PROGRAMME SPECIFICATON

OFFICE USE ONLY	
Date of validation event:	12 February 2018
Date of approval by Academic Board:	13 March 2018
Approved Validation Period:	*5 years from September 2018*
Date and type of revision:	AM2 approved by APSC Nov 2018 to replace SCI628 with SCI638 with effect from Sep 2019

Intended awards;

BSc (Hons) Chemistry

1 Awarding body

Glyndŵr University

2 Programme delivered by

Glyndŵr University

3 Location of delivery

Plas Coch Campus, Wrexham

4 School/Department

School of Applied Science, Computing and Engineering

5 Exit awards available

BSc Chemistry
Diploma of Higher Education in Chemistry
Certificate of Higher Education in Chemistry

6 Professional, Statutory or Regulatory Body (PSRB) accreditation

The proposed programme has been developed with Royal Society of Chemistry (RSC) accreditation in mind. The key requirements for RSC accreditation are that the main branches of chemistry are developed at appropriate times during the programme. At level 4, students are introduced to modules designed to provide an understanding of general chemistry, inorganic chemistry and organic chemistry. Areas such as analytical chemistry are introduced in subsequent years. A key requirement is that students are able to apply the knowledge to the solution of theoretical and practical problems. Hence many modules incorporate a practical element and students are assessed by formal exams as well as practical portfolios.

Another key requirement is that programmes incorporate independent investigative methodology. This has been covered by a level 5 module; Research Methods: Theory and Practice, where students carry out a 5 week mini project designed to help them with skills necessary for their final year research project. Professional skills are covered in the above named module as well as a level 4 module; Academic Study Skills and Personal Development. Transferable skills are incorporated in all modules.

	RSC accreditation can be sought after complete delivery of the programme and submission of previous two years of EE reports. Time frame for accreditation is normally 4-6 months. Accreditation lasts for 5 years and is free. For the proposed BSc (Hons) Chemistry programme, RSC accreditation will be sought at the earliest opportunity. **The information above is correct at the point of programme validation, refer to university PSRB register and university website for current details of programme accreditation.**
7	**Accreditation available**
	As above.
8	**Please add details of any conditions that may affect accreditation (*e.g.* is it dependent on choices made by a student?)**
	Programme design has been informed by RSC Accreditation of Degree Programmes document, 2017.
9	JACS3 **code**
	F100
10	UCAS **code**
	BSc (Hons) Chemistry - CM18 BSc (Hons) Chemistry (with Foundation Year) - CMFY
11	**Relevant QAA subject benchmark statement/s**
	QAA Subject Benchmark Statement: Chemistry (2014) http://www.qaa.ac.uk/en/Publications/Documents/SBS-chemistry-14.pdf
12	**Other external and internal reference points used to inform the programme outcomes**
	RSC Accreditation of Degree Programmes 2017
13	**Mode of study**
	Full & part time
14	**Normal length of study**
	FT: 3 years (4 years with Foundation Year) PT: 6 years (8 years with Foundation Year)
15	**Language of study**
	English

17 Criteria for admission to the programme

Standard entry criteria
Entry requirements are in accordance with the University's admissions policy https://www.glyndwr.ac.uk/en/media/FINAL%20ADMISSIONS%20POLICY%202020 17.pdf The University's entry requirements are set out at http://www.glyndwr.ac.uk/en/Undergraduatecourses/UCAStariffchange2017/

International entry qualifications are outlined on the National Academic Recognition and Information Centre (NARIC) as equivalent to the relevant UK entry qualification.

In addition to the academic entry requirements, all applicants whose first language is not English or Welsh must demonstrate English language proficiency.

European students are able to provide this evidence in a number of ways (please see http://www.glyndwr.ac.uk/en/Europeanstudents/entryrequirements/ for details), including IELTS.

International students require a UKVI Approved Secure English Language Test (SELT) (please see http://www.glyndwr.ac.uk/en/Internationalstudents/EntryandEnglishLanguageRequirements/ for details).

Foundation Year:
The programme will also be offered as a four-year kick-start degree (an introductory foundation year plus this three-year degree programme). The kick-start will be offered where an applicant does not meet the entry requirements for the three year honours degree or where the department / applicants feel they would benefit from an additional year to gain some additional experience before progression to the full three-year degree. Upon successful completion of foundation year the student will automatically progress to the relevant BSc (Hons) / BA (Hons) degree course. Entry requirements for the four-year kick start programmes are 48 UCAS points or equivalent. In addition, passes at GCSE in Maths and English/Welsh Language at grade C or above are normally expected. Entry to the four-year kick-start programme will be conditional on interview and review of applications to confirm that students are able to satisfactorily complete the programme. Therefore, this route is aimed at:

- Those who do not meet the entry requirements for a full degree.
- Those who have been out of education for a while and feel they would benefit from the extra year of preparation.
- Those looking to undertake a degree in an entirely new subject area and do not have the subject specific experience necessary to go straight to a degree.

Applicants who are unsure if they meet the criteria should contact Admissions.

DBS Requirements

N/A

Non-standard entry criteria and programme specific requirements

N/A

18 Recognition of Prior (Experiential) Learning

Applicants may enter the programme at various levels with Recognition of Prior Learning (RPL) or Recognition of Prior Experiential learning (RPEL) in accordance

with the University General Regulations. Any programme specific restrictions are outlined below

Programme specific restrictions

N/A

19 Aims of the programme

The primary aim is to deliver a programme that imparts upon students a comprehensive working knowledge of inorganic, physical, organic and analytical chemistry with emphasis on the latest developments in each of these fields. The aim is to produce high quality graduates with excellent further study and employment opportunities. Modules have been designed to cover the specific criteria of the QAA Chemistry 2014 Benchmarks as well as being aligned to the RSC accreditation standards 2017 in order to facilitate eventual accreditation of the programme. The programme is structured so as to provide a logical, coherent progression through the modules.

