`APPROVED`

CHEM7005: Topics in Inorg/Phys Chemistry

Module Details

Module Code:	CHEM7005
Title:	Topics in Inorg/Phys Chemistry `APPROVED`
Long Title:	Topics in Inorg/Phys Chemistry
NFQ Level:	Intermediate
Valid From:	Semester 1 - 2019/20 (September 2019)

Duration:	1 Semester

Credits:	5

Field of Study:	4421 - Chemistry

Module Delivered in:	**2 programme(s)**

Module Description:	This module presents additional aspects of advanced inorganic and physical chemistry. It includes an extensive laboratory practical programme.

Learning Outcomes	
On successful completion of this module the learner will be able to:	
#	**Learning Outcome Description**
LO1	Apply advanced bonding theories, (crystal field, valence bond, molecular orbital, ligand field), to diatomic, polyatomic and transition metal complexes
LO2	Discuss properties of complexes with particular emphasis on isomerism, spectral, magnetic, kinetic and thermodynamic properties.
LO3	Discuss the physical chemistry of photochemical and photophysical processes.
LO4	Discuss the differences between the kinetics of thermochemical reactions and photochemical reactions.
LO5	Use and assess a variety of practical laboratory techniques in inorganic and physical chemistry. Solve related calculations.

Dependencies	
Module Recommendations	

Incompatible Modules
No incompatible modules listed

Co-requisite Modules
No Co-requisite modules listed

Requirements
Students should have completed modules for a level 6 qualification in chemistry or a related discipline

Indicative Content
Bonding in Complexes Crystal field theory, determination of CFSE and OSPE; Valence bond theory, hybrid orbitals, structure of inorganic compounds; review of Molecular orbital theory; Ligand field theory, symmetry, geometry, determination of LSFE; comparison of all four bonding models.
Properties of Complexes Properties of complexes: isomerism, colour, magnetism, structure; thermodynamic, kinetic, mechanisms of ligand exchange reactions; Jann Teller effect; trans effect.
Photochemistry Laws and principles of photochemistry, photochemical and photophysical processes, energy diagrams, quantum yields.
Kinetics of Photochemical Reactions Thermal reaction versus photochemical reactions. Factors influencing kinetics of thermal processes (catalysed and uncatalysed). Factors influencing the kinetics of photochemical processes.
Practical Programme A selection of the following practicals: 1. A study of manganese chemistry 2. Determination of the composition of Fe(III) and Ni(II) complexes 3. Electrophoresis 4. Adsorption of acetic acid on charcoal 5. Polystyrene (preparation & viscosity studies) 6. Preparation and analysis of iron oxalate complexes 7. Verification of the Nernst equation 8. Chemistry of chromium 9. Surface tension-concentration studies 10. Kinetics of hydrogen peroxide-hydrogen iodide reaction 11. Dissociation energy of iodine 12. Preparation and disproportionation of copper (I) oxide 13. Flourimetric determination of Aluminium 14. Argentimetric Analysis 15. Gravimetric Determination of sulphate in a soluble salt

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
Assessment Description Theory test in Inorganic Chemistry			
Assessment Type	Short Answer Questions	**% of Total Mark**	25
Timing	Week 7	**Learning Outcomes**	3,4
Assessment Description Theory test in Physical Chemistry			
Assessment Type	Practical/Skills Evaluation	**% of Total Mark**	50
Timing	Every Week	**Learning Outcomes**	5
Assessment Description Performance of laboratory practicals with associated reports and calculations.			

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 Second Week	1.00	2
Lecture	Contact	Physical Chemistry Theory.	Every Second Week	1.00	2
Lab	Contact	Inorganic and Physical Chemistry Practicals	Every Second Week	3.00	6
Independent & Directed Learning (Non-contact)	Non Contact	Personal study	Every Week	2.00	2
				Total Hours	12.00
				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	Inorganic Chemistry Theory.	Every Second Week	1.00	2
Lecture	Contact	Physical Chemistry Theory	Every Second Week	1.00	2
Lab	Contact	Inorganic and Physical Chemistry Practicals.	Every Second Week	3.00	6
Independent & Directed Learning (Non-contact)	Non Contact	Personal study	Every Week	2.00	2
				Total Hours	12.00
				Total Weekly Learner Workload	7.00
				Total Weekly Contact Hours	5.00

Module Resources

Recommended Book Resources

K. M. Mackay, R. A. Mackay, W. Henderson. (2002), Introduction to modern inorganic chemistry, 6th. Nelson Thornes, Cheltenham, U.K., [ISBN: 9780748764204].

Carol E. Wayne, Richard P. Wayne. (1996), Photochemistry, OUP, [ISBN: 9780198558866].

M. Weller, T.Overton, J. Rourke, F. Armstrong. (2018), Inorganic Chemistry, 7th. Oxford UK, [ISBN: 9780198768128].

Supplementary Book Resources

F. A. Cotton, G. Wilkinson, P. L. Gaus. (2007), Basic Inorganic Chemistry, 3rd. Wiley, [ISBN: 9788126511143].

Metz, C.R.. (1990), 2000 Solved Problems in Physical Chemistry: Schaum's Solved Problem Series, McGraw-Hill, [ISBN: 0070417164].

Peter Atkins, Julio de Paula. (2009), Physical Chemistry, 9th. OUP, [ISBN: 978-0-19-954337-3].

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