietic system, shock diuretics and anti-diuretics.
C503.3	identify the role of autocoids and related drugs.
C503.4	analyze the drugs acting on the endocrine system.
C503.5	determine the physiological role of sex hormones and assess the effects of oral contraceptives and drugs acting on the uterus.
C503.6	evaluate the principles of bioassay for dose determination of various drugs.
	Pharmacognosy and Phytochemistry II– Theory (BP504T) : C504
C504.1	explain the concept of modern extraction techniques, characterization, identification of the herbal drugs and phytoconstituents.
C504.2	design methods of herbal drug analysis, Quality control parameter as per WHO guidelines.
C504.3	determine properties, methods of extraction, of carbohydrates, lipids, and proteins along with applications
C504.4	examine the various concepts of herbal drug interactions.
C504.5	identify the metabolic pathway in higher plants and their biogenetic studies.
C504.6	apply chromatographic& non chromatographic separation methods for different phytoconstituents.
	Pharmaceutical Jurisprudence – Theory (BP505T) : C505
C505.1	explain the pharmaceutical legislations and their implications in the development and marketing of pharmaceuticals.

C505.2	apply various Indian pharmaceutical Acts and Laws.
C505.3	evaluation of regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals.
C505.4	utilize code of ethics during the pharmaceutical practice.
C505.5	appraise intellectual property laws and legislations in india.
C505.6	elaborate the significance of Drugs and cosmetics act 1940 and its rules 1945 in relation to import and manufacture of drugs.
	Industrial Pharmacy I – Practical (BP506P) : C506
C506*.1	apply physicochemical properties of drugs to characterize different dosage forms.
C506*.2	formulate and prepare tablets , capsules and cosmetics using established procedures and technology.
C506*.4	analyze stability of tablets by using different quality control tests.
C506*.5	Interpret quality of eye drops and eye ointments.
C506*.6	estimate quality control test on parenteral.
	Pharmacology II – Practical (BP507P) : C507*
C507*.1	summarize importance of physiological salt solutions and the effect of various drugs on isolated frog heart, blood pressure and heart rate of dog.
C507*.2	illustrate the diuretic activity of drugs in mice/rats.
C507*.3	identify the dose response relationship, effect of drugs on DRC and drug concentrations by various bioassay methods using animal simulator software.
C507*.4	categorize the PA_2 and PD_2 value of drugs using rat anococcygeal muscle and guinea pig ileum.
C507*.5	interpret the effect of spasmogens and spasmolytics using rabbit jejunum.
C507*.6	explain various screening models for analgesic and anti- inflammatory.
	Pharmacognosy and Phytochemistry II –Practical (BP508P) : C508*
C508*.1	analyze the wide variety of the crude drugs and their sources by Chemical test.
C508*.2	explain the concept of TLC of crude drugs.
C508*.3	evaluate the powdered crude drug samples by morphological and microscopical characteristics, histological characterization.
C508*.4	predict the crude drug by performing chromatographic techniques.
C508*.5	examine Isolation & Detection of active components from herbal drugs.

Note : * stands for practical

B. Pharmacy 6th Semester	
Medicinal Chemistry III – Theory (BP601T) : C601	
After the completion of the course, students will be able to	
Course Code	**Course Outcomes**
C601.1	explain the importance of drug design and different techniques of drug design.
C601.2	identify the chemistry of drugs concerning their biological activity.
C601.3	determine the metabolism, adverse effects and therapeutic value of drug
C601.4	analyze the importance of SAR of drugs.
C601.5	elaborate the classification and nomenclature of drugs of natural and synthetic origin
C601.6	examine the concept of prodrugs and their importance.
	Pharmacology III – Theory (BP602T) : C602
C602.1	identify the mechanism of drug action and its relevance in the treatment of different infectious diseases.
C602.2	explain the principles of toxicology and treatment of various poisonings.
C602.3	evaluate the correlation of pharmacology with related medical sciences.
C602.4	illustrate the list of drugs used in respiratory and gastrointestinal complications.
C602.5	determine the biological clock and its significance leading to chronotherapy.
C602.6	analyze the chemotherapy of UTI's, STD's, anti-cancer drugs and to categorize the immunopharmacology.
	Herbal Drug Technology – Theory (BP603T) : C603
C603.1	utilize raw material as the source of cultivation to transformed herbal drug product.
C603.2	examine the WHO and ICH guidelines for the evaluation of herbal drugs.
C603.3	identify the herbal cosmetics, natural sweeteners, and nutraceuticals.
C603.4	determine the different patenting herbal drugs and GMP.
C603.5	analyze various herbal formulations concerning their stability and utilization aspects.
C603.6	illustrate the scope and future prospects of the herbal drug industry.
	Biopharmaceutics and Pharmacokinetics – Theory (BP604T) : C604
C604.1	explain the basic concepts of absorption, distribution, metabolism and excretion of drugs.
C604.2	examine the mechanism, and various factors affecting drug absorption, distribution, metabolism, and excretion of drugs.
C604.3	utilize the pharmacokinetic models for determination of pharmacokinetic parameters
C604.4	analyze the bioavailability of drug and to compare the bioequivalence between drug products.
C604.5	evaluate various pharmacokinetic parameters for the drugs exhibiting saturation kinetics.
C604.6	determine the dosage regimens of the drugs using pharmacokinetic and bio pharmacokinetic parameters.
	Pharmaceutical Biotechnology – Theory (BP605T) : C605
C605.1	identify the basic concepts of biotechnology concerning enzyme technology, microbial technology, genetic engineering protein engineering and PCR.

C605.2	analyze the steps involved in the development of biosensors, recombinant products, and concepts of immunology.
C605.3	outline the production parameters important in pharmaceutical product development using principles of biotechnology.
C605.4	compare the genetic organization of different types of cells and to list detection methods at genomic level, gene transfer methods and mutagens.
C605.5	explain general requirements of fermentative production and biotechnological production of pharmaceuticals.
C605.6	elaborate microbial genetics, biotransformation, and various immunological products.
	Quality Assurance –Theory (BP606T) : C606
C606.1	determine the concepts of quality assurance, quality management and ICH guidelines.
C606.2	explain the ISO, NABL and QbD concepts in pharmaceutical industry.
C606.3	identify the organization and personnel responsibilities.
C606.4	categorize the cGMP aspects in the pharmaceutical industry.
C606.5	estimate the importance of documentation in pharmaceutical industry.
C606.6	analyze the responsibilities of QA & QC departments.
	Medicinal chemistry III – Practical (BP607P) : C607*
C607*.1	elaborate reaction mechanisms involved in synthesis of medicinally important organic compound.
C607*.2	synthesize medicinally important organic compounds using microwave assisted organic synthesis
C607*.3	determine the molar refractivity of compounds.
C607*.4	explain the method for assay of drugs by quantitative analysis
C607*.5	estimate the tools needed for drawing structures and reactions
C607*.6	predict the relationship between physicochemical properties and biological activity
	Pharmacology III – Practical (BP608P): C608*
C608*.1	prepare doses for animals' studies and stock solution
C608*.2	explain various guidelines involved in ethical research
C608*.3	build knowledge regarding the animal models involved in various diseases
C608*.4	analysis of results in animal experiments by using biostatistics
C608*.5	apply the method for pyrogen testing in rabbits.
	Herbal Drug Technology – Practical (BP609P): C609*
C609*.1	classify different preliminary phytochemical screening of crude drugs.
C609*.2	evaluate the various herbal formulations by using different test.
C609*.3	apply monographic analysis of herbal drugs as per pharmacopoeias.
C609*.4	compare parameters such as aldehyde and phenol contents.
C609*.5	measure the total alkaloid content in leaves.

Note : * stands for practical

B. Pharmacy 7th Semester	
Instrumental Methods of Analysis – Theory (BP701T): C701	
After the completion of the course, students will be able to	
Course Code	**Course Outcomes**
C701.1	identify the theoretical concept of interaction of matter with electromagnetic radiations and its applications in drug analysis.
C701.2	summarize the basic principles and instrumentation of UV, IR, fluorimeter, and flame photometer.
C701.3	illustrate the chromatographic separation and analysis of drugs.
C701.4	explain the quantitative & qualitative analysis of drugs using various analytical instruments.
C701.5	apply the knowledge of separation of molecules using electrophoretic techniques.
C701.6	outline the applications of various chromatographic techniques for organic, inorganic and natural products.
	Industrial Pharmacy II – Theory (BP702T): C702
C702.1	identify the process of pilot plant and scale up of pharmaceutical dosage forms.
C702.2	utilize the process of technology transfer from lab scale to commercial batch.
C702.3	analyze different Laws and Acts that regulate the pharmaceutical industry.
C702.4	determine the approval process and regulatory requirements for drug products.
C702.5	explains pilot plant scale up techniques and SUPAC guidelines.
C702.6	outline various aspects of technology transfer involved from R & D to productions.
	Pharmacy Practice – Theory (BP703T): C703
C703.1	examine the various drug distribution methods in a hospital.
C703.2	explain the pharmacy stores management and inventory control.
C703.3	construct the drug therapy of patient through medication chart review and clinical review.
C703.4	interpret medication history interview and counsel the patients.
C703.5	identify drug related problems and adverse drug reactions.
C703.6	apply the concept of rational drug therapy.
	Novel Drug Delivery System – Theory (BP704T): C704
C704.1	utilize various approaches for the development of novel drug delivery systems.
C704.2	explain about rate controlling polymers and penetration enhancers for development of transdermal drug delivery system.
C704.3	develop the criteria for the selection of drugs and polymers for the development of novel drug delivery systems.
C704.4	outline the concepts of formulation and evaluation of oral, mucosal and implantable drug delivery system.
C704.5	summarize the importance of site-specific drug delivery systems or devices for ocular and intra uterine routes.

