Imperial College London

Programme Information

Programme Title		Programme Code	HECoS Code
Green Chemistry: Energy and the Environment		F1U7	For Registry Use Only

Award	Length of Study	Mode of Study	Entry Point(s)	Total Credits	
				ECTS	CATS
MRes	12 months	Full-time	Annually in October	90	180

Ownership

Awarding Institution	Imperial College London	Faculty	Faculty of Natural Sciences
Teaching Institution	Imperial College London	Department	Chemistry
Associateship	Diploma of Imperial College (DIC)	Main Location(s) of Study	White City campus

External Reference

Relevant QAA Benchmark Statement(s) and/or other external reference points	Master's Degree in Chemistry
FHEQ Level	Level 7
EHEA Level	2nd Cycle

External Accreditor(s) (if applicable)

External Accreditor 1:	N/A		
Accreditation received:	N/A	Accreditation renewal:	N/A

Collaborative Provision

Collaborative partner	Collaboration type	Agreement effective date	Agreement expiry date
N/A	N/A	N/A	N/A

Specification Details

Programme Lead	Dr Agi Brandt-Talbot Dr Andrew Ashley
Student cohorts covered by specification	2023-24 entry
Date of introduction of programme	October 07
Date of programme specification/revision	August 23

Programme Overview

Chemistry plays a pivotal role in securing a high quality of life. The chemical industry and other related industries supply us with a huge variety of products, from plastic materials to pharmaceuticals. However, these industries also have the potential to seriously damage our environment.

There is now a growing need for a reduced reliance on fossil fuels and for less polluting manufacturing processes. There is also a need for future innovations to be built on more sustainable foundations.

Green chemistry therefore serves to promote the design and efficient use of environmentally benign chemicals and chemical processes.

This course is designed to introduce you to all aspects of developing and using sustainable chemical practices, with the majority of time in term 2 and 3 dedicated to a 9-month research project in a green chemistry area.

Graduates of this course can expect to have all the necessary skills and experience to apply green chemical technologies in either commercial or academic laboratories or adjacent professions, such as consultancy and chemistry teaching. The extended research project in particular equips them admirably for PhD studies.

Learning Outcomes

The programme will enable **you** to:

1. **Demonstrate** a sound understanding of core concepts in green chemistry, including sustainability, catalysis, reaction solvents, environmental impact analysis, renewable materials, recovery of valuable materials and renewable energy sources
2. **Recognise, appraise** and **apply** specialised knowledge associated to your chosen research area, with the ability to **conceptualise** and **explore** theories, data and methods relevant to the field.
3. **Employ** research techniques including the collection and manipulation of experimental data, design and refinement of experiment, synthetic techniques, analytical methods and characterisation, technical report writing and effective oral presentation.
4. **Independently evaluate** and **apply** the essential facts, concepts, principles and theories relevant to your research project.
5. **Perform** research within a multi-disciplinary environment, **developing** management and communication skills, including problem definition, project design, decision processes, teamwork, written and oral reports, scientific publications.
6. **Critically evaluate** your own and others' work, including an appreciation of novelty and significance and analyse existing processes, assess their sustainability and propose more sustainable amendments and / or commercially viable alternatives.
7. **Recognise and critically appraise** broader issues in green/sustainable/environmental science.
8. **Compose and deliver** written, oral and visual science communications, which are effective at conveying the message to a variety of audiences.
9. **Demonstrate** laboratory/computational **skills** required to perform your research project in an **effective and safe** manner.
10. **Design** a novel research project and **compose** a corresponding grant proposal, appropriate for submission to an academic funding body.

The Imperial Graduate Attributes are a set of core competencies which we expect students to achieve through completion of any Imperial College degree programme. The Graduate Attributes are available at: www.imperial.ac.uk/students/academic-support/graduate-attributes

Entry Requirements

Academic Requirement	The minimum requirement is normally a 2:1 UK Bachelor's Degree with Honours in a chemistry or engineering based subject (or a comparable qualification recognised by the College).
	For further information on entry requirements, please go to PG: www.imperial.ac.uk/study/apply/postgraduate-taught/entry-requirements/accepted-qualifications/

Non-academic Requirements	None
English Language Requirement	Standard requirement (PG) Please check for other Accepted English Qualifications
Admissions Test/Interview	Candidates will be invited for interview in person or online.

