



**Gyanmanjari**  
Innovative University

**Course Syllabus**  
**Gyanmanjari Pharmacy College**  
**Semester-3(B.Pharm.)**

**Subject:** Pharmaceutical Organic Chemistry –II (BPHBP13310)

**Type of course:** Major

**Prerequisite:** Pharmaceutical Organic Chemistry –I

**Rationale:** Study of pharmaceutical applications of the Organic compounds led to the establishment of a new avenue called pharmaceutical Organic chemistry. This subject deals with general methods of preparation and reactions of some organic compounds. Reactivity of organic compounds are also studied here. The syllabus emphasizes on mechanisms and orientation of reactions. Chemistry of fats and oils are also included in the syllabus.

**Teaching and Examination Scheme:**

Teaching Scheme			Credits	Examination Marks					Total Marks
CI	T	P	C	Theory Marks		Practical Marks		CA	
				ESE	MSE	V	P	ALA	
3	1	4	6	75	25	10	25	15	150

*Legends: CI-Class Room Instructions; T – Tutorial; P - Practical; C – Credit; ESE - End Semester Examination; MSE- Mid Semester Examination; V – Viva; CA - Continuous Assessment; ALA- Active Learning Activities.*

**Course Content:**

Chapter No.	Course content	Hrs	% Weightage
1.	<p>General methods of preparation and reaction of compound superscripted with asterisk (*) to be explained to emphasize on definition, types, classification, principle/mechanisms, applications, examples and differences</p> <p><b>Benzene and its derivatives</b></p> <ul style="list-style-type: none"> <li>Analytical, synthetic and other evidences in the derivation of structure of benzene, Orbital picture, resonance in benzene, aromatic characters, Huckel's rule</li> <li>Reactions of benzene - nitration, sulphonation, halogenations-reactivity, Friedel crafts alkylation-reactivity,</li> </ul>	10	22



	<p>limitations, Friedelcrafts acylation.</p> <ul style="list-style-type: none"> <li>Substituents, effect of substituents on reactivity and orientation of mono substituted benzene compounds towards electrophilic substitution reaction</li> </ul> <p>Structure and uses of DDT, Saccharin, BHC and Chloramine</p>		
2.	<ul style="list-style-type: none"> <li><b>Phenols*</b>: Acidity of phenols, effect of substituents on acidity, qualitative tests, Structure and uses of phenol, cresols, resorcinol, naphthols</li> <li><b>Aromatic Amines*</b>: Basicity of amines, effect of substituents on basicity, and synthetic uses of aryl diazonium salts</li> <li><b>Aromatic Acids*</b>: Acidity, effect of substituents on acidity and important reactions of benzoic acid.</li> </ul>	10	22
3.	<p><b>Fats and Oils:</b></p> <p>Fatty acids – reactions. Hydrolysis, Hydrogenation, Saponification and Rancidity of oils, Drying.</p> <ul style="list-style-type: none"> <li><b>Oils.</b></li> </ul> <p>Analytical constants – Acid value, Saponification value, Ester value, Iodine value, Acetyl value, Reichert Meissl (RM) value – significance and principle involved in their determination</p>	10	22
4.	<p><b>Polynuclear hydrocarbons:</b></p> <p>Synthesis, reactions</p> <p>Structure and medicinal uses of Naphthalene, Phenanthrene, Anthracene, Diphenylmethane, Triphenylmethane and their derivatives</p>	8	18
5.	<p><b>Cyclo alkanes*:</b></p> <p>Stabilities – Baeyer's strain theory, limitation of Baeyer's strain theory, Coulson and Moffitt's modification, Sachse Mohr's theory (Theory of strainless rings), reactions of cyclopropane and cyclobutane only</p>	7	16





