



Swansea University
Prifysgol Abertawe

**FACULTY OF SCIENCE AND
ENGINEERING**

**UNDERGRADUATE STUDENT
HANDBOOK**

YEAR 4 (FHEQ LEVEL 7)

CHEMISTRY
DEGREE PROGRAMMES

SUBJECT SPECIFIC
PART TWO OF TWO
MODULE AND COURSE STRUCTURE
2023-24

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 23-24 academic year begins on 25 September 2023

Full term dates can be found [here](#)

DATES OF 23-24 TERMS

25 September 2023 – 15 December 2023

8 January 2024 – 22 March 2024

15 April 2024 – 07 June 2024

SEMESTER 1

25 September 2023 – 29 January 2024

SEMESTER 2

29 January 2024 – 07 June 2024

SUMMER

10 June 2024 – 20 September 2024

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.

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.

At Swansea University and in the Faculty of Science and 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, technical and administrative staff, administrators - I'm sure you will find many friendly helping hands ready to assist you. And make the most of living and working alongside your fellow students.

During your time with us, please learn, create, collaborate, and most of all – enjoy yourself!

Professor David Smith
Pro-Vice-Chancellor and Executive Dean
Faculty of Science and Engineering



Faculty of Science and Engineering	
Pro-Vice-Chancellor and Executive Dean	Professor David Smith
Director of Faculty Operations	Mrs Ruth Bunting
Associate Dean – Student Learning and Experience (SLE)	Professor Laura Roberts
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 Joel Loveridge Year 2 – Dr Francisco Martin-Martinez Year 3 – Dr Mariolino Carta Year 4 – Dr Sumati Bhatia

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 8.30am-4pm.

The **Student Support Team** provides dedicated and professional support to all students in 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 (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 other resources:

<https://myuni.swansea.ac.uk/fse/>

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 23-24 handbooks to ensure that you have access to the most up-to-date versions.

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) 2023/24

Chemistry

MCHEM Chemistry[F123]

Coordinator: Dr S Bhatia

Semester 1 Modules	Semester 2 Modules
CH-412 Advanced Integrated Topics in Chemistry Part 1 20 Credits Prof SG Bott/Prof GN Alexandrowicz/Prof 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/Prof I Mabbett/Dr JW Ryan	
CH-409 MChem Research Project 60 Credits Dr EJ Loveridge/Prof GN Alexandrowicz/Dr S Bhatia/Dr M Carta/Dr E Evans/Dr MR Gill/...	
Total 120 Credits	

CH-409 MChem Research Project

Credits: 60 Session: 2023/24 September-June

Pre-requisite Modules:

Co-requisite Modules:

Lecturer(s): Dr EJ Loveridge, Prof GN Alexandrowicz, Dr S Bhatia, Dr M Carta, Dr E Evans, Dr MR Gill, Prof OJ Guy, Prof I Mabbett, Prof J Mareque-Rivas, Dr FJ Martin-Martinez, Dr D Roy, Dr JW Ryan

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%)
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Assessment Description:	Dissertation of up to 15,000 words Presentation (10 minutes) plus questions Viva Supervisor mark based on student engagement and contribution
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Moderation approach to main assessment:	Universal Double Blind Marking of the whole cohort
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Assessment Feedback:	Individual written feedback on each component, plus verbal feedback on the presentation and viva.
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Failure Redemption:	Resubmit dissertation
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Additional Notes:	Module code reserved by i.mabbett on 31/05/2016 15:52:41
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CH-412 Advanced Integrated Topics in Chemistry Part 1

Credits: 20 Session: 2023/24 September-January

Pre-requisite Modules:

Co-requisite Modules:

Lecturer(s): Prof SG Bott, Prof GN Alexandrowicz, Prof 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:	Moderation by sampling of the cohort
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: 2023/24 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:	Moderation by sampling of the cohort
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:** 2023/24 September-January

Pre-requisite Modules:

Co-requisite Modules:

Lecturer(s): Dr FJ Martin-Martinez, Prof 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 to write a grant or a business proposal on a topic of their choosing, guided by three mentor meetings to (1) discuss the broad topics before the specific problem is picked, (2) discuss the chosen problem before the proposal is written, and (3) discuss students' progress on the proposal. 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: Progress Report (20%)
Group Work - Project (40%)
Interviewing (20%)
Participation Exercise (20%)

Assessment Description: A 3000 word (maximum) research proposal will be written as a small group (2-3 students), to address the context and importance of the problem being solved, their proposed solution, and their work plan (including indicative costings) for achieving this solution.

The group will make a ten-minute pitch of their proposal to an interview panel, with minimal visual aids, and defend it against questions on their science, originality, business plan, budget, and impact.

The mentor will assess students individually through direct observation based on the mentor meetings, and also by informed decision based on student feedback. Students will produce individual proposals or reports before each mentor meeting for discussion and feedback, the quality of which will also be assessed by the mentor.

Moderation approach to main assessment: Moderation by sampling of the cohort

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.