Specifically, the programme will equip/provide students with:

i) An in-depth knowledge of science in particular chemistry, physics, mathematics and statistics. (Glyndŵr Graduate Attribute- Expert)
ii) A strong theoretical understanding of chemistry and its real life applications. (Glyndŵr Graduate Attribute- Expert & Enterprising)
iii) The practical laboratory skills, procedures and safety appreciation required for employment in a modern science laboratory. (Glyndŵr Graduate Attribute- Professional)
iv) The ability to critically evaluate, analyse, discuss and present scientific data/information. (Glyndŵr Graduate Attribute- Independent thinkers)
v) A broader understanding of science in both the workplace and society. (Glyndŵr Graduate Attribute- Lifelong learners and international and future oriented perspective).
vi) The generic, transferable skills demanded by employers such as communication, numeracy, IT, information management, research and team working. (Glyndŵr Graduate Attribute- Professional)

20 Distinctive features of the programme

This programme has been designed to offer students three components:

- A solid foundation in the theory of chemistry.
- Practical skills / knowledge essential for employment in the chemical sector.
- Transferable skills valued by employers.

The chemical industry is the UK's largest manufacturing export sector and this programme has been designed to meet the requirements of the sector. The programme curriculum is underpinned by an understanding of the needs of the industry gained through close collaboration between the programme team and industrial experts. An important aspect of the programme is thus to embed within the curriculum a working knowledge of green chemistry alongside provision of a specialist module, Green and Sustainable Chemistry (SCI506). This module maps onto identified needs to develop a truly sustainable manufacturing industry. Students

will gain a critical understanding of how the Chemical Industry can operate in manner which minimises pollution and selects environmentally benign materials over those sourced from the petrochemical industry. The BSc (Hons) Chemistry programme has been specifically developed for students who have an interest in chemistry and a strong desire to explore the latest developments in the field. Students will gain in depth theoretical knowledge and practical skills in chemistry through modules such as Introduction to Chemistry (SCI414) and Laboratory Chemical Analysis (SCI416). Level 5 modules: Analytical Methods (SCI509), Instrumental Analysis (SCI512) and Laboratory Instrumental Analysis (SCI513) develop this knowledge and skill further to give students confidence in use of key instrumental techniques essential across the chemical sector. The programme has been structured so that theoretical and experiential learning modules interlink and support each other throughout. The programme has been designed with particular consideration to the widening participation agenda, which attracts and supports students from non-traditional backgrounds.

Students on the programme will have opportunities to contribute to ongoing research within the School Research Centre, including the Centre for Water Soluble Polymers and Advanced Composite Training and Development Centre. Projects in the former have included the design, synthesis and testing of environmentally friendly surfactants for use in skin and hair-care products, and exploration of new high value biopolymers from vegetable waste streams. Students may also benefit from working alongside international visiting researchers and also with industrial collaborators from local industries.

Graduates completing the BSc (Hons) Chemistry degree will be well-placed to apply for employment across the Chemicals Sector, particularly in product development and innovation roles. Equally students may elect to work within the Education sector, where there is high demand for Chemistry graduates, or undertake Postgraduate study.

Key benefits of the programme are:

(i) Highly experienced, research-active staff, all holding doctorate degrees.
(ii) Dedicated chemical and instrumental analysis labs to allow students' hands-on practical experience.
(iii) Research-led advanced modules in green and sustainable chemistry and polymer chemistry and formulations.
(iv) Work-related learning opportunities.
(v) Opportunities to become a Student Member of the Royal Society of Chemistry and engage with the RSC North Wales section events
(vi) University support available through the medium of Welsh.
(vii) Access to the state-of-the-art facilities in the Centre for Water Soluble Polymers research group and Advanced Composite Training and Development Centre.

21 Programme structure narrative

Full-time study takes 3 years as shown in the following modular framework table, whilst part-time study takes 6 years. The exit awards are listed below:

Certificate of Higher Education in Chemistry
This qualification is available for students who exit the programme after gaining 120 credits at Level 4 or above.

Diploma of Higher Education in Chemistry
This qualification is available for students who exit the programme after gaining 240 credits with a minimum of 120 credits at level 5 or above.

BSc Chemistry (Ordinary Degree)
This qualification is available for students who exit the programme after gaining 300 credits with a minimum of 60 credits at level 6.

BSc (Hons) Chemistry
This qualification is available for students who exit the programme after gaining 360 credits with a minimum of 120 credits at level 6.

The taught content is delivered on a modular basis, full time students studying three 20 credit modules in each semester. For part time students this is reduced on a pro-rata basis such that students study three 20 credit modules per academic year. This is illustrated in the following programme structure diagram.
Whilst there is no formal placement or fieldwork associated with the programme, students will be encouraged to take advantage of informal opportunities for collaboration with local industrialists and this may form the basis of the student's level 6 Research Project.

- All the learning and teaching hours, including tutorials are associated with credit.
- The part-time provision will be along with the full-time timetable.

