Module Descriptor

Title	Chemical Analysis and Evaluation		
Session	2025/26	**Status**	Published
Code	CHEM08004	**SCQF Level**	8
Credit Points	20	**ECTS (European Credit Transfer Scheme)**	10
School	**Computing, Engineering and Physical Sciences**		
Module Co-ordinator	Dr Alastair Marr		

Summary of Module

This module presents a review of standardisation and use of commoner reagents in acid/base, redox, precipitation and complexation reactions It will also offer an Introduction to gravimetry, principles, instrumentation and applications of UV/VIS, IR and atomic absorption spectrometry as well as a comparative overview of methods.

In addition, the module will include coverage of the following: application of Beer's Law to calibration and to mixtures, brief introduction to principles of chromatography and sorption processes - partition, ion exchange etc, columns, detector types, mobile and stationary phases, outline of high-performance liquid chromatography, qualitative and quantitative analysis

Also, this module provides an introduction to some of the concepts related to (i) mass balance calculations -applications to straightforward batch processes and steady state flow systems with and without chemical reactions, examples from chemical processing and from the environment-, (ii) statistics and chemical measurement -precision, accuracy and errors, mean, standard deviation and confidence limits, propagation of errors, error in linear calibration.

The Graduate Attributes relevant to this module are listed below:

Academic: Critical thinker: analytical, inquiring, knowledgeable, digital literate, problem solver, autonomous, incisive, innovative.

Personal: Effective communicator, influential, motivated

Professional: Collaborative, research minded, ambitious, driven.

Module Delivery Method	On-Campus[1] ☒	Hybrid[2] ☐	Online[3] ☐	Work -Based Learning[4] ☐
Campuses for Module Delivery	☐ Ayr ☐ Dumfries	☐ Lanarkshire ☐ London ☒ Paisley	☐ Online / Distance Learning ☐ Other (specify)	

Terms for Module Delivery	Term 1	☐	Term 2	☒	Term 3	☐
Long-thin Delivery over more than one Term	Term 1 – Term 2	☐	Term 2 – Term 3	☐	Term 3 – Term 1	☐

Learning Outcomes	
L1	Demonstrate an appreciation of a range of classical and modern practices of chemical measurement
L2	Display basic competence in quantitative aspects of stoichiometry, mass balance, analytical and environmental issues.
L3	
L4	
L5	

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)	**SCQF 8** Broad knowledge of main concepts associated with statistics and chemical measurement, collection and evaluation of chemical data. Detailed knowledge and understanding of some of the techniques and principles employed in Analytical Chemistry. Some knowledge and understanding of main concepts and principles involved in mass balance.

[1] Where contact hours are synchronous/ live and take place fully on campus. Campus-based learning is focused on providing an interactive learning experience supported by a range of digitally-enabled asynchronous learning opportunities including learning materials, resources, and opportunities provided via the virtual learning environment. On-campus contact hours will be clearly articulated to students.

[2] The module includes a combination of synchronous/ live on-campus and online learning events. These will be supported by a range of digitally-enabled asynchronous learning opportunities including learning materials, resources, and opportunities provided via the virtual learning environment. On-campus and online contact hours will be clearly articulated to students.

[3] Where all learning is solely delivered by web-based or internet-based technologies and the participants can engage in all learning activities through these means. All required contact hours will be clearly articulated to students.

[4] Learning activities where the main location for the learning experience is in the workplace. All required contact hours, whether online or on campus, will be clearly articulated to students

Practice: Applied Knowledge and Understanding	**SCQF 8** Performing a variety of practical exercises illustrating (i) the use of instrumental techniques such as chromatography and spectroscopy in relation to analytical chemical measurement, and (ii) the principles of mass and energy balance in a system where two input flows are mixed in a reactor with a single outlet. Performing a variety of practical exercises illustrating (i) the use of instrumental techniques such as chromatography and spectroscopy in relation to analytical chemical measurement, and (ii) the principles of mass and energy balance in a system where two input flows are mixed in a reactor with a single outlet.
Generic Cognitive skills	**SCQF 8** Undertaking a critical analysis of information to draw conclusions from quantitative chemical observations and measurement.
Communication, ICT and Numeracy Skills	**SCQF 8** Making effective use of IT skills to obtain, process and evaluate numerical and graphical data to enable the production of appropriate written reports for assignments and laboratory exercises.
Autonomy, Accountability and Working with Others	**SCQF 8** Working effectively with others when carrying out practical laboratory exercises and completing appropriate group tasks associated with the coursework element of this module.