C704.6	estimate the rate and maximize therapeutic compliance of site-specific drug delivery systems by modifying conventional dosage forms.
	Instrumental Methods of Analysis – Practical (BP705P): C705*
C705*.1	demonstrate various chromatographic separation techniques for analysis of drugs.
C705*.2	interpret UV and IR spectra of given compounds.
C705*.3	estimate drugs in analytical chemistry.
C705*.4	evaluate different drug samples by UV-visible spectrophotometer and HPLC.
C705*.5	apply various types of analytical techniques in drug detection .
C705*.6	predict the effect of solvent on absorption maxima for given compounds.
	Practice School (BP706PS): C706*
C706*.1	explain the importance of realistic learning through practice in various domains such as community pharmacy, drug testing and manufacturing, preclinical testing, clinical practice, patent filing, etc.
C706*.2	improve knowledge and skills related to practical learning in the domain of interest.
C706*.3	make use of theoretical knowledge to resolve the problems encountered during realistic practice.
C706*.4	explain concepts of hospitals, hospital organization, their functioning, various drug distribution methods in a hospital and role of hospital pharmacist.

Note : * stands for practical

B. Pharmacy 8th Semester	
Biostatistics and Research Methodology (BP801T) : C801	
After the completion of the course, students will be able to	
Course Code	**Course Outcomes**
C801.1	determine different types of statistical tools.
C801.2	predict the relationship between variables using corelation and regression modelling tools.
C801.3	analyze the data using the concepts of probability and probability distribution.
C801.4	elaborate design and analysis of experiments usingfactorial design and response surface methodology.
C801.5	test the hypothesis for different samples using parametric and non-parametric statistical tests .
	Social and Preventive Pharmacy (BP802T) : C802
C802.1	examine the concept of health and health education.
C802.2	develop awareness about various preventive measures for stated communicable and non-communicable diseases.
C802.3	explain national health programmes mentioned in real world to serve the society.
C802.4	elaborate various vaccines under national immunization programme and their schedule.
C802.5	demonstrate the impact of socio-cultural factors and urbanization on health.
C802.6	evaluate the health and pharmacy related problems in societal perspective.
	Pharma Marketing Management (BP803ET) : C803
C803.1	examine the different concepts of marketing.
C803.2	identify marketing mix for pharmaceutical products.
C803.3	categorize the different types of sales promotion.
C803.4	analyze pharmaceutical marketing channels.
C803.5	compare pricing of the pharmaceutical products.
C803.6	adapt to emerging concepts of marketing.
	Pharmaceutical Regulatory Science (BP804ET) : C804
C804.1	illustrate the concept, scope and benefits of the generic drug product development
C804.2	identify about the different drug regulatory approval agencies and drug approval process
C804.3	Categorize Drug Master Files (DMF), Common Technical Document (CTD), electronic Common Technical Document (eCTD) and ASEAN Common Technical Document (ACTD)
C804.4	summarize clinical trial development and pharmacovigilance
C804.5	make use of concepts and functions of Orange book, Federal Register, Code of Federal Regulatory and Purple book for regulatory submission
	Pharmacovigilance (BP805ET) : C805
C805.1	identify the adverse drug reactions, and basic terminologies in pharmacovigilance.
C805.2	summarize the use of various drug disease classifications, drug dictionaries and drug information resources in pharmacovigilance.

C805.3	explain various methods of pharmacovigilance and communication process during ADR reporting.
C805.4	appraise safety data generation and ICH guidelines in pharmacovigilance.
C805.5	evaluate drug and vaccine safety in special population and to appraise the process of hemovigilance and materiovigilance.
C805.6	build the ability to report adverse drug reactions through various ADR reporting forms.
	Quality Control and Standardization of Herbals (BP806ET) : C806
C806.1	explain the quality control, quality assurance, storage and evaluation of herbal drugs
C806.2	describe the WHO, EU and ICH guidelines for quality control, current good manufacturing practices (cGMP) and GACP for herbal medicines
C806.3	identify he research guidelines for evaluating the safety and efficacy of herbal medicines
C806.4	illustrate the importance of stability testing in the evaluation of herbal medicines
C806.5	summarize the role of chemical and biological markers in standardization of herbal products
	Computer-Aided Drug Design (BP807ET) : C807
C807.1	describe the concepts of drug discovery and design strategies
C807.2	explain the principle and applications of quantitative- structureactivity relationship (QSAR) in the lead optimization process
C807.3	illustrate the virtual screening approaches and their applications inthe drug discovery science
C807.4	make use of the principle and applications of molecular modelling techniques
C807.5	elaborate the importance of bioinformatics analysis in the drug
	Cell and Molecular Biology (BP808ET) : C808
C808.1	describe the foundations and applications of molecular biology.
C808.2	illustrate the DNA properties of cell biology.
C808.3	utilize protein structure and function for drug discovery.
C808.4	analyze basic molecular genetics mechanisms
C808.5	summarize the Cell signals and signalling pathways
	Cosmetic Science (BP809ET) : C809
C809.1	describe he evolution, types and applications of cosmetic products
C809.2	explain he principle and formulations aspects of skin and hair care products
C809.3	illustrate the benefits of herbal cosmetics
C809.4	make use of analytical methods for the evalution of cosmetic products
C809.5	elaborate he mechanism of action and problems of cosmetic products
	Experimental Pharmacology (BP810ET) : C810
C810.1	explain the CPCSEA and OECD guidelines for maintenance, breeding and conduct of experiments on laboratory animals

C810.2	illustrate the techniques for collection of blood and common routes of drug administration in laboratory animals
C810.3	utilize the rationale for selection of preclinical models
C810.4	demonstrate the various screening methods used in preclinical research
C810.5	elaborate the tools used in the for the pre-clinical data analysis and interpretation
	Advanced Instrumentation Techniques (BP811ET) : C811
C811.1	identify the advanced instruments used in drug analysis.
C811.2	summarize the chromatographic separation and analysis of drugs.
C811.3	utilize the knowledge of calibration of various analytical instruments.
C811.4	analyze the structure of drug from analytical spectrum (NMR, MS, XRD, DSC).
C811.5	evaluate the use of hyphenated techniques in the analysis of pharmaceutical drugs.
	Dietry Supplement and Nutraceuticals (BP812ET) : C812
C812.1	explain the health benefits of nutraceuticals and dietary supplements
C812.2	illustrate the chemistry and functions of phytochemical as nutraceuticals
C812.3	evaluate generation of free radicals and their role in tissue damage
C812.4	summarize the role of natural antioxidants in preventing the free radical mediated diseases
C812.5	elaborate the function of regulatory authorities (FSSAI, FDA, FPO,MPO, AGMARK. HACCP) in maintaining the safety aspects of nutraceuticals
	Pharmaceutical Product Development (BP813ET) : C813
C813.1	formulate different types of dosage forms.
C813.2	examine the role of different pharmaceutical excipients in product development
C813.3	evaluate the different excipients for specific drug products.
C813.4	categorize different types of packaging for the drug product and materials used for primary and secondary packaging.
C813.5	select optimization technique in the development of pharmaceutical drug product.
C813.6	design the drug product by using principles of Quality by Design.
	Project Work (BP814PW): C814*
C814*.1	explain multidisciplinary areas related to pharmacy profession.
C814*.2	illustrate required skills for technical presentation
C814*.3	examine on specific topic in scientific and pharmacy fields
C814*.4	make use of knowledge of the research and manuscript writing
C814*.5	summarize new trends among group of students and faculties.

Note : * stands for practical/project work

CHANDIGARH COLLEGE OF PHARMACY
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Programme Outcomes (POs) for All M. Pharmacy Courses

PO1.	An ability to independently carry out research /investigation and development work.
PO2.	An ability to write and present a substantial technical report/document.
PO3.	Students should be able to demonstrate a degree of mastery over the area as per the specialization of the program. The mastery should be at a level higher than the requirements in the appropriate bachelor program.

Programme Specific Outcomes (PSOs) for M. Pharmacy (Pharmacology)

PSO1	Relate the acquired scientific information and principles of pharmacokinetics and pharmacodynamics in drug discovery process.
PSO2	Translate the high-level of understanding of drug action into key stages in preclinical and clinical research studies.
PSO3	Demonstrate knowledge of professional and ethical responsibilities in clinical and non-clinical laboratory as required by regulatory bodies.

Programme Specific Outcomes (PSOs) for M. Pharmacy (Pharmacy Practice)

PSO1	Proficiency and expertise in optimizing patient drug therapy using evidence-based medicine.
PSO2	Enhance the proficiency necessary for pharmacy practice, providing support to both medical professionals and patients within clinical settings.
PSO3	Understanding of regulatory considerations within the pharmaceutical industry.

Programme Specific Outcomes (PSOs) for M. Pharmacy (Pharmaceutics)

PSO1	Will become capable of handling interdisciplinary work in the pharmaceutical quality system.
PSO2	Capable of recognizing and addressing research challenges by leveraging technical skills acquired through training and experimentation.
PSO3	Conduct collaborative research within a team to implement inventive solutions in product development, quality control, and technology transfer.
PSO4	Acquire knowledge of fundamental and advanced scientific principles, while also mastering the design and development of innovative drug delivery systems.

