

APPROVED**CHEM6013: Physical Chemistry Principles****Module Details**

Module Code:	CHEM6013
Title:	Physical Chemistry Principles APPROVED
Long Title:	Physical Chemistry Principles
NFQ Level:	Fundamental
Valid From:	Semester 1 - 2019/20 (September 2019)
Duration:	1 Semester
Credits:	5
Field of Study:	4421 - Chemistry
Module Delivered in:	7 programme(s)
Module Description:	This module introduces students to the concepts of thermochemistry, reaction kinetics & chemical equilibrium, redox reactions and physical/chemical properties of selected main group elements.

Learning Outcomes

On successful completion of this module the learner will be able to:

#	Learning Outcome Description
LO1	Define various fundamental laws of thermochemistry, reaction kinetics, chemical equilibria and electrochemistry.
LO2	Perform basic calculations regarding heat changes, reaction rates and equilibrium states.
LO3	Describe the measurement principles of calorimeters, pH meters, electrochemical cells and the fundamentals of catalysis.
LO4	Describe the physical and chemical properties of selected main group elements.
LO5	Use a range of chemical equipment and techniques to perform laboratory procedures.

Dependencies**Module Recommendations****Incompatible Modules**

No incompatible modules listed

Co-requisite Modules

No Co-requisite modules listed

Requirements

Students wishing to register for this module are required to have taken Chemical Principles or an equivalent level 6 chemistry module

Indicative Content**Thermochemistry**

Energy functions. First law of thermodynamics. Enthalpy/Heats of chemical reactions and physical processes. Energy measurements and calorimetry. Numerical calculations.

Elementary Kinetics

Reaction rates. Factors affecting reaction rates. Reaction rates and stoichiometry. Rate laws, order of reactions, and determination of rate constants.

Introduction to Chemical Equilibria.

Dynamic equilibrium. Equilibrium constants and calculations. Homogeneous and heterogeneous equilibria. Factors affecting equilibrium. Le Chateliers principle.

Ionic Equilibria

Electrolytes, Common-ion Effect. Acids/ bases theories, pH scale, buffer solutions. Henderson Hasselbach equation. pH calculations for aqueous solutions.

Oxidation - Reduction Reactions

Oxidation numbers. Redox reactions. Balancing redox equation. Basic electrochemical cells.

Main Group Chemistry

Study of physical and chemical properties of selected main group elements.

Module Content & Assessment

Assessment Breakdown	%
Coursework	50.00%
End of Module Formal Examination	50.00%

Assessments

Coursework			
Assessment Type	Short Answer Questions	% of Total Mark	20
Timing	Week 7	Learning Outcomes	1,2,3
Assessment Description Assessment based on heat exchange, reaction rates and equilibrium			
Assessment Type	Practical/Skills Evaluation	% of Total Mark	30
Timing	Every Week	Learning Outcomes	2,3,5
Assessment Description Performance of practicals and completion of written reports / assignments with relevant calculations			
End of Module Formal Examination			
Assessment Type	Formal Exam	% of Total Mark	50
Timing	End-of-Semester	Learning Outcomes	1,2,3,4,5
Assessment Description End-of-Semester Final Examination			
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.			

Module Workload

Workload: Full Time					
Workload Type	Contact Type	Workload Description	Frequency	Average Weekly Learner Workload	Hours
Lecture	Contact	Delivery of theory underpinning learning outcomes	Every Week	3.00	3
Lab	Contact	Practical skills development	Every Week	2.00	2
Independent & Directed Learning (Non-contact)	Non Contact	Student independent learning time for this module	Every Week	2.00	2
Total Hours					7.00
Total Weekly Learner Workload					7.00
Total Weekly Contact Hours					5.00

Workload: Part Time					
Workload Type	Contact Type	Workload Description	Frequency	Average Weekly Learner Workload	Hours
Lecture	Contact	Delivery of theory underpinning learning outcomes	Every Week	3.00	3
Lab	Contact	Practical Skills development	Every Week	2.00	2
Independent & Directed Learning (Non-contact)	Non Contact	Student independent learning time for this module	Every Week	2.00	2
Total Hours					7.00
Total Weekly Learner Workload					7.00
Total Weekly Contact Hours					5.00

Module Resources

Recommended Book Resources	
Brown, LeMay, Bursten, Murphy, Woodward, Stoltzfus. (2017), Chemistry: The Central Science in SI Units, 14th. Pearson, [ISBN: 9781292221229].	
Supplementary Book Resources	
McMurray, Fay, Robinson. (2015), Chemistry, 7th. [ISBN: 9781292092751].	
This module does not have any article/paper resources	
Other Resources	
Website, Chemguide, http://www.chemguide.co.uk	

Module Delivered in

Programme Code	Programme	Semester	Delivery
CR_SCHQA_8	Bachelor of Science (Honours) in Analytical Chemistry with Quality Assurance	-1	Mandatory
CR_SESST_8	Bachelor of Science (Honours) in Environmental Science and Sustainable Technology	-1	Mandatory
CR_SINEN_8	Bachelor of Science (Honours) in Instrument Engineering	-1	Elective
CR_SCHEM_7	Bachelor of Science in Analytical and Pharmaceutical Chemistry	-1	Mandatory
CR_SPHYS_7	Bachelor of Science in Applied Physics and Instrumentation	-1	Elective
CR_SPHYS_6	Higher Certificate in Science in Applied Physics and Instrumentation	-1	Elective
CR_SCHEM_6	Higher Certificate in Science in Chemistry	-1	Mandatory