

Syllabus for the Ph.D. Entrance Examination

Name Of the Institute	:	Institute of Pharmacy
Name of Department/Specialization	:	Pharmaceutics, Pharmacology, Pharmaceutical Chemistry, Pharmaceutical Analysis and Pharmacognosy
Academic Year	:	2024-2025

RESEARCH METHODOLOGY

1. Fundamentals of Research

- Objective & Types of Research
- Selecting a research problem
- Methods, Design and Tools used in research
- Literature Survey, Primary & Secondary Sources of Information
- Documentation types and techniques

2. The research Report/Paper writing/thesis writing and Scientific Writing

- E-Resources
- Presentation of Experimental Data
- Ethics in Research & Publication
- Plagiarism and software to detect plagiarism
- Writing scientific manuscript

3. Research Grants Writing

- Overview of various National and International Agencies
- Types of different Government and Private granting bodies
- Research Proposal Writing

4. Intellectual property rights (IPR) & Patents

- IPR: Introduction to patents, copy rights & trademarks
- Patent : Prior art search, patent filing in India and abroad, patent infringement

5. Statistics in research

- Fundamentals and applications of mean, median, mode, standard deviation, S.M., Regression and Correlation analysis, hypothesis testing (Z-test, t-test, chi square etc.), ANOVA etc. in pharmaceutical research with its interpretations.

Date: 31/01/2024


Dr. Gopal Varshni
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Academic Year	:	2024-2025

Topics:

1. Organic Chemistry:

1.1 Different classes of compounds: Detail explanation of compounds with respect to their IUPAC / systematic nomenclature, methods of preparations, physical properties & chemical reactions with emphasis on reaction mechanisms & stereochemistry for Alkanes, Alkenes, Alkynes, Aliphatic hydroxyl, Alkyl halides, Aldehydes & Ketones, Carboxylic acids and functional derivatives of carboxylic acids.

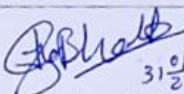
1.2 Aromaticity & chemistry of aromatic compounds: Concept of aromaticity, Huckel's rule & its use in determining the aromatic/non-aromatic. Detail explanation of compounds with respect to their IUPAC / systematic nomenclature, methods of preparations, physical properties & chemical reactions with emphasis on reaction mechanisms & stereochemistry for Aromatic hydrocarbons, Phenolic compounds, Aromatic & aliphatic amines, Diazonium salts and Aromatic nitro- compounds, aryl halides, & ethers and Polycyclic aromatic hydrocarbons.

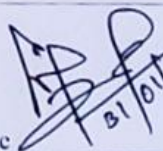
1.3 Heterocyclic Chemistry: IUPAC Nomenclature of heterocyclic rings [3-10 membered] containing O, S, & N atoms, Nomenclature of 2 & 3 fused rings containing mono-, di-, & multiple heteroatoms. Syntheses of quinoline, isoquinoline, benzoxazole, benzothiazole, & benzimidazole, benzotriazole, and benzothiazole.

2. Medicinal Chemistry: Structure, nomenclature, classification, SAR, chemistry and pharmacology of drugs acting on the Central nervous system, Cardiovascular system, Autonomic nervous system, Gastrointestinal system, Respiratory system, chemotherapeutic agents, Hormonal and Immune system.

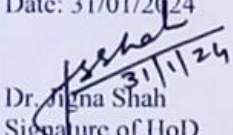
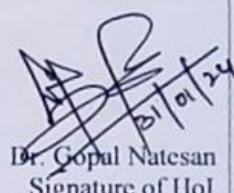
3. Drug Design: An overview of structure-based and ligand-based drug design, QSAR studies, Pharmacophore mapping and virtual screening, and molecular docking studies.

Date & Signature of HoD / HoI on each page


31/01/24
(Dr. Hardik Bhatt)


31/01/24

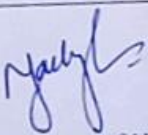
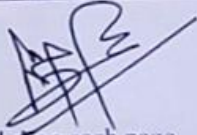
Syllabus for the Ph.D. Entrance Examination

Name Of the Institute	:	Institute of Pharmacy
Name of Department/Specialization	:	Pharmacology
Academic Year	:	2024-2025
<ol style="list-style-type: none">1. Basic and General Pharmacology, Pharmacodynamics, Pharmacokinetics, Pharmacogenetics, Discovery and development of new drugs-Preclinical and clinical studies. Pharmacology of peripheral nervous system, cardiovascular system, urinary system, respiratory system, central nervous system, Endocrine system, gastrointestinal tract, Autacoids and their Antagonists, Immuno-pharmacology, Chemotherapy of malignant diseases and principles of toxicology.2. Development and Scope of Clinical Pharmacy Practice, Role of Clinical Pharmacist, Patient Data Analysis, Drug and Poison information, Rational use of drugs, Medication error and medication adherence, Pharmacoepidemiology.3. Etiopathogenesis, pharmacology of drugs used and pharmacotherapy of following diseases: Cardiovascular disorders, Respiratory disorders, Haematological disorders, Arthritic disorders, Gout and Hyperuricemia, Gastrointestinal disorders, Pain Management, Immune disorders, Disease of ageing, Renal disorders, Endocrine disorders, Psychiatric and Neurologic Disorders, drug addiction, Infectious Diseases, Sexually Transmitted Diseases, Oncologic diseases, Ophthalmologic disorders, Skin diseases.4. Clinical Pharmacokinetics, Drug Interactions, Pharmacoeconomics, Research design and conduct of clinical trials, Pharmacovigilance, ADRs, Pre-clinical and Clinical Toxicology, Hospital Pharmacy, Regulatory guidelines for hospital pharmacy of different countries, Medical writing.		
Date: 31/01/2024		
		
