Swansea University
Prifysgol Abertawe

FACULTY OF SCIENCE AND ENGINEERING

UNDERGRADUATE STUDENT HANDBOOK

YEAR 4/M (FHEQ LEVEL 7)

CHEMISTRY

DEGREE PROGRAMMES

SUBJECT SPECIFIC

PART TWO OF TWO
MODULE AND COURSE STRUCTURE
2022-23

DISCLAIMER

The Faculty of Science and Engineering has made all reasonable efforts to ensure that the information contained within this publication is accurate and up-to-date when published but can accept no responsibility for any errors or omissions.

The Faculty of Science and Engineering reserves the right to revise, alter or discontinue degree programmes or modules and to amend regulations and procedures at any time, but every effort will be made to notify interested parties.

It should be noted that not every module listed in this handbook may be available every year, and changes may be made to the details of the modules. You are advised to contact the Faculty of Science and Engineering directly if you require further information.

The 22-23 academic year begins on 26 September 2022

Full term dates can be found here

DATES OF 22-23 TERMS

26 September 2022 – 16 December 2022

9 January 2023 – 31 March 2023

24 April 2023 – 09 June 2023

SEMESTER 1

26 September 2022 – 27 January 2023

SEMESTER 2

30 January 2023 – 09 June 2023

SUMMER

12 June 2023 – 22 September 2023

IMPORTANT

Swansea University and the Faculty of Science of Engineering takes any form of **academic misconduct** very seriously. In order to maintain academic integrity and ensure that the quality of an Award from Swansea University is not diminished, it is important to ensure that all students are judged on their ability. No student should have an unfair advantage over another as a result of academic misconduct - whether this is in the form of **Plagiarism**, **Collusion** or **Commissioning**.

It is important that you are aware of the **guidelines** governing Academic Misconduct within the University/Faculty of Science and Engineering and the possible implications. The Faculty of Science and Engineering will not take intent into consideration and in relation to an allegation of academic misconduct - there can be no defence that the offence was committed unintentionally or accidentally.

Please ensure that you read the University webpages covering the topic – procedural guidance here and further information here. You should also read the Faculty Part One handbook fully, in particular the pages that concern Academic Misconduct/Academic Integrity. You should also refer to the Faculty of Science and Engineering proof-reading policy and this can be found on the Community HUB on Canvas, under Course Documents.

Welcome to the Faculty of Science and Engineering!

Whether you are a new or a returning student, we could not be happier to be on this journey with you.

This has been a challenging period for everyone. The COVID-19 pandemic has prompted a huge change in society as well as how we deliver our programmes at Swansea University and the way in which you study, research, learn and collaborate. We have been working hard to make sure you will have or continue to having an excellent experience with us.

We have further developed some exciting new approaches that I know you will enjoy, both on campus and online, and we cannot wait to share these with you.

At Swansea University and in the Faculty of Science & Engineering, we believe in working in partnership with students. We work hard to break down barriers and value the contribution of everyone. Our goal is an inclusive community where everyone is respected, and everyone's contributions are valued. Always feel free to talk to academic staff, administrators, and your fellow students - I'm sure you will find many friendly helping hands ready to assist you.

We all know this period of change will continue and we will need to adapt and innovate to continue to be supportive and successful. At Swansea we are committed to making sure our students are fully involved in and informed about our response to challenges.

In the meantime, learn, create, collaborate, and most of all – enjoy yourself!

Professor Johann (Hans) Sienz
Interim Pro-Vice Chancellor/Interim Executive Dean
Faculty of Science and Engineering

Faculty of Science and Engineering	
Interim Pro-Vice Chancellor/Interim Executive Dean	Professor Johann Sienz
Head of Operations	Mrs Ruth Bunting
Associate Dean – Student Learning and Experience (SLE)	Professor Paul Holland
School of Engineering and Applied Sciences **Head of School: Professor Serena Margadonna**	
School Education Lead	Professor Simon Bott
Head of Chemistry	Professor Owen Guy
Chemistry Programme Director	Dr Joel Loveridge
Year Coordinators	Year 0: Professor Simon Bott Year 1: Dr Marcella Bassetto Year 2: Dr Francisco Martin-Martinez Year 3: Dr Mariolino Carta Year 4: Dr Joel Loveridge

STUDENT SUPPORT

The Faculty of Science and Engineering has two **Reception** areas - Engineering Central (Bay Campus) and Wallace 223c (Singleton Park Campus).