Programme Specific Outcomes (PSOs) for M. Pharmacy (Regulatory Affairs)

PSO1	Assess current regulations that focus on drugs and medical devices and their impact on regulatory submissions such as New Drug Applications (NDA), Abbreviated NDAs, Investigational New Drug (IND) Applications, 510k, and Pre-Market Authorizations PMAs.
PSO2	Identify the differences between patents, trademarks, and trade secrets as they relate to regulatory and marketing strategy.

PSO3	Identify and utilize the laws and regulations that apply to the development, testing, and production of new medical products, including medical devices, In-Vitro Diagnostics (IVDs, pharmaceuticals, biotechnology-derived therapeutics, and biologics.

Course Outcomes (M.Pharmacy)

M Pharmacy (Pharmacology)

M. Pharmacy 1st Semester (Pharmacology)	
Modern Pharmaceutical Analytical Techniques- Theory (MPL101T) : C101	
After the completion of the course, students will be able to	
Course Code	**Course Outcomes**
C101.1	explain the underlying principle, instrumentation, and applications of chromatographic techniques used for the separation, identification, and quantification of the analyte.
C101.2	illustrate the basic theoretical and practical skills of the instruments
C101.3	utilize skills inselecting the suitable techniques for analysis of drugs and pharmaceuticals.
C101.4	elaborate on the theoretical knowledge of various instrumental techniques available for analysing organic substances.
C101.5	compare various methods of analysis and their outcomes
C101.6	interpret immunological, electrophoresis, thermal and X-Ray crystallographic techniques.
	Advanced Pharmacology-I –Theory (MPL102T) : C102
C102.1	outline the basic principle of pharmacokinetics and pharmacodynamics of drug
C102.2	explain the mechanism of drug actions at cellular and molecular level.
C102.3	develop a comprehensive understanding of neurotransmitters and the pharmacology of the autonomic nervous system.
C102.4	utilize basic pharmacological principles to prevent and treat diseases.
C102.5	summarize the pathophysiology of disease, pharmacology and pharmacotherapy of various drugs acting on central nervous system.
C102.6	analyze the adverse effects, contraindications, and clinical applications of drugs used in the treatment of diseases.
	Pharmacological & Toxicological Screening Methods-I – Theory (MPL103T) : C103
C103.1	appraise the regulations and ethical requirement for the usage of experimental animals.
C103.2	describe the various animals used in the drug discovery process and good laboratory practices in maintenance and handling of experimental animals.
C103.3	elaborate the various newer screening methods involved in the drug discovery process.
C103.4	analyzeand correlate the preclinical data with human implications.
C103.5	assess the in-vitro data and extrapolate it to preclinical and clinical setting
C103.6	implement innovative animal alternative models for research.
	Cellular & Molecular Pharmacology –Theory (MPL104T) :C104
C104.1	interpret the fundamentals of cell biology, recombinant DNA technology, and gene transfer into mammalian cells.
C104.2	analyze the genetic components of DNA and apply techniques in fingerprint analysis.

C104.3	evaluate the relevance of molecular pharmacology and biomarkers in the drug discovery process.
C104.4	develop an understanding of the drug-receptor theory.
C104.5	apply general and new approaches to drug design like combinatorial chemistry, proteomics & array technology
C104.6	summarize the gene expression, regulation & mapping, recombinant DNA technology and gene therapy
	Experimental Pharmacology-I – Practical (MPL105P) : C105*
C105*.1	interpret different experimental animals in pharmacology, elucidating their blood collection techniques, anaesthesia, and euthanasia methods.
C105*.2	demonstrate the mechanism of action of specified drug classes used to treat the major types of disease in experimental animal models.
C105*.3	utilize experimental data to demonstrate the efficacy of drugs.
C105*.4	explain the basic principle of bioassay and type of bioassay of different drugs.
C105*.5	examine the effect of drugs on animals by simulated experiments.
C105*.6	elaborate in detail about mechanism of drug action at organ system/sub cellular/ macromolecular levels.
	Seminar/Assignment
C106**.1	apply effective presentation skills to create and deliver PowerPoint presentations.
C106**.2	examine the recent advancement in pharmacology.
C106**.3	access supplemental knowledge beyond the curriculum.
C106**.4	interpret different pharmacological and clinical related data using software.

Note : * stands for practical

** stands for seminar/journal club/research Work

M. Pharmacy 2nd Semester (Pharmacology)	
After the completion of the course, students will be able to	
Advanced Pharmacology II - Theory(MPL201T) : C201	
Course Code	**Course Outcomes**
C201.1	explain the mechanism of drug actions at cellular and molecular level.
C201.2	describe the concept of the pathophysiology and pharmacotherapy of certain diseases.
C201.3	explain the concept and applications of chronopharmacology.
C201.4	outline pharmacological aspects of drugs affecting GIT system.
C201.5	illustrate the pharmacological aspects of chemotherapeutic agents.
	Pharmacological & Toxicological Screening Methods-II –Theory (MPL202T) : C202
C202.1	classify toxicity studies inpharmaceutical drug development.
C202.2	outline the importance of ethical and regulatory requirements for toxicity studies.
C202.3	demonstrate the practical skills required to conduct the preclinical toxicity studies.
C202.4	Describe the concept of preclinical toxicology studies in different organ systems.
C202.5	illustrate safety pharmacology studies.
C202.6	apply toxicokinetics.
	Principles of Drug Discovery – Theory (MPL203T) : C203
C203.1	explain the various stages of drug discovery.
C203.2	outline the importance of the role of genomics, proteomics and bioinformatics in drug discovery.
C203.3	elaborate various targets for drug discovery.
C203.4	summarize various lead seeking method and lead optimization.
C203.5	illustrate the importance and role of computer aided drug design in drug discovery.
C203.6	Compare the role of genomics, proteomics and bioinformatics in drug discovery
	Clinical Research & Pharmacovigilance –Theory (MPL204T) : C204
C204.1	explain the regulatory requirements to conduct the clinical trials.
C204.2	classify types of clinical trials design for drug development.
C204.3	categorize the responsibilities of key player involved in clinical trials.
C204.4	outline the principles of pharmacovigilance.
C204.5	assess thenew adverse drug reactions.
C204.6	summarize the regulatory requirements for conducting clinical trials.
	Experimental Pharmacology-II – Practical (MPL205P) : C205
C205*.1	demonstrate the effect of different drugs on the concentration response curves.
C205*.2	illustrate the various receptor actions using isolated tissue preparation.
C205*.3	experiment with isolation of different organs/tissues from the laboratory animals by simulated experiments.
C205*.4	examine the use of isolated tissue preparation for bioassay methods.

C205*.5	evaluate different pharmacokinetic parameters of different drugs from plasma level time curve and urinary excretion data .
C205*.6	estimate mean residence time of various drugs in different compartments.
	Seminar/Assignment
C206**.1	apply effective presentation skills to create and deliver PowerPoint presentations.
C206**.2	examine the recent advancement in pharmacology.
C206**.3	access supplemental knowledge beyond the curriculum.
C206**.4	interpret different pharmacological and clinical related data using software.

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M. Pharmacy 3rd Semester (Pharmacology)	
Research Methodology & Biostatistics - Theory (MRM301T) : C301	
After the completion of the course, students will be able to	
Course Code	**Course Outcomes**
C301.1	explain the concept of research methodology and statistics.
C301.2	apply various parametric and non-parametric test of significance biostatistics and its importance in research methodology.
C301.3	make use of the ethical principles governing medical research within clinical trials.
C301.4	outline CPCSEA guidelines for the ethical use of animals in research.
C301.5	summarize the significance of declaration of Helsinki.
	Journal Club
C302**.1	apply the knowledge of pharmacology in article publishing.
C302**.2	evaluate the research findings in pharmacology.
C302**.3	analyze various data presented in different articles.
C302**.4	elaborate the research related findings in different articles.
	Research Work
C303**.1	outline the hypothesis setting and able to frame research proposal.
C303**.2	identify the different research gaps and design experimentation.
C303**.3	access knowledge based on literature review.
C303**.4	develop experimental design to ascertain outcomes of the experiment.

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M. Pharmacy 4th Semester (Pharmacology)	
Journal Club	
After the completion of the course, students will be able to	
Course Code	**Course Outcomes**
C401**.1	compare outcomes of different experimental articles.
C401**.2	explain significance of study in relation to pharmaceutical aspects.
C401**.3	examine the research methodology used in experimental work.
C401**.4	justify the conclusions drawn from the experimental work.
	Research Work
C402**.1	utilize literature-based information to conduct experiments.
C402**.2	make use of ethical principles for research work.
C402**.3	determine various outcomes of the experiments performed.
C402**.4	estimate the results of the experiments performed.
C402**.5	conclude the documentation of research work under prescribed guidelines

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M Pharmacy (Pharmacy Practice)

M. Pharmacy1st Semester (Pharmacy Practice)	
Clinical Pharmacy Practice–Theory (MPP101T) : C101	
After the completion of the course, students will be able to	
Course Code	**Course Outcomes**
C101.1	explain elements and scope of clinical pharmacy to provide comprehensive patient care services.
C101.2	plan pharmaceutical care for patients.
C101.3	assess the drug therapy of patient through medication chart review and clinical review.
C101.4	Identify adverse drug reaction for safe drug monitoring.
C101.5	interpret clinical laboratory test results of specific diseases.
C101.6	analyze medicine and poison information for efficient patient management.
	Pharmacotherapeutics-I– Theory (MPP 102T) : C102
C102.1	explain the rationale for drug therapy.
C102.2	summarize the therapeutic approach for management of various disease conditions including reference to the latest available evidence
C102.3	analyze the clinical controversies in drug therapy and evidence-based medicine.
C102.4	develop individualized therapeutic plans based on diagnosis.
C102.5	identify the patient specific parameters relevant in initiating and monitoring drug therapy.
C102.6	interpret the pathologic basis of different diseases.
	Hospital & Community Pharmacy – Theory(MPP 103T): C103
C103.1	summarize organisational structure of hospital pharmacy, drug committees & policies of hospital.
C103.2	utilize various drug distribution methods & inventory control techniques.
C103.3	describe drug related problem and their legal requirement.
C103.4	identify the admixtures of radiopharmaceuticals.
C103.5	develop basic skills for community pharmacy management and value-added services in community pharmacies.
C103.6	explain various health promotion activities and their significance.
	Clinical Research – Theory (MPP 104T) : C104
C104.1	asses knowledge of the principles and practice of drug development process
C104.2	classify various stages of clinical trial pipeline.
C104.3	categorize the role and responsibility ofclinical trial study team
C104.4	summarize applications of databases in clinical trials.
C104.5	interpret standard guidelines in clinical trials.
C104.6	Investigate safety monitoring and reporting in clinical trials.
	Pharmacy Practice Practical I (MPP 105P) : C105*
C105*.1	summarize elements of pharmaceutical care and poison information query.
C105*.2	plan individualized diagnose for clinical cases related to different disease conditions.