22 Programme structure diagram

Programme structure for full time

Year One Level Four	Sem 1	**Introduction to Chemistry** SCI426 (20 Credits) Core - Dr Jixin Yang	**Academic Study Skills and Personal Development** SCI427 *(*20 Credits) Core - Dr Amiya Chaudhry	**Maths and Statistics for Science** SCI428 (20 Credits) Core - Dr Jixin Yang
	Sem 2	**Organic and Biochemistry** SCI425 *(*20 Credits) Core - Dr Amiya Chaudhry	**Laboratory Chemical Analysis** SCI429 (20 Credits) Core - Dr Amiya Chaudhry	**Inorganic and Materials Chemistry** SCI437 *(*20 Credits) Core - Dr Ian Ratcliffe

Year Two Level Five	Sem 1	**Analytical Methods** SCI523 (20 Credits) Core - Dr Jixin Yang	**Essential Physical Chemistry** SCI524 (20 Credits) Core - Dr Jixin Yang	**Research Methods: Theory and Practice** SCI525 (20 Credits) Core – Amy Rattenbury
	Sem 2	**Instrumental Analysis** SCI526 (20 Credits) Core - Dr Jixin Yang	**Laboratory Instrumental Analysis** SCI527 (20 Credits) Core - Dr Jixin Yang	**Green and Sustainable Chemistry** SCI528 (20 Credits) Core - Dr Ian Ratcliffe

Year Three Level Six	Sem 1	**Advanced Inorganic and Materials Chemistry** SCI624 (20 Credits) Core - Dr Ian Ratcliffe	**Drugs and Toxicology** SCI625 (20 Credits) Core - Dr Amiya Chaudhry	**Research Project** SCI638 (40 Credits) Core - Dr Amiya Chaudhry
	Sem 2	**Structure and Synthesis** SCI626 (20 Credits) Core - Dr Jixin Yang	**Polymer Chemistry and Formulations** SCI627 (20 Credits) Core - Dr Ian Ratcliffe	

Programme structure for part time

Year One Level Four	Sem 1	**Introduction to Chemistry** SCI426 (20 Credits) Core - Dr Jixin Yang	**Academic Study Skills and Personal Development** SCI427 *(*20 Credits) Core - Dr Amiya Chaudhry
	Sem 2	**Laboratory Chemical Analysis** SCI429 (20 Credits) Core - Dr Amiya Chaudhry	

Year Two Level Four	Sem 1	**Maths and Statistics for Science** SCI428 (20 Credits) Core - Dr Jixin Yang	
	Sem 2	**Inorganic and Materials Chemistry** SCI437 (20 Credits) Core - Dr Ian Ratcliffe	**Organic and Biochemistry** SCI425 *(*20 Credits) Core - Dr Amiya Chaudhry

Year Three Level Five	Sem 1	**Essential Physical Chemistry** SCI524 (20 Credits) Core - Dr Jixin Yang	**Research Methods: Theory and Practice** SCI525 (20 Credits) Core - Dr Amiya Chaudhry
	Sem 2	**Green and Sustainable Chemistry** SCI528 (20 Credits) Core - Dr Ian Ratcliffe	

Year Four Level Five	Sem 1	**Analytical Methods** SCI523 (20 Credits) Core - Dr Jixin Yang	
	Sem 2	**Instrumental Analysis** SCI526 (20 Credits) Core - Dr Jixin Yang	**Laboratory Instrumental Analysis** SCI527 (20 Credits) Core - Dr Jixin Yang

Year Five Level Six	Sem 1	**Advanced Inorganic and Materials Chemistry** SCI624 (20 Credits) Core - Dr Ian Ratcliffe	**Drugs and Toxicology** SCI625 (20 Credits) Core - Dr Amiya Chaudhry
	Sem 2	**Polymer Chemistry and Formulations** SCI627 (20 Credits) Core - Dr Ian Ratcliffe	

Year Six Level Six	Sem 1		**Research Project** SCI638 (40 Credits) Core - Dr Amiya Chaudhry
	Sem 2	**Structure and Synthesis** SCI626 (20 Credits) Core - Dr Jixin Yang	

23 Intended learning outcomes of the programme

Knowledge and understanding					
		Level 4	**Level 5**	**Level 6**	**Level 6 Honours Degree**
A1	*Concepts, principles and theories in chemistry*	On completion of level 4 students will be able to demonstrate knowledge of the fundamental concepts, principles and theories in chemistry including selected topics in material / solid state science.	On completion of level 5 students will be able to demonstrate knowledge of concepts of physics and physical chemistry, as well as chemical and instrumental analysis	On completion of level 6 students will be able to demonstrate a critical understanding and explanation of the concepts, principles and theories in chemistry.	On completion of level 6 students will be able to demonstrate a systematic and critical understanding and application of the central concepts, principles and theories in chemistry, as informed by leading edge research.
A2	*Laboratory chemical and instrumental analysis*	On completion of level 4 students will be able to demonstrate competence of working safely in a chemistry laboratory and conduct documented laboratory procedures and measurement of chemical properties under the guidance of a tutor	On completion of level 5 students will be able to demonstrate safe working in a chemistry laboratory and being able to conduct documented laboratory procedures and measurement of chemical properties using a variety of instruments.	On completion of level 6 students will be able to demonstrate the ability to devise and develop chemistry learning objects (e.g. laboratory exercises) for use in a school or other training environment.	On completion of level 6 students will be able to demonstrate a critical understanding of how to work safely and independently in a chemistry laboratory and able to plan laboratory procedures and measurement of chemical properties.
A3	*Mathematics, statistics and research skills*	On completion of level 4 students will be able to demonstrate basic numeracy, algebraic and statistical competence and the ability to manipulate data related to scientific problems.	On completion of level 5 students will be able to discuss the relative merits and applicability of various approaches to research design; data collection and analysis, and the concepts which underpin such approaches.	On completion of level 6 students will be able to critically apply a range of research skills and ethical protocols to collect and analyse data relating to chemistry-based studies.	On completion of level 6 students will be able to critically apply a range of research skills and ethical protocols in an independent manner to collect and analyse data relating to chemistry-based studies.

