Program	Bachelor of Pharmacy (BPharm)	**Semester - 4**
Type of Course	-	
Prerequisite		
Course Objective	-	
Effective From A.Y.	2023-24	

Teaching Scheme (Contact Hours)				Examination Scheme				
				Theory Marks		Practical Marks		
Lecture	**Tutorial**	**Lab**	**Credit**	**External Marks (T)**	**Internal Marks (T)**	**External Marks (P)**	**Internal Marks (P)**	**Total Marks**
3	1	0	4	75	25	-	-	100

SEE *- Semester End Examination,* ***CIA*** *- Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)*

Course Content

T - Teaching Hours | **W** - Weightage

Sr.	Topics	T	W
1	**Stereoisomerism** Optical isomerism – Optical activity, enantiomerism, diastereoisomerism, meso compounds Elements of symmetry, chiral and achiral molecules DL system of nomenclature of optical isomers, sequence rules, RS system of nomenclature of optical isomers Reactions of chiral molecules Racemic modification and resolution of racemic mixture. Asymmetric synthesis: partial and absolute	10	22
2	**Geometrical isomerism** Nomenclature of geometrical isomers (Cis Trans, EZ, Syn Anti systems) Methods of determination of configuration of geometrical isomers. Conformational isomerism in Ethane, n-Butane and Cyclohexane. Stereo isomerism in biphenyl compounds (Atropisomerism) and conditions for optical activity. Stereospecific and stereoselective reactions	10	22
3	**Heterocyclic compounds:** Nomenclature and classification Synthesis, reactions and medicinal uses of following compounds/derivatives Pyrrole, Furan, and Thiophene Relative aromaticity and reactivity of Pyrrole, Furan and Thiophene	10	22
4	**Synthesis, reactions and medicinal uses of following compounds/derivatives** Pyrazole, Imidazole, Oxazole and Thiazole. Pyridine, Quinoline, Isoquinoline, Acridine and Indole. Basicity of pyridine Synthesis and medicinal uses of Pyrimidine, Purine, azepines and their derivatives	8	18
5	**Reactions of synthetic importance** Metal hydride reduction (NaBH4 and LiAlH4), Clemmensen reduction, Birch reduction, Wolff Kishner reduction. Oppenauer-oxidation and Dakin reaction. Beckmanns rearrangement and Schmidt rearrangement. Claisen-Schmidt condensation	7	16
	Total	45	100

Suggested Distribution Of Theory Marks Using Bloom's Taxonomy

Level	Remembrance	Understanding	Application	Analyze
Weightage	40	30	20	10

NOTE : This specification table shall be treated as a general guideline for the students and the teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcomes

At the end of this course, students will be able to:	
CO1	Understanding the methods of preparation and properties of heterocyclic organic compounds
CO2	Knowledge and understanding of the stereochemical aspects of organic compounds and stereochemical reactions
CO3	Knowledge about the medicinal uses and other applications of heterocyclic organic compounds
CO4	Knowledge and applications about the reactions of synthetic importance

Reference Books

1.	**A textbook of Organic Chemistry** By Arun Bahl, B. S. Bahl | 2012 | 21
2.	**Organic Chemistry (TextBook)** By R. B. Morrison and R. N. Boyd | 2000 | 6
3.	**Organic Chemistry – Reactions and Reagents** By O. P. Agarwal | 2012 | 48
4.	**Organic Reaction mechanism** By Dr. R. K. Bansal | 2004 | 3
5.	**Organic Chemistry (TextBook)** By P. Y. Bruice | 2009 | 5
6.	**Heterocyclic Chemistry (TextBook)** By Raj K. Bansal | 2007 | 4