C105*.4	utilize the regulatory & ethical requirements to conduct clinical trials
C105*.5	make use of inventory management techniques.
	Seminar/Assignment
C106**.1	apply effective presentation skills using PowerPoint presentations.
C106**.2	examine the recent advancement in pharmacy practice
C106**.3	access supplemental knowledge beyond the curriculum
C106**.4	interpret different clinical data using software.

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M. Pharmacy 2nd Semester (Pharmacy Practice)	
Principles of Quality Use of Medicines–Theory (MPP201T): C201	
After the completion of the course, students will be able to	
Course Code	**Course Outcomes**
C201.1	explain the principles and regulatory aspects for quality use of medicines.
C201.2	outline the essential drugs in different health care setting.
C201.3	predict risk associated with quality use of medicines in special population.
C201.4	identify and resolve medication related problem.
C201.5	apply evidence-based medicine principles in practice.
	Pharmacotherapeutics II– Theory (MPP 202T): C202
C202.1	explain the rationale for drug therapy.
C202.2	outline the therapeutic approach for management of various disease conditions.
C202.3	illustrate the clinical controversies in drug therapy and evidence-based medicine.
C202.4	plan individualized diagnose for patients' therapeutics.
C202.5	identify the patient specific parameters relevant in initiating and monitoring drug therapy.
C202.6	analyze the clinical laboratory indices of therapeutic response.
	Clinical Pharmacokinetics and Therapeutic Drug Monitoring – Theory (MPP 203T): C203
C203.1	design dosage regimen of a drug based on its route of administration.
C203.2	categorize pharmacokinetic services in reference to patient therapeutic outcome.
C203.3	assess the drug interaction issues in pharmacokinetics, pharmacogenetics and pharmacometrics.
C203.4	Interpret basic protocol for the conduct of BA/BE study.
C203.5	examine nonlinear models and their effects for drug monitoring.
C203.6	estimate dosage regimen for patients with renal / hepatic impairments in elderly, paediatric and obese patients.
	Pharmacoepidemiology & Pharmacoeconomics – Theory (MPP 204T): C204
C204.1	explain various pharmacoepidemiological methods used in clinical application.
C204.2	predict different risks related to pharmacoepidemiology studies.
C204.3	elaborate on fundamental principles of pharmacoeconomics.
C204.4	examine pharmacoeconomic decision analysis methods.
C204.5	summarize the methodologies employed in pharmacoeconomic analysis.
C104.6	Apply pharmacoeconomics methods to various pharmacy settings.
	Pharmacy Practice Practical II (MPP 205P): C205*
C205*.1	analyze the rationale use of medicines in special population.
C205*.2	plan individualized therapeutic diagnose for various disease conditions.
C205*.3	interpret BA/BE data and TDM reports for given patient.
C205*.4	examine pharmacokinetic parameters in drug development process.
C205*.5	estimate various pharmacoeconomic outcome analysis for given data.

	Seminar/Assignment
C206**.1	explain different experimental techniques used in pharmacy practice.
C206**.2	develop proficiency in advanced techniques in pharmacy practice.
C206**.3	classify different ex-silico-based experimentation in pharmacy practice
C206**.4	evaluate different verbal and non-verbal communication skills

Note : * stands for practical

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M.Pharmacy 3rd Semester (Pharmacy Practice)	
Research Methodology & Biostatistics–Theory (MRM301T): C301	
After the completion of the course, students will be able to	
Course Code	**Course Outcomes**
C301.1	explain the concept of research methodology and statistics.
C301.2	apply various parametric and non-parametric test of significance biostatistics and its importance in research methodology.
C301.3	make use of the ethical principles governing medical research within clinical trials.
C301.4	outline CPCSEA guidelines for the ethical use of animals in research.
C301.5	summarize the significance of declaration of Helsinki.
	Journal Club
C302**.1	apply the knowledge of pharmacology in article publishing.
C302**.2	evaluate the research findings in pharmacology.
C302**.3	analyze various data presented in different articles.
C302**.4	elaborate the research related findings in different articles.
	Research Work
C303**.1	outline the hypothesis setting and able to frame research proposal.
C303**.2	identify the different research gaps and design experimentation.
C303**.3	access knowledge based on literature review.
C303**.4	develop experimental design to ascertain outcomes of the experiment.

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M.Pharmacy 4th Semester (Pharmacy Practice)	
Journal Club	
After the completion of the course, students will be able to	
Course Code	**Course Outcomes**
C401**.1	compare outcomes of different experimental articles.
C401**.2	explain significance of study in relation to pharmaceutical aspects.
C401**.3	examine the research methodology used in experimental work.
C401**.4	justify the conclusions drawn from the experimental work.
	Research Work
C402**.1	utilize literature-based information to conduct experiments.
C402**.2	make use of ethical principles for research work.
C402**.3	determine various outcomes of the experiments performed.
C402**.4	estimate the results of the experiments performed.

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M Pharmacy (Pharmaceutics)

M. Pharmacy 1st Semester (Pharmaceutics)	
Modern Pharmaceutical Analytical Techniques –Theory (MPH101T): C101	
After the completion of the course, students will be able to	
Course Code	**Course Outcomes**
C101.1	explain the principle, instrumentation, and applications of chromatographic techniques and spectroscopy.
C101.2	illustrate the basic theoretical and practical skills of the instruments
C101.3	analyze drugs and dosage forms using suitable techniques.
C101.4	examine various instrumental techniques available for analyzing organic substances.
C101.5	interpret immunological, electrophoresis, thermal and X-Ray crystallographic techniques.
	Drug Delivery System –Theory (MPH102T): C102
C102.1	interpret various sustained release and controlled release formulations.
C102.2	evaluate the approaches used in the development of novel drug delivery systems.
C102.3	illustrate criteria for selecting drugs and polymers for the development of drug delivery systems.
C102.4	infer recent developments in protein and peptide delivery systems.
C102.5	formulate transdermal drug delivery systems.
C102.6	elaborate vaccine drug delivery systems.
	Modern Pharmaceutics – Theory (MPH103T): C103
C103.1	explain the concept of Pre-formulation.
C103.2	utilize pharmaceutical ingredient for drug development.
C103.3	apply ICH and WHO guidelines for equipment calibration and validation.
C103.4	outline the importance of materials management and production management in pharmaceutical industries.
C103.5	explain optimization& pilot plant scale up techniques.
C103.6	analyze compression and consolidation parameters to determine the stability of a dosage form.
	Regulatory Affairs –Theory (MPH104T): C104
C104.1	explain the concept of innovator and generic drug development process.
C104.2	outline regulatory guidelines and the approval process in different countries.
C104.3	summarize chemistry manufacturing controls and their regulatory importance.
C104.4	plan documentation requirements for CTD/e-CTD formats for conducting clinical trials.
C104.5	illustrate the preparation of dossiers and their submission to regulatory agencies in different countries.
C104.6	elaborate on the significance of pharmacovigilance and the process of monitoring in clinical trials.
	Pharmaceutical practical 1 – Practical (MPH105P): C105*
C105*.1	explain the fundamental principles governing analytical techniques.

C105*.2	formulate various controlled/sustained drug delivery dosage.
C105*.3	utilize various analytical instruments for estimating drugs in various formulations.
C105*.4	evaluate micrometric properties of powders and granulation.
C105*.5	analyze laboratory data using different plots and determine similarity factor.
	Seminar/Assignment
C106**.1	apply effective presentation skills using PowerPoint presentations.
C106**.2	examine the recent advancement in pharmacy practice
C106**.3	access supplemental knowledge beyond the curriculum
C106**.4	interpret different clinical data using software.

