

APPROVED

CHEM7004: Inorganic and Physical Chem

Module Details

Module Code:	CHEM7004
Title:	Inorganic and Physical Chem APPROVED
Long Title:	Inorganic and Physical Chemistry
NFQ Level:	Intermediate
Valid From:	Semester 1 - 2023/24 (September 2023)
Duration:	1 Semester
Credits:	5
Field of Study:	4421 - Chemistry
Module Delivered in:	2 programme(s)
Module Description:	This module presents to the student some advanced topics in Inorganic and Physical Chemistry.

Learning Outcomes	
On successful completion of this module the learner will be able to:	
#	Learning Outcome Description
LO1	Determine atomic and molecular structure using diffraction, absorption and magnetic techniques.
LO2	Discuss the physical and chemical properties of the transition metal elements (d-block). Compare and contrast with main group elements (s and p block).
LO3	State, explain and apply the basic laws/principles and concepts involved in the physical chemistry of selected systems.
LO4	Discuss the role and limitations of theoretical models in the description of selected chemical systems.
LO5	Solve advanced problems in inorganic chemistry and physical chemistry.
Dependencies	
Module Recommendations	
Incompatible Modules	
No incompatible modules listed	
Co-requisite Modules	
No Co-requisite modules listed	
Requirements	
No requirements listed	

Indicative Content
Atomic and Molecular Structure Determination Bragg's Law, X-ray diffraction (powder and single crystal), Phase identification, unit cells; Further diffraction techniques (neutron, electron); Absorption methods (IR, Raman); Magnetometry (spin only magnetic moment, NMR); related calculations
Transition Metal Chemistry Physical and chemical properties; structures; variable oxidation states; magnetic properties; redox potential; relative stability; non-stoichiometry, colour, catalysis.
Surface Chemistry Gas adsorption, empirical adsorption isotherms, theoretical models of gas adsorption, heterogeneously catalysed reactions; liquid adsorption, detergents, Gibbs' adsorption isotherm, adsorption from solution.
Disperse Systems and Macromolecules Disperse systems/colloids, properties of sols, colloidal behaviour of macromolecular solutions, macromolecule molecular mass determination.

Module Content & Assessment

Assessment Breakdown	%
Coursework	100.00%

Assessments

Coursework			
Assessment Type	Short Answer Questions	% of Total Mark	15
Timing	Week 4	Learning Outcomes	1,5
Assessment Description	Written in class theory test in Inorganic Chemistry		
Assessment Type	Short Answer Questions	% of Total Mark	15
Timing	Week 5	Learning Outcomes	3,4,5
Assessment Description	Written in class theory test in Physical Chemistry		
Assessment Type	Short Answer Questions	% of Total Mark	35
Timing	Week 8	Learning Outcomes	1,2,3,4,5
Assessment Description	Theory Assessment		
Assessment Type	Short Answer Questions	% of Total Mark	35
Timing	Week 13	Learning Outcomes	1,2,3,4,5
Assessment Description	Theory Assessment		
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	Inorganic Chemistry Theory	Every Week	2.00	2
Lecture	Contact	Physical Chemistry Theory.	Every Week	2.00	2
Independent & Directed Learning (Non-contact)	Non Contact	Personal study	Every Week	3.00	3
Total Hours					7.00
Total Weekly Learner Workload					7.00
Total Weekly Contact Hours					4.00

Workload: Part Time					
Workload Type	Contact Type	Workload Description	Frequency	Average Weekly Learner Workload	Hours
Lecture	Contact	Inorganic Chemistry Theory	Every Week	2.00	2
Lecture	Contact	Physical Chemistry Theory.	Every Week	2.00	2
Directed Learning	Non Contact	Personal study	Every Week	3.00	3
Total Hours					7.00
Total Weekly Learner Workload					7.00
Total Weekly Contact Hours					4.00

Module Resources

Recommended Book Resources	
<p>M. Weller, T. Overton, J. Rourke, F. Armstrong. (2018), Inorganic Chemistry, 7th. Oxford, [ISBN: 9780198768128].</p> <p>P. Atkins, J. de Paula, J. Keeler. (2018), Atkins' Physical chemistry, 11th. OUP, [ISBN: 9780198769866].</p>	
Supplementary Book Resources	
<p>K. M. Mackay, R. A. Mackay, W. Henderson. (2002), Introduction to modern inorganic chemistry, 6th. Nelson Thornes, Cheltenham, U.K., [ISBN: 9780748764204].</p> <p>F. Albert Cotton, G. Wilkinson, P. L. Gaus. (2007), Basic Inorganic Chemistry, 3rd. Wiley, [ISBN: 9788126511143].</p> <p>E.M. McCash. (2001), Surface Chemistry, Oxford University Press, [ISBN: 0198503288].</p> <p>Metz, C.R.. (1990), 2000 Solved Problems in Physical Chemistry: Schaum's Solved Problem Series, McGraw-Hill, [ISBN: 0070417164].</p> <p>(2007), Quantities, Units and Symbols in Physical Chemistry, 3rd. Royal Society of Chemistry, Cambridge, [ISBN: 978 0 85404 433 7].</p>	
This module does not have any article/paper resources	
Other Resources	
<p>Website, Atkins' Physical Chemistry companion web site, https://oup-arc.com/access/pchem11e</p>	

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