

**College of Pharmacy**  
**Teerthanker Mahaveer University**

**Pharm.D. (Doctorate in Pharmacy)**

**Programme Outcome**

<b>PO-1</b>	:	Acquiring and retrieve sound knowledge on fundamental principles and their applications in the area of Pharmaceutical Sciences.
<b>PO-2</b>	:	Understanding and communicate the value of pharmacist's professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).
<b>PO-3</b>	:	Developing ability for in-depth analytical and critical thinking in order to identify, formulate and solve the issues related to Pharmaceutical Industry, Regulatory Agencies, Hospital and Community Pharmacy Services.
<b>PO-4</b>	:	Developing ability for in-depth analytical and critical thinking in order to identify, formulate and solve the issues related to Pharmaceutical Industry, Regulatory Agencies, Hospital and Community Pharmacy Services.
<b>PO-5</b>	:	Developing written and oral communication skills.
<b>PO-6</b>	:	Developing creativity to solve need based problems in pharmaceutical Industry as well as in healthcare systems for raising quality use of medicine.
<b>PO-7</b>	:	Developing professional ethics, entrepreneurship, leadership and team spirit.

**Programme Specific Outcome**

<b>PSO-1</b>	:	Understanding the basic concepts of homeostasis, disease etiology and therapeutic management with their principles and applications.
<b>PSO-2</b>	:	Understanding the various concepts of development of drug and pharmaceuticals
<b>PSO-3</b>	:	Describing various requirements and methodology used for manufacturing and quality control of various pharmaceutical and cosmetic products.
<b>PSO-4</b>	:	Demonstrating use of various instruments and equipment with their standard operating procedures (SOPs) for the analysis of drugs and pharmaceuticals.
<b>PSO-5</b>	:	Demonstrating the ability to compound extemporaneous and commercially available dosage forms, dispense, and administer medications in a variety of healthcare settings.
<b>PSO-6</b>	:	Applying standards, guidelines, best practices, and established processes related to safe and effective medication use.
<b>PSO-7</b>	:	Conducting various pharmaceutical research studies such as identify and report drug related problems, ADRs, drug-drug interactions, drug toxicities, DUR etc. during pharmacy practice in clinics/hospitals.
<b>PSO-8</b>	:	Developing and providing an evidence-based approach to care that considers the cost, care, access, and satisfaction needs of a targeted patient population.
<b>PSO-9</b>	:	Developing research instinct in the area of community, hospital and clinical pharmacy.

## Course Outcomes

<b>PDR101</b>	<b>CO-1</b>	Understanding the structure and functions of various organs of the human body.
	<b>CO-2</b>	Describing various homeostatic mechanisms and their imbalances in various Systems.
	<b>CO-3</b>	Applying the hematological tests and vital signs and symptoms.
	<b>CO-4</b>	Analyzing the interlinked mechanisms of homeostasis in human body.
<b>PDR102</b>	<b>CO-1</b>	Understanding the formulation aspects of different dosage forms
	<b>CO-2</b>	Applying different pharmaceutical calculation involved in formulation.
	<b>CO-3</b>	Formulating different types of dosage forms.
	<b>CO-4</b>	Evaluating the formulations for effectiveness.
<b>PDR103</b>	<b>CO-1</b>	Understanding the role and importance of enzymes in the diagnosis of diseases.
	<b>CO-2</b>	Defining the genetics, mutation and repair mechanism of human body.
	<b>CO-3</b>	Explaining the metabolic process of biomolecules in health and illness.
	<b>CO-4</b>	Demonstrating the biochemical principles in organ function and their biochemical tests in body fluids.
<b>PDR104</b>	<b>CO-1</b>	Understanding important physical & chemical properties of organic compounds
	<b>CO-2</b>	Explaining various nomenclature systems of organic compounds.
	<b>CO-3</b>	Applying the mechanism of organic chemical reactions.
	<b>CO-4</b>	Analyzing methods of preparation, tests for purity, assay, medicinal uses of important organic compounds.
<b>PDR105</b>	<b>CO-1</b>	Understanding the principles and procedures of analysis of drugs and the application of inorganic pharmaceuticals
	<b>CO-2</b>	Demonstrating the importance of inorganic pharmaceuticals in preventing and curing the disease
	<b>CO-3</b>	Analyzing the inorganic pharmaceuticals and their application
<b>PDR1036</b>	<b>CO-1</b>	Understanding the basic concepts of mathematical theory, formulas and their applications in Pharmacy.
	<b>CO-2</b>	Demonstrating the important application of Mathematics in Pharmacy.
	<b>CO-3</b>	Applying formulas to solve the different types of pharmaceutical calculations.
<b>PDR107</b>	<b>CO-1</b>	Understanding classification and salient features of plant and animal kingdoms.
	<b>CO-2</b>	Demonstrating about naturally occurring drugs its sources and use.
	<b>CO-3</b>	Analyzing tools and techniques used in herbal drug and cell biology study
<b>PDR151</b>	<b>CO-1</b>	Understanding the anatomy and physiology of different systems of our body.
	<b>CO-2</b>	Describing various homeostatic mechanisms and their imbalances of various systems.
	<b>CO-3</b>	Demonstrating various hematological tests and record vital signs.
	<b>CO-4</b>	Applying the interlinked mechanisms in the maintenance of normal functioning (homeostasis) of human body.
<b>PDR152</b>	<b>CO-1</b>	Understanding formulation aspects of different dosage forms.
	<b>CO-2</b>	Explaining physical, chemical and therapeutic incompatibilities in