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M. Pharmacy 2nd Semester (Pharmaceutics)	
Molecular Pharmaceutics (Nano Tech & Targeted DDS) –Theory (MPH201T) : C201	
After the completion of the course, students will be able to	
Course Code	**Course Outcomes**
C201.1	explain various approaches for development of novel drug delivery systems.
C201.2	analyze the criteria for selecting drugs and polymers for the development of nano tech & targeted DDS.
C201.3	apply nanoformulation in drug delivery.
C201.4	interpret the formulation and evaluation procedures of pulmonary drug delivery systems.
C201.5	elaborate the concept of gene therapy and liposomal gene delivery.
	Advanced Biopharmaceutics & Pharmacokinetics –Theory (MPH202T): C202
C202.1	outline the basic concept of biopharmaceutics and pharmacokinetics
C202.2	analyze the diverse factors influencing drug absorption, distribution, metabolism, and excretion.
C202.3	utilize raw data to derive pharmacokinetic models and parameters that best describe the processes of drug absorption, distribution, metabolism, and elimination.
C202.4	evaluate biopharmaceutics studies involving drug product equivalency.
C202.5	summarize the design and evaluation of dosage regimens using pharmacokinetic and biopharmaceutics parameters.
C202.6	estimate bioavailability measurement and solve related numerical problems.
	Computer Aided Drug Delivery System –Theory (MPH203T): C203
C203.1	explain the history of computers in pharmaceutical research and development.
C203.2	outline computational modelling of drug disposition.
C203.3	elaborate the role of computers in preclinical development.
C203.4	interpret the impact of artificial intelligence and robotics.
C203.5	simulate clinical results for pharmaceutical development.
C203.6	apply computational fluid dynamics in pharmaceutical applications.
	Cosmetic & Cosmeceuticals–Theory (MPH204T): C204
C204.1	choose key ingredients suitable for formulating various cosmetics.
C204.2	design cosmetics to address cleansing needs for the face, eyelids, lips, hands, feet, nails, scalp, neck, body, and underarms.
C204.3	explain building blocks principles for various cosmetic/cosmeceutical products.
C204.4	utilize herbal ingredients in formulating cosmetics for hair care, skin care, and oral care.
C204.5	apply scientific knowledge in the production of cosmeceuticals with desired safety, stability, and efficacy.
C204.6	outline guidelines for herbal cosmetics by private bodies.
	Pharmaceutical practical II – Practical (MPH205P): C205*
C205*.1	demonstrate the techniques for preparing microspheres, liposomes, noisome, and solid dispersions.
C205*.2	compare the dissolution studies of various marketed products.

C205*.3	evaluate drug binding characteristics, cell permeation and bioavailability of the pharmaceutical formulations.
C205*.4	analyze formulations using the Quality by Design (QbD) concept.
C205*.5	assess different formulations on various parameters to ensure product quality.
	Seminar/Assignment
C206**.1	explain different experimental techniques used in pharmacy practice.
C206**.2	develop proficiency in advanced techniques in pharmacy practice.
C206**.3	classify different ex-silico based experimentation in pharmacy practice
C206**.4	evaluate different verbal and non-verbal communication skills

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M. Pharmacy 3rd Semester (Pharmaceutics)	
Research Methodology & Biostatistics –Theory (MRM301T) : C301	
After the completion of the course, students will be able to	
Course Code	**Course Outcomes**
C301.1	explain the concept of research methodology and statistics.
C301.2	apply various parametric and non-parametric test of significance biostatistics and its importance in research methodology.
C301.3	make use of the ethical principles governing medical research within clinical trials.
C301.4	outline CPCSEA guidelines for the ethical use of animals in research.
C301.5	summarize the significance of declaration of Helsinki.
	Journal Club
C302**.1	apply the knowledge of pharmacology in article publishing.
C302**.2	evaluate the research findings in pharmacology.
C302**.3	analyze various data presented in different articles.
C302**.4	elaborate the research related findings in different articles.
	Research Work
C303**.1	outline the hypothesis setting and able to frame research proposal.
C303**.2	identify the different research gaps and design experimentation.
C303**.3	access knowledge based on literature review.
C303**.4	develop experimental design to ascertain outcomes of the experiment.

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M. Pharmacy 4th Semester (Pharmaceutics)	
Journal Club	
After the completion of the course, students will be able to	
Course Code	**Course Outcomes**
C401**.1	compare outcomes of different experimental articles.
C401**.2	explain significance of study in relation to pharmaceutical aspects.
C401**.3	examine the research methodology used in experimental work.
C401**.4	justify the conclusions drawn from the experimental work.
	Research Work
C402**.1	utilize literature-based information to conduct experiments.
C402**.2	make use of ethical principles for research work.
C402**.3	determine various outcomes of the experiments performed.
C402**.4	estimate the results of the experiments performed.

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M Pharmacy (Regulatory Affairs)

M. Pharmacy 1st Semester (Regulatory Affairs)	
Good Regulatory Practices –Theory (MRA101T): C101	
After the completion of the course, students will be able to	
Course Code	**Course Outcomes**
C101.1	categorise US-CGMP, EC GMP guidelines of medical devices.
C101.2	illustrate principles of Good Laboratory Practices.
C101.3	explain the concept of Good Automated Laboratory Practices.
C101.4	outline good distribution practices described by WHO, CDSCO, and ICH.
C101.5	plan cleaning validation protocol.
C101.6	describe the concept of quality management system and validation.
	Documentation & Regulatory Writing Theory (MRA102T): C102
C102.1	identify the various documents relevant to pharmaceutical drugs in the industry.
C102.2	explain the fundamental concepts involved in regulatory compilation.
C102.3	summarize regulatory submissions as per requirement of agencies.
C102.4	evaluate the follow-up procedures required for submissions and post-approval document management.
C102.5	develop strategies for dossier preparation and submission according to Common Technical Document (CTD) standards.
C102.6	assess the importance and procedures of both internal and external audits in maintaining regulatory compliance and quality standards.
	Clinical Research Regulations – Theory (MRA103T): C103
C103.1	explain the historical context, origins, and core ethical principles underlying clinical and biomedical research and evaluation.
C103.2	outline key stages and procedure for clinical drug and medical device development process.
C103.3	Classify phases of clinical trials based on different methodologies.
C103.4	Make use of regulatory requirements and guidance for conducting clinical trials in India.
C103.5	assess the implications and effectiveness of the regulatory guidance for conducting clinical trials and research in the USA.
C103.6	summarize the regulatory guidance for the conduct of clinical trials in the EU.
	Regulations &Legislation for Drugs & Cosmetics, Medical Device, Biologicals & Herbals, and Food & Nutraceuticals In India and Intellectual Property Rights – (MRA104T): C104
C104.1	summarize the various acts and guidelines related to drugs and industries in India.
C104.2	contrast guidelines governing drugs & cosmetics, medical devices, biological & herbals, and food & nutraceuticals industries in India.
C104.3	apply regulatory requirements, guidelines, and pharmacopoeia standards for testing of natural products and drugs.
C104.4	explain the process of filing for patents and dossiers.
C104.5	categorize intellectual property rights and regulatory affairs.

	Regulatory Affairs Practical –I (MRA105P): C105*
C105*.1	contrast various regulatory guidelines for governing clinical trials.
C105*.2	explain the regulatory requirements specific to herbal drug.
C105*.3	design protocol for registering clinical trials in India.
C105*.4	list the components and requirements of IND and NDA submissions to the USFDA.
C105*.5	evaluate the outcomes of both internal and external audits.
C105*.6	interpret bio statistical data derived from clinical trials.
	Seminar/Assignment
C106**.1	apply effective presentation skills using PowerPoint presentations.
C106**.2	examine the recent advancement in pharmacy practice
C106**.3	access supplemental knowledge beyond the curriculum
C106**.4	interpret different clinical data using software.

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M.Pharmacy 2nd Semester (Regulatory Affairs)	
Regulatory Aspects of Drugs & Cosmetics –Theory (MRA201T): C201	
After the completion of the course, students will be able to	
Course Code	**Course Outcomes**
C201.1	outline the regulatory approval and registration procedures for API and drug products in the USA and Canada.
C201.2	apply legislation and regulations to navigate the import, manufacture, distribution, packaging, and sale of drugs and cosmetics in different countries.
C201.3	illustrate the procedures for drug registration and post-approval requirements in ASEAN, CIS, and GCC countries.
C201.4	explain the concept of the Certificate of Pharmaceutical Product (COPP), both in general terms and specific to individual countries.
C201.5	categorize various committees such as APEC, EAC, GCC, PANDRH, and SADC.
	Regulatory Aspects of Herbal & Biologicals– Theory (MRA202T): C202
C202.1	outline the Indian regulations for similar biologics.
C202.2	compare the good manufacturing practices and good distribution practices for similar biologics.
C202.3	summarize the distinctions in regulatory requirements for similar biologics between India and the USA.
C202.4	contrast the regulations for similar biologics in comparison to European regulatory standards.
C202.5	explain the vaccine development process and regulations.
C202.6	assess the licensing and regulatory requirements for blood and related products.
	Regulatory Aspects of Medical Devices – Theory (MRA203T): C203
C203.1	explain medical device approval processes in the US and EU.
C203.2	outline the comprehensive technical requirements for a risk-based medical device approval process.
C203.3	apply risk management concepts during the design and development phases of medical devices.
C203.4	elaborate the quality management principles in the design and production of medical devices.
C203.5	examine processes and methodologies involved in clinical evaluation and investigation of medical devices and in vitro diagnostics.
C203.6	analyze harmonization initiatives for approval and marketing of medical devices and IVDS.
	Regulatory Aspects of Food & Nutraceuticals –Theory (MRA204T): C204
C204.1	explain the regulatory requirements governing nutraceuticals
C204.2	contrast nutraceuticals, functional foods, dietary supplements, and medical foods.
C204.3	summarize the scope and opportunities in the nutraceutical market.
C204.4	outline the nutraceutical regulations within the European Union
C204.5	illustrate the recommended dietary allowance in various regulated countries
C204.6	compare the regulations for registration and labelling of nutraceuticals and food supplements in India, the USA, and Europe

