NIRMA UNIVERSITY
INSTITUTE OF PHARMACY

Syllabus for PhD. Entrance Examination 2023-24

(Pharmaceutical Chemistry)

Physical Chemistry: Understanding about Composition & physical states of matter, Colligative Properties, Refractive index, Solutions and Electrochemistry.

Organic Chemistry:

General principles: A brief review of classification & sources of organic compounds, hybridization, bond lengths, bond angles & bond energies. An overview of bond polarization, hydrogen bonds, inductive effects, resonance, and hyperconjugation. Calculations for determining empirical & molecular formula should be covered. Protection and de-protection of groups.

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.

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.

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.

Stereochemistry: Stereochemistry. Chirality & asymmetry, Definition & classification Enantiomers, diastereomers. Enantiomerism & diastereomerism. Meso compounds & their optical activity. Stereochemistry in acyclic compounds. Newman projection formulae & their significance. Absolute & relative configuration. Assigning R & S configuration based on Cahn Ingold & Prelog system. Racemic mixture- its definition & resolution. An introduction to atropisomerism.

Medicinal Chemistry: Structure, nomenclature, classification, SAR, chemistry and pharmacology of drugs acting on Central nervous system, Cardiovascular system, Autonomic nervous system, Gastro intestinal system, Respiratory system, chemotherapeutic agents, Hormonal and Immune system. Structure based and Ligand based drug design.