Intellectual skills					
		Level 4	**Level 5**	**Level 6**	**Level 6 Honours Degree**
B1	*Knowledge application*	On completion of level 4 students will be able to demonstrate ability to organise and appraise the knowledge and understanding of the essential scientific facts, concepts and theories relating to chemistry.	On completion of level 5 students will be able to demonstrate increasing ability to organise and appraise the knowledge and understanding of the essential scientific facts, concepts and theories relating to chemistry.	On completion of level 6 students will be able to organise efficiently and appraise the knowledge and understanding of the essential scientific facts, concepts and theories relating to chemistry.	On completion of level 6 students will be able to organise efficiently and critically appraise the knowledge and understanding of the essential scientific facts, concepts and theories relating to chemistry, and recognise the uncertainty, ambiguity and limits of knowledge.
B2	*Information assembly and evaluation*	On completion of level 4 students will be able to demonstrate the ability to assemble information from a variety of sources and discuss different viewpoints.	On completion of level 5 students will be able to demonstrate the ability to assemble and evaluate information from a variety of sources and discuss different viewpoints.	On completion of level 6 students will be able to assemble efficiently, evaluate and critically assess information from a variety of sources and discuss different viewpoints.	On completion of level 6 students will be able to assemble efficiently, evaluate and critically assess scientific and educational data/information from a variety of sources and discuss different viewpoints, demonstrating awareness of the respective merit of journal articles, review articles and patents.

Intellectual skills					
		Level 4	**Level 5**	**Level 6**	**Level 6 Honours Degree**
B3	*Database research and literature*	On completion of level 4 students will be able to demonstrate an awareness of the scientific database and the ability to perform basic academic literature search under the guidance of tutor.	On completion of level 5 students will be able to demonstrate a comprehensive awareness of the scientific databases and the ability to perform academic literature search.	On completion of level 6 students will be able to critically evaluate the usefulness of the scientific databases and perform independent literature search.	On completion of level 6 students will be able to critically evaluate the usefulness of the scientific databases and show the strong ability of literature search to locate key information.
B4	*Academic communication and presentation*	On completion of level 4 students will be able to demonstrate basic academic presentation skills (oral and written) in the subject of study.	On completion of level 5 students will be able to demonstrate essential academic communication skills (oral and written) in the subject of study.	On completion of level 6 students will be able to apply extensive academic communication skills (oral and written) in the subject of study.	On completion of level 6 students will be able to apply professional academic writing and oral presentation skills in the subject of study.
B5	*Methodology and approaches*	On completion of level 4 students will be able to demonstrate an appreciation of methodology in laboratory work.	On completion of level 5 students will be able to demonstrate a comprehensive understanding of methodology in laboratory work.	On completion of level 6 students will be able to demonstrate criticality in the development and application of learning approaches and supporting materials.	On completion of level 6 students will be able to critically understand methodology in laboratory work with the ability to formulate and plan experiments.

Subject skills					
		Level 4	**Level 5**	**Level 6**	**Level 6 Honours Degree**
C1	*Risk assessment*	On completion of level 4 will be able to demonstrate awareness of the health and safety issues of laboratory experiments. Perform proper risk assessment under guidance from the tutor.	On completion of level 5 students will be able to demonstrate a comprehensive appreciation of the health and safety issues of laboratory experiments. Perform appropriate risk assessment.	On completion of level 6 students will be able to demonstrate a safe working practice within a laboratory.	On completion of level 6 students will be able to demonstrate ability to select, develop and set up safe laboratory experiments.
C2	*Analytical skills*	On completion of level 4 will be able to demonstrate a basic understanding of the use of possible techniques and tools for the analysis of chemical substances.	On completion of level 5 students will be able to demonstrate a comprehensive understanding of the use of possible techniques and advanced instruments for the analysis of chemical substances.	On completion of level 6 students will be able to demonstrate skills in the use of technologies for research.	On completion of level 6 students will be able to demonstrate advanced skills in the use of technologies for research.
C3	*Experimental procedure*	On completion of level 4 will be able to demonstrate a basic knowledge on recording and appraising experimental observations and processing data results.	On completion of level 5 students will be able to record and appraise experimental observations in a logical, comprehensive and contemporaneous manner.	On completion of level 6 students will be able to debate, practise, reflect upon and apply effective professional skills such as communication, ICT, problem-solving, decision-making, teamwork, interpersonal relationships.	On completion of level 6 students will be able to critique and demonstrate understanding and application of research methodology, including that related to their own independent research project.

Subject skills					
		Level 4	**Level 5**	**Level 6**	**Level 6 Honours Degree**
C4	*Research*	Appreciate the importance of research work in the scientific area.	Understand and appreciate the general research methodology.	Critically appreciate the general research methodology and strategy.	Critically appreciate the general research methodology and strategy. Plan and conduct research, under supervision, to expand their knowledge base.