Prerequisites	**Module Code** CHEM07011	**Module Title** Chemistry and Reactions
	Other or appropriate background.	
Co-requisites	**Module Code**	**Module Title**

Learning and Teaching	
In line with current learning and teaching principles, a 20-credit module includes 200 learning hours, normally including a minimum of 36 contact hours and maximum of 48 contact hours.	
Learning Activities During completion of this module, the learning activities undertaken to achieve the module learning outcomes are stated below:	**Student Learning Hours** (Note: Learning hours include both contact hours and hours spent on other learning activities)
Lecture / Core Content Delivery	18
Tutorial / Synchronous Support Activity	10
Laboratory / Practical Demonstration / Workshop	20
Independent Study	152
Please select	

Please select	
TOTAL	200

Indicative Resources

The following materials form essential underpinning for the module content and ultimately for the learning outcomes:

Analytical Chemistry, Gary D. Christian, Purnendu K. Dasgupta, Kevin A. Schug, Wiley Global Education, 7th Edition, 2014, ISBN: 9781118805275

Fundamentals of Analytical Chemistry, D A Skoog, D M West and F J Holler, Brooks Cole, 9th Edition, 2014. ISBN: 978-0495558286

Chemical Analysis & Evaluation: Reference Booklet, A M Marr, C J McHugh, J N Chacon

Please ensure the list is kept short and current. Essential resources should be included, broader resources should be kept for module handbooks / Aula VLE.

Resources should be listed in Harvard Cite Them Rite referencing style or agreed professional body deviation and in alphabetical order.

(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)

Attendance and Engagement Requirements

In line with the Student Attendance and Engagement Procedure, Students are academically engaged if they are regularly attending and participating in timetabled on-campus and online teaching sessions, asynchronous online learning activities, course-related learning resources, and complete assessments and submit these on time.

For the purposes of this module, academic engagement equates to the following:

The School of Computing, Engineering and Physical Sciences considers attendance and engagement to mean a commitment to attending, and engaging in, timetabled sessions. You will scan your attendance via the scanners each time you are on-campus and you will login to the VLE several times per week. Where you are unable to attend a timetabled learning session due to illness or other circumstance, you should notify the Programme Leader that you cannot attend. Across the School an 80% attendance threshold is set. If you fall below this, you will be referred to the Student Success Team to see how we can best support your studies.

Equality and Diversity

The University's Equality, Diversity and Human Rights Procedure can be accessed at the following link: UWS Equality, Diversity and Human Rights Code.

Aligned with the University's commitment to equality and diversity, this module supports equality of opportunity for students from all backgrounds and learning needs. Using the VLE, material will be presented electronically in formats that allow flexible access and manipulation of content. This module complies with University regulations and guidance on inclusive learning and teaching practice. This module has lab-based teaching and as such you are advised to speak to the Module Co-ordinator to ensure that specialist assistive equipment, support provision and adjustment to assessment practice can be put in place, in accordance with the University's policies and regulations.

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

Supplemental Information

Divisional Programme Board	**Engineering Physical Sciences**
Overall Assessment Results	☐ **Pass / Fail** ☒ **Graded**
Module Eligible for Compensation	☐ **Yes** ☒ **No** **If this module is eligible for compensation, there may be cases where compensation is not permitted due to programme accreditation requirements. Please check the associated programme specification for details.**
School Assessment Board	Physical Sciences
Moderator	Dr Callum McHugh
External Examiner	Prof. Martin Paterson
Accreditation Details	This module is accredited by the royal Society of Chemistry (RSC) as part of the BSc (Hons) Chemistry programme
Module Appears in CPD catalogue	☐ **Yes** ☒ **No**
Changes / Version Number	2.14

Assessment (also refer to Assessment Outcomes Grids below)
Assessment 1
Class Test
Assessment 2
Coursework 40% lab report and lab proformae 20% class short tests 20% group workshops 10% Group Case Study 10% Stoichiometry Assignment
Assessment 3
(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 Module Handbook.)

Component 1							
Assessment Type	**LO1**	**LO2**	**LO3**	**LO4**	**LO5**	**Weighting of Assessment Element (%)**	**Timetabled Contact Hours**

Closed book on campus assessment	☒	☒	☐	☐	☐	50	2

Component 2							
Assessment Type	**LO1**	**LO2**	**LO3**	**LO4**	**LO5**	**Weighting of Assessment Element (%)**	**Timetabled Contact Hours**
Coursework	☒	☒	☐	☐	☐	50	42

Component 3							
Assessment Type	**LO1**	**LO2**	**LO3**	**LO4**	**LO5**	**Weighting of Assessment Element (%)**	**Timetabled Contact Hours**
	☐	☐	☐	☐	☐		
Combined total for all components						100%	44 hours

Change Control

What	**When**	**Who**