The programme's competency standards documents can be found at: www.imperial.ac.uk/chemistry/postgraduate/mres/

Learning & Teaching Approach

Learning and Teaching Delivery Methods

The course aims to teach the practice of science with the learning and teaching strategy being constructively aligned with the knowledge, skills and abilities required by professional scientists in academia, government, NGOs and the commercial sector.

Most of the weighting of the course is focused on the research component, starting with a proposal writing exercise and culminating with a dissertation documenting an extensive research project, which reflect the core activities undertaken by modern scientists. In addition, the taught component exposes you to fields outside your immediate project area, including generic and transferable research skills at the interface between disciplines, especially scientific writing.

Across the programme, a range of teaching methods are used including laboratory work, seminars, lectures, workshops, journal clubs and a poster project.

Overall Workload

Your overall workload consists of face-to-face sessions and independent learning. While your actual contact hours may vary according to the optional modules you choose to study, the following gives an indication of how much time you will need to allocate to different activities at each level of the programme.

At Imperial College, each ECTS credit taken equates to an expected total study time of 25 hours. Therefore, the expected total study time is 2250 hours per year. This comprises approximately 250 hours for the Journal Club and Poster Project Module, 125 hours each for the Introduction to Green and Sustainable Chemistry and Recovery of Metals from Waste Lecture Modules (covering delivery, independent learning, essay writing), 250 hours of planning and designing the research project (Research Proposal Module), guided by your supervisors, and 1500 hours of individual research project work (Research Project Module).

Assessment Strategy

Assessment Methods

Each assessment is designed to test your acquisition of the separate skills required for the furthering of a career in green/sustainability/environmental research and associated professional paths (All assessments are linked to the intended learning outcomes listed above as indicated below in brackets).

The essays, which form the assessment of the material presented in the **Sustainable Chemistry and Recovery of Metals from Waste lectures** will test your ability to use the principles taught in these courses to assess and evaluate (using green metrics) the content of an original research (Learning outcomes 1, 6).

The **Journal Club** and **Renewable Energy Poster Project** presentations assess your ability to understand and critique material on an unfamiliar topic presented in a publication or from a variety of sources. Working as a team, you will present this as part of a group in a clear, engaging and insightful manner both visually and orally (Learning outcomes 2, 6-8).

The **Research Project Proposal** will assess your aptitude to analyse critically the scientific literature to provide context to your research, plan the work packages necessary to complete the research project and reflect on ethical, safety and commercial/societal considerations (Learning outcomes 1-4, 6, 8 and 10).

The **Research Project** will be judged through a dissertation, an oral presentation, and an oral examination (viva). The dissertation will evaluate your skills at presenting, describing and critically discussing your own experimental data. At the oral presentation, you will be assessed on your ability to present your research with the help of visual tools in a clear, concise and engaging fashion, summarising your findings and their relevance. You will also be

tested on your ability to answer questions directly relevant to your project in the oral examination. This will also probe your knowledge and understanding of the relevant literature and theoretical background to the subject area, of the experimental techniques you used as well as the proposed follow-on work (Learning outcomes 1-9).

Academic Feedback Policy

With the exception of the major research project module you will receive feedback within 2 week of submission and where this is not possible students will be advised. This feedback should inform learning and performance in subsequent modules.

The College's Policy on Academic Feedback and guidance on issuing provisional marks to students is available at:
www.imperial.ac.uk/about/governance/academic-governance/academic-policy/exams-and-assessment/

Re-sit Policy

The College's Policy on Re-sits is available at: www.imperial.ac.uk/about/governance/academic-governance/academic-policy/exams-and-assessment/

Mitigating Circumstances Policy

The College's Policy on Mitigating Circumstances is available at:
www.imperial.ac.uk/about/governance/academic-governance/academic-policy/exams-and-assessment/

Additional Programme Costs

This section should outline any additional costs relevant to this programme, which are not included in students' tuition fees.