Standard Reception opening hours are Monday-Friday 9am-5pm.

The **Student Support Team** provides dedicated and professional support to all studentsin the Faculty of Science and Engineering. Should you require assistance, have any questions, be unsure what to do or are experiencing difficulties with your studies or in your personal life, our team can offer direct help and advice, plus signpost you to further sources of support within the University. There are lots of ways to get information and contact the team:

Email: studentsupport-scienceengineering@swansea.ac.uk (Monday–Friday, 9am–5pm)

Call: +44 (0) 1792 295514 and 01792 6062522 (Monday-Friday, 10am–12pm, 2–4pm).

Zoom: By appointment. Students can email, and if appropriate we will share a link to our Zoom calendar for students to select a date/time to meet.

The current student **webpages** also contain useful information and links to otherresources:

https://myuni.swansea.ac.uk/fse/coe-student-info/

READING LISTS

Reading lists for each module are available on the course Canvas page and are also accessible via http://ifindreading.swan.ac.uk/. We've removed reading lists from the 22-23 handbooks to ensure that you have access to the most up-to-date versions. Access to print material in the library may be limited due to CV-19; your reading lists will link to on-line material whenever possible. We do not expect you to purchase textbooks, unless it is a specified key text for the course.

THE DIFFERENCE BETWEEN COMPULSORY AND CORE MODULES

Compulsory modules must be **pursued** by a student.

Core modules must not only be **pursued**, but also **passed** before a student can proceed to the next level of study or qualify for an award. Failures in core modules must be redeemed.

Further information can be found under "Modular Terminology" on the following link - https://myuni.swansea.ac.uk/academic-life/academic-regulations/taught-guidance/essential-info-taught-students/your-programme-explained/

Year 4 (FHEQ Level 7) 2022/23
Chemistry
MCHEM Chemistry[F123]

Coordinator: Dr EJ Loveridge

Semester 1 Modules	Semester 2 Modules
CH-412 **Advanced Integrated Topics in Chemistry Part 1** **20 Credits** **Prof SG Bott/Prof GN Alexandrowicz/Dr E Andreoli/Dr MR Gill/...**	**CH-413** **Advanced Integrated Topics in Chemistry Part 2** **20 Credits** **Prof SG Bott/Prof AR Barron/Prof MJ Carnie/Prof OJ Guy/...**
CH-414 **Scientific innovation and entrepreneurship** **20 Credits** **Dr FJ Martin-Martinez/Dr I Mabbett/Dr JW Ryan**	
CH-409 **MChem Research Project** **60 Credits** **Dr EJ Loveridge/Dr M Bassetto/Dr MF Kuehnel**	
Total 120 Credits	

CH-409 MChem Research Project

Credits: 60 Session: 2022/23 September-June

Pre-requisite Modules:

Co-requisite Modules:

Lecturer(s): Dr EJ Loveridge, Dr M Bassetto, Dr MF Kuehnel

Format: 40 hours meeting with supervisor,
200 hours project work,
360 hours independent study and dissertation writing

Delivery Method: This will consist of a briefing, followed by independent work embedded in a research group, guided by regular meetings with an academic supervisor.

Module Aims: MChem projects are the defining feature of the integrated masters with a chance to contribute research work of potentially publishable standard to an active research group within the University.
In Swansea these projects can be embedded in active research groups across the Faculty of Science and Engineering or the Faculty of Medicine, Health and Life Science, allowing you to build a network and experience in your chosen specialism within the chemical sciences.
These projects are an excellent way of managing the transition on to your next destination after undergraduate study, whether that is a postgraduate research studentship or into employment.
The skills developed in the MChem projects demonstrate the ability to successfully deliver all aspects of a 60 credit research project and on exit you will have demonstrated the academic equivalence and begun developing the other skills required for entry into professional development schemes leading to chartership.
This selection suggests an interest in a project embedded within a research group in science, focusing on straight chemistry, or interacting and collaborating with another department such as bioscience, geography, physics, maths or computer science.

Module Content: Independent research project.

These are open ended activities requiring students to manage their own learning.

Students will be embedded in a research group and must use their previous learning to inform their research. Their project work will be guided by an academic supervisor and they will meet regularly.

Intended Learning Outcomes: At the end of this module students will be able to:

Demonstrate and explain fundamental Physico-Chemical principles as they apply to Chemistry.