Professional and employability skills					
		Level 4	**Level 5**	**Level 6**	**Level 6 Honours Degree**
D1	*Communication and presentation skills*	On completion of level 4 students will be able to communicate in a clear and concise way, in writing and orally, in particular demonstrating some competence in academic writing.	On completion of level 5 students will be able to communicate in a clear, systematic and concise way, in writing and orally, in more formal academic and professional styles, and in longer pieces of scientific writing	On completion of level 6 students will be able to engage effectively in a variety of roles; debate in writing and orally; produce clear, structured reports and other extended pieces of work in a variety of contexts.	On completion of level 6 students will be able to engage effectively in independent roles; engage effectively in debate in a professional manner, in writing and orally; produce detailed critiques and coherent documents and research paper(s).
D2	*IT skills*	On completion of level 4 students will be able to apply their IT skills to enable the appropriate presentation of a wide range of information.	On completion of level 5 students will be able to demonstrate more advanced IT skills and use online databases effectively to gain information.	On completion of level 6 students will be able to conduct effective searches for information using a range of online resources.	On completion of level 6 students will be able to conduct effective searches for information using a range of online resources. Apply IT skills in the interpretation and analysis of data.
D3	*Learning skills and time management*	On completion of level 4 students will be able to demonstrate good skills in using the Internet and particularly the University's virtual learning environment. Access data and information from University and other resources.	On completion of level 5 students will be able to demonstrate the ability to learn in an increasingly effective and purposeful way, with beginning of development as an autonomous learner. Demonstrate a responsible, ethical, professional approach to work.	On completion of level 6 students will be able to adopt a broad-ranging and flexible approach to study; identifies learning needs; pursues activities designed to meet these needs in increasingly autonomous ways. Work independently, setting and achieving appropriate goals.	On completion of level 6 students will, with minimal guidance, manage own learning using a wide range of resources appropriate to profession; seek and make effective use of feedback. Effectively manage their time, and work within a framework where there are competing priorities and values.

Professional and employability skills					
		Level 4	**Level 5**	**Level 6**	**Level 6 Honours Degree**
D4	*Interactive and group skills and teamwork*	On completion of level 4 students will be able to interact with tutors and fellow students; participate in clearly defined group situations.	On completion of level 5 students will be able to demonstrate more advanced interactive and group skills including effective participation in more demanding group tasks.	On completion of level 6 students will be able to debate, practise, reflect upon and apply professional skills such as communication, ICT, problem-solving, decision making and teamwork.	On completion of level 6 students will be able to interact effectively within learning or professional groups; recognise, support or be proactive in leadership, negotiating in a professional context and manage conflict.
D5	*Problem-solving*	On completion of level 4 students will be able to apply basic theory and methods to a well-defined problem and appreciate the complexity of the issues in the subject.	On completion of level 5 students will be able to identify key areas of problems and choose appropriate tools/methods for their solution in a considered manner.	On completion of level 6 students will be confident and flexible in identifying and defining complex problems and apply appropriate knowledge and skills to their solution.	On completion of level 6 students will be able to use initiative and experience to solve complex problems encountered in undertaking research-based project work at the forefront of the field.

24 Curriculum matrix

	Module Title	*Core or option?*	***A1***	***A2***	***A3***	***B1***	***B2***	***B3***	***B4***	***B5***	***C1***	***C2***	***C3***	***C4***	***D1***	***D2***	***D3***	***D4***	***D5***
Level 4	SCI426 Introduction to Chemistry	Core	■	□	■	■	■	■	■	□	□	□	□	■	■	■	■	□	□
	SCI427 Academic Study Skills and Personal Development	Core	□	□	■	□	■	■	■	□	□	□	□	■	■	■	■	■	■
	SCI428 Maths and Statistics for Science	Core	□	□	■	□	■	□	□	□	□	□	□	□	■	■	□	□	■
	SCI429 Laboratory Chemical Analysis	Core	□	■	■	■	■	■	■	■	■	■	■	□	■	■	■	■	□
	SCI425 Organic and Biochemistry	Core	■	■	■	■	□	□	■	■	■	■	■	□	■	■	■	■	■
	SCI437 Inorganic and Materials Chemistry	Core	■	□	■	■	■	■	■	□	□	□	□	■	■	■	■	■	■

	Module Title	*Core or option?*	***A1***	***A2***	***A3***	***B1***	***B2***	***B3***	***B4***	***B5***	***C1***	***C2***	***C3***	***C4***	***D1***	***D2***	***D3***	***D4***	***D5***
Level 5	SCI523 Analytical Methods	Core	■	■	■	■	■	■	□	■	■	■	■	□	■	■	■	■	■
	SCI528 Green and Sustainable Chemistry	Core	■	■	■	■	■	■	■	■	■	□	■	□	■	□	■	□	□
	SCI525 Research Methods: Theory and Practice	Core	□	□	■	□	■	■	□	□	□	□	□	■	■	■	■	■	■
	SCI526 Instrumental Analysis	Core	■	■	■	■	■	■	■	■	■	■	■	□	■	■	□	■	■
	SCI527 Laboratory Instrumental Analysis	Core	■	■	■	□	■	■	■	■	■	■	■	□	■	□	□	■	■
	SCI524 Essential Physical Chemistry	Core	■	■	■	■	■	■	□	□	□	□	□	□	■	■	■	■	■

	Module Title	*Core or option?*	***A1***	***A2***	***A3***	***B1***	***B2***	***B3***	***B4***	***B5***	***C1***	***C2***	***C3***	***C4***	***D1***	***D2***	***D3***	***D4***	***D5***
Level 6	SCI625 Drugs and Toxicology	Core	■	□	■	■	■	■	■	□	□	■	□	□	■	■	□	■	■
	SCI626 Structure and Synthesis	Core	■	□	■	■	□	■	■	□	□	□	□	□	□	■	■	□	□
	SCI627 Polymer Chemistry and Formulations	Core	■	□	□	■	□	■	■	□	□	□	□	□	□	■	■	□	□
	SCI624 Advanced Inorganic and Materials Chemistry	Core	■	■	■	□	■	□	■	■	□	□	■	■	■	■	□	■	■
	SCI638 Research Project	Core	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

25 Learning and teaching strategy

The programme will be delivered using a range of learning and teaching approaches, placing the learner at the centre and promoting equality, diversity and respect for the individual.