	Regulatory Affairs Practical-II (MRA205P): C205*
C205*.1	interpret case study on deviations and CAPA (Corrective and Preventive Action).
C205*.2	demonstrate the preparation of audit checklist for various regulatory agencies.
C205*.3	utilize EMA's e-CTD software for regulatory submissions.
C205*.4	outline the process for submissions to MHRA using eCTD software.
C205*.5	Investigate documentation of raw materials in accordance with official monographs
C205*.6	organize checklists for 510(k) and PMA submissions for the US market.
	Seminar/Assignment
C206**.1	explain different experimental techniques used in pharmacy practice.
C206**.2	develop proficiency in advanced techniques in pharmacy practice.
C206**.3	classify different ex-silico based experimentation in pharmacy practice
C206**.4	evaluate different verbal and non-verbal communication skills

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M.Pharmacy 3rd Semester (Regulatory Affairs)	
Research Methodology & Biostatistics –Theory (MRM301T) : C301	
After the completion of the course, students will be able to	
Course Code	**Course Outcomes**
C301.1	explain the concept of research methodology and statistics.
C301.2	apply various parametric and non-parametric test of significance biostatistics and its importance in research methodology.
C301.3	make use of the ethical principles governing medical research within clinical trials.
C301.4	outline CPCSEA guidelines for the ethical use of animals in research.
C301.5	summarize the significance of declaration of Helsinki.
	Journal Club
C308**.1	apply the knowledge of pharmacology in article publishing.
C308**.2	evaluate the research findings in pharmacology.
C308**.3	analyze various data presented in different articles.
C308**.4	elaborate the research related findings in different articles.
	Research Work
C309**.1	outline the hypothesis setting and able to frame research proposal.
C309**.2	identify the different research gaps and design experimentation.
C309**.3	access knowledge based on literature review.
C309**.4	develop experimental design to ascertain outcomes of the experiment.

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M.Pharmacy 4th Semester (Regulatory Affairs)	
Journal Club	
After the completion of the course, students will be able to	
Course Code	**Course Outcomes**
C401**.1	compare outcomes of different experimental articles.
C401**.2	explain significance of study in relation to pharmaceutical aspects.
C401**.3	examine the research methodology used in experimental work.
C401**.4	justify the conclusions drawn from the experimental work.
	Research Work
C402**.1	utilize literature-based information to conduct experiments.
C402**.2	make use of ethical principles for research work.
C402**.3	determine various outcomes of the experiments performed.

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CHANDIGARH COLLEGE OF PHARMACY
Building Careers. Transforming Lives.

Chandigarh College of Pharmacy

Programme Outcomes (POs) for Pharm D and Pharm D PB

PO1.	**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.
PO2.	**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.
PO3.	**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.
PO4.	**Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.
PO5.	**Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well-being.
PO6.	**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).
PO7.	**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.
PO8.	**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.
PO9.	**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.
PO10.	**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.
PO11.	**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-access and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Programme Specific Outcomes (PSOs) for Pharm D and Pharm D PB

PSO1	Provide pharmaceutical care including, but not limited to, Medication Therapy Management (MTM), vaccinations and drug therapy monitoring in all practice areas (e.g., inpatient, ambulatory and community practice).
PSO2	Provide high quality, evidence-based, patient-centered care in cooperation with patients, prescribers and members of the inter-professional health care team and locate, appraise and assimilate evidence from scientific studies to enhance the quality of care and services.
PSO3	Demonstrate mastery and application of core knowledge and skills in relation to the evolving biomedical, clinical, epidemiological and social-behavioral sciences.
PSO4	Demonstrate the ability to use critical analysis and problem-solving skills for the provision of high quality, evidence-based pharmacy services and patient care and effectively utilize information, informatics and technology to optimize learning and patient care.

Course Outcomes (Pharm D) and Pharm D PB

Pharm D 1st Year	
Human Anatomy and Physiology I–Theory (PD101T-19) : C101	
After the completion of the course, students will be able to	
Course Code	**Course Outcomes**
C101.1	explain the anatomy and physiology of the human body organs.
C101.2	describe several homeostatic mechanisms and cause of imbalance in body.
C101.3	identify organs and tissues of various systems in the body.
C101.4	examine blood pressure, heart rate, breathing volumes and haematological assays.
C101.5	explain coordinated operation of the various organs in each system of body.
C101.6	determine interrelated mechanisms of human body for its homeostasis.
	Pharmaceutics –Theory (PD102T-19): C102
C102.1	outline formulation aspect of different dosage forms.
C102.2	apply basic knowledge of good formulation for its effectiveness.
C102.3	categorize different types of process involved in dosage forms.
C102.4	appraise knowledge of pharmaceutical calculation for dispensing of drugs.
C102.5	elaborate novel drug delivery systems.
	Medicinal Biochemistry – Theory (PD103T-19): C103
C103.1	explain the role of enzymes in the identification of diseases and their treatments.
C103.2	interpret the metabolic pathways in health and disease (metabolic disorders).
C103.3	identify genetic structure of the genome and related repair mechanisms.
C103.4	distinguish the molecular basis of function testing for different organs.
C103.5	assess the qualitative examination of the biomolecules in the bodily fluids for their clinical relevance.
C103.6	improve chemistry of bio-molecule for optimum therapeutic potential.
	Pharmaceutical Organic Chemistry-Theory (PD104T-19): C104
C104.1	relate various organic compound for establishing their structural relationship.
C104.2	classify different kinds of isomerism for their pharmaceutical implication.
C104.3	utilize physical characteristics of organic compounds for purity determination.
C104.4	categorise types of reactions, and technique of compound conversion.
C104.5	modify organic compounds for exploring new therapeutic potential.
	Pharmaceutical Inorganic Chemistry-Theory (PD105T-19):C105
C105.1	explain the concepts and techniques involved in drug analysis.
C105.2	utilize inorganic pharmaceuticals in pharma industry.
C105.3	develop inorganic medicines for their therapeutic uses.
C105.4	examine inorganic pharmaceuticals for their use in prevention and treatment of the disease.
C105.5	evaluate the method of preparation, assay, properties, medicinal uses of astringent, poison and antidote.
C105.6	elaborate the properties, storage condition and application of radiopharmaceuticals.
	Remedial Biology Theory (PD106RBT-19): C106

C106.1	understand the classification and salient features of plant kingdoms.
C106.2	identify the plants morphology and salient features of the plants.
C106.3	examine the taxonomy of plants, fruits and seeds.
C106.4	explain the plant physiology and study of different microorganisms.
C106.5	elaborate the anatomy and physiology of animals.
	Remedial Mathematics-Theory(PD106RMT-19): C107
C107.1	solve system of linear equation using matrix algebra.
C107.2	find the relationship between two variable using analytical geometry.
C107.3	apply the concept of differential calculus and integral calculus to solve differential equation.
C107.4	understand the concept of laplace transform.
	Human Anatomy and Physiology I–Practical (PD107P-19): C108*
C108*.1	demonstrate the principle and working of various instruments used in HAP.
C108*.2	illustrate microscopical features of various cells and tissues.
C108*.3	identify gross anatomy and physiology of various bones.
C108*.4	analyze haematological tests including blood pressure, heart rate & pulse measurements.
C108*.5	appraise coordinated working pattern of different organs of each system.
C108*.6	explain the physiology of skeletal muscle contraction.
	Pharmaceutics -Practical (PD108P-19): C109*
C109*.1	derive working formula from master formula of given formulation.
C109*.2	formulate the dosage form and dispense in appropriate container.
C109*.3	design the label with necessary product and patient information.
C109*.4	analyze the basic quality control tests for the common dosage forms.
C109*.5	assess manufacturing and packing of pharmaceuticals.
C109*.6	elaborate analytical aspect of formulated dosages form.
	Medicinal Biochemistry -Practical (PD109P-19): C110*
C110*.1	explain chemical nature, structure and functions of various biomolecules.
C110*.2	classify qualitative and quantitative estimation of the biomolecules in body fluids.
C110*.3	make use of the laboratory values and elucidate about the disease status.
C110*.4	simplify knowledge on metabolism of biomolecules in physiological and pathological conditions.
C110*.5	appraise catalytic role of enzyme for their therapeutic implication.
C110*.6	elaborate diagnostic applications of enzymes.
	Pharmaceutical Organic Chemistry –Practical (PD110P-19): C111*
C111*.1	identify and characterize of simple organic compounds.
C111*.2	synthesize simple organic compounds and their derivatives.
C111*.3	analyze experiment with derivatives and confirmation of the unknown using MP.
C111*.4	identify suitable solid derivatives from organic compounds.
C111*.5	detection of elements like nitrogen, sulphur and halogen by Lassaigne's test.
C111*.6	elaborate use of organic compound in preparation of new pharmaceuticals.
	Pharmaceutical Inorganic Chemistry –Practical (PD111P-19): C112*

C112*.1	choose method of preparation, assay, medicinal uses of acids, bases, buffers, extra and intracellular electrolytes.
C112*.2	prepare and assay of dental products.
C112*.3	build storage condition and application of radiopharmaceuticals in drug development.
C112*.4	categorize, assay, properties, medicinal uses of astringent, poison and antidote.
C112*.5	compare medicinal uses of acidifiers, antacids and cathartics.
C112*.6	formulate pharmaceuticals including antimicrobials for protection against infections.
	Remedial Biology Practical (PD112RBP): C113*
C113*.1	explain the characters of living organisms and the classification of kingdoms.
C113*.2	compare knowledge of morphology and functions of various plant parts.
C113*.3	construct basic knowledge on morphology and functions of various plant parts such as root, stem etc.
C113*.4	conclude the basic knowledge of morphology and functions of various plant parts such as flower, fruit, and seed.
C113*.5	elaborate the physiology, and nutrient requirements of medicinal plants.

