

Liverpool John Moores University

Title: INTRODUCTION TO ORGANIC CHEMISTRY
Status: Definitive
Code: **3203FNDSCI** (113131)
Version Start Date: 01-08-2014

Owning School/Faculty: Pharmacy & Biomolecular Sciences
Teaching School/Faculty: Pharmacy & Biomolecular Sciences

Team	Leader
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Academic Level: FHEQ3 **Credit Value:** 12.00 **Total Delivered Hours:** 31.00
Total Learning Hours: 120 **Private Study:** 89

Delivery Options

Course typically offered: Semester 2

Component	Contact Hours
Lecture	18.000
Practical	4.000
Workshop	8.000

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Report	AS1	Coursework 1 : Practical reports (1)	20.0	
Essay	AS2	Coursework 2 : Assignments (1)	20.0	
Test	AS3	coursework 3 - test	10.0	
Exam	AS4	Examination : multiple choice and short answer questions	50.0	1.00

Aims

This module is intended to introduce the structure and bonding of simple organic molecules. An appreciation of petroleum as a feedstock of organic chemicals for a

variety of purposes will be given. The reactivity and mechanism of organic compounds will be explored for a number of functional groups. The relevance of organic chemistry to everyday life and biological processes will be developed.

Learning Outcomes

After completing the module the student should be able to:

- 1 Define the following terms: empirical formula, molecular formula and structural formula.
- 2 Define the following terms: homologous series, functional group and structural isomerism
- 3 Describe the composition and uses of petroleum
- 4 Recall the free radical reaction of methane and chlorine
- 5 Recognise and describe the electrophilic reactions of alkenes
- 6 Recognise and describe the nucleophilic reactions of haloalkanes
- 7 Recall the elimination reactions of haloalkanes
- 8 Recall the production and reactions of alcohols
- 9 Carry out simple organic reactions involving functional group interconversions

Learning Outcomes of Assessments

The assessment item list is assessed via the learning outcomes listed:

Reports	8	9			
Assignments	1	2			
Test	3	4	5	6	7
EXAM	3	4	5	6	7

Outline Syllabus

Nomenclature and Isomerism: Empirical formula, homologous series and functional group, Application of IUPAC rules to nomenclature of simple organic compounds (for functional groups listed in the module). Constitutional isomers and geometric isomers.

Petroleum and alkanes: Mixture of alkanes found in petroleum - major fraction and their uses.

Petroleum - cracking process. Conditions for thermal and catalytic cracking. Economic reasons for the process and the products which are produced.

Petroleum - Combustion. Combustion of sulphur containing impurities in petroleum can lead to acid rain. Incomplete combustion in internal combustion engines produces various pollutants which can be removed by catalytic converters.

Alkanes - Chlorination. Free radical mechanism involving initiation, propagation and termination steps.

Alkenes: Double bond has a planar arrangement and is a centre of high electron density.

Hydrogenation reaction. Mechanism of electrophilic addition of hydrogen bromide, sulphuric acid and bromine with alkenes. Addition to unsymmetrical alkenes.

Hydration, epoxidation & polymerisation reactions of alkenes.

Haloalkanes. Polar covalent bonds. Nucleophilic attack by nucleophiles such as hydroxide ion, cyanide ion and ammonia. Influence of C-X bond enthalpy on rate of hydrolysis. Hydrolysis of nitriles.

Alcohols: Production of ethanol as primary, secondary and tertiary. Elimination reaction of alkenes.

Aldehyde and ketones: Tests to distinguish between aldehydes and ketones. Reduction of aldehydes and ketones.

Functional group interconversion will be taught via the practical exercises. Other laboratory skills relevant to organic chemistry will also be taught at these sessions. Wherever possible, the above syllabus will be linked to everyday life and biological processes.

Learning Activities

Computer aided learning, lecture. laboratory work and tutorial/workshop work

References

Course Material	Book
Author	Hunt, A
Publishing Year	2001
Title	AS Chemistry
Subtitle	
Edition	
Publisher	Stodder & Houghon
ISBN	

Course Material	Book
Author	Hill, G and Hunt,A
Publishing Year	2008
Title	Exexcel for Chemistry for AS
Subtitle	
Edition	
Publisher	Hodder Education
ISBN	03040949082

Course Material	Book
Author	Lister, T and Renshaw, J
Publishing Year	2008
Title	AQA AS Chemistry
Subtitle	Student's Book
Edition	
Publisher	Nelson Thornes Ltd
ISBN	074878280X

Notes

This module will give students a basic introduction to pre-degree chemistry that is built upon in other foundation level chemistry modules. The module is supported by three practical exercises that will reinforce concepts associated with organic chemistry