

**UNIVERSITY OF MADRAS**  
**B.Sc. DEGREE PROGRAMME IN CHEMISTRY**  
 SYLLABUS WITH EFFECT FROM 2023-2024

<b>Title of the Course</b>	<b>ORGANIC CHEMISTRY-II</b>					
<b>Paper No.</b>	<b>CoreXIII (CC13)</b>					
<b>Category</b>	<b>Core</b>	<b>Year</b>	<b>III</b>	<b>Credits</b>	<b>4</b>	<b>Course Code</b> 324C6A
		<b>Semester</b>	<b>VI</b>			
<b>Instructional Hours per week</b>	<b>Lecture</b>	<b>Tutorial</b>	<b>Lab Practice</b>		<b>Total</b>	
	4	1	-		5	
<b>Prerequisites</b>	Organic Chemistry-I					
<b>Objectives of the course</b>	This course aims at providing knowledge on <ul style="list-style-type: none"> <li>• classification, isolation and discussing the properties of alkaloids and terpenes</li> <li>• preparation and properties of saccharides</li> <li>• biomolecules</li> <li>• different molecular rearrangement</li> <li>• preparation and properties of organometallic compounds</li> </ul>					
<b>Course Outline</b>	<p style="text-align: center;"><b>UNIT I</b></p> <p><b>Alkaloids</b>          Classification, isolation, general properties-Hofmann Exhaustive Methylation; Structure elucidation – Coniine, piperine, nicotine.</p> <p><b>Terpenes:</b> Classification, Isoprene rule, isolation and structural elucidation of Citral, alpha terpineol, Menthol, Geraniol and Camphor.</p>					

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	<p><b>UNIT II</b>  <b>Carbohydrates</b>          Definition and Classification of Carbohydrates with examples. Relative configuration of sugars. Determination of configuration (Fischer's Proof). Definition of enantiomers, diastereomers, epimers and anomers with suitable examples.</p> <p><b>Monosaccharides</b>—configuration—D and L hexoses —aldohexoses and ketohexoses.          Glucose, Fructose—Occurrence, preparation, properties, reactions, structural elucidation, uses.          Interconversions of sugar series—ascending, descending, aldose to ketose and ketose to aldose.</p> <p><b>Disaccharides</b>—sucrose, lactose, maltose—preparation, properties and uses (no structural elucidation).</p> <p><b>Polysaccharides</b>—Source, constituents and biological importance of homopolysaccharides- starch and cellulose, heteropolysaccharides – hyaluronic acid, heparin.</p>
	<p><b>UNIT III</b>  <b>Molecular rearrangements:</b>          Molecular Rearrangement: Type of rearrangements, Mechanism for Benzidine, Favorskii, Claisen, Fries, Hofmann, Curtius, Schmidt and Beckmann, Pinacol-pinacolone rearrangement.</p>
	<p><b>UNIT IV</b></p> <p><b>Organometallic compounds in Organic Synthesis</b>          Preparation, Properties and applications:          Grignard Reagents, Organo Lithium Compounds, Ziegler – Natta, Wilkinson, Metal Carbonyl, Zeiss's Salt</p>
	<p><b>UNIT V</b>  <b>Green Chemistry:</b>          Principles, chemistry behind each principle and Applications in chemical synthesis. Green reaction media –green solvents, green reagents and catalysts; tools used like microwave and ultra-sound in chemical synthesis.</p>
<p>Extended Professional Component (is a part of internal component only,</p>	<p>Questions related to the above topics, from various competitive examinations UPSC/JAM/TNPSC other to be solved (To be discussed during the Tutorial hours)</p>

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Not to be included in the external examination question paper)	
Skills acquired from this course	Knowledge, Problem solving, Analytical ability, Professional Competency, Professional Communication and Transferable skills.
<b>Recommended Text</b>	<ol style="list-style-type: none"><li>1. M.K. Jain, S.C. Sharma, Modern Organic Chemistry, Vishal Publishing, 4<sup>th</sup> reprint, 2009.</li><li>2. S.M. Mukherji, and S.P. Singh, Reaction Mechanism in Organic Chemistry, Macmillan India Ltd., 3<sup>rd</sup> edition, 2009</li><li>3. Arun Bahal and B.S. Bahl, Advanced organic chemistry, New Delhi, S. Chand &amp; Company Pvt. Ltd., Multicoloured edition, 2012.</li><li>4. P.L. Soni and H.M. Chawla, Text Book of Organic Chemistry, Sultan Chand &amp; Sons, New Delhi, 29<sup>th</sup> edition, 2007.</li></ol>

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	<p>5. C Bandyopadhyaya; An Insight into Green Chemistry; Published on 2020</p> <p>6. A. Rajendran, Glimpses of green chemistry, Sree Veera publications          First edition, 2012.</p>
<b>Reference Books</b>	<p>1. R. T. Morrison and R. N. Boyd, Organic Chemistry, Pearson Education, Asia, 6<sup>th</sup> edition, 2012.</p> <p>2. T. W. Graham Solomons, Organic Chemistry, John Wiley &amp; Sons, 11<sup>th</sup> edition, 2012.</p> <p>3. A. Carey Francis, Organic Chemistry, Tata McGraw-Hill Education Pvt. Ltd., New Delhi, 7<sup>th</sup> edition, 2009.</p> <p>4. I. L. Finar, Organic Chemistry, Vol. (1 &amp; 2), England, Wesley Longman Ltd, 6<sup>th</sup> edition, 2006.</p> <p>5. J. A. Joule, and G. F. Smith, Heterocyclic Chemistry, Wiley, 5<sup>th</sup> Edition, 2010.</p>
<b>Website and e-learning source</b>	<p>1. <a href="http://www.epgpathshala.nic.in">www.epgpathshala.nic.in</a></p> <p>2. <a href="http://www.nptel.ac.in">www.nptel.ac.in</a> 3. <a href="http://swayam.gov.in">http://swayam.gov.in</a></p> <p>4. Virtual Textbook of Organic Chemistry</p> <p>5. <a href="https://vlab.amrita.edu/">https://vlab.amrita.edu/</a></p>
<p><b>Course Learning Outcomes (for Mapping with POs and PSOs) On completion of the course the students should be able to</b></p> <p><b>CO1:</b> explain isolation and properties of alkaloids and terpenes</p> <p><b>CO2:</b> explain preparation and reactions of mono and disaccharides</p> <p><b>CO3:</b> classify biomolecules and natural products based on their structure, properties, reactions and uses.</p> <p><b>CO4:</b> explain molecular rearrangements like benzidine, Hoffmann etc.,</p> <p><b>CO5:</b> preparation and properties of organolithium compounds</p>	

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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	S	M	S	M
CO2	M	S	S	S	M	S	S	M	M	M
CO3	S	S	S	M	S	S	S	M	S	M
CO4	S	S	S	S	S	S	S	M	M	M
CO5	S	M	S	S	S	S	S	M	M	S

**CO-PO Mapping (Course Articulation Matrix)**

CO / PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	3
CO2	3	3	3	3	3
CO3	3	3	3	3	3
CO4	3	3	3	3	3
CO5	3	3	3	3	3
Weightage	15	15	15	15	15
Weighted percentage of Course Contribution to Pos	3.0	3.0	3.0	3.0	3.0

**Level of Correlation between PSO's and CO's**