		formulations.
	<b>CO-3</b>	Demonstrating the manufacturing of various dosage forms by understanding the use of equipment.
<b>PDR153</b>	<b>CO-1</b>	Understanding the qualitative and quantitative estimation of biochemical Parameters.
	<b>CO-2</b>	Analyzing the biochemical tests for blood and urine.
<b>PDR154</b>	<b>CO-1</b>	Understanding various stereo models of organic molecules.
	<b>CO-2</b>	Explaining various laboratory techniques involved in synthesis of organic Compounds.
	<b>CO-3</b>	Illustrating schematic qualitative organic analysis for identification of organic functional groups.
<b>PDR155</b>	<b>CO-1</b>	Understanding the principle and procedures involved in limit tests and volumetric analysis.
	<b>CO-2</b>	Identifying the presence and the purity of inorganic compounds based on official monograph.
	<b>CO-3</b>	Preparing inorganic pharmaceutical compounds
<b>PDR156</b>	<b>CO-1</b>	Understanding the basic morphology of animals and plants.
	<b>CO-2</b>	Defining the plant physiology.
	<b>CO-3</b>	Preparing the transvers sections and permanent slides of given plant samples.
<b>PDR201</b>	<b>CO-1</b>	Understanding the etiology, pathogenesis and clinical features of the selected disease conditions and immunogenic reactions.
	<b>CO-2</b>	Explaining the pathophysiologic conditions of some common and infectious diseases.
	<b>CO-3</b>	Analyzing laboratory values of clinical significance for disease identification.
<b>PDR202</b>	<b>CO-1</b>	Understanding the structure, classification, identification of microorganisms and disinfection & sterilization techniques.
	<b>CO-2</b>	Demonstrating the mode of transmission, sign and symptoms of disease caused by microorganisms.
	<b>CO-3</b>	Experimenting various identification and diagnostic tests for microorganisms.
<b>PDR203</b>	<b>CO-1</b>	Understanding the basic principles of cultivation, collection, storage and sources of adulteration of crude drugs.
	<b>CO-2</b>	Identifying the sources, its active constituents and use of crude drugs.
	<b>CO-3</b>	Demonstrating the application of primary and secondary metabolites of plants.
	<b>CO-4</b>	Estimating different values for standardization of crude drugs.
<b>PDR204</b>	<b>CO-1</b>	Understanding the pharmacology of different classes of drugs acting on different systems of human body.
	<b>CO-2</b>	Classifying the drugs on the basis of their pharmacological action and therapeutic uses.
	<b>CO-3</b>	Illustrating the associated side effect and toxicities of drugs and its interaction in between them.
	<b>CO-4</b>	Explaining the mechanism of drug's action.
<b>PDR205</b>	<b>CO-1</b>	Understanding professional practice management and pharmaceutical care services in community pharmacy.