Demonstrate and explain the application of Instrumental and Analytical Chemistry across core Chemistry themes/areas.

Demonstrate a level of understanding in the field of one or more of the Chemistry specialisms at Swansea sufficient to contribute to research in the field.

Successfully complete a research project in the field of one or more of the Chemistry specialisms at Swansea, potentially generating publishable results.

Apply their knowledge of both general Chemistry and Chemistry specialisms to analyse and solve specific applied problems in the field.

Apply their knowledge of both general Chemistry and Chemistry specialisms, along with their practical skills and project management knowledge, to the completion of a substantial research project

Analyse and identify their own intellectual and practical skill gaps, and address them via independent learning.

Demonstrate the essential Chemistry-related practical skills as described in the QAA Chemistry Benchmark Statement.

Execute laboratory-based experiments and apply a range of synthetic and measurement techniques.

Apply specific and general safety practices to laboratory-based and other practical work.

Demonstrate the practical skills to practice in Chemistry commensurate with the requirements for chartered status (CChem and/or CSci)

Assessment:
Presentation (10%)
Report (60%)
Viva (10%)
Participation Exercise (20%)

Assessment Description: Dissertation of up to 15,000 words
Presentation (10 minutes) plus questions
Viva
Supervisor mark based on student engagement and contribution

Moderation approach to main assessment: Universal double-blind marking

Assessment Feedback: Individual written feedback on each component, plus verbal feedback on the presentation and viva.

Failure Redemption: Resubmit dissertation

Additional Notes: Module code reserved by i.mabbett on 31/05/2016 15:52:41

CH-412 Advanced Integrated Topics in Chemistry Part 1

Credits: 20 Session: 2022/23 September-January

Pre-requisite Modules:

Co-requisite Modules:

Lecturer(s): Prof SG Bott, Prof GN Alexandrowicz, Dr E Andreoli, Dr MR Gill, Prof OJ Guy, Dr EJ Loveridge

Format: 56 hours lectures,
144 hours independent study and preparation for assessment

Delivery Method: Flipped classes, lectures, seminars, workshops, peer support, laboratory experiments and online content.

Module Aims: This module gives students the opportunity to explore options within Chemistry, giving opportunity to apply prior learning to advanced research topics and allowing students to pursue more specialised topics related to their research interests and aligned with the research areas represented within the Department. Study areas available will include advanced spectroscopic techniques, the application of instrumentation in chemistry, as well as more advanced synthetic pathways and a return to more integrated study of the traditional branches of organic/inorganic/physical chemistry. Classes will be supported with workshops which will help students gain a thorough understanding of the integrated nature of Chemistry at an advanced level.

Where possible, topics will be taught using relevant examples from primary literature, encouraging students to evaluate and appraise a range of primary literature sources and locate appropriate new sources.

The module is designed to be flexible to allow the content to vary with the research areas represented within the Department.

Module Content: Students will have the choice within following broad study areas (list is representative):

- Organo-main group chemistry
- Physical organic chemistry
- Synthetic organic chemistry
- Organic polymer chemistry
- Further computational chemistry
- Instrumentation in Chemistry
- Advanced optical spectroscopy
- Medical imaging
- Inorganic nanomedicine
- Multinuclear NMR
- Materials Chemistry
- The f-Block

Students will be examined on FOUR of the study areas but should plan to attend lectures on all topics.

All options will be subject to minimum interest levels in order to run. Students will have the opportunity to specify preferences from a master list in Semester One to determine what topics are taught.

As the module is designed to include topic areas aligned with the research areas of the Department, the broad study areas may vary over time. The list of topic areas for the academic year will be finalised at the start of that academic year prior to student selection.

No books or formal reading list will be assigned as the reading will be extensive, from the primary literature, and very topical.