Note : * stands for practical

Pharm D 2nd Year	
Pathophysiology–Theory (PD201T-19): C201	
After the completion of the course, students will be able to	
Course Code	**Course Outcomes**
C201.1	explain etiology and pathogenesis of the selected disease states.
C201.2	compare relevant aspects of pathology of diseases with reference to its pharmacological applications.
C201.3	identify signs and symptoms of the diseases.
C201.4	appraise epidemiology of different diseases.
C201.5	interpret complications of the diseases for understanding their pathophysiology.
	Pharmaceutical Microbiology – Theory (PD202T-19): C202
C202.1	explain the structure, identification, growth factors and sterilisation of microorganisms.
C202.2	compare route of transmission of disease-causing microorganism, symptoms, and treatment elements.
C202.3	identify DNA and RNA levels in order to determine the source of disease.
C202.4	Perform cultivation and identification of microorganism (bacteria and fungi).
C202.5	interpret diagnostic procedures to identify diseases.
C202.6	elaborate properties of microorganisms and their behaviour of motility for their pharmaceutical importance.
	Pharmacognosy & Phytopharmaceuticals-Theory (PD203T-19):C203
C203.1	evaluate therapeutic benefits of numerous naturally occurring medicines.
C203.2	explain fundamental guidelines for growing, gathering, and storing crude medicines.
C203.3	make use of the source, ingredients, and testsfor identification of crude medicines.
C203.4	compare phytochemistry and phytopharmaceuticals related to plants.
C203.5	determine the secondary metabolities and their synthesis pathways.
C203.6	elaborate the application of primary and secondary metabolites of the plant.
	Pharmacology I – Theory (PD204T-19): C204
C204.1	interpret pharmacological actions of different categories of the drug.
C204.2	identify mechanism of drug action at organ system/subcellular/macromolecular level.
C204.3	explain prevention and treatment of various diseases.
C204.4	distinguish the basics of pharmacology including cell receptors, route of drug administration, pk-pd, drug interactions.
C204.5	justify pharmacology and pharmacotherapy of various drugs acting on cardiovascular, central nervous, respiratory and endocrine system.
C204.6	elaborate pharmacology of autocoids and related drugs.
	Community Pharmacy– Theory (PD205T-19): C205
C205.1	find the importance of pharmaceutical care services.
C205.2	explain the business and professional practice management skills in community pharmacies.
C205.3	identify the importance of patient counselling & provide health screening services.
C205.4	assume medication to patients with minor ailments.
C205.5	appraise working of drug information center.
C205.6	estimate the importance of rational drug therapy.

	Pharmacotherapeutics I– Theory (PD206T-19): C206
C206.1	explain rationale for drug therapy of different diseases.
C206.2	demonstrate therapeutic approach to management of diseases.
C206.3	identify the importance of individualised therapeutic plans based on diagnosis.
C206.4	examine the patient-specific parameters in initiating and monitoring drug therapy.
C206.5	evaluate different stages of drug therapies.
C206.6	predict errors in drug therapy.
	Pharmaceutical Microbiology – Practical (PD207P-19): C207*
C207*.1	demonstrate methods of identification, cultivation and preservation of microbes.
C207*.2	implement sterilization technique in pharmaceutical industry.
C207*.3	test sterility of pharmaceutical products.
C207*.4	evaluate microbiological standardization of pharmaceuticals.
C207*.5	apply cell culture technology in pharmaceutical research and technology.
C207*.6	utilize various culture media for sterility testing of pharmaceuticals.
	Pharmacognosy & Phytopharmaceuticals – Practical (PD208P-19) C208*
C208*.1	demonstrate microscopic structure of various crude drugs.
C208*.2	explain the concept of saponification value in relation to crude drugs.
C208*.3	utilize chemical tests for identification of phytochemical in herbal drugs.
C208*.4	inspect basic of pharmacognosy laboratory instruments and their utility.
C208*.5	justify the importance of iodine value with regard to herbal drugs.
C208*.6	elaborate extraction and screening of secondary metabolites.
	Pharmacotherapeutics I– Practical (PD209P-19):C209*
C209*.1	explain soap (subjective, objective, assessment and plan) notes for the given clinical cases of selected common diseases.
C209*.2	summarize the patients about the disease's conditions.
C209*.3	identify the cases to enable dose calculation of selected drugs in paediatrics, and geriatrics.
C209*.4	examine the methods of handling and administration of drugs, life-style modifications, and monitoring parameters.
C209*.5	analyze counselling exercises using role plays based on depression.
C209*.6	counselling exercises using role plays based on GERD.
	Pharmacology I– Practical (PD210P-19): C210*
C210*.1	explain the basic concepts of experimental pharmacology.
C210*.2	demonstrate use of laboratory apparatus in pharmacology.
C210*.3	identify the commonly used laboratory animals in pharmacology.
C210*.4	design experiments to test the safety and efficacy of experimental drugs.
C210*.5	calculate the dose and decide the route of administration of drug.
C210*.6	understand principles of toxicology and treatment of various poisonings.

Note : * stands for practical

Pharm D 3rd Year	
Pharmacology-II- Theory (PD301T-19): C301	
After the completion of the course, students will be able to	
Course Code	**Course Outcomes**
C301.1	determine pharmacological aspects of drugs acting on blood and renal system.
C301.2	compare pharmacological aspects of chemotherapeutic agents used in various diseases.
C301.3	apply pharmacology of immune suppressants and immune stimulants in prevention of infectious diseases.
C301.4	examine acute, sub-acute and chronic animal toxicity studies.
C301.5	explain the structure and functions of the components of the cell, role of secondary messengers in cell signaling and chromosomes.
C301.6	elaborate the role of genetic material in synthesis of proteins. the appropriateness of gene therapy and recombinant DNA technology.
	Pharmaceutical Analysis-Theory (PD302T-19): C302
C302.1	understand the interaction of matter with electromagnetic radiations.
C302.2	apply qualitative and quantitative analysis of drugs using various instruments.
C302.3	outline the methods for chromatographic separation and analysis of drugs.
C302.4	elaborate the importance of assay in analytical chemistry.
C302.5	determine the role and applications of various types of analytical techniques.
C302.6	analyze pharmaceutical formulation using standard guidelines for total quality management
	Pharmacotherapeutics-II -Theory (PD303T-19): C303
C303.1	explain pathophysiology and management of cardiovascular, respiratory and endocrine diseases.
C303.2	identify patient-specific parameters relevant in initiating drug therapy.
C303.3	apply the quality use of therapeutic agents in the treatment of diseases.
C303.4	examine clinical skills in the therapeutic management of different diseases.
C303.5	assess the medical adherence of patients in relation to communication skills.
C303.6	extend patient–centred care using the evidence-based medicine.
	Pharmaceutical Jurisprudence –Theory (PD304T-19): C304
C304.1	explain professional ethics and pharmaceutical legislation.
C304.2	summarize the various concepts underlying India's pharmaceutical legislation.
C304.3	apply the regulations of drug and cosmetic act for labelling and packaging pharmaceutical product.
C304.4	examine the drug policy, design act, dangerous drugs act, pharmacy act and excise duties act.
C304.5	interpret laws as prescribed by PCI and international agencies.
C304.6	utilize prescribed act and schedule in pharmaceutical profession.
	Medicinal Chemistry – Theory (PD305T-19): C305
C305.1	explain pharmacological activity of medicines in relation to their chemistry.
C305.2	describe drug metabolism, side effects, and the therapeutic efficacy of medications.
C305.3	make use of the structural activity relationship (SAR) of various medication classes for drug development.

C305.4	classify the chemical synthesis of medications for increasing their efficacy.
C305.5	design chemical structure using chem draw software.
C305.6	utilize chemical reaction for synthesis of pharmaceuticals.
	Pharmaceutical Formulations- Theory (PD306T-19): C306
C306.1	Classify pharmaceutical dosage forms based on route of administration.
C306.2	explain various conventional dosage forms.
C306.3	identify problems and remedies of formulation of various dosage forms.
C306.4	analyze novel drug delivery formulation.
C306.5	apply laboratory evaluation methods for testing different dosage forms.
C306.6	elaborate role of bioavailability and bioequivalence in clinical settings.
	Pharmacology-II-Practical (PD307P-19): C307*
C307*.1	explain the basic concepts of experimental pharmacology.
C307*.2	demonstrate use of laboratory animals and apparatus in experimental pharmacology.
C307*.3	calculate the dose and decide the route of administration of drug.
C307*.4	design experiments for safety and efficacy of experimental drugs.
C307*.5	determine the potency of experimental drugs using bioassay.
C307*.6	utilize pharmacological screening methods in drug development.
	Pharmaceutical Analysis-Practical (PD308P-19): C308*
C308*.1	examine the method for chromatographic separation and analysis of drugs.
C308*.2	apply principle of volumetric and electro-chemical analysis in estimation of drugs.
C308*.3	estimate qualitative and quantitative parameters of drugs in analytical chemistry.
C308*.4	demonstrate analytical techniques for drug testing.
C308*.5	interpret results of UV, HPLC, and IR spectra of given compounds.
C308*.6	identify issues related to various analytical instruments.
	Pharmacotherapeutics-II -Practical (PD309P-19) : C309*
C309*.1	demonstrate process of gathering information from patients and health care professionals.
C309*.2	interpret pathophysiology and management of diseases using case reports.
C309*.3	utilize pathological laboratory data for patient risk assessment.
C309*.4	identify usual doses, dosage forms, common drug related problems, monitoring parameters and outcome of pharmacotherapy.
C309*.5	examine therapeutic problems and appropriately select patient specific management regimens.
	Medicinal Chemistry-Practical (PD310P-19): C310*
C310*.1	make use of safety guidelines of intermediates and medicinal compounds.
C310*.2	demonstrate the chemical synthesis of intermediates and medicinal compounds.
C310*.3	assess the purity of organic/medicinal compounds using quantitative analysis.
C310*.4	Synthesize medicinally important compounds / intermediate.
C310*.5	interpret chemical structures using chem draw software.
	Pharmaceutical Formulations -Practical (PD311P-19): C311*
C311*.1	explain different pharmaceutical formulations.
C311*.2	evaluate pharmaceutical formulations using QC test.
C311*.3	identify operation of machines involved in the formulation of pharmaceutical dosage forms.