	<b>CO-2</b>	Demonstrating patient counselling and practicing health screening services in community pharmacy.
	<b>CO-3</b>	Practicing community services and responding to minor ailments providing appropriate medications with professional code of ethics.
	<b>CO-4</b>	Supporting health education services to the community.
<b>PDR206</b>	<b>CO-1</b>	Understanding the pathophysiology of selected disease states and rationale behind drug therapy.
	<b>CO-2</b>	Identifying patient specific parameters in initiating and monitoring drug therapy.
	<b>CO-3</b>	Demonstrating different therapeutic approaches in management of selected disease conditions.
	<b>CO-4</b>	Devising individualized drug therapy based on diagnosis of selected disease conditions.
<b>PDR207</b>	<b>CO-1</b>	Understanding the principles and process of communication.
	<b>CO-2</b>	Recognizing the barriers of communication.
	<b>CO-3</b>	Analysing the verbal and non-verbal communication.
	<b>CO-4</b>	Developing interpersonal skills, oral and written communication skills.
<b>PDR208</b>	<b>CO-1</b>	Understanding application of computers in pharmacy.
	<b>CO-2</b>	Recognising concept of information system, software and bioinformatics.
	<b>CO-3</b>	Applying computers for data analysis in preclinical development.
<b>PDR251</b>	<b>CO-1</b>	Understanding the basics of experimental microbiology.
	<b>CO-2</b>	Identifying the presence of microorganism in some infectious diseases & pharmaceutical preparation.
	<b>CO-3</b>	Demonstrating the microbiological assay of antibiotics and vitamins.
<b>PDR252</b>	<b>CO-1</b>	Understanding the microscopic evaluations of crude/herbal drugs including internal structure (T.S.), powder analysis, leaf surface microscopy to confirm plant species and variety.
	<b>CO-2</b>	Identifying crude drugs with morphology, chemical tests for active chemical constituents as compared with official standards.
	<b>CO-3</b>	Analyzing the fixed & volatile oils by saponification, acid value, ester values, physic-chemical evaluations for purity.
	<b>CO-4</b>	Developing plant monographs, herbarium and authentication for official comparison.
<b>PDR253</b>	<b>CO-1</b>	Understanding the principles and practices involved in selection of drug therapy including clinical discussions for selected diseases.
	<b>CO-2</b>	Interpreting the follow up, progress and changes made in drug therapy.
	<b>CO-3</b>	Analyzing the pharmaceutical care issues and their solutions.
	<b>CO-4</b>	Developing the evidence based pharmaceutical care plans for allotted patients.
<b>PDR254</b>	<b>CO-1</b>	Understanding the basics of communication skills.
	<b>CO-2</b>	Applying oral and written communication skills with proper pronunciation and presentation.
<b>PDR208</b>	<b>CO-1</b>	Understanding basic concepts of HTML and its use in creating websites.
	<b>CO-2</b>	Demonstrating the information of any drug and its adverse effects using online tools.
	<b>CO-3</b>	Deploying MS Office tools to store and retrieve patient information from the Database.

	<b>CO-4</b>	Generating and printing report from patient database.
<b>PDR301</b>	<b>CO-1</b>	Understanding the pharmacological aspects of selected drugs.
	<b>CO-2</b>	Applying the pharmacology of drugs and correlate therapeutics.
	<b>CO-3</b>	Evaluating and interpreting the drugs action through animal toxicology.
<b>PDR302</b>	<b>CO-1</b>	Understanding the concept of quality assurance, principles of instrumental techniques such as and electro chemical techniques in drug analysis. chromatography, spectroscopy, thermal
	<b>CO-2</b>	Analyzing drugs and pharmaceuticals using different analytical techniques.
	<b>CO-3</b>	Estimating the drug content in various formulations
<b>PDR303</b>	<b>CO-1</b>	Relating the pathophysiology of selected disease states and the rationale for drug therapy.
	<b>CO-2</b>	Demonstrating different therapeutic approaches in management of selected disease conditions.
	<b>CO-3</b>	Assessing the needs for monitoring the drug therapy for selected diseases Conditions.
	<b>CO-4</b>	Devising individualized drug therapy plans based on diagnosis for selected disease.
<b>PDR304</b>	<b>CO-1</b>	Recognizing the role of regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals.
	<b>CO-2</b>	Illustrating various concepts of the pharmaceutical legislation in India including drug and cosmetic act and rules, drug policies, DPCO, Patent and design act.
	<b>CO-3</b>	Practicing professional ethics during handling of drugs, pharmaceuticals and cosmetics.
	<b>CO-4</b>	Employing the concepts of different acts and related laws as prescribed by the Pharmacy Council of India and International drug regulatory authorities.
<b>PDR305</b>	<b>CO-1</b>	Understanding various modern approaches in drug design, QSAR and CADD.
	<b>CO-2</b>	Demonstrating the chemistry & SAR of various categories of drugs with respect to their biological activities.
	<b>CO-3</b>	Explaining the metabolism, adverse effects and therapeutic activities of various categories of drugs.
	<b>CO-4</b>	Estimating drugs qualitatively and quantitatively in formulations through assays.
	<b>CO-5</b>	Synthesizing drugs using different chemical reaction approach.
<b>PDR306</b>	<b>CO-1</b>	Understanding the principles involved in formulation of various pharmaceutical forms.
	<b>CO-2</b>	Demonstrating the concept of bioavailability and bioequivalence and their role in clinical situations.
	<b>CO-3</b>	Formulating various dosage forms.
	<b>CO-4</b>	Evaluating various dosage forms.
<b>PDR307</b>	<b>CO-1</b>	Understanding concepts & sources of environment and its associated problems and measures to control.
	<b>CO-2</b>	Describing the ecosystems.
	<b>CO-3</b>	Analysing human impacts on the environment.

