



Birla Institute of Technology & Science, Pilani
Hyderabad Campus

SECOND SEMESTER 2018-2019

Course Handout (Part - II)

Date: 07-01-

2019

In addition to part I (general handout for all courses appended to the timetable) this portion gives specific details regarding the course.

Course No. : CHEM F342

Course Title : Organic Chemistry IV

Instructor-in-charge : Manab Chakravarty

Instructor : Anupam Bhattacharya

1. Course Description: In this course the fundamental structural characteristics, synthesis and reaction of various heterocyclic compounds, natural products and biomolecules will be discussed.

2. Scope and Objective of the Course: Vast majority of organic compounds are constituted by heterocycles which are key components of pharmaceuticals, agrochemicals, electroactive polymers, flavour and fragrances. They are also found widely in biologically important natural products. The objective of the course is to provide knowledge of different heterocycles, natural products and biomolecules. In case of natural products emphasis will be laid on methods of isolation, separation, characterization and preparation.

3. Text Books:

Raj K. Bansal, Heterocyclic Chemistry, 5th Ed., New Age International Publishers, 2010. **(TB1)**

I.L. Finar, Organic Chemistry Vol-2, 5th Ed., Pearson Education, 2009. **(TB2)**

Reference Books:

J. A. Joule and K. Mills, Heterocyclic chemistry, 5th Ed, Wiley, 2010. **(R1)**

J. Clayden, N. Greeves, S. Warren, P. Wothers, Organic Chemistry, OUP, 1st Ed., 2000. **(R2)**

4. Course Plan:

Lec. No.	Topic(s) to be Covered	Learning Objectives	Chapter in the Text Book
1-2	Heterocycles, introduction and nomenclature	What are Heterocycles? Introduction, importance, structural diversity and nomenclature of simple heterocyclic systems.	TB1: Chapter 1, Lect. notes
3-5	Three-membered ring systems	Preparation, properties and reactions of epoxides, aziridines and episulphides.	TB1: Chapter 2, Lect. notes
6-8	Four- membered ring systems	Preparation, properties and reactions of oxetane, azetidine, thietane	TB1: Chapter 4, Lect. notes
9-13	Five-membered ring systems	Synthesis, properties and reactions of furan, pyrrole and thiophene	TB1: Chapter 5, R2: Chapter 43, Lect. notes
14-17	Condensed five membered heterocycles	Synthesis, properties and reactions of indole(benzopyrrole)	TB1: Chapter 7, Lect. notes
18-20	Six-membered and condensed six membered ring systems	Synthesis, properties and reactions of pyridine, quinoline and isoquinoline	TB1: Chapter 6 & 8, R2: Chapter 43, Lect. notes
21-26	Synthesis, physical properties and reactions of amino acids. Protein/polypeptide sequence analysis, structural features and	What are natural amino acids and why are they important? Isoelectric point and its importance in the separation of the α -amino acids. General methods for the preparation of α -amino acids. Methods used for determination of polypeptide and protein sequences. Synthetic methods for the preparation of polypeptides. Basic information on the structural organization of proteins, Importance of ϕ and ψ dihedral angles.	Lect. notes

	synthesis.		
27	Natural products	What are natural products? Importance and classification	Lect. notes
28-31	Terpenoids	Introduction, classification, isolation, separation and general biosynthetic route. Structure determination of geraniol.	TB2: Ch.8 368-369, 467-471, Lect. notes
32-36	Alkaloids	Introduction, classification, isolation, general methods for determining structure, structure determination of nicotine and atropine, chemistry of some common alkaloids like quinine, morphine, reserpine and colchicines, pharmaceutical applications.	TB2: Ch.14 710-716, Lect. notes
37	Steroids	Introduction, nomenclature and biosynthesis	TB2: Ch.11 531-532, 553-554, 581-583, Lect. notes
38	Lipids	Various types of lipids (Fatty acids, triglycerides and waxes). Biosynthesis of fatty acids. Systematic organization of lipids to form cell membranes (Fluid mosaic model of cell membrane).	Lect. notes
39-40	Vitamins	Introduction, types of vitamins, synthesis of vitamins A, D, E, and K	TB2: Ch.9 491-495, Ch.11 573-576, Ch.17 865-873, Lect. notes

5. Evaluation scheme.

Component	Duration	Weightage (%)	Date	Time	Remarks
Mid Sem Exam	1.5 hr	30		12/3	Closed Book

			3.30 - 5.00 PM	
Class Tests	15 min.	20	Continuous	Closed Book
Assignment/ Seminar		10		
Compre. Exam.	3 hrs.	40	04/05 AN	Open Book (20%) + Closed Book (20%)

6. Chamber Consultation Hour: Will be announced in the class

7. Notices concerning the course will be displayed on Chemistry Department Notice Board only.

8. 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

Manab Chakravarty

