

Course (Unit) Title	Organic Chemistry III
Course (Unit) Code	CHE303G3
Credit Value	3 (45 hours of lectures and tutorials)
Objective/s	<ul style="list-style-type: none"> <li>• Explain the principles and mechanistic similarities of various types of rearrangement reactions of organic compounds</li> <li>• Outline the synthesis, properties and reactivity of simple heterocycles</li> <li>• Explain the biosynthetic pathways of metabolites</li> <li>• Design organic syntheses</li> </ul>
Intended Learning Outcomes	<ul style="list-style-type: none"> <li>• Outline the appropriate mechanisms for specific rearrangement reactions</li> <li>• Explain the reactivity of heterocycles based on their properties</li> <li>• Predict potential synthetic routes for heterocycles</li> <li>• Explain the transformation mechanisms of metabolites</li> <li>• Devise organic synthetic strategies</li> </ul>
Contents	<p><b>Polar Rearrangements</b></p> <ul style="list-style-type: none"> <li>• Nucleophilic rearrangements to carbon involving carbocation induced alkyl and hydride shifts: Wagner-Meerwein, pinacol, Tiffeneau-Demyanov, dienone-phenol and hydride shift</li> <li>• Nucleophilic rearrangements to carbon involving carbanions: Favorskii and benzil-benzilic acid rearrangements</li> <li>• Nucleophilic rearrangement to carbon involving carbenes: Wolff rearrangement</li> <li>• Nucleophilic rearrangements to nitrogen: Beckmann, Curtius, Lossen, Schmidt and Hofmann rearrangements</li> <li>• Nucleophilic rearrangements to oxygen: Baeyer-Villiger and hydroperoxide rearrangements</li> <li>• Electrophilic rearrangements from nitrogen: Stevens, Sommelet-Hauser and Meisenheimer rearrangements</li> <li>• Electrophilic rearrangement from oxygen: Wittig rearrangement</li> <li>• Aromatic rearrangements: Fries, Fischer-Hepp, Orton, Bamberger and benzidine rearrangements</li> </ul> <p><b>Heterocyclic Chemistry</b></p> <ul style="list-style-type: none"> <li>• Nomenclature of heterocycles, properties of 5- and 6-membered heteroaromatic compounds</li> <li>• Synthesis and reactions of pyrrole, thiophene, furan and pyridine</li> </ul> <p><b>Biomolecules</b></p>

	<p>Biochemical pathways: Polyketide pathway, Shikimic acid pathway and Mevalonic acid pathway</p> <ul style="list-style-type: none"> <li>• Monosaccharides: Properties, classification, stereochemistry, synthesis and reactions</li> <li>• Amino acids: Properties, classification, stereochemistry, synthesis and reactions</li> <li>• Lipids: Properties, classification and extraction</li> </ul> <p><b>Designing organic synthesis</b></p> <ul style="list-style-type: none"> <li>• Principles of retrosynthetic analysis, functional group inter-conversions, synthons and synthetic equivalents</li> <li>• C-X disconnections, C-C disconnections: 1,2-, 1,3-, 1,4-, 1,5- and 1,6-difunctionalised compounds</li> <li>• Disconnections of 3, 5 and 6-membered rings and aromatic heterocycles</li> <li>• Synthesis of complex molecules using disconnection approach</li> </ul>				
Teaching and Learning Methods / Activities	Lectures, Tutorials and Assignments				
Evaluation	<table style="width: 100%; border: none;"> <tr> <td style="width: 70%;">In-course Assessments</td> <td style="text-align: right;">30%</td> </tr> <tr> <td>End of Course Examination</td> <td style="text-align: right;">70%</td> </tr> </table>	In-course Assessments	30%	End of Course Examination	70%
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End of Course Examination	70%				
Recommended References	<ul style="list-style-type: none"> <li>• Peter Sykes; <i>A Guidebook to Mechanism in Organic Chemistry</i>. 6<sup>th</sup> Edition. Pearson India, 2003</li> <li>• Laurence M. H., <i>Polar rearrangements</i>. 1<sup>st</sup> Edition. Oxford University Press, 1992</li> <li>• John A. J. &amp; Keith M., <i>Heterocyclic Chemistry</i>. 5<sup>th</sup> Edition. Wiley-Blackwell, 2010</li> <li>• Thomas. L. G., <i>Heterocyclic Chemistry</i>. 3<sup>rd</sup> Edition. Prentice Hall, 1997</li> <li>• David T. D.; <i>Aromatic Heterocyclic Chemistry</i>. 1<sup>st</sup> Edition. Oxford University Press, 1992</li> <li>• Finar I. L., <i>Organic Chemistry (Volume II)</i>, 5<sup>th</sup> Edition, Longman, 1988</li> <li>• Chatwal, Gurdeep, R., <i>Organic Chemistry of Natural Products</i>, 3<sup>rd</sup> Edition, Himalaya Publications, 1988.</li> </ul>				

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|  | <ul style="list-style-type: none"><li>• Warren, S., <i>Organic synthesis - The Disconnection Approach</i>, 2<sup>nd</sup> Edition, John Wiley, 2008</li></ul> |
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