

University of the West of Scotland Module Descriptor

Session: 2024/25

Title of Module: Physical & Inorganic Chemistry 4			
Code: CHEM10004	SCQF Level: 10 (Scottish Credit and Qualifications Framework)	Credit Points: 20	ECTS: 10 (European Credit Transfer Scheme)
School:	School of Computing, Engineering and Physical Sciences		
Module Co-ordinator:	Andrew McLean		
Summary of Module			
<p>Advanced topics in Physical & Inorganic Chemistry will be covered, including some aspects of currently active research in the discipline. This will be broken down into three components; (i) Aspects of photochemistry will be developed including light absorption and excited states, singlet and triplet states, lifetimes, shapes, dipole moments. Photophysical and photochemical pathways, fluorescence and phosphorescence, lifetime measurements and quenching will be related to the Jablonski diagram. (ii) Aspects of theory and the application of rotational, infrared and RAMAN spectroscopy will be developed. (iii) Aspects of Inorganic Chemistry explored at level 3 will be developed to a higher level; transition metal carbonyl compounds, their bonding and vibrational spectra and reactions of the carbonyl moiety, quantification of the relative rates of substitution reactions of transition metals complexes, review of NMR spectroscopy including expansion to more exotic nuclei pertinent to Inorganic chemistry, metallic bonding, common properties of both main group and transition metals in the zero oxidation state as well as differences between these two groups of metallic elements, noble gases will be included thereby completing aspects of the chemistry of the remainder of the periodic table.</p> <p>The graduate attributes relevant to this module are;</p> <ul style="list-style-type: none"> • Academic: Critical thinker, analytical, inquiring, knowledgeable, literate, problem solver, autonomous. • Personal: Effective communicator, influential, motivated, team-worker. • Professional: collaborative. <p>able (outside the Lanthanide / Actinide Series).</p>			

Module Delivery Method					
Face-To-Face	Blended	Fully Online	HybridC	HybridO	Work-based Learning
✓					

Face-To-Face

Term used to describe the traditional classroom environment where the students and the lecturer meet synchronously in the same room for the whole provision.

Blended

A mode of delivery of a module or a programme that involves online and face-to-face delivery of learning, teaching and assessment activities, student support and feedback. A programme may be considered "blended" if it includes a combination of face-to-face, online and blended modules. If an online programme has any compulsory face-to-face and campus elements it must be described as blended with clearly articulated delivery information to manage student expectations

Fully Online

Instruction that is solely delivered by web-based or internet-based technologies. This term is used to describe the previously used terms distance learning and e learning.

HybridC

Online with mandatory face-to-face learning on Campus

HybridO

Online with optional face-to-face learning on Campus

Work-based Learning

Learning activities where the main location for the learning experience is in the workplace.

Campus(es) for Module Delivery

The module will **normally** be offered on the following campuses / or by Distance/Online Learning: (Provided viable student numbers permit)

Paisley:	Ayr:	Dumfries:	Lanarkshire:	London:	Distance/Online Learning:	Other:
✓						

Term(s) for Module Delivery

(Provided viable student numbers permit).

Term 1	Term 2	Term 3
	✓	

Learning Outcomes: (maximum of 5 statements)

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

L1. Display a knowledge of theory and applications in some of the more recent significant advances in photochemistry, in advanced spectroscopy including rotational, IR and RAMAN theory and applications and in a range of topics within inorganic chemistry.

L2. Present written accounts of dry-lab type studies in advanced areas of physical & inorganic chemistry .

Employability Skills and Personal Development Planning (PDP) Skills**SCQF Headings**

During completion of this module, there will be an opportunity to achieve core skills in:

Knowledge and Understanding (K and U)	<p>SCQF Level 10. Demonstrate a knowledge and integrative understanding of major aspects of physical & inorganic chemistry and of established techniques of enquiry including research methodologies.</p> <p>Display a critical understanding of a range of principal theories and concepts in physical & inorganic chemistry.</p> <p>Show a detailed knowledge and understanding of specialist material, informed by forefront developments in aspects of photochemical reaction kinetics and applications of NMR, IR, RAMAN and laser spectroscopy.</p>
Practice: Applied Knowledge and Understanding	<p>SCQF Level 10. Use a selection of principal skills, practices and materials including some at an advanced / specialised level, associated with physical & inorganic chemistry.</p> <p>Execute defined, advanced dry-lab exercises or investigations and</p>

	<p>identify and implement relevant outcomes.</p> <p>Practise a range of professional level skills in physical & inorganic chemistry, including a degree of unpredictability and specialism..</p>	
Generic Cognitive skills	<p>SCQF Level 10. Critically identify, define and analyse complex professional level problems and issues in physical & inorganic chemistry.</p> <p>Consolidate and critically review knowledge, skills and practices and thinking in aspects of physical & inorganic chemistry.</p> <p>Demonstrate some originality and creativity in dealing with professional level issues in physical & inorganic chemistry.</p> <p>Make judgments where information is limited or where a range of sources is involved</p>	
Communication, ICT and Numeracy Skills	<p>SCQF Level 10. Communicate with peers, senior colleagues and specialists in areas of physical & inorganic chemistry.</p> <p>Use a range of software and IT applications to enhance work.</p> <p>Interpret, use and evaluate a range of numerical and graphical data in setting goals and achieving targets.</p>	
Autonomy, Accountability and Working with others	<p>SCQF Level 10. Exercise autonomy and initiative in activities at a professional level.</p> <p>Show awareness of own and others' roles and responsibilities.</p> <p>Work effectively under guidance with qualified practitioners.</p>	
Pre-requisites:	Before undertaking this module the student should have undertaken the following:	
	<table border="1"> <tr> <td>Module Code: CHEM09003 CHEM09001</td> <td>Module Title: Physical Chemistry 3 Inorganic Chemistry 3</td> </tr> </table>	Module Code: CHEM09003 CHEM09001
Module Code: CHEM09003 CHEM09001	Module Title: Physical Chemistry 3 Inorganic Chemistry 3	

	Other:	Or appropriate background
Co-requisites	Module Code:	Module Title:

* Indicates that module descriptor is not published.