Intended Learning Outcomes: By the end of this modules, students will be able to

Explain advanced concepts in chemistry based on prior learning
Analyse research findings in research articles and evaluate these in light of other sources.
Identify appropriate sources for research articles and summarise these as part of a critical appraisal of material.
Formulate arguments to explain chemical phenomena in a range of contexts

Assessment: Viva (25%)
Examination (50%)
Assignment 1 (25%)

Assessment Description: Students will select the topics on which they will be assessed before the start of the term. Different topics will have different types of assessment (may be more than one) One topic will be assessed by some form of assignment during the term (literature evaluation, research, proposal etc) One topic will be assessed using an oral exam at the end of term Two topics will be assessed in a standard exam - one hour associated with each topic.
Moderation approach to main assessment: Second marking as sampling or moderation
Assessment Feedback: Students will receive regular targeted feedback on their work through verbal, written and online media. Students will also be trained in self-reflection and peer support to enhance the student-generated feedback. Students will also be supported in making best use of feedback available.
Failure Redemption: A suitable supplementary attempt will be permitted on relevant assessment in line with University policy.
Additional Notes: Available to visiting and exchange students.

CH-413 Advanced Integrated Topics in Chemistry Part 2

Credits: 20 Session: 2022/23 January-June

Pre-requisite Modules:

Co-requisite Modules:

Lecturer(s): Prof SG Bott, Prof AR Barron, Prof MJ Carnie, Prof OJ Guy, Dr C Klinke, Dr EJ Loveridge, Prof J Mareque-Rivas, Dr D Roy, Miss E Winrow

Format: 56 hours lectures,
144 hours independent study and preparation for assessment

Delivery Method: Flipped classes, lectures, seminars, workshops, peer support, laboratory experiments and online content.

Module Aims: This module gives students the opportunity to explore options within Chemistry, giving opportunity to apply prior learning to advanced research topics and allowing students to pursue more specialised topics related to their research interests and aligned with the research areas represented within the Department. Study areas available will include advanced spectroscopic techniques, the application of instrumentation in chemistry, as well as more advanced synthetic pathways and a return to more integrated study of the traditional branches of organic/inorganic/physical chemistry. Classes will be supported with workshops which will help students gain a thorough understanding of the integrated nature of Chemistry at an advanced level.

Where possible, topics will be taught using relevant examples from primary literature, encouraging students to evaluate and appraise a range of primary literature sources and locate appropriate new sources.

The module is designed to be flexible to allow the content to vary with the research areas represented within the Department.

Module Content: Students will have the choice within following broad study areas (list is representative):

- Organo-main group chemistry
- Physical organic chemistry
- Synthetic organic chemistry
- Organic polymer chemistry
- Further computational chemistry
- Instrumentation in Chemistry
- Advanced optical spectroscopy
- Medical imaging
- Inorganic nanomedicine
- Multinuclear NMR
- Materials Chemistry
- The f-Block

Students will be examined on FOUR of the study areas but should plan to attend lectures on all topics.

All options will be subject to minimum interest levels in order to run. Students will have the opportunity to specify preferences from a master list in Semester One to determine what topics are taught.

As the module is designed to include topic areas aligned with the research areas of the Department, the broad study areas may vary over time. The list of topic areas for the academic year will be finalised at the start of that academic year prior to student selection.

No books or formal reading list will be assigned as the reading will be extensive, from the primary literature, and very topical.

Intended Learning Outcomes: By the end of this modules, students will be able to

Explain advanced concepts in chemistry based on prior learning
Analyse research findings in research articles and evaluate these in light of other sources.
Identify appropriate sources for research articles and summarise these as part of a critical appraisal of material.
Formulate arguments to explain chemical phenomena in a range of contexts

Assessment: Viva (25%)
Examination (50%)
Assignment 1 (25%)

Assessment Description: Students will select the topics on which they will be assessed before the start of the term. Different topics will have different types of assessment (may be more than one) One topic will be assessed by some form of assignment during the term (literature evaluation, research, proposal etc) One topic will be assessed using an oral exam at the end of term Two topics will be assessed in a standard exam - one hour associated with each topic.
Moderation approach to main assessment: Second marking as sampling or moderation
Assessment Feedback: Students will receive regular targeted feedback on their work through verbal, written and online media. Students will also be trained in self-reflection and peer support to enhance the student-generated feedback. Students will also be supported in making best use of feedback available.
Failure Redemption: A suitable supplementary attempt will be permitted on relevant assessment in line with University policy.
Additional Notes: Available to visiting and exchange students.

