

CHEM6007: Physical Chemistry

Module Details

Module Code:	CHEM6007
Title:	Physical Chemistry APPROVED
Long Title:	Physical Chemistry
NFQ Level:	Fundamental
Valid From:	Semester 1 - 2019/20 (September 2019)
Duration:	1 Semester
Credits:	5
Field of Study:	4421 - Chemistry
Module Delivered in:	3 programme(s)
Module Description:	This module develops the concepts of thermodynamics, chemical equilibrium and kinetics, and electrochemistry

Learning Outcomes	
On successful completion of this module the learner will be able to:	
#	Learning Outcome Description
LO1	Describe the gaseous and liquid states of matter and their properties
LO2	Explain basic physicochemical laws, concepts and equations
LO3	Explain the thermodynamic basis of chemical and physical equilibria
LO4	Perform unit-based physicochemical calculations in a problem-solving context
LO5	Use a range of experimental techniques for the measurement/determination of physicochemical parameters
Dependencies	
Module Recommendations	
Incompatible Modules	
No incompatible modules listed	
Co-requisite Modules	
No Co-requisite modules listed	
Requirements	
No requirements listed	

Indicative Content
States of Matter Gases: Ideal and real gases; theoretical models; liquefaction; critical region; Liquids: viscosity; surface tension; refractive index
Thermodynamics Laws of thermodynamics; thermodynamic parameters (Free energy, enthalpy, entropy) and relationships; reaction spontaneity; chemical equilibria and reaction quotient
Phase equilibria Phase diagrams; ideal and non-ideal solutions; miscible and immiscible systems; distillation; eutectics; thermal analysis
Chemical Kinetics Collision Model Theory, Reaction Rate Determination Methods; Kinetic versus thermodynamic control; energetics of reactions, catalysis; rate laws;
Electrochemical concepts Basic electrochemical cells, Nernst Equation; Electrolysis, electrode potentials and potentiometry; ; electrochemical applications
Practical Physical Chemistry The practical programme will involve (i) the investigation and measurement of physical properties of liquids, (ii) the determination of the enthalpies of processes, (iii) determination of equilibrium constants, (iv) phase equilibrium studies, (v) kinetic studies, and (vi) electrochemical measurements.

Module Content & Assessment

Assessment Breakdown	%
Coursework	100.00%

Assessments

Coursework			
Assessment Type	Short Answer Questions	% of Total Mark	25
Timing	Week 7	Learning Outcomes	1,2,4
Assessment Description	Theory test		
Assessment Type	Short Answer Questions	% of Total Mark	25
Timing	Week 13	Learning Outcomes	1,2,3,4
Assessment Description	Theory test		
Assessment Type	Practical/Skills Evaluation	% of Total Mark	50
Timing	Every Week	Learning Outcomes	4,5
Assessment Description	Practical performance, calculations and practical reports. Lab data manipulation and assignments.		
No End of Module Formal 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 and related calculations	Every Week	3.00	3
Lab	Contact	Practical Skills Development	Every Week	2.00	2
Independent & Directed Learning (Non-contact)	Non Contact	Personal study	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 and related calculations	Every Week	3.00	3
Lab	Contact	Practical Skills Development	Every Week	2.00	2
Independent Learning	Non Contact	Personal Study	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

Peter Atkins, Julio de Paula. (2017), Elements of physical chemistry, 7th. OUP, [ISBN: 9780198796350].

Supplementary Book Resources

Peter Atkins, Julio de Paula, James Keeler. (2018), Physical chemistry, 11th. OUP, [ISBN: 9780198769866].

David W. Oxtoby, H. Pat Gillis, Alan Campion. (2012), Principles of Modern Chemistry, 7th.. Brooks Cole, [ISBN: 9780840049315].

W.L. Masterson, C.N. Hurley, E. Neth. (2012), Chemistry:Principles and Reactions, 7th.. Brooks Cole, [ISBN: 9781111572174].

This module does not have any article/paper resources

This module does not have any other resources

Module Delivered in

Programme Code	Programme	Semester	Delivery
CR_SCHQA_8	Bachelor of Science (Honours) in Analytical Chemistry with Quality Assurance	-1	Mandatory
CR_SCHEM_7	Bachelor of Science in Analytical and Pharmaceutical Chemistry	-1	Mandatory
CR_SCHEM_6	Higher Certificate in Science in Chemistry	-1	Mandatory