



## UNIVERSITI TEKNOLOGI MARA

### CBE422: ORGANIC AND INSTRUMENTAL CHEMISTRY FOR ENGINEERS

<b>Course Name (English)</b>	ORGANIC AND INSTRUMENTAL CHEMISTRY FOR ENGINEERS <b>APPROVED</b>
<b>Course Code</b>	CBE422
<b>MQF Credit</b>	3
<b>Course Description</b>	The course introduces organic compounds, their structure, properties, nomenclature, reactions and applications. Also, this course highlighted the study of the organic chemistry of biological molecules, with a special emphasis on chemical and bioprocess principles. In this course, we will consider the structure, properties and reactivity of biological molecules. We will also study their synthesis and their roles in biological processes. The main purpose of the course is to give the students insight into the chemical and bioprocess industry, which focus on the organic fine chemicals industry.
<b>Transferable Skills</b>	N/A
<b>Teaching Methodologies</b>	Lectures, Blended Learning, Tutorial, Discussion
<b>CLO</b>	CLO1 Describe the organic bonding theory with the application in the industry. CLO2 Distinguish the functional groups of compounds that commonly produced in the industry from organic chemistry reactions. CLO3 Appraise the organic chemistry reactions involved in relation to functional groups for industrial application
<b>Pre-Requisite Courses</b>	No course recommendations
<b>Topics</b>	
<b>1. Chapter 1: Structures and bonding</b> 1.1) Atomic structures 1.2) Orbital theory 1.3) Valence bond theory 1.4) Hybridisation	
<b>2. Chapter 2: Electronegativity</b> 2.1) Periodicity 2.2) Dipole moments 2.3) Formal charge 2.4) Resonance	
<b>3. Chapter 3: Chemical structure &amp; reaction pathways</b> 3.1) Lewis structures 3.2) Kekule structures 3.3) Skeletal structures 3.4) SN1, SN2, E1, E2 reaction pathways	
<b>4. Chapter 4: Acids and bases</b> 4.1) Bronsted-Lowry acids and bases 4.2) Lewis acids and bases 4.3) Conjugate pairs 4.4) Strength and reactivity	
<b>5. Chapter 5: Bio-chemical molecules</b> 5.1) Carbohydrates: disaccharides & polysaccharides 5.2) Lipids	
<b>6. Chapter 6: Bio-chemical molecules</b> 6.1) Amino Acids 6.2) Polypeptides to proteins	

<b>7. Chapter 7 - 9: Bio-molecules analysis</b> 7.1) NMR 7.2) FTIR 7.3) X-ray crystallography 7.4) UV-vis spectroscopy 7.5) SEM 7.6) HPLC 7.7) GC 7.8) Biochemistry analyzer
<b>8. Chapter 10: Stereochemistry of bio-molecules production</b> 8.1) Conformational 8.2) Constitutional 8.3) Stereoisomers 8.4) Stereochemistry-enantiomers, chirality, enantiometric drugs
<b>9. Chapter 11 - 12: Organic chemistry in industry application</b> 9.1) Petroleum and petrochemicals 9.2) Polymers 9.3) Fermentation 9.4) Pharmaceuticals 9.5) Textiles industry
<b>10. Special Topic and Revision</b> 10.1) n/a

Assessment Breakdown	%
Continuous Assessment	40.00%
Final Assessment	60.00%

Details of Continuous Assessment	Assessment Type	Assessment Description	% of Total Mark	CLO
	Assignment	n/a	20%	CLO2 , CLO3
	Test	Test 1	10%	CLO1 , CLO2
	Test	Test 2	10%	CLO2 , CLO3

Reading List	Recommended Text
	<ul style="list-style-type: none"> <li>McMurray J 2010, <i>Organic Chemistry. A Biological Approach 2nd ed.</i></li> </ul>

Article/Paper List
This Course does not have any article/paper resources

Other References
<ul style="list-style-type: none"> <li>Book Brown, T.L., LeMay, Jr, H.E and Bursten, B.E., 2006, <i>Chemistry: The Central Science</i>, New Jersey: Prentice Hall.</li> <li>Book Housecraft, C.E. and Sharpe, A.G.<i>Inorganic Chemistry.</i>, New Jersey: Prentice Hall</li> </ul>