Title:	Physical and Organic Chem APPROVED
Long Title:	Physical and Organic Chemistry
Module Code:	CHEM6003
Credits:	5
NFQ Level:	Fundamental
Field of Study:	Chemistry
Valid From:	Semester 1 - 2009/10 (September 2009)
Module Delivered in	no programmes
Module Coordinator:	Donagh OMahony
Module Author:	
Module Description:	This module introduces the basic concepts of physical and organic chemistry to students of biological and life sciences.

Learning Outcomes	
On successful completion of this module the learner will be able to:	
LO1	Define some fundamental laws of physical chemistry.
LO2	Perform some basic calculations regarding heat changes, reaction rates, and equilibrium states.
LO3	Employ a range of selected laboratory techniques for measurement of physical parameters.
LO4	Classify and discuss a variety of organic compounds.
LO5	Describe some reaction mechanisms of organic molecules.
LO6	Perform some experimental procedures relating to synthesis, purification, and characterisation of organic compounds.

Pre-requisite learning
Module Recommendations *This is prior learning (or a practical skill) that is strongly recommended before enrolment in this module. You may enrol in this module if you have not acquired the recommended learning but you will have considerable difficulty in passing (i.e. achieving the learning outcomes of) the module. While the prior learning is expressed as named CIT module(s) it also allows for learning (in another module or modules) which is equivalent to the learning specified in the named module(s).*
Students should have completed the CIT module "General and Inorganic Chemistry" or its equivalent
Incompatible Modules *These are modules which have learning outcomes that are too similar to the learning outcomes of this module. You may not earn additional credit for the same learning and therefore you may not enrol in this module if you have successfully completed any modules in the incompatible list.*
Physical Chemistry; Organic Chemistry
Co-requisite Modules
No Co-requisite modules listed
Requirements *This is prior learning (or a practical skill) that is mandatory before enrolment in this module is allowed. You may not enrol on this module if you have not acquired the learning specified in this section.*
No requirements listed
Co-requisites
No Co Requisites listed

Module Content & Assessment

Indicative Content
Thermochemistry State and path functions, first and second laws of thermodynamics, Hess's Law, heats of reaction, calorimetry, enthalpy changes, bond energies.
Kinetics Factors affecting rates of reaction, first and second order rate laws, energy of activation and catalysts, collision theory, rate constant determination.
Chemical Equilibrium Dynamic nature of equilibrium, equilibrium expressions, factors affecting equilibria, Le Chatelier's principle, equilibrium calculations. Acid base theories, acid base equilibria, pH scale, buffer solutions, Henderson Hasselbach equation, calculation of pH values for strong acids and bases, weak acids, and buffer solutions.
Introduction to Organic Chemistry Elemental analysis, empirical and molecular formulae, physical properties of organic compounds, a survey of organic functional groups.
Saturated and Unsaturated Hydrocarbons Alkanes and cycloalkanes. I.U.P.A.C. nomenclature. Synthesis and reaction of haloalkanes. Alkenes, isomerism, electrophilic addition reactions, carbocations, polymer formation. Alkynes, acidity, addition reactions.
Alcohols Elimination reactions, oxidation, ether and ester formation, alcohol synthesis.
Amines Basicity and factors affecting Kb. Amines as nucleophiles.

Assessment Breakdown	%
Course Work	50.00%
End of Module Formal Examination	50.00%

Course Work

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Short Answer Questions	n/a	1,2,4,5	20.0	
Practical/Skills Evaluation	n/a	3,6	30.0	

End of Module Formal Examination

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Formal Exam	End-of-Semester Final Examination	1,2,3,4,5,6	50.0	End-of-Semester

Reassessment Requirement
Repeat examination *Reassessment of this module will consist of a repeat examination. It is possible that there will also be a requirement to be reassessed in a coursework element.*

The institute reserves the right to alter the nature and timings of assessment

Module Workload

Workload: Full Time				
Workload Type	*Workload Description*	*Hours*	*Frequency*	*Average Weekly Learner Workload*
Lecture	No Description	3.0	Every Week	3.00
Lab	One 3-hr practical per week for 8 weeks	2.0	Every Week	2.00
Independent & Directed Learning (Non-contact)	No Description	2.0	Every Week	2.00
			Total Hours	7.00
			Total Weekly Learner Workload	7.00
			Total Weekly Contact Hours	5.00

This module has no Part Time workload.

Module Resources

Recommended Book Resources

- **Brown TL, LeMay HE, Bursten BE 2003, *Chemistry:The Central Science*, Prentice Hall [ISBN: 0130491403]**
- **Freemantle MH 1995, *Chemistry in Action*, Macmillan [ISBN: 0333565150]**
- **McMurray J, Fay RC 2001, *Chemistry*, Prentice Hall [ISBN: 0130872059]**

Supplementary Book Resources

- **Ege S 2004, *Organic Chemistry, Structure and Reactivity*, Houghton Mifflin [ISBN: 0618318097]**
- **Morrison RT, Boyd RN 2000, *Organic Chemistry*, Prentice Hall [ISBN: 0136438911]**
- **Petrucci RH 2001, *General Chemistry : Principles and Modern Applications*, Prentice Hall [ISBN: 0130143294]**

This module does not have any article/paper resources

This module does not have any other resources