



जम्मू केंद्रीय विश्वविद्यालय  
CENTRAL UNIVERSITY OF JAMMU

रसायन शास्त्र एवं रासयानिक बिज्ञान

DEPARTMENT OF CHEMISTRY AND CHEMICAL SCIENCES

राया-सूचानी (बागला), जिला सांबा-181143, जम्मू, जम्मू एवं कश्मीर

Rahya-Suchani (Bagla), District Samba-181143, Jammu, Jammu & Kashmir

**Integrated B.Sc.-M.Sc. Chemistry  
Teaching Plan (August 2022-January 2023)**

Semester: I  
Course: Organic Chemistry-I (ICHE1C002T), 4 Credits (3T+1P), 5 h/w  
Course Teacher: Dr. V. Sridharan

**THEORY (3 credits, 3 h/w)**

Week	Lecture No./Day	Topic to be Taught	No of Hours	Suggested Readings
1 <sup>st</sup> Week	I	<b>Basics of organic chemistry:</b> Classification and nomenclature of organic compounds	1	1,2,6
	II	Hybridization, Shapes of molecules	1	1,2,6
	III	Influence of hybridization on bond lengths, bond angles and bond energy	1	1,2,6
2 <sup>nd</sup> Week	I	Contd...	1	1,2,6
	II	Inductive effect, Polar covalent bonds and dipole moment	1	1,2,6
	III	Delocalized bonds and resonance, Drawing resonance structures	1	1,2,6
3 <sup>rd</sup> Week	I	Concept of formal charge, Hyperconjugation	1	1,2,6
	II	Steric effect, Steric inhibition of resonance	1	1,2,6
	III	Hydrogen bonding, Inter- and intramolecular hydrogen bonding, Effect on boiling point and solubility	1	1,2,6
4 <sup>th</sup> Week	I	Contd...	1	1,2,6
	II	<b>Introduction to organic reaction mechanism:</b> Addition, elimination, substitution and rearrangement reactions	1	1,2,6
	III	Contd...	1	1,2,6
5 <sup>th</sup> Week	I	Homolytic and heterolytic C–C bond fission	1	1,2,6
	II	Electrophiles and nucleophiles	1	1,2,6
	III	Generation, structure and stability of reactive intermediates: carbocations	1	1,2,6
6 <sup>th</sup> Week	I	Carbanions	1	1,2,6
	II	Free radicals	1	1,2,6
	III	Carbenes and nitrenes	1	1,2,6
7 <sup>th</sup> Week	I	Acids and bases	1	1,2,6
	II	Factors affecting acid and base strength	1	1,2,6
	III	<b>Aromaticity:</b> Resonance in benzene, Huckel's rule	1	1,3,4,5,6
8 <sup>th</sup> Week	I	Aromatic, non-aromatic and anti-aromatic compounds	1	1,3,4,5,6
	II	Aromatic character of arenes, Cyclic carbocations/carbanions and heterocyclic compounds	1	1,3,4,5,6



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	III	Contd...	1	1,3,4,5,6
9 <sup>th</sup> Week	I	Electrophilic substitution reactions in aromatic compounds	1	1,3,4,5,6
	II	Contd...	1	1,3,4,5,6
	III	General mechanisms of nitration, halogenation, sulphonation	1	1,3,4,5,6
10 <sup>th</sup> Week	I	Contd...	1	1,3,4,5,6
	II	Friedel-Craft's acylation and alkylation	1	1,3,4,5,6
	III	<i>ortho/para/meta</i> directive effect of substituents	1	1,3,4,5,6
11 <sup>th</sup> Week	I	<b>Stereochemistry:</b> Concept of isomerism, Optical isomerism	1	1,5,6
	II	Chirality and elements of symmetry	1	1,5,6
	III	Classification of stereoisomers, Enantiomers and diastereoisomerism involving one and two chiral centers, <i>Meso/dl</i> and <i>erythro/threo</i> isomers	1	1,5,6
12 <sup>th</sup> Week	I	Contd...	1	1,5,6
	II	Relative and absolute configurations	1	1,5,6
	III	<i>D-L, R-S</i> systems of nomenclature, Fischer, Newmann and Sawhorse projection formulae and their interconversion	1	1,5,6
13 <sup>th</sup> Week	I	Contd...	1	1,5,6
	II	Introduction to allenes, biphenyls and spiranes	1	1,5,6
	III	Contd...	1	1,5,6
14 <sup>th</sup> Week	I	Conformational analysis of ethane, <i>n</i> -butane and cyclohexane	1	1,5,6
	II	Preferred conformations of cyclic and acyclic compounds, Ring inversion of cyclohexane	1	1,5,6
	III	Geometrical isomerism: <i>cis-trans, syn-anti, E-Z</i> notations	1	1,5,6
15 <sup>th</sup> Week	I	Geometrical isomerism in oximes, cumulenes and alicyclic compounds	1	1,5,6
	II	Revision of Units I and II	1	
	III	Revision of Units III and IV	1	
16 <sup>th</sup> Week	I	Discussion of model question papers	1	
	II	Discussion of model question papers	1	
	III	Discussion of model question papers	1	