Learning and Teaching	
<p>This module covers a wide variety of theoretical, conceptual and practical areas, which require a range of knowledge and skills at a more advanced level to be displayed and exercised. Delivery of its syllabus content therefore involves a diversity of teaching and assessment methods suitable to the learning outcomes of the module; these include formal lectures, structured tutorials (work closely integrated with the lecture material), an extended dry-lab exercise, completion and submission of written coursework making use of appropriate forms of IT and VLE, and independent study</p>	
<p>Learning Activities During completion of this module, the learning activities</p>	<p>Student Learning Hours (Normally totalling 200 hours): (Note: Learning hours include both</p>
<p>undertaken to achieve the module learning outcomes are stated below:</p>	<p>contact hours and hours spent on other learning activities)</p>
Lecture/Core Content Delivery	24
Tutorial/Synchronous Support Activity	12
Laboratory/Practical Demonstration/Workshop	12
Independent Study	152
	200 Hours Total
**Indicative Resources: (eg. Core text, journals, internet access)	
<p>The following materials form essential underpinning for the module content and ultimately for the learning outcomes: P Atkins and J de Paula, Atkins' Physical Chemistry, Oxford University Press, 12th Edition, 2022</p> <p>D F Shriver and P W Atkins Inorganic Chemistry, OUP, 5th Edition 2013, 0199236178</p> <p>Fundamentals of Molecular Spectroscopy C.N. Banwell (UWS Library Code 543.54 BAN)</p> <p>Inorganic Chemistry D. F. Shriver & P. W. Atkins (UWS Library Code 546 SHR)</p> <p>Chemistry of the Elements N. N. Greenwood & A Earnshaw (UWS Library Code 546 GRE)</p> <p>Advanced Inorganic Chemistry F. A. Cotton & G. Wilkinson (UWS Library Code 546 COT)</p>	
<p>(**N.B. Although reading lists should include current publications, students are advised (particularly for material marked with an asterisk*) to wait until the start of session for confirmation of the most up-to-date material)</p>	
Engagement Requirements	

In line with the Academic Engagement Procedure, Students are defined as academically engaged if they are regularly engaged with timetabled teaching sessions, course-related learning resources including those in the Library and on the relevant learning platform, and complete assessments and submit these on time. Please refer to the Academic Engagement Procedure at the following link: [Academic engagement procedure](#)

Supplemental Information

Programme Board	Physical Sciences
Assessment Results (Pass/Fail)	No
Subject Panel	Physical Sciences
Moderator	Dr Alastair Marr
External Examiner	M Paterson
Accreditation Details	This module is accredited by the Royal Society of Chemistry (RSC) as part of the BSc (Hons) Chemistry Programme.
Changes/Version Number	3.06

Assessment: (also refer to Assessment Outcomes Grids below)

(a) final written exam worth 60% of the final mark

(b) continuous assessment worth 40% of the final mark.
The continuous assessment component in this module will consist of the following elements: (i) written assignments worth 20% of the final mark, (ii) dry-lab(s) worth 20% of the final mark.

(N.B. (i) **Assessment Outcomes Grids** for the module (one for each component) can be found below which clearly demonstrate how the learning outcomes of the module will be assessed.
(ii) An **indicative schedule** listing approximate times within the academic calendar when assessment is likely to feature will be provided within the Student Handbook.)

Assessment Outcome Grids (Footnote A.)

Component 1				
Assessment Type (Footnote B.)	Learning Outcome (1)	Learning Outcome (2)	Weighting (%) of Assessment Element	Timetabled Contact Hours
Unseen open book (standard)	✓		60	2
Component 2				

Assessment Type (Footnote B.)	Learning Outcome (1)	Learning Outcome (2)	Weighting (%) of Assessment Element	Timetabled Contact Hours
Case study		✓	40	6
Combined Total For All Components			100%	8 hours

Footnotes

A. Referred to within Assessment Section above

B. Identified in the Learning Outcome Section above

Note(s):

1. More than one assessment method can be used to assess individual learning outcomes.
2. Schools are responsible for determining student contact hours. Please refer to University Policy on contact hours (extract contained within section 10 of the Module Descriptor guidance note).

This will normally be variable across Schools, dependent on Programmes &/or Professional requirements.

Equality and Diversity

This module is suitable for any student with appropriate chemistry background, however it should be noted that in order for you to complete this module the laboratory element of coursework will require to be undertaken, disability support can be provided where necessary, consequently, if disability support is needed to complete this part of the module, then the University's Health and Safety Officer should be consulted to make sure that safety in the laboratory is not compromised.

Current University Policy on Equality and Diversity applies.

[UWS Equality and Diversity Policy](#)

(N.B. Every effort will be made by the University to accommodate any equality and diversity issues brought to the attention of the School)