Lectures will be used to provide students with an introduction to each topic, covering the fundamental factual and theoretical material. This delivery method ensures all students gain a common, firm basis on which to build. During the course of lectures students will also develop key transferable skills such as active listening and note taking.

Seminars and workshops will be used to support lecture material, providing opportunities for more student-centred, interactive learning and the development of problem solving skills. Seminars and workshops deepen students' knowledge and understanding of a particular subject, and their ability to sort and critically evaluate information. Students will also have the opportunity to develop presentation, communication and team-working skills.

In **laboratory classes,** students will gain hands-on experience of the various experimental techniques used in chemical and instrumental analysis. Laboratory classes will enable students to develop their practical skills in a simulated work environment. Practical and problem solving skills will be strongly developed, as will students' written communication skills. The Department has a wide range of specialised subject-appropriate instrumentation.

Small group tutorials will provide students with the opportunity to explore themes and ideas in an in-depth, self-directed, but staff guided fashion. Tutorials play a pivotal part in the personal development of students, building confidence and developing communication skills.

Independent study is a key element in any degree programme promoting self-discipline and reflective learning at a pace set by the learner, which is essential to their employability skills. Initial staff-directed self-study will, as the student progresses, give way to student-directed self-study, enabling learners to expand their knowledge and explore the subject matter to the full limit of their abilities. It also facilitates the development of students' peer and self-assessment skills.

IT supported learning. Virtual learning environment (VLE) will be extensively used to support the teaching and learning of all the modules in this programme, with the emphasis of student's independent study. Through Moodle VLE, students will be able to access all the course materials (including lecture notes, PowerPoint slides, e-books, e-journals and software etc.), try exercises and quizzes, use the virtual learning chemistry software LabSkills and participate in online forums and discussion boards. The reading of e-journals, available from Science Direct, enhances knowledge and helps students evaluate information critically.

Students will be introduced to the available learning resources during Induction. Chiefly these will comprise the Programme handbook and individual Module Handbooks, both of which will be available electronically and will be updated annually. These will include assessment guidelines and grading criteria (including penalties for late submission and plagiarism), advice about writing assessments and scholarly requirements for the presentation of work. Module Handbooks will incorporate assignment briefs.

26 Work based/placement learning statement

All students enrolled on the programme at and beyond level 5 will complete the module SCI513, Laboratory Chemical Analysis. This comprises a body of practical exercises employing analytical equipment routinely found in commercial analysis labs, viz: FT-IR spectroscopy, UV-vis spectroscopy, Fluorescence Spectrophotometry, Atomic Absorption Spectroscopy, Gas Chromatography, High Performance Liquid Chromatography, and Scanning Electron Microscopy. The exercises are framed in a commercial context, i.e. based upon scenarios likely to be encountered in the sector by a chemistry graduate. *e.g.* to determine the amount of given analytes in a range of analgesic tablets. The assessment method chosen, i.e. a portfolio of laboratory reports again matches a typical style that would be required in the workplace.

Research-based modules: SCI522 Research Methods: Theory and Practice and SCI618 Research Project may also be undertaken in conjunction with local employers, working chiefly in Wrexham Glyndŵr University laboratories, but on projects provided by local employers.

27 Welsh medium provision

The programmes will be delivered through the medium of English. Students are entitled to submit assessments in the medium of Welsh.

28 Assessment strategy

The assessment strategy for this programme has been informed by (i) the UK Quality Code for Higher Education - Chapter B6: “Assessment of students and the recognition of prior learning” (QAA, 2013).

Assessment has three primary aims:

(i) To provide a framework for the assessment of students’ competence, knowledge and understanding and a method for evaluating a student’s abilities for the purposes of progression and certification.

(ii) To provide a vehicle for the promotion of student learning, during the stages of both preparing for the assessment and reading feedbacks from the tutors afterward.

(iii) To provide information to teaching staff and external examiners on the quality of the provision and to ensure equity of standards across the HE sector.

The most appropriate methods of assessment vary between modules. The methods of assessment used will reflect the content and learning objectives of each module, ensuring that students get different opportunities to showcase their ability, knowledge, understanding and transferable skills. Students will be made fully aware of the methods of assessment and the weighting of individual components to be used in each module from the outset, as well as the marking criteria *etc*.

The following methods of assessment will be used:

i. Unseen written examination / in-class test
ii. Coursework
iii. Portfolio
iv. Practical Examination
v. Written Report
vi. Poster Presentation
vii. Case Study
viii. Oral Assessment
ix. Oral Presentation
x. Dissertation

Unseen written examinations / in-class test
Unseen written examinations test a student's knowledge and understanding of the subject matter, along with their ability to develop lines of argument, solve problems and work independently. Assessment by unseen written examinations is expected by professional bodies, such as the Royal Society of Chemistry, and will be used as part of the assessment process in modules with a substantial lecture component.

Coursework
Coursework comprises a number of different assessments and facilitates regular formal feedback and grading to students on an ongoing basis.

Portfolio
Typically, a portfolio will contain a number of pieces of work, usually connected by a topic or theme. A practice-based portfolio requires signing-off by a mentor or supervisor.

Practical Examination
Employers demand science graduates with a high degree of practical skill. Practical examinations enable these skills to be assessed. In addition to testing a student's ability to perform specific tasks, practical examinations also assess a student's ability to evaluate a problem and form a plan of action, collect and process data/information, manage their time effectively and learn independently.