CH-414 Scientific innovation and entrepreneurship

Credits: 20 Session: 2022/23 September-January

Pre-requisite Modules:

Co-requisite Modules:

Lecturer(s): Dr FJ Martin-Martinez, Dr I Mabbett, Dr JW Ryan

Format: 20 hours seminars/workshops
3 hours mentor meetings
100 hours independent study
77 hours preparation for assessment

Delivery Method: Onsite and online seminars, workshops and meetings

Module Aims: This is a seminar-based module that provides an introduction to the world of research, innovation and entrepreneurship, where students apply their chemical knowledge to tackle important scientific, societal and industrial challenges. Seminars and workshops will be provided partly by departmental staff and partly by invited external speakers including academics, industry professionals, grant-writing advisors, technology transfer officers, patent lawyers, venture capitalists, accomplished entrepreneurs and start-up CEOs and CTOs. The seminars will cover a broad range of complementary topics that are required to fund, manage and grow an academic or entrepreneurial project.

Speakers will share their career path, failures, successes and how they and others have used their skills and ingenuity to have an impact on worldwide and local problems that society is facing. Some speakers could also provide a challenge or a case study for the students to work on and share with classmates. From these seminars, students will build up a strong portfolio of knowledge and transferable skills that they will then use it to write a impact analysis and business model canvas on a topic of their choosing, guided by mentor meetings to (1) discuss the broad topics before the specific problem is picked, (2) discuss the chosen problem before the exercises are done, and (3) discuss students' progress on the work. At the end of the module, they will pitch their project to a panel, where they will be questioned on their science, originality, business plan, budget, and impact.

Module Content: Research design and innovation;
entrepreneurship;
grant/proposal writing;
technology transfer;
intellectual property;
patent law;
venture capital;
start-up incubation and acceleration;
industry and academia case studies, e.g., energy harvesting and storage, semiconductors, biomedicine, nanotechnology, biobased chemicals, functional materials, precision agriculture, infrastructure.

Intended Learning Outcomes: By the end of this modules, students will be able to

• Apply chemistry knowledge to tackle real world problems

• Develop and write a professional grant or business proposal

• Demonstrate entrepreneurial and/or research design skills

• Demonstrate an ability to solve problems in an original manner

• Demonstrate an ability to defend an idea against an interview panel

• Apply personal and professional management skills

Assessment: Assignment 1 (25%)
Assignment 2 (20%)
Presentation 2 (30%)
Participation Exercise (25%)

Assessment Description: The impact analysis component of CH-414 will be assessed through a short (approx. 2-3 page) document outlining, from the students' perspective, the potential impacts that could be achieved through their work. Within their work, particularly our research, they should consider what impact they can derive from their activities. Impact can be defined as an effect on, change or benefit to the economy, society, culture, public policy or services, health, the environment or quality of life, beyond academia.

The impact analysis is a report in which the students should ideally consider their research projects, or potentially some other activities from which they can describe how impact can be derived, and outline what scale of impact could be delivered and what the pathway(s) to achieving that impact could be.

They are free to decide on the format, but it will be important to convey the message of the bigger picture and what your contributions are. They are not expected to give a detailed plan of how they, personally, will take your work through all the stages to the delivery of impact. However, they should identify the potential of the work to contribute to a wider field and set out how they would position it to do so.

An elevator pitch is a brief, persuasive speech that you use to spark interest in an organization, project, idea, or product – or even in yourself. A good elevator pitch should last 4 to 5 minutes. It is expected to include: Significance: Explain in vivid words what this is all about, why it is important and why everybody should pay attention now. Problem: Show what is in our way right now. What do we not yet know, what is not yet working? Solution: How your research solves the problem? What role you play in finding a solution? Benefit: How the results of your study will benefit the public? What is the impact? How it already helped the world? Or how is it going to help it?

The business model canvas addresses, as much as possible, the different questions in the canvas, and it completes the nine sections. It needs to be tailored to the students' business cases.

Moderation approach to main assessment: Second marking as sampling or moderation

Assessment Feedback: Students will receive feedback on all assessed work through verbal, written and online media. Written feedback will be provided for all aspects, while verbal feedback will be provided for the presentation. Students will meet with academic mentors twice during the module to assess their progress, identify challenges and to provide feedback. Students will also seek advice and verbal, written or online feedback from mentor and external contributors to the module to assist in the preparation of their assignment.

Failure Redemption: A suitable supplementary attempt will be permitted on relevant assessment in line with University policy.

Additional Notes: Available to students with strong interest in scientific innovation, and entrepreneurship across the Faculties of Science and Engineering; Medicine, Health and Life Science; and Humanities and Social Sciences. Also available to visiting exchange students provided they are present in the January assessment period.