C311*.4	examine the preparation of different cosmetics and nanoformulation.
C311*.5	formulate liquid orals such as syrups and suspensions.

Note : * stands for practical

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Pharm D 4th Year	
Pharmacotherapeutics-III- Theory (PD401T-19): C401	
	After the completion of the course, students will be able to
Course Code	**Course Outcomes**
C401.1	explain pathophysiology and the rationale for drug therapies of diseases.
C401.2	interpret the therapeutic approach to the management of these diseases.
C401.3	identify errors in drug therapy using case reports.
C401.4	simplify preparation of individualized therapeutic plans based on diagnosis.
C401.5	compare the effectiveness of given treatment regimen.
C401.6	identify the patient specific parameter in initiating drug therapy.
	Hospital Pharmacy–Theory (PD402T-19): C402
C402.1	explain different drug distribution techniques.
C402.2	compare the professional practise management techniques used by hospital pharmacies.
C402.3	organize unbiased drug information to the doctors.
C402.4	categorize the methods of production of various formulations in a hospital setting.
C402.5	relate the management of the stores and the inventory control.
C402.6	elaborate the use of practice-based research methodologies.
	Clinical Pharmacy– Theory (PD403T-19): C403
C403.1	relate drug therapy of patient through medication chart review and clinical review.
C403.2	outline medication history interview and provide patient counselling.
C403.3	Identify and resolve drug-related issues in clinical case reports.
C403.4	monitor adverse drug reaction of patients.
C403.5	interpret selected laboratory results of different diseases.
C403.6	formulate drug or medicine information for clinical manifestations.
	Biostatistics & Research Methodology –Theory (PD404T-19): C404
C404.1	demonstrate MS excel, SPSS, MINITAB, and DoE software.
C404.2	compare various statistical techniques of data analysis.
C404.3	apply qualitative and quantitative research techniques in pharmacy.
C404.4	estimate statistical methods for problem-solving and hypothesis testing procedures.
C404.5	identify objectives of research and its process.
	Biopharmaceutics &Pharmacokinetics-Theory(PD405T-19): C405
C405.1	relate pharmacokinetic and biopharmaceutical concepts.
C405.2	illustrate plasma drug concentration over time data to calculate the pharmacokinetic parameters.
C405.3	identify the importance of bioavailability and bioequivalence of drug products.
C405.4	analyze numerous pharmacokinetic parameters and their significance in drug development.
C405.5	elaborate the kinetics of drug absorption, distribution, metabolism, excretion and elimination.
	Clinical Toxicology- Theory (PD406T-19): C406
C406.1	explain principles and practice of clinical toxicology.
C406.2	outline health implications of toxic exposures.

C406.3	compare history, assessment, and therapy considerations associated with the management of a toxic exposure.
C406.4	explain characteristics and guidelines for treating specific toxic substances.
C406.5	elaborate preventive approaches to reduce unintentional poisoning.
	Pharmacotherapeutics I & II-Theory (PD407T-19): C407
C407.1	explain pathophysiology of selected disease states and rationale for drug therapy.
C407.2	summarise the diagnostic and therapeutic approaches to manage the diseases.
C407.3	identify controversies in drug therapy.
C407.4	examine therapeutic plans based on diagnosis and therapy.
C407.5	estimate patient-specific parameters relevant in initiating drug therapy, and monitoring therapy.
	Pharmacotherapeutics-III-Practical (PD408P-19): C408*
C408*.1	analyze laboratory results of specific disease state.
C408*.2	describe the therapeutic approach to manage the diseases.
C408*.3	identify the patient-specific parameters relevant in initiating the drug therapy
C408*.4	discuss the rationale for drug therapy of the selected disease
C408*.5	develop the individualized therapeutic plans based on diagnosis
	Hospital Pharmacy -Practical (PD409P-19): C409*
C409*.1	identify methods to prevent drug interactions.
C409*.2	analyze drug information queries and provide solution.
C409*.3	formulate parenteral and powders.
C409*.4	analyze various methods of inventory control in hospital pharmacy.
C409*.5	evaluate ADR and drug toxicity.
	Clinical Pharmacy-Practical (PD410P-19): C410*
C410*.1	explain the role of clinical pharmacist at various healthcare settings.
C410*.2	demonstrate drug therapy of the patient through medication chart review and clinical review.
C410*.3	identify the medication history and counsel the patients.
C410*.4	infer selected laboratory results of specific disease states.
C410*.5	assess adverse drug reactions of specific therapies.
C410*.6	investigate case studies for drug and medicine information.
	Biopharmaceutics & Pharmacokinetics-Practical (PD411P-19): C411*
C411*.1	Identify methods of pharmacokinetics for screening of drugs.
C411*.2	compare dissolution parameters of different marketed product of same drug.
C411*.3	Estimate different pharmacokinetic parameters based on plasma level time curve data.
C411*.4	examine plasma protein binding of drug.
C411*.5	relate dissolution studies with in vivo performance of dosage form.
C411*.6	improve results of in vitro absorption studies of different dosage forms of poorly soluble drugs.
	Pharmacotherapeutics I & II-Practical (PD412P-19): C412*
C412*.1	describe the diagnosis and management of various diseases.
C412*.2	explain drug therapy based on patient -specific parameters.

C412*.3	utilize pathophysiology, therapeutic management and pharmacology in treatment of diseases.
C412*.4	compare methods of educating patients for rational use of drugs.
C412*.5	make use of prescribed guidelines for rational drug use of drugs in paediatrics, geriatrics, pregnancy.

Note : * stands for practical

Pharm D 5th Year	
Clinical Research- Theory (PD501T-19): C501	
After the completion of the course, students will be able to	
Course Code	**Course Outcomes**
C501.1	classify clinical trial designs and phases.
C501.2	categorise responsibilities of key players involved in clinical trials.
C501.3	identify documentation requirements for clinical trials.
C501.4	compare applications of databases in clinical research.
C501.5	examine strategies and techniques involved in drug discovery process.
C501.6	make use of GCP guidelines in clinical research.
	Pharmacoepidemiology & Pharmacoeconomics–Theory (PD502T-19): C502
C502.1	explain pharmacoepidemiology and Pharmacoeconomics in clinical settings.
C502.2	classify different pharmacoepidemiological methods.
C502.3	measure various pharmacoeconomic outcomes generated from different methods.
C502.4	identify various risks in pharmacoepidemiology.
C502.5	appraise various clinical system for studying drug effects in populations.
C502.6	Apply pharmacoepidemiology in the study of vaccine safety and drug induced birth defects.
	Clinical Pharmacokinetics & Pharmacotherapeutic Drug Monitoring– Theory (PD503T-19): C503
C503.1	explain clinical pharmacokinetics and drug interaction.
C503.2	design dosage regimens and implement therapeutic drug monitoring.
C503.3	identify the significance of population pharmacogenetics and pharmacokinetics.
C503.4	relate concept of pharmacogenetics and pharmacokinetic/pharmacodynamic in drug therapy.
C503.5	estimate drug dosage regimen for patient with renal / hepatic impairments.
C503.6	analyze genetic polymorphism in drug metabolism, drug transport and drug target.
	Clerkship–Practical (PD504P-19): C504*
C504*.1	classify clinical pharmacy services.
C504*.2	demonstrate pharmaceutical care planning.
C504*.3	examine concept of therapeutics.
C504*.4	relate of Adverse Drug Reaction and drug interaction.
C504*.5	determine flow of pharmaceutical in hospital.
C504*.6	interpret case studies in hospitals.
	Project Work (Six Months)– Practical (PD505P-19): C505*
C505*.1	relate published articles and record the findings in impartial manner.
C505*.2	apply data collection and reporting skills in the area of community, hospital and clinical pharmacy.
C505*.3	plan patient consent and care.
C505*.4	Interpret collected data from case studies.
C505*.5	conclude the documentation of project work under prescribed guidelines

Note : * stands for practical/Clerkship/Project Work

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Pharm D 6th Year	
Internship	
After the completion of the course, students will be able to	
Course Code	**Course Outcomes**
C601.1	demonstrate their skills to work in clinical setting.
C601.2	apply data collection and reporting skills in the area of community, hospital and clinical pharmacy.
C601.3	interpret collected data from case studies.
C601.4	utilize skills for patient counselling.

Saurabh Sharma
Digitally signed by Saurabh Sharma
Date: 2024.04.06 10:51:45 +05'30'

Dr. Saurabh Sharma
Director
Chandigarh College of Pharmacy
Landran, Mohali