Description	Mandatory/Optional	Approximate cost
Laptop with camera and microphone	Mandatory	£400-600

Important notice: The Programme Specifications are the result of a large curriculum and pedagogy reform implemented by the Department and supported by the Learning and Teaching Strategy of Imperial College London. The modules, structure and assessments presented in this Programme Specification are correct at time of publication but might change as a result of student and staff feedback and the introduction of new or innovative approaches to teaching and learning. You will be consulted and notified in a timely manner of any changes to this document.

Programme Structure[1]

Year 1 - FHEQ Level 7
You will study all core and compulsory modules

Code	Module Title	Core/ Compulsory	Group	Term	Credits
CHEM70038	Journal Club and Renewable Energy Poster	Compulsory	N/A	Autumn-Summer	10
CHEM70010	Sustainable Chemistry	Compulsory	N/A	Autumn	5
CHEM70039	Recovery of Metals from Waste	Compulsory	N/A	Autumn-Spring	5
CHEM70040	Proposal for Green Chemistry Research Project	Core	N/A	Autumn	10
CHEM70041	Green Chemistry Research Project	Core	N/A	Spring-Autumn	60
				Credit Total	90

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[1] **Core** modules are those which serve a fundamental role within the curriculum, and for which achievement of the credits for that module is essential for the achievement of the target award. Core modules must therefore be taken and passed in order to achieve that named award. **Compulsory** modules are those which are designated as necessary to be taken as part of the programme syllabus. Compulsory modules can be compensated. **Elective** modules are those which are in the same subject area as the field of study and are offered to students in order to offer an element of choice in the curriculum and from which students are able to select. Elective modules can be compensated.

Progression and Classification

Award of a Masters Degree (including MRes)
To qualify for the award of a postgraduate degree you must have:
1. accumulated credit to the value of no fewer than 90 credits at Level 7
2. and no more than 15 credits as a Compensated Pass

Classification of Postgraduate Taught Awards

The College sets the class of Degree that may be awarded as follows:
1. Distinction: 70.00% or above.
2. Merit: 60.00% or above but less than 70.00%.
3. Pass: 50.00% or above but less than 60.00%.

Your classification will be determined through the Programme Overall Weighted Average meeting the threshold for the relevant classification band.

Your degree algorithm provides an appropriate and reliable summary of your performance against the programme learning outcomes. It reflects the design, delivery, and structure of your programme without unduly over-emphasising particular aspects.

Programme Specific Regulations

N/A

Supporting Information
The Programme Handbook is available upon enrolment.
The Module Handbook is available upon enrolment.
The College's entry requirements for postgraduate programmes can be found at: www.imperial.ac.uk/study/pg/apply/requirements
The College's Quality & Enhancement Framework is available at: www.imperial.ac.uk/registry/proceduresandregulations/qualityassurance
The College's Academic and Examination Regulations can be found at: www.imperial.ac.uk/about/governance/academic-governance/regulations
Imperial College is an independent corporation whose legal status derives from a Royal Charter granted under Letters Patent in 1907. In 2007 a Supplemental Charter and Statutes was granted by HM Queen Elizabeth II. This Supplemental Charter, which came into force on the date of the College's Centenary, 8th July 2007, established the College as a University with the name and style of "The Imperial College of Science, Technology and Medicine". www.imperial.ac.uk/admin-services/secretariat/college-governance/charters/
Imperial College London is regulated by the Office for Students (OfS) www.officeforstudents.org.uk/advice-and-guidance/the-register/
This document provides a definitive record of the main features of the programme and the learning outcomes that you may reasonably be expected to achieve and demonstrate if you take full advantage of the learning opportunities provided. This programme specification is primarily intended as a reference point for prospective and current students, academic and support staff involved in delivering the programme and enabling student development and achievement, for its assessment by internal and external examiners, and in subsequent monitoring and review.