REFERENCES

1. R. T. Morrison, R. N. Boyd and S. K. Bhattacharjee, *Organic Chemistry*, 7<sup>th</sup> Ed., 2011.
2. A. Bahl and B. S. Bahl, *A Text Book of Organic Chemistry*, 22<sup>nd</sup> Ed., 2016.
3. T. W. G. Solomons, *Fundamentals of Organic Chemistry*, John Wiley, 5<sup>th</sup> Ed., 1998.
4. L.G. Wade Jr., *Organic Chemistry*, Prentice Hall, 8<sup>th</sup> Ed., 2016.
5. P. Y. Bruice, *Organic Chemistry*, 8<sup>th</sup> Ed., 2016.
6. F. A. Carey and R. M. Giuliano, *Organic Chemistry*, McGraw Hill, 10<sup>th</sup> Ed., 2016.



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**PRACTICALS (1 credit, 2 h/w)**

Week	Practical No./Day	Experiment to be Conducted	No of Hours	Suggested Readings
1 <sup>st</sup> Week	I	Purification of organic compounds by crystallization. <i>Compounds: Phthalic acid, Acetanilide, Naphthalene, Benzoic acid etc.</i> <i>Solvents: Water, Ethanol, Aqueous ethanol.</i>	2	1-3
2 <sup>nd</sup> Week	I	Contd...	2	1-3
3 <sup>rd</sup> Week	I	Contd...	2	1-3
4 <sup>th</sup> Week	I	Determination of melting point of at least four organic compounds	2	1-3
5 <sup>th</sup> Week	I	Contd...	2	1-3
6 <sup>th</sup> Week	I	Effect of impurities on the melting point: mixed melting point of two unknown organic compounds	2	1-3
7 <sup>th</sup> Week	I	Contd...	2	1-3
8 <sup>th</sup> Week	I	Determination of boiling point of liquid compounds (distillation and capillary method).	2	1-3
9 <sup>th</sup> Week	I	Contd...	2	1-3
10 <sup>th</sup> Week	I	Separation of a mixture of two amino acids by ascending and horizontal paper chromatography.	2	1-3
11 <sup>th</sup> Week	I	Contd...	2	1-3
12 <sup>th</sup> Week	I	Separation of a mixture of compounds by thin layer chromatography (TLC).	2	1-3
13 <sup>th</sup> Week	I	Contd...	2	1-3
14 <sup>th</sup> Week	I	Revision of Experiments 1 to 6	2	1-3
15 <sup>th</sup> Week	I	Model Practical Exam -1	2	1-3
16 <sup>th</sup> Week	I	Model Practical Exam -2	2	1-3

**REFERENCES**

1. F. G. Mann, and B. C. Saunders, *Practical Organic Chemistry*, Pearson Education, 2009.
2. B. S. Furniss, A. J. Hannaford, P. W. G. Smith, A. R. Tatchell, *Vogel's Textbook of Practical Organic Chemistry*, 5<sup>th</sup> Ed., Pearson, 2012.
3. In-house laboratory manual with experimental procedures and relevant information (Department of Chemistry and Chemical Sciences, Central University of Jammu).