<b>PDR351</b>	<b>CO-1</b>	Understanding the animal handling and route of drug administration of several types of dosage forms.
	<b>CO-2</b>	Recognizing the different types of experimental instruments dealing with pharmacological research.
	<b>CO-3</b>	Demonstrating the several molecular level target in in-vitro and in-vivo technology.
	<b>CO-4</b>	Evaluating currently accepted experimental methods, instrumental techniques and procedure.
<b>PDR352</b>	<b>CO-1</b>	Understanding the principles and procedures involved in estimation of drugs and pharmaceuticals.
	<b>CO-2</b>	Demonstrating different analytical techniques and instruments.
	<b>CO-3</b>	Interpreting the data and spectra for analysis.
<b>PDR353</b>	<b>CO-1</b>	Understanding the principles and practices involved in selection of drug therapy including clinical discussions for selected diseases.
	<b>CO-2</b>	Interpreting the follow up, progress and changes made in drug therapy.
	<b>CO-3</b>	Analyzing pharmaceutical care issues and their solutions.
	<b>CO-4</b>	Developing the evidence based pharmaceutical care plans for allotted patients
<b>PDR354</b>	<b>CO-1</b>	Recognizing various mechanisms for synthesis of drugs or their intermediates.
	<b>CO-2</b>	Illustrating different physico-chemical properties of various classes of drug.
	<b>CO-3</b>	Applying the principles involved in assay of drugs in dosage forms
<b>PDR355</b>	<b>CO-1</b>	Understanding the principle involved in formulation of various pharmaceutical dosage forms.
	<b>CO-2</b>	Recalling the concept of bioavailability and bioequivalence.
	<b>CO-3</b>	Evaluating pharmaceutical dosage forms.
	<b>CO-4</b>	Preparing various pharmaceutical formulations.
<b>PDR401</b>	<b>CO-1</b>	Understanding the pathophysiology of selected disease states and the rational drug therapy.
	<b>CO-2</b>	Demonstrating different therapeutic approaches in management of selected disease conditions.
	<b>CO-3</b>	Developing individualized therapeutic plans based on diagnosis.
<b>PDR402</b>	<b>CO-1</b>	Understanding drug distribution and professional practice management skills in hospital pharmacies.
	<b>CO-2</b>	Demonstrating unbiased drug information to the patients and physicians.
	<b>CO-3</b>	Formulating extemporaneous drug preparations in the hospital pharmacies.
	<b>CO-4</b>	Practicing drug dispensing, store management and inventory control in hospitals.
	<b>CO-5</b>	Developing practice-based research methods.
<b>PDR403</b>	<b>CO-1</b>	Identifying and resolving drug related problems.
	<b>CO-2</b>	Assessing adverse drug reactions.
	<b>CO-3</b>	Interpreting selected laboratory results (as monitoring parameters in therapeutics) for specific diseased conditions and providing medicine information.
	<b>CO-4</b>	Practicing medication history interviews and patients counselling.

