

<b>Course Code</b>	CHE408M3	
<b>Course Title</b>	Advanced Organic Chemistry IV	
<b>Credit Value</b>	03	
<b>Hourly breakdown</b>	Theory	Independent learning
	45	105
<b>Objectives</b>	<ul style="list-style-type: none"> <li>• Explain the synthesis and structure elucidation of secondary metabolites</li> <li>• Impart knowledge on natural products</li> <li>• Provide knowledge on bio-synthetic strategies</li> </ul>	
<b>Intended Learning Outcomes</b>	<ul style="list-style-type: none"> <li>• Describe the fundamentals and chemistry of secondary metabolites</li> <li>• Discuss the extraction methods of natural products</li> <li>• Devise chemical and bio-synthetic strategies for secondary metabolites</li> <li>• Characterize the secondary metabolites</li> <li>• Illustrate reactions of secondary metabolites</li> </ul>	
<b>Course Contents</b>	<p><b>Isolation</b></p> <ul style="list-style-type: none"> <li>• Selection and extraction of natural products, analysis of natural product extracts, bioassay guided fractionation and identification of active compounds</li> </ul> <p><b>Terpenoids</b></p> <ul style="list-style-type: none"> <li>• Classification, chemical and spectroscopic methods in structure elucidation, reactions and synthesis of different groups of terpenoids such as monoterpenoid, sesquiterpenoids, diterpenoids, triterpenoids and polyterpenoids</li> </ul> <p><b>Steroids</b></p> <ul style="list-style-type: none"> <li>• Nomenclature, stereochemistry, synthesis of sterols (eg. cholesterol, ergosterol, stigmasterol), bile acids and steroid hormones</li> </ul> <p><b>Carotenoids</b></p> <ul style="list-style-type: none"> <li>• Characterisation of carotenoids, synthesis of carotenes; <math>\alpha</math>-, <math>\beta</math>- and <math>\gamma</math>- carotenes, lycopene, xanthophylls and carotenoid acids</li> </ul> <p><b>Alkaloid</b></p> <ul style="list-style-type: none"> <li>• Classification, chemical and spectroscopic methods in structure elucidation, reactions and synthesis of different groups of alkaloids, for eg. phenylethylamine, pyrrolding,</li> </ul>	

	<p>pyridine and piperidine, pyrrolidine-pyridine, quinolone, isoquinoline, phenantherene, aporphine, berbarine and indole groups</p> <p><b>Flavonoids</b></p> <ul style="list-style-type: none"> <li>Nomenclature, classification, chemical and spectroscopic methods in structure elucidation, reactions and synthesis of different groups of flavonoids such as anthocyanins, flavones and isoflavones</li> </ul> <p><b>Biosynthesis</b></p> <ul style="list-style-type: none"> <li>Brief review of biosynthesis pathways such as acetate, shikimic acid and mevalonic acid pathways. Biosynthesis of terpenoids, steroids, carotenoids, alkaloids and flavonoids</li> </ul>	
<b>Teaching and learning methods/activities</b>	Lectures, tutorial discussion, small group assignment and homework assignments, e-learning, online learning	
<b>Evaluation/Assessment Strategy</b>	In-course Assessment	End of Course Examination
	30%	70%
<b>Recommended References</b>	<ul style="list-style-type: none"> <li>Bhat, S. V., Nagasampagi, B. A., and Sivakumar, M., "Chemistry of Natural Products", Narosa Publishing House, India, 2005.</li> <li>Finar, I. L., "Organic chemistry", 6<sup>th</sup> edition, Vol. II, Pearson, New Delhi, 2011.</li> <li>Mann, J., Davidson, R. S., Jacobs, J. B., Banthorpe, D. V., Harborne, J. B., "Natural Products, their Chemistry and Biological significance Addison", Wesley Longman Ltd., 1994.</li> <li>Mann, J., "Chemical Aspects of Biosynthesis", Oxford University Press, 1995.</li> </ul>	