Dr. Jigna Shah Signature of HoD		
		
Dr. Gopal Natesan Signature of HoI		

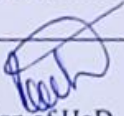

Syllabus For The Ph.D. Entrance Examination

Name Of The Institute	:	Faculty of Pharmacy Department of Pharmacognosy
Academic Year	:	2024-2025

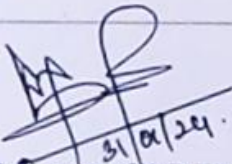
- Pharmacognosy, phytochemistry, isolation, characterization and estimation of commercially important Alkaloids, Glycosides, Flavonoids, Phenolics, Terpenoids and Steroids from natural sources.
- General Techniques of Biosynthetic Studies and Basic Metabolic Pathways/Biogenesis, Role of plant-based drugs on National economy: World-wide trade in medicinal plants and derived products. Utilization and production of important phyto-constituents, medicinal plant biotechnology and Plant Tissue Culture and its applications in pharmacognosy, Novel medicinal agents from marine sources; Natural allergens, natural sweeteners, enzymes
- Analytical pharmacognosy and Herbal Drug Technology: Standardization and quality control of herbal drugs and WHO guidelines applications of different analytical techniques like UV, IR, Mass, NMR and chromatographic techniques for quality of herbal drugs, Safety and efficacy of herbal drugs, Infrastructure of herbal drug industry involved in production of standardized extracts and various dosage forms, Monographs of herbal drugs, Current challenges in upgrading and modernization of herbal formulations, Schedule T and Regulatory guidelines for herbal drugs, Commonly used herbal cosmetics, raw materials, preservatives, surfactants, humectants, oils, colors, and some functional herbs. Regulations and challenges in herbal cosmetics.
- Nutraceuticals: Standardization of nutraceuticals, Regulatory aspects, FSSAI guidelines and health benefits and uses of important contemporary nutraceuticals constituents, phytopharmaceuticals: isolation and characteristic features (Chemical nature, uses in pharmacy, medicinal and health benefits) of important carotenoids, flavonoids phenolics, saponins etc.
- Pharmacovigilance of drugs of natural origin, Safety and toxicological aspects of drugs of natural origin.

 
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Syllabus For the Ph.D. Entrance Examination

Name of the Institute	:	Institute of Pharmacy, Nirma University (Department of Pharmaceutical Analysis)
Academic Year	:	2024-2025
Topic I <ul style="list-style-type: none">• Spectroscopy: UV-Visible spectroscopy, IR spectroscopy, Spectrofluorimetry, Flame emission spectroscopy and atomic absorption spectroscopy, NMR spectroscopy, Mass Spectroscopy. Interpretation of the NMR, Mass and IR spectra of various organic compounds.• Chromatography: High Performance Thin Layer Chromatography, Ion exchange chromatography, Column chromatography, Gas chromatography, High Performance Liquid chromatography, Ultra High-Performance Liquid chromatography, Affinity chromatography, Gel Chromatography, Super critical fluid chromatography. Hyphenated techniques like LC-MS, LC-MS/MS, GC-MS.		
Topic II <ul style="list-style-type: none">• Impurity and stability studies, Impurities in new drug products, Impurities in residual solvents, Elemental impurities, Stability testing protocols, Impurity profiling and degradant characterization,• Calibration and qualification of analytical instruments, Analytical method validation for dissolution, assay etc.• Extraction of drugs and metabolites from biological matrices, Bioanalytical method validation, Biopharmaceutics Classification System, Pharmacokinetic and Toxicokinetic, Metabolite identification, In-vivo: Bioavailability and Bioequivalence.• Analysis of raw materials, finished products, packaging materials, in process quality control (IPQC), Developing specification (ICH Q6 and Q3), Documentation in pharmaceutical industry, Manufacturing operations and controls.		
Topic III <ul style="list-style-type: none">• Herbal drug standardization, Stability testing of natural products, Evaluation of cosmetic products.• Analysis of biotherapeutics and biological products including peptide mapping, n-terminal sequencing, post translational modification, disulfide bond characterization		
Date: 11/2/2024		
	Sign of HoD (Dr Priti Mehta)	Sign of HoD (Dr Gopal Natesan)

Syllabus For The Ph.D. Entrance Examination

Name of The Institute	:	Institute of Pharmacy
Department Specialization	:	Pharmaceutics
Academic Year	:	2024-2025
<ol style="list-style-type: none">1. Formulation and evaluation of specialized solid, liquid and semisolid dosage forms. An overview of aerosol, cosmetic and nutraceutical products.2. Pre-formulation and stability testing, Process Validation, GMP practices and Dissolution Profiling, Scale-up considerations in Pharmaceutical Industry, Sterilization and aseptic manufacturing of parenteral products.3. Biopharmaceutics and Pharmacokinetics and their importance in formulation. Transporters for absorption of drug, an importance of BCS classification, BA-BE study of various dosage forms, An overview on biowaiver, orange book and IVIVC.4. Sustained and controlled drug delivery Systems-Basic concepts and factors for selection of particular drug delivery, Development of novel drug delivery systems like sustained, osmotic, oral, parenteral, topical, buccal, nasal, transdermal, pulmonary, ocular etc. Formulation and evaluation of Nano drug delivery systems for treatment of various diseases.5. An overview of NDA, ANDA and IND application. Regulations for Product filing and Documentation in various countries.6. Applications of Design of experiments and Quality by design in optimization of formulation. Development and its statistical interpretation. An overview on guidelines related to Quality by Design and its implications in Pharmaceutical Industry.		
 Date & Signature of HoD / HoI		