

## CHEMISTRY COMPONENT - DSE

### DISCIPLINE SPECIFIC ELECTIVE COURSE (DSE 04)

#### Credit distribution, Eligibility and Pre-requisites of the Course

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/ Practice		
Medicinal Chemistry; ALS CHEM DSE 04	4	2	0	2	Class 12 <sup>th</sup> Pass with Science	NIL

#### Learning Objectives:

The learning objectives of this course are as follows:

- to impart fundamental knowledge on the structure, chemistry, and therapeutic value of drugs.
- to familiarize the structure activity relationships (SAR) of drugs.
- to understand the importance of physicochemical properties and metabolism of drugs.
- to study chemical synthesis of important drugs under each class.

#### Learning Outcomes:

By studying this course, students will be able to:

- understand the chemistry of drugs with respect to their pharmacological activity.
- explain the drug metabolic pathways, adverse effect and therapeutic value of drugs.
- analyze the Structural Activity Relationship (SAR) of different class of drugs.
- write the chemical synthesis of some drugs.

#### Unit 1: Basic Principles of Medicinal Chemistry

(10 Hours)

History and development of medicinal Chemistry. Stereochemical aspects: optical, geometrical, conformational, Isosterism. Physicochemical properties: solubility, acid-base, chemical bond,

partition coefficient. Drug receptor interaction and International Nonproprietary Names (INNs) of drugs.

**Unit 2: Pharmacokinetics**

**(4 Hours)**

ADME: Drug absorption, drug distribution, drug metabolism - Phase 1, Phase 2 metabolism, drug excretion, Drug Half Life.

**Unit 3: Medicinally Important Classes of Compounds**

**(10 Hours)**

Introduction, Structure, Synthesis, Therapeutic value and elementary SAR of representative drugs of the following classes:

- Analgesics agent: Ibuprofen
- Antipyretic agent: Paracetamol
- Anti-inflammatory agent: Aspirin
- Antibacterial and antifungal agents: Sulphonamides; Sulphanethoxazol, Sulphacetamide
- Antiviral agent: Acyclovir
- Antibiotics agents: Penicillin, Cephalosporin, Chloromycetin and Streptomycin
- Antileprosy agent: Dapsone

**Unit 4: Drugs Acting on Central Nervous System**

**(6 Hours)**

Introduction, structure, therapeutic value and elementary SAR of representative drugs of the following classes:

- Central Nervous System agents: Phenobarbital, Diazepam
- Morphine and related drugs
- Narcotic antagonists: Nalorphine hydrochloride
- Miscellaneous: Cardiovascular (Glyceryl trinitrate), HIV-AIDS related drugs (AZT-Zidovudine)

**PRACTICAL**

**(60 Hours)**

1. Preparation of aspirin and its analysis.

2. Preparation of paracetamol and its analysis.
3. Preparation of sulphacetamide of sulphonamide and its analysis.
4. Determination of alcohol contents in liquid drugs/galenical.
5. Determination of ascorbic acid in vitamin C tablets by iodometric or coulometric titrations.
6. Assay of drugs (any two)
  1. Chlorpromazine
  2. Phenobarbitone
  3. Atropine
  4. Ibuprofen
  5. Aspirin

**Essential/ Recommended Readings:**

1. Patrick, G. (2017), *Introduction to Medicinal Chemistry*, Oxford University Press.
2. Lemke, T. L.; William, D.A.; Roche, V. F.; Zito, S. W. (2012), *Principles of Medicinal Chemistry*, 7<sup>th</sup> Edition, Wolter Kluwer I Lippincott Williams and Wilkins.
3. Burger, (2021) *Medicinal Chemistry, Drug Discovery and Development*, Vol I to VIII, 8<sup>th</sup> Edition, Wiley.

**Suggestive Reading:**

1. Beale, J. M.; Block, J. H. (2010), *Organic Medicinal and Pharmaceutical Chemistry*, 12<sup>th</sup> Edition, Wolters Kluwer India Pvt. Ltd.
2. Singh H.; Kapoor V.K. (1996), *Medicinal and Pharmaceutical Chemistry*, Vallabh Prakashan.

**Note:** Examination scheme and mode shall be as prescribed by the Examination Branch, University of Delhi, from time to time.