

Part B - Syllabus

PHARM.D (POST BACCALAUREATE) (PHD)

Pharmaceutics: Preformulation studies: physicochemical properties of drug substances; dosage form design; tablet technology: granulation, compression, coating, and quality control; capsule formulation; liquid dosage forms: solutions, suspensions, emulsions, and syrups; semi-solid preparations: ointments, creams, gels, and pastes; parenteral formulations: sterility, pyrogen testing, and packaging; ophthalmic and otic preparations; aerosols; novel drug delivery systems: controlled release, transdermal, liposomes, nanoparticles, and microspheres; biopharmaceutics: dissolution, absorption, and bioavailability.

Pharmaceutical Chemistry: Structure-activity relationships (SAR); organic synthesis of drug molecules; drug metabolism: phase I and phase II reactions; pro-drugs; stereochemistry and its role in drug activity; classes of drugs: analgesics, antibiotics, antifungals, antiviral agents, antihypertensives, antidiabetics, antineoplastics, and CNS drugs; medicinal chemistry of cardiovascular, anti-inflammatory, and antimicrobial agents; spectroscopic methods in structure elucidation: UV, IR, NMR, and mass spectrometry.

Pharmacology and Toxicology: Pharmacokinetics: absorption, distribution, metabolism, and excretion (ADME); drug-receptor interactions; agonists and antagonists; dose-response relationships; pharmacodynamics of major drug classes: autonomic nervous system drugs, cardiovascular drugs, analgesics, antipyretics, NSAIDs, antiepileptics, antipsychotics, and antibiotics; toxicology: acute and chronic toxicity testing; teratogenicity, carcinogenicity, and mutagenicity; antidotes and management of poisoning; drug interactions; adverse drug reactions.

Pharmacognosy and Phytochemistry: Crude drugs: sources, collection, and processing; phytochemical constituents: alkaloids, glycosides, tannins, flavonoids, terpenoids, steroids, and volatile oils; biosynthetic pathways; quality control of crude drugs: WHO guidelines; standardisation and adulteration; plant drug extraction and isolation techniques; bioactive natural products and their medicinal uses; herbal drug technology; nutraceuticals and dietary supplements; AYUSH and traditional medicine systems; marine natural products.

Pharmaceutical Analysis: Principles and applications of titrimetry: acid-base, redox, complexometric, and precipitation titrations; gravimetric analysis; UV-visible spectrophotometry; fluorimetry; IR spectroscopy; atomic absorption spectroscopy; flame photometry; HPLC: instrumentation, method development, and validation; gas chromatography; TLC and HPTLC; electrophoresis; NMR and mass spectrometry in pharmaceutical analysis; pharmacopoeial standards: IP, BP, and USP; validation of analytical methods (ICH guidelines).

Pharmaceutics — Biopharmaceutics and Pharmacokinetics: Biopharmaceutic Classification System (BCS); factors affecting drug absorption: physicochemical and physiological; routes of drug administration; oral drug absorption models; distribution of drugs: plasma protein binding, apparent volume of distribution; drug metabolism and enzyme induction/inhibition; renal and hepatic elimination; compartmental and non-compartmental PK models; one- and two-compartment models; multiple dosing; bioavailability and bioequivalence studies; pharmacokinetic-pharmacodynamic (PK-PD) relationships; population pharmacokinetics.

Hospital and Clinical Pharmacy: Drug information services; formulary management; clinical pharmacokinetics and therapeutic drug monitoring; patient counselling; adverse drug reaction

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monitoring and reporting; clinical trials: phases, GCP guidelines, and ethics; rational drug use; drug-drug and drug-food interactions; pharmacy and therapeutics committee; medication reconciliation; clinical pharmacy practice in oncology, cardiology, and infectious diseases; pharmacovigilance; medication errors and risk management.

Regulatory Affairs and Quality Assurance: Good Manufacturing Practices (GMP): WHO and ICH guidelines; quality control and quality assurance in pharmaceutical industry; validation of processes, equipment, and analytical methods; documentation and change control; CGMP compliance; regulatory submissions: NDA, ANDA, and CTD format; ICH guidelines (Q, S, E, M series); drug regulatory authorities: DCGI, USFDA, EMA; schedule M and schedule Y regulations; pharmacopoeia standards; stability testing: ICH Q1A guidelines; pharmaceutical auditing.

Pharmacoinformatics and Drug Design: Computer-aided drug design (CADD): molecular docking, virtual screening, QSAR; molecular modelling: energy minimisation, molecular dynamics; cheminformatics: chemical databases and structure-activity data mining; bioinformatics tools in drug discovery; target identification and validation; fragment-based drug discovery; high-throughput screening (HTS); lead optimisation; ADMET prediction using in-silico tools; pharmacophore modelling; protein-ligand interaction analysis.