Written reports/assignments
Report writing is another key skill for scientists. Data must be correctly noted and presented in a logical, coherent fashion, understandable to both fellow scientists and lay persons. Written assignments enable a student to develop a fuller understanding and explore ideas in more depth. Written reports and assignments test a student's critical thinking, information collection, management and communication skills. Group assignments also develop team working and interpersonal skills.

Poster Presentations
Scientific information is often disseminated in the form of a poster presentation. It is therefore important that students are able to compile information and present it in a cogent fashion *via* this medium. A student's critical thinking and judgement, time management, information management and communication skills are also challenged by this form of assessment.

Case Study
Case studies expose students to dealing with 'real world' examples and typically require the application of knowledge and skills acquired through more formal learning

experiences such as lectures. The skills needed to succeed in case study assessments map well onto those needed in employment.

Oral Assessment

The *viva voce* examination allows assessment of not only the extent to which students understand concepts and ideas but also their ability to articulate them in discussion. The ability to confidently report findings verbally to colleagues or line managers is essential in many professional roles a chemist may encounter in their career.

Oral presentations

Oral presentations promote self-confidence, and develop verbal and visual communication skills. Other skills developed/assessed include time management, critical thinking, planning, research, and, of group projects, team working and interpersonal skills.

Dissertation

Dissertation on the final year research project is a substantial piece of academic writing. The students are expected to perform a thorough literature review in the chosen field, raise sensible research questions and compose a logically structured written work to present and critically review the discovery in the project with comparison and contrast to previous publications.

All assessments are peer reviewed for consistency of standard and layout before issuing to students. All module assessments for level 5 and 6 will be approved by the programme leader, academic head and sent to the external examiner in line with university regulations, to ensure that each assessment is explicit in its intent, and that it is valid and reliable. Samples of student assessments for each module are double marked by a tutor in the same subject area in order to ensure the correct standard of marking. Samples of marked assessments are then sent to the External Examiner for further scrutiny. All stages of peer review and double marking are recorded on a proforma for each module.

Students will receive formative assessment, particularly during the practical and self-study elements of the programme to ensure they can keep track of their progress and development. This will also be a key factor in ensuring student engagement and retention on the programme of study. In the case of practical assessment, there may be a final summative assessment, so more frequent formative assessment provides academic rigour and increases student awareness and confidence in the subject.

Module leaders will collate work and are responsible for presenting this at assessment boards, to enable ratification of results. External examiners will attend assessment boards and contribute to the process, to ensure external validity of assessment. Students will be informed of provisional results prior to an assessment board, and in writing following ratification of the results, with re-submission dates if needed.

Module code & title	Assessment type and weighting	Assessment loading	Indicative submission date
SCI426 Introduction to Chemistry	25% Online test 50% In class test 25% Research essay	30 min 2 hours 1,000 words	Week 12, Sem 1 Week 13, Sem 1 Week 10, Sem 1
SCI428 Maths and Statistics in Science	50% Coursework 50% In class test	1,500 words 2 hours	Week 13, Sem 1 Week 13, Sem 1
SCI427 Academic Study Skills and Personal Development	100% Portfolio	3,000 words	Week 12, Sem 1
SCI429 Laboratory Chemical Analysis	100% Portfolio	4000 words	Week 13, Sem 2 Week 13, Sem 2
SCI425 Organic and Bio-chemistry	60% In Class test 40% Coursework	2 hours 1,600 words	Week 12, Sem 2 Week 13, Sem 2
SCI437 Inorganic and Materials Chemistry	50% Examination 50% Poster Presentation	2 hours 1500 words	Week 13, Sem 2 Week 11, Sem 2
SCI523 Analytical Methods	50% Coursework 50% Examination	1500 words 2 hours	Week 10, Sem 1 Week 14, Sem 1
SCI525 Research Methods: Theory and Practice	100% Portfolio	4000 words	Week 14, Sem 1
SCI528 Green and Sustainable Chemistry	40% In class test 60% Portfolio	1 hour 3000 words	Week 11, Sem 1 Week 14, Sem 1
SCI526 Instrumental Analysis	50% In class test 50% Examination	2 hours 2 hours	Week 12, Sem 2 Week 14, Sem 2
SCI527 Laboratory Instrumental Analysis	100% Laboratory Portfolio	3,500 words	Week 13, Sem 2
SCI524 Essential Physical Chemistry	50% Coursework 50% Examination	1500 words 2 hours	Week 9, Sem 1 Week 14, Sem 1
SCI625 Drugs and toxicology	50% Presentation 50% Examination	20 minutes 2 hours	Week 11, Sem 1 Week 15, Sem 1
SCI627 Polymer Chemistry and Formulations	50% Exam 50% Report	2 hours 2,000 words	Week 6, Sem 2 Week 12, Sem 2
SCI626 Structure and Synthesis	40% Report 60% Examination	1500 words 2 hours	Week 12, Sem 2 Week 14, Sem 2
SCI624 Advanced Inorganic and Materials Chemistry	50% Coursework 50% Report	2,000 words 20 minutes	Week 8, Sem 1 Week 13, Sem 2
SCI638 Research Project	20% Oral assessment 80% Dissertation	15 minutes 7,000-9,000 words	Week 13, Sem 2 Week 14, Sem 2

29 Assessment regulations

Glyndŵr University regulations for Bachelor Degrees, Diplomas, Certificates and Foundation Degrees will apply to this programme.