**Continuous Assessment:**

Sr. No	Active Learning Activities	Marks
1.	<b>Compound Identification:</b> Faculty will provide name or class of compounds and students have to prepare detail flow chart of synthesis and preparation upload GMIU web portal.	5
2.	<b>Functional group or substituent attachment and Structural configuration of compounds understanding:</b> Faculty will give topic to think and present themselves in class and shares their ideas to class within given period of time and also can upload GMIU web portal.	10
Total		15

**Suggested Specification table with Marks (Theory):75**

Distribution of Theory Marks (Revised Bloom's Taxonomy)						
Level	Remembrance (R)	Understanding (U)	Application (A)	Analyze (N)	Evaluate (E)	Create (C)
Weightage	20%	45 %	20%	10%	05 %	-

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

**Course Outcome:**

After learning the course the students should be able to:	
CO1	Explain the structure and uses of the organic compounds.
CO2	Demonstrate the reaction, name the reaction and orientation of reactions.
CO3	Synthesize different organic compounds.
CO4	Perform analysis of reactivity/stability of organic compounds.
CO5	Comprehend the chemistry, chemical reactions and analytical constant of fats and oils.





**List of Practical**

Sr. No	Descriptions	Chapter No	Hrs
1.	<b>Experiments involving laboratory techniques</b> Recrystallization by Cooling Method	1	4
2.	<b>Experiments involving laboratory techniques</b> Recrystallization by Solvent Evaporation Method	1	4
3.	<b>Experiments involving laboratory techniques</b> Steam Distillation of Given Liquid Sample	1	4
4.	<b>Determination of following oil values (including standardization of reagents)</b> Acid Value	3	4
5.	<b>Determination of following oil values (including standardization of reagents)</b> Saponification Value	3	4
6.	<b>Determination of following oil values (including standardization of reagents)</b> Ester Value	3	4
7.	<b>Determination of following oil values (including standardization of reagents)</b> Iodine Value	3	4
8.	<b>Preparation of compounds</b> Benzanilide/Phenyl Benzoate/Acetanilide from Aniline/ Phenol /Aniline by Acylation Reaction.	2	4
9.	<b>Preparation of compounds</b> Para Bromo Acetanilide from Acetanilide by Halogenation Reaction	2	4
10.	<b>Preparation of compounds</b> 2,4,6-Tribromo Aniline from Aniline by Halogenation Reaction	2	4
11.	<b>Preparation of compounds</b> 5-Nitro Salicylic Acid/Meta Di nitro Benzene from Salicylic Acid / Nitro Benzene by Nitration Reaction	2	4
12.	<b>Preparation of compounds</b> Benzoic Acid from Benzyl Chloride by Oxidation Reaction.	2	4
13.	<b>Preparation of compounds</b> Benzoic Acid/ Salicylic Acid from Alkyl Benzoate/Alkyl Salicylate by Hydrolysis Reaction.	2	4
14.	<b>Preparation of compounds</b> 1-Phenyl Azo-2-Naphthol from Aniline by Diazotization and Coupling Reactions.	2	4
15.	<b>Preparation of compounds</b> Benzil from Benzoin by Oxidation Reaction.	2	4
		Total	60



**Instructional Method:**

The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.

From the content 10% topics are suggested for flipped mode instruction.

Students will use supplementary resources such as online videos, NPTEL/SWAYAM videos, e-courses, Virtual Laboratory

The internal evaluation will be done on the basis of Active Learning Assignment

Practical/Viva examination will be conducted at the end of semester for evaluation of performance of students in laboratory.

**Reference Books:**

- [1] Organic Chemistry by Morrison and Boyd
- [2] Organic Chemistry by I.L. Finar , Volume-I
- [3] Textbook of Organic Chemistry by B.S. Bahl & Arun Bahl.
- [4] Organic Chemistry by P.L.Soni
- [5] Practical Organic Chemistry by Mann and Saunders.
- [6] Vogel's text book of Practical Organic Chemistry
- [7] Advanced Practical organic chemistry by N.K.Vishnoi.
- [8] Introduction to Organic Laboratory techniques by Pavia, Lampman and Kriz.