<b>PDR404</b>	<b>CO-1</b>	Understanding research methodology.
	<b>CO-2</b>	CO2. Applying biostatistical tools and techniques to test hypothesis, optimize and correlate different types of data and its analysis.
	<b>CO-3</b>	CO3. Employing computer application in hospital pharmacy, community pharmacy, drug information retrieval and managing stores.
<b>PDR405</b>	<b>CO-1</b>	Understanding the basic concepts of Biopharmaceutics and Pharmacokinetics.
	<b>CO-2</b>	CO2. Experimenting in-vitro dissolution studies and in-vivo bioavailability studies for various drugs and its formulations.
	<b>CO-3</b>	CO3. Analyzing plasma drug availability data and pharmacokinetic parameters of a drug to fix its dosage regimen.
	<b>CO-4</b>	CO4. Developing bioavailability and bio-equivalence study for new drug formulations.
<b>PDR406</b>	<b>CO-1</b>	Understanding the concept of poisoning, drug toxicities, its general management and Supportive care.
	<b>CO-2</b>	CO2. Analyzing various toxicities, poisonings, bites and stings with their clinical features, diagnosis and management.
	<b>CO-3</b>	CO3. Managing acute & chronic poisoning due heavy metals, plants and food.
<b>PDR451</b>	<b>CO-1</b>	Understanding the rational drug use in selection of drug therapy including clinical discussions for selected diseases.
	<b>CO-2</b>	CO2. Interpreting the follow up, progress and changes made in drug therapy.
	<b>CO-3</b>	CO3. Analyzing the pharmaceutical care issues and their solutions.
	<b>CO-4</b>	CO4. Developing the evidence based pharmaceutical care plans including pharmacological, nonpharmacological counselling for allotted patients.
<b>PDR452</b>	<b>CO-1</b>	Understanding inventory control for hospitals.
	<b>CO-2</b>	Assessing drug interactions in the given prescriptions.
	<b>CO-3</b>	Analyzing drug information queries in the given prescription.
	<b>CO-4</b>	Formulating parenteral and powder preparations.
<b>PDR453</b>	<b>CO-1</b>	Understanding the concept and procedures involved in patient medication history interviews and counseling.
	<b>CO-2</b>	Analyzing laboratory investigations in case studies.
	<b>CO-3</b>	Evaluating drug information queries.
<b>PDR454</b>	<b>CO-1</b>	Understanding the concepts of bioavailability and pharmacokinetics in clinical context.
	<b>CO-2</b>	CO2. Interpreting the various pharmacokinetic parameters from blood profile and urine excretion data.
	<b>CO-3</b>	CO3. Analyzing in-vitro dissolution studies for different drugs as per the standards.
<b>PDR501</b>	<b>CO-1</b>	Understanding various approaches to drug discovery, developments an requirements of drug regulatory bodies at national and international level.
	<b>CO-2</b>	CO2. Demonstrating various phases of clinical trials and various methods of post marketing surveillance.
	<b>CO-3</b>	CO3. Applying good clinical practice as per ICH guidelines.
	<b>CO-4</b>	CO4. Designing clinical study documents and safety monitoring in clinical

		trials.
<b>PDR502</b>	<b>CO-1</b>	Understanding the concept of pharmacoepidemiology and pharmacoconomics.
	<b>CO-2</b>	CO2. Identifying risk factors related to the occurrence of disease.
	<b>CO-3</b>	CO3. Comparing the costs and outcomes of pharmaceutical products and services to reduce monetary burden on the consumers.
	<b>CO-4</b>	CO4. Evaluating out comes based case study reports to minimize cost of drug therapy.
<b>PDR503</b>	<b>CO-1</b>	Understanding the concept of clinical pharmacokinetics.
	<b>CO-2</b>	Computing dosage regimen using pharmacokinetic data.
	<b>CO-3</b>	Interpreting drug interactions and monitoring individual drug therapy.
	<b>CO-4</b>	Practicing different approaches for dosage adjustment in patients with different pathophysiologic conditions.
<b>PDR551</b>	<b>CO-1</b>	Familiarizing with various clinical aspects by interacting with patients and healthcare professionals.
	<b>CO-2</b>	Developing pharmaceutical care skills during clerkship.
<b>PDR552</b>	<b>CO-3</b>	Developing research questions and methodology.
	<b>CO-4</b>	Developing data collection, analysis, reporting skills in the area of community, hospital and clinical pharmacy.