

Course Code	Course Name	Credits
26CH601	PHARMACEUTICAL CHEMISTRY	04

Course Objectives

- Understand the fundamental concepts of pharmaceutical chemistry, including drug classification, pharmacological terminology, mechanisms of drug action, and methods of drug assay and storage.
- Analyze the relationship between chemical structure and biological activity of drugs, including QSAR, SAR, and factors influencing drug design, synthesis, and therapeutic efficacy.
- Apply principles of clinical and pharmaceutical chemistry in drug analysis and diagnostic procedures, including estimation of biochemical parameters and the study of radiopharmaceuticals.

Learning Outcomes

Upon successful completion of this course, it is intended that a student will be able to:

- Understand basic concepts of drugs, pharmacological terms, assays, and storage of pharmaceutical substances.
- Explain drug action, metabolism, absorption, and factors affecting pharmacokinetics and pharmacodynamics.
- Apply concepts of drug design including QSAR and structure–activity relationships in pharmaceuticals.
- Analyze the synthesis, applications, and clinical aspects of drugs and diagnostic techniques in healthcare.

Unit 1 - Introduction to pharmaceutical chemistry (12 Hrs.)

Drug definition; nature and source of drugs; important terminologies including pharmacology, pharmacy, pharmacodynamics, pharmacokinetics, molecular pharmacology, pharmacophore, metabolites, antimetabolites, pharmacopoeia, pharmacognosy, toxicology, pharmacotherapeutics, LD₅₀, ED₅₀, and therapeutic index; assay of drugs by chemical, biological, and immunological methods; storage of pharmaceutical substances; types of storage; encapsulation; hard and soft gelatin capsules.

Unit 2 – Drugs (12 Hrs.)

Mechanism of action; actions at cellular and extracellular sites; metabolism of drugs; Phase I reactions; mechanisms of different types of drug action; physical and chemical properties of drugs; absorption of drugs; routes of administration; factors affecting absorption; digestion and absorption of proteins and fats.

Unit 3 - Development of new drugs (12 Hrs.)

Factors affecting development of new drugs, concept of quantitative structure activity relation (QSAR), QSAR methods, Hansch approach and Wilson method. Relation between the chemical structure and pharmaceutical activity, effect of unsaturation, chain length, isomerism, halogens, amino group, acidic group, hydroxyl group, structure activity relationship (SAR) of penicillin and streptomycin.

Unit 4 – Structure and synthesis (12 Hrs.)

Cardio vascular drugs: Nifedipine and Clofibrate, Analgesic and Antipyretic drugs: Mefenamic acid, diclofenac, Paracetamol, and aspirin, Psychoactive drugs: Diazepam and alprazolam. Antihistamin drugs: structure and synthesis of Diphenhydramine, Cyproheptadine, Cetirizine and Ranitidine.

Unit 5 - Clinical chemistry (12 Hrs.)

Determination of serum glucose: Folin & Wu's and o-toluidine methods, Determination of serum glucose cholesterol: Sacket's method, diagnostic tests for salt in serum and urine, Detection of diabetics and anemia, Estimation of hemoglobin. Radiopharmaceuticals for scintigraphy, types of radiopaques, radiopaques substances, radiographic procedure, Iopanoic acid: structure functions and mode of action.

Reference Books:

1. Jaya shree Ghosh, Text book of pharmaceutical chemistry, 2nd Edn, 2008, S. Chand, New Delhi.
2. V.K.Ahluwalia, Drugs, 1st Edn, 2010, Ane books Private Ltd, New Delhi.
3. Kasture, Wadodkar, Pharmaceutical Chemistry-I, 2008, K. Nirali Prakashan.
4. Kasture, Wadodkar, Pharmaceutical Chemistry-II, 2014.
5. Nirali Prakashan. S. Lakshmi, Pharmaceutical Chemistry; 1st Edn, 1995, S. Chand and Company Ltd., New Delhi.
6. Bhagavathi Sundari, Applied Chemistry, 1st Edn, 2006, MJP Publishers, Chennai.

Websites and eLearning Sources:

1. <https://nptel.ac.in/courses/103101787>
2. <https://www.news-medical.net/life-sciences/Clinical-Chemistry-Tests.aspx>
3. <https://link.springer.com/book/10.1007/978-3-319-64230-7>

COs and Bloom's Taxonomy Mapping – 26CH601

Course Outcomes	On completing P.G. program the students will be able to	BTL
CO1	Recall key drug classifications and terminology, and explain basic concepts and sources in pharmacology.	K1, K2
CO2	Apply knowledge of drug action mechanisms to assess how absorption, metabolism, and drug properties influence efficacy and administration routes.	K3
CO3	Analyze how chemical structure and QSAR principles influence drug development and pharmaceutical activity in drugs like penicillin and streptomycin.	K4
CO4	Evaluate the structure, synthesis, and therapeutic effectiveness of key drugs like Nifedipine, Mefenamic acid, Diazepam, and Diphenhydramine.	K5
CO5	Create diagnostic assays for biochemical markers and design radiopharmaceutical protocols for medical imaging applications.	K6

BTL K1 and K2 – remembering and understanding, K3- Applying, K4 – Analyse, K5- Evaluate and K6- Create

Relationship Matrix – 26CH601

Course Outcomes	Programme Outcomes (POs)						Programme Specific Outcomes (PSOs)					Mean Score of Cos
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	3	1	1	1.5	3	3	2	3	3	2	2.3
CO2	3	2	3	2	1	2	2	3	3	2.5	1	2.2
CO3	3	2	3	1.5	2	2	2	3	3	3	1	2.2
CO4	3	3	3	2	2	3	3	2	3	2	3	2.3
CO5	3	2	3	1.5	3	2	3	3	3	2	3	2.3
Total												2.26

Mean Score: 3- High, 2- Medium/Moderate, 1-Low

