Faculty of Pharmacy
Bachelor of Pharmacy (B. Pharm.)
(W. E. F.: 2023-24)
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Name of Faculty	:	Faculty of Pharmacy
Name of Program	:	Bachelor of Pharmacy
Course Code	:	2BPH02
Course Title	:	Pharmaceutical Organic Chemistry - II
Type of Course	:	Basic Pharmaceutical Sciences
Year of Introduction	:	2023-24

Prerequisite	:	Zeal to learn the subject
Course Objective	:	This subject deals with classification and nomenclature of simple organic compounds, structural isomerism, intermediates forming in reactions, important physical properties, reactions and methods of preparation of these compounds
Course Outcomes	:	At the end of this course, students will be able to:
	CO1	To understand the nomenclature of simple organic compounds by analyzing chemical structure and vice versa; and to classify structural Isomerism
	CO2	To synthesize organic compounds by different methods; and to relate the structure of organic compounds with their physical Properties
	CO3	To understand the mechanism and orientation of important name reactions of organic compound
	CO4	To interpret reactivity/stability of organic compounds
	CO5	To apply the knowledge for the identification of organic compounds; and to appraise their medicinal and pharmaceutical applications

Teaching and Examination Scheme

Teaching Scheme (Contact Hours)			Credits	Examination Marks				
				Theory Marks		Practical Marks		Total Marks
L	T	P	C	SEE	CIA	SEE	CIA	
03	01	04	06	75	25	35	15	150

*Legends: **L**-Lecture; **T**–Tutorial/Teacher Guided Theory Practice; **P** – Practical, **C** – Credit, **SEE** – Semester End Examination, **CIA** - Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)*

Course Content

Unit No.	Topics	Teaching Hours	Weightage	Mapping with COs
1	Classification, nomenclature and isomerism Classification of Organic Compounds Common and IUPAC systems of nomenclature of organic compounds (up to 10 Carbons open chain and carbocyclic compounds) Structural isomerisms in organic compounds	07	15.56%	CO1
2	Alkanes*, Alkenes* and Conjugated dienes* SP3 hybridization in alkanes, Halogenation of alkanes, uses of paraffins. Stabilities of alkenes, SP2 hybridization in alkenes E1 and E2 reactions – kinetics, order of reactivity of alkyl halides, rearrangement of carbocations, Saytzeffs orientation and evidences. E1 verses E2 reactions, Factors affecting E1 and E2 reactions. Ozonolysis, electrophilic addition reactions of alkenes, Markownikoff's orientation, free radical addition reactions of alkenes, Anti Markownikoff's orientation. Stability of conjugated dienes, Diel-Alder, electrophilic addition, free radical addition reactions of conjugated dienes, allylic rearrangement	10	22.22%	CO2 CO3 CO4
3	Alkyl halides* SN1 and SN2 reactions - kinetics, order of reactivity of alkyl halides, stereochemistry and rearrangement of carbocations. SN1 versus SN2 reactions, Factors affecting SN1 and SN2 reactions Structure and uses of ethylchloride, Chloroform, trichloroethylene, tetrachloroethylene, dichloromethane, tetrachloromethane and iodoform. Alcohols*- Qualitative tests, Structure and uses of Ethyl alcohol, Methyl alcohol, chlorobutanol, Cetosteryl alcohol, Benzyl alcohol, Glycerol, Propylene glycol	10	22.22%	CO2 CO3 CO4 CO5
4	Carbonyl compounds* (Aldehydes and ketones) Nucleophilic addition, Electromeric effect, aldol condensation, Crossed Aldol condensation, Cannizzaro reaction, Crossed Cannizzaro reaction, Benzoin condensation, Perkin condensation,	10	22.22%	CO2 CO3 CO4 CO5

	qualitative tests, Structure and uses of Formaldehyde, Paraldehyde, Acetone, Chloral hydrate, Hexamine, Benzaldehyde, Vanilin, Cinnamaldehyde.			
5	Carboxylic acids* Acidity of carboxylic acids, effect of substituents on acidity, inductive effect and qualitative tests for carboxylic acids ,amide and ester Structure and Uses of Acetic acid, Lactic acid, Tartaric acid, Citric acid, Succinic acid. Oxalic acid, Salicylic acid, Benzoic acid, Benzyl benzoate, Dimethyl phthalate, Methyl salicylate and Acetyl salicylic acid Aliphatic amines* - Basicity, effect of substituent on Basicity. Qualitative test, Structure and uses of Ethanolamine, Ethylenediamine, Amphetamine	08	17.78%	CO2 CO3 CO4 CO5

Suggested Distribution of Theory Marks Using Bloom's Taxonomy						
Level	Remembrance	Understanding	Application	Analyse	Evaluate	Create
Weightage	**00**	**60**	**20**	**20**	**0**	**0**

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.

Suggested List of Experiments/Tutorials

Sr. No.	Name of Experiment/Tutorial	Teaching Hours
1	Systematic qualitative analysis of unknown organic compounds like	
1.1	Preliminary test: Color, odour, aliphatic/aromatic compounds, saturation and unsaturation, etc.	4
1.2	Detection of elements	8
1.3	Solubility test	8
1.4	Functional group test like Phenols, Amides/ Urea, Carbohydrates, Amines, Carboxylic acids, Aldehydes and Ketones, Alcohols, Esters,	8

	Aromatic and Halogenated Hydrocarbons, Nitro compounds and Anilides.	
1.5	Melting point/Boiling point of organic compounds	4
1.6	Identification of the unknown compound from the literature using melting point/ boiling point.	4
1.7	Preparation of the derivatives and confirmation of the unknown compound by melting point/ boiling point.	4
1.8	Minimum 5 unknown organic compounds to be analysed systematically.	8
2	Preparation of suitable solid derivatives from organic compounds	8
3	Construction of molecular models	4

Major Equipment/ Instruments and Software Required

Sr. No.	Name of Major Equipment/ Instruments and Software
1	Test tubes
2	Burette stands
3	Electronic water bath
4	

Suggested Learning Websites

Sr. No.	Name of Website
1	https://pci.nic.in/pdf/Syllabus_B_Pharm.pdf
2	https://www.aicte-india.org/downloads/bpharma.pdf.
3	https://www.ipc.gov.in/
4	https://www.ayush.gov.in/
5	https://ayudmla.gujarat.gov.in/home.php
6	https://www.fda.gov/
7	https://www.pharmacopoeia.com/
8	https://ipapharma.org/
9	https://gpat.nta.nic.in/
10	https://drnaitiktrivedi.com/
11	https://gdc4gpat.com/course/gpat/
12	https://niscpr.res.in/
13	https://delnet.in/
14	https://ihubgujarat.in/
15	https://www.ssipgujarat.in/

Reference Books

Sr. No.	Name of 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.
9	Reaction and reaction mechanism by Ahluwaliah/Chatwal.