



**ACADEMIC-GRADUATE STUDIES AND RESEARCH DIVISION**

**SECOND SEMESTER 2019-2020**

**Course Handout (Part II)**

Date: 07/01/2020

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. : **CHEM G561**  
Course Title : **Heterocyclic Chemistry**  
Instructor-in-charge : **KVG CHANDRA SEKHAR**  
Instructors : **Tanmay Chatterjee**

**Course Description:** The fundamental structural characteristics; synthesis and reactions of various heterocycles with nitrogen, oxygen and sulphur heteroatom in the ring; heterocycles such as pyrrole, thiophene, furan, imidazole, thiazole, oxazole, indole, benzofuran, pyridine and quinoline; advanced synthesis and reaction mechanism of heterocyclic compound

**1. Scope and Objective of the Course:** The course aims at covering topics in heterocyclic chemistry of professional interest. It provides the fundamental structural characteristics; synthesis and reactions of various heterocycles with nitrogen, oxygen and sulfur heteroatom in the ring. The specific heterocycles are oxirane, thiirane, aziridines, pyrrole, thiophene, furan, imidazole, thiazole, oxazole, indole, benzofuran, pyridine and quinoline. The emphasis will be on advanced synthesis and reaction mechanism of heterocyclic compounds.

**2. Text Book:**

J. A. Joule and K Mills, Heterocyclic Chemistry, fifth edition, Wiley-Blackwell publishers

**3. Reference Books:**

**R1.** Raj K Bansal, Heterocyclic Chemistry, 5<sup>th</sup> edition, New Age International (P) Limited, Publishers.

**R2.** Thomas L. Gilchrist, Heterocyclic Chemistry, 3<sup>rd</sup> edition, Prentice Hall, Inc.1997.

**4. Course Plan:**

Lec. No.	Topic	Learning Objectives	Reference to text book
1-3	Heterocyclic nomenclature and chemistry of three, four membered heterocycles	How to name the aromatic and non-aromatic heterocycles	Chapter 1 and lecture notes
4-5	Reactivity of aromatic heterocycles	Oxidation and reduction, electrophilic, nucleophilic and radical reactions	Chapter 3
6-8	Synthesis of aromatic heterocycles	Reaction type used in synthesis of heterocycles and different synthetic methods	Chapter 6
9-20	Five membered ring systems	Synthesis and reactions of furan, thiophene, pyrrole, imidazole, thiazole, oxazole	Chapter 16-18 and 24
21-25	Condensed five membered	Synthesis and reactions of indole	Chapter 20 and 21

	heterocycles	and benzofurans	
26-34	Six membered ring systems	Synthesis and reactions of pyridine, quinolone and isoquinoline	Chapter 8 and 9
35-40	Heterocycles at work	Synthesis of selected natural products and synthesis of drugs	Chapter 32, 33 and lecture notes

### 5. Evaluation Scheme:

Component	Duration	Weightage (%)	Date and Time	Nature of component
Midsem Test	90 mins	20	04/03 1:30-3:00	Closed Book
Presentations*	15 mins.	40		Open Book
Comprehensive Examination <sup>s</sup>	3 hrs	40	08/05 (FN)	Closed Book / Open Book

\*Student need to give presentation on the assigned topics. One will be conducted before midsem and the other presentation post midsem

**6. Chamber Consultation Hours:** To be announced through a separate notice.

**7. Notices:** Notices concerning the course will be displayed on the **Chemistry Department Notice Board** as well as in **CMS**.

**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.

**9. Make-up-policy:** Make up would be considered only for very **genuine reasons**.

**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 BITS-G513**

**KV G Chandra Sekhar**