Derogations

None

Non-credit bearing assessment

None

Borderline classifications (for undergraduate programmes only)

Requirement for raising classification in borderline cases:

- At least 50% of the credits at level 6 fall within the higher classification.
- All level 6 modules must have been passed at the first attempt.
- The mark for the 40 credit SCI618 Research Project module at level 6 must fall within the higher classification.

30 Programme Management

Programme leader

Dr Amiya Chaudhry (Senior Lecturer in science)

Module Leaders

Dr Amiya Chaudhry (Senior Lecturer in science)
Dr Jixin Yang (Senior Lecturer in chemistry)
Dr Ian Ratcliffe (Senior Lecturer in science)
Amy Rattenbury (Senior Lecturer, Department of Chemistry)

Technician support

Dr Chandra Senan (Senior research officer)

Several other academic members from the School of Applied Science, Computing and Engineering contribute the teaching of some modules in this programme.

Link to Staff Profiles

https://www.glyndwr.ac.uk/en/StaffProfiles/AmiyaChaudhry/
https://www.glyndwr.ac.uk/en/StaffProfiles/JixinYang/
https://www.glyndwr.ac.uk/en/StaffProfiles/IanRatcliffe/
https://www.glyndwr.ac.uk/en/StaffProfiles/AmyRattenbury/
https://www.glyndwr.ac.uk/en/StaffProfiles/ChandraSenan/

31 Quality Management

Programme board meetings are held three times a year. The board consists of the programme team noted above. In addition to the matters raised by the programme team, the meetings consider the minutes from Student Voice Forum (SVF) meetings which are held two times a year, and are attended by student representatives from each level of the programme. Minutes of the SVF meetings and team responses to the outcomes raised are published on Moodle available to all students.

Minutes from the programme boards then go forward to the relevant academic subject board, which the programme team also attend.

The formal mechanisms used to evaluate student perception of quality include the Student Evaluation of Module (SEM) form on each module, the feedback from the SVF meetings noted above, and the NSS completed by final year students. Information from each of these is considered firstly at the programme board, and can if necessary also go to the academic subject board. Student engagement with the SEM will be encouraged through timetabling specific slots for completion at appropriate time intervals throughout the programme.

Quality is also monitored by the programme leader's annual monitoring report (AMR) and by the report of the external examiner. Issues arising from the examiner's report and from the above evaluations of student perception are responded with actions in the AMR. This is considered by the programme team and the head of school at an annual meeting, and the report and minutes of the meeting are forwarded to the academic quality assurance unit of the university.

32 Research and scholarship activity

All members of the programme team are actively involved in frontline research and scholarly activities that have informed and underpinned both the module content and the structure of the proposed programme.
Students will benefit from the expert knowledge of tutors to expand the scope of their learning, and for example, the quality of their final year research project.
Collaborative research with academics from other universities, both national and international, facilitates student access to visiting subject specialists. Typically, this is by means of guest lectures either as part of the formal teaching provision or else as part of the Public Lecture programme run in association with the Royal Society of Chemistry North Wales Section.

33 Learning support

Institutional level support for students

The University has a range of departments that offer the support for students as:

- Library & IT Resources
- The Assessment Centre
- DisAbility Support Team
- Irlen Centre

- Careers Centre and Job Shop
- Zone Enterprise hub
- Chaplaincy
- Counselling & Wellbeing
- Student Funding and Welfare
- International Welfare
- Student Programmes Centre
- Glyndŵr Students' Union

School support for students

Many students find adjusting to higher education difficult and/or stressful. Support will be available to students from a variety of sources, both at programme level and at the institutional/university level.

All students will be allocated a personal tutor at the beginning of the programme to whom they can turn to for help and support in academic contexts. The personal tutor or programme leader is typically the first person to be approached by a student experiencing difficulties. If the problem cannot be resolved by the team, they may then be referred to the Head of Academic School or to Student Services, as necessary. Staff members also operate an "open door" policy to promptly resolve students' queries and difficulties.

Students' attendance will be monitored at all classes using electronic registers, which enables the tutors to quickly identify any students with a poor engagement record in that module. Additionally, registers from different modules will be cross-referenced to ascertain if students are missing from Individual modules or from the programme as a whole, which is monitored by the administrators from the School for Undergraduate Studies Office. Students whose attendance gives cause for concern will be contacted by the Programme Leader in order to discuss the situation.

Students' academic progress will be monitored constantly throughout each module, through in-class quizzes and assessments. Students struggling academically are thus quickly highlighted, enabling appropriate remedial support to be offered.

An induction week will take place prior to the commencement of the programme where the team will set out to ensure that the students are informed and understand the programme requirements, the processes in place, such as student handbooks and personal tutor roles. In addition, a health and safety training workshop will be included in induction week to ensure that all students are confident in working safely in the laboratory-based elements of the programme.

Programme specific support for students

Student' learning activities will be strongly supported by the use of Moodle. The electronic resources are an important part of the programme. A number of electronic books and journals can be accessed by students as well as the lecture material which is available on Moodle. The multiple functions of Moodle, such as news, forum, texting, Turnitin *etc*. are fully utilised to assist the programme delivery. We have also chemistry virtual learning software embedded in Moodle for students to use. Regular drop-in sessions for the support on maths and chemistry are also offered to students.

34 Equality and Diversity

Glyndŵr University is committed to providing access to all students and promotes equal opportunities in compliance with the Equality Act 2010 legislation. This programme complies fully with the University's Equal Opportunities Policy (http://www.glyndwr.ac.uk/en/AboutGlyndwrUniversity/Governance/TheFile,64499,en.pdf), ensuring that everyone who has the potential to achieve in higher education is given the chance to do so.