BIRLA INSTITUTE OF TECHNOLOGY & SCIENCE, PILANI
Hyderabad Campus
Second Semester 2023 -2024
Course Handout

Date: 09.01.2024

In addition to part-I (General Handout for all courses appended to the time table) this portion gives further specific details regarding the course.

Course No. : *PHA F241*
Course Title : *Pharmaceutical Chemistry*
Instructor-in-charge : D. Sriram
Instructor : Refer time table

1. **Scope and Objective of the Course**:
This course deals with study of important classes of organic compounds. It provides students a basic idea about reactions of these compounds and mechanisms for these reactions. This course also emphasizes the uses of inorganic compounds in pharmacy. This course also covers chemistry of some important heterocycles.

2. Course learning outcomes: On successful completion of the course, the student will be able to

- Identify strategy for new drug synthesis [CO-1]
- Choose various chemical reactions involved during the drug synthesis [CO-2]
- To devise the synthetic route for various drugs. [CO-3]

3. Text Book:
1. L. G. Wade and Maya Shankar Singh, Organic Chemistry, Pearson, 6th Edition
2. Bentley and Driver's Text book of Pharmaceutical Chemistry. 8th Edition, Oxford Medical publications.

4. Reference Books:
1. R T Morrison and R N Boyd Organic Chemistry PHI, 6Th Edition
2. T W Grahm Soloman and Craig B Fryhle , Organic Chemistry, 8th Edition, John Wiley and Sons , New York , 2004.
3. John A. Joule, Keith Mills. Heterocyclic Chemistry, 5th Edition, April 2010, Wiley-Blackwell, ISBN: 978-1-4051-3300-5
4. Inorganic Pharmaceutical Chemistry by Dr. K. G. Bothara, Pragati Books.

5. Course Plan :
THEORY

L N	Topic	Learning Objectives	Text
1 – 2	Naming of organic compounds: Systematic nomenclature, General principles, saturated branched and unbranched chain, alkene, alkyne, carbonyl, carboxylic acid, halogens, amines etc.	To label any chemical structure with IUPAC name.	1.10A-1.10H

3-6	Chemistry of alcohols, phenol, thiols & ethers: Structure and classification, general synthesis and various reactions. Examples & synthesis of drugs containing those functional groups.	To list various chemical route of synthesis of functional groups. To explain various chemical reactions of organic functional groups.	10.1,10.2,10.6,10.12
7–10	Chemistry of ketones and aldehydes: Structure, synthesis and various reactions.	To compare the reactions involved with same or similar functional groups. To select the chemical reactions used for synthesis of compounds which involved multi steps.	16.1,2,4,7,12,14,16,21
11-14	Chemistry of amines: Structure, preparation and reactions of nitro, nitrile, azide, amide, imine. Rearrangements and reactions involving above. Examples & synthesis of drugs containing those functional groups.		17.3,5,6,13,15,20,22
15-19	Chemistry of carboxylic acid and its derivatives: Structure, synthesis and reactions of carboxylic acids. Examples & synthesis of drugs containing those functional groups.		19.9,15,20.1,5,9,10-20.
20-21	Inorganic compound in pharmacy: Chemistry, preparation, properties and uses of various inorganic compounds used in therapeutics and as pharmaceutical aids.	To list the important inorganic compounds used in pharmaceuticals and able to identify their preparations and uses	RB:4 TB-2
22-34	Heterocyclic compounds: Nomenclature, synthesis & reactions of important heterocyclic molecules. 3/4/5/6-membered, benzo-fused, & fused heterocycles. Examples & synthesis of drugs containing those functional groups.	To identify and name the heterocyclic compounds To explain methods for synthesis and properties of heterocyclic compounds. To categorize the drugs based on heterocyclic nucleus. To design synthetic route for drugs whose structure contains heterocyclic nucleus with sidechain/functional groups.	RB:3 Joule Mills

PRACTICALS: Single/multiple step synthesis of compounds involves esterification, amidation, reduction, rearrangement, coupling, condensation and cyclisation reactions. Purification & Characterization by M.P, TLC, IR/Mass/NMR.

6. Evaluation:

Evaluation Component	Duration	Weightage (%)	Date & Time	Remarks	CO
Mid Sem Exam	90 min	30	15/03 - 9.30 - 11.00AM	OB	CO 1 & 2
Surprise Quiz [3-4]	20 min each	20	Lecture class	OB	CO-1 & 2
Lab Components*	-	10	Practical class	OB	-
Compre. Exam.	180 min	40	16/05 FN	OB	CO-1,2,3

*Lab quiz + Experiments + Record

7. Chamber consultation hours: To be announced in class.

8. Notices: Notices concerning the course will be displayed on the CMS.

9. Make-Ups: Generally, make-up will be considered for regular students only (**80% attendance IN LECTURE CLASSES** [serious medical conditions with hospitalisation]. Prior permission for all make ups is a must.

10. Academic Honesty and Integrity Policy: Academic honesty and integrity are to be maintained by all the students throughout the semester and no type of academic dishonesty is acceptable.

Instructor In-Charge
PHA F 241