M G Science Institute, Ahmedabad

(Autonomous college affiliated to Gujarat University)

B. Sc. in Chemistry

(Faculty of Science)

New Syllabus of

S. Y. B. Sc. Chemistry

(As Per National Education Policy- 2020)

To be implemented from Academic Year 2025-26

Board of Studies (Chemistry)

M G Science Institute, Ahmedabad

Autonomous college affiliated to Gujarat University

CHM 241(T): Organic Chemistry

Credit – 4, Hours – 60, Marks - 100

Course Outcomes:

The student will be able to

CO1: Know and understand about the fundamental properties organic acids & bases and its applications in drug design

CO2: Know about Carbohydrates and Heterocycles with their synthesis & chemical properties and their importance in medicinal chemistry

CO3: Know ASE reactions and mechanism, and understand their applications to establish synthetic strategies for organic compounds

CO4: Know and understand about B-dicarbonyl compounds and their applications in organic synthesis

CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	2	2	2	2	
CO2	2	2	2		1	
CO3	2	2	2		1	1
CO4	2	2	2			

Unit I:

Carbohydrates: Monosaccarides and Disaccarides

[A] Mono saccharides **[12 Marks]**
[7 Hours]

Introduction, classification of carbohydrates, osazone formation, epimerization, step up and step down reactions of monosaccharides, simple structures of glucose and fructose, Fischer's proof of configuration of D-glucose

[B] Disaccharides **[13 Marks]**
[8 Hours]

Disaccharides, structure of (+) maltose, (+) cellobiose and (+) sucrose

Unit II:

Chemical Reactivity and Molecular Structure: (Acid- Base Properties)
[25 Marks]
[15 Hours]

Introduction to acid and bases, Lewis acid and bases, scale of acidity-basicity, Resonance effect, drawing of structures and the condition for resonance, Effect of

change of hybridization on acidity and basicity, Inductive and electronic effects, steric effect and hydrogen bonding, Keto–enol tautomerism. Difference between resonance and tautomerism

Unit III:

[A]Electrophilic Aromatic Substitution. [13 Marks]
[8 Hours]

Introduction, effect of substituent groups, determination of orientation and relative reactivity, classification of substituent groups, electrophilic substitution (ES) reactions. (Nitration, Sulfonation, Halogenation, Friedel Craft alkylation and acylation), Orientation in mono and disubstituted benzene.

[B] Polynuclear Hydrocarbons [12 Marks]
[7 Hours]

Nomenclature, structure and synthesis of Naphthalene and its derivatives. Reactions (oxidation, reduction and electrophilic substitution reaction (ESR)) of naphthalene

Unit IV:

[A] Heterocyclic Compounds [13 Marks]
[8 Hours]

Introduction, structure of Pyrrole, Furan and Thiophene, Paal Knorr synthesis and electrophilic substitution of Pyrrole, Furan and Thiophene, reactivity and orientation of electrophilic substitution reactions (ESR) in five membered heterocycles (Pyrrole, Furan and Thiophene) Structure of Pyridine, Electrophilic and Nucleophilic substitution reactions of pyridine. Basicity of pyridine

[B] B-Di carbonyl compound [12 Marks]
[7 Hours]

Introduction, synthesis of Ethyl acetoacetate (EAA) and Diethylmalonate Acidic and ketonic hydrolysis of B-dicarbonyl compounds, Synthetic applications of B-dicarbonyl compounds. (i) Crotonic acid from EAA (ii) Valeric Acid from diethyl malonate

REFERENCE BOOKS

1. ‘Organic Chemistry’ by Robert Thornot Morrison and Robert Neilson, Pearson Publication, Seventh edition, 2010.
2. ‘Organic Chemistry’ by I. L. Finar, Pearson Education Pvt Ltd, New Delhi, Sixth Edition.
3. ‘Organic Chemistry’ by James B Hendrickson, Donald J. Cram and George S. Hammond, Mc-Graw-Hill, Third Edition.

4. ‘Advance Organic Chemistry’ by Arun Bahl, B. S. Bahl, S.Chand and Co. Ltd. New Delhi, Fifth Edition, 2012.
5. ‘Organic Chemistry’ by Bhupinder Mehta, Manju Mehta, Prentice Hall of India Pvt Ltd, New Delhi, 2005.
6. ‘Organic Chemistry’ by G. Marc Loudon, Oxford University Press, Fourth Indian edition 2010.
7. ‘Organic Chemistry Of Natural Products’ by G.R.Chatwal, Vol. I &II, Himalaya Publishing House-2005.
8. ‘Advanced General Organic Chemistry- A modern Approach’ by S.K.Ghosh,