

MSc Sustainable Energy Futures

This document provides a definitive record of the main features of the programme and the learning outcomes that a typical student may reasonably be expected to achieve and demonstrate if s/he takes full advantage of the learning opportunities provided. This programme specification is intended as a reference point for prospective students, current students, external examiners and academic and support staff involved in delivering the programme and enabling student development and achievement.

Programme Information

Programme Title	Sustainable Energy Futures			
Award(s)	MSc			
Programme Code	H9A1			
Awarding Institution	Imperial College London			
Teaching Institution	Imperial College London			
Faculty	Faculty of Engineering			
Department	Energy Futures Lab, Department of Mechanical Engineering			
Associateship	None			
Main Location of Study	South Kensington Campus			
Mode and Period of Study	1 academic year, full-time			
Cohort Entry Points	Annually in October			
Relevant QAA Benchmark Statement(s) and/or other external reference points	Engineering			
Total Credits	ECTS:	90	CATS:	180
FHEQ Level	Level 7			
EHEA Level	2 nd cycle			
External Accreditor(s)	N/A			
Specification Details				
Student cohorts covered by specification	2020-21 entry			
Person responsible for the specification	Dr Mark Workman			
Date of introduction of programme	October 2007			

Date of programme specification/revision	February 2020
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Programme Overview

The MSc in Sustainable Energy Futures is an internationally unique course. Throughout the year our students have lectures and guidance from experts across all research areas at Imperial College London, as well as leaders from the energy industry. The curriculum's focus on a multidisciplinary view of the energy sector means graduates are well placed to work in a diverse range of energy-related areas and are in high demand from employers.

The main aim of the course is to develop the next generation of leaders in the energy sector. This postgraduate course provides grounding in the major features of global energy issues, sustainable energy technologies and their interactions with economics, the environment and policy. Taking a quantitative approach to the study of technology and systems, the MSc mainly, though not exclusively, attracts students from engineering and physical sciences. It also appeals to those with some post degree experience wishing to gain a broader, more strategic perspective of energy issues.

Combining the academic and industrial experience of the Faculty of Engineering with the Faculty of Natural Sciences, the Imperial College Business School and the Department of Computing, the MSc in Sustainable Energy Futures offers a unique multidisciplinary teaching programme. Emphasis is placed on the study of whole systems and sustainability in order to be directly applicable to the wide-ranging and cross-cutting energy problems faced by society. Students will develop the critical evaluation skills, research techniques and quantitative analytical methodologies essential for assessing real-world energy systems.

Learning Outcomes

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

The programme aims/objectives are to:

- Train the next generation of “energy savvy” graduates equipping them to pursue careers in, and make an impact on, the energy industry, the energy investment sector, the public sector and nongovernmental organisations;
- Provide students with knowledge for the recognition and understanding of the major features of the global energy issues, sustainable energy technologies and interactions with energy economics and policy;
- Develop skills in methods of energy system analysis that allow this knowledge to be applied in practice;
- Foster the acquisition and implementation of broad research and analytical skills related to sustainable energy;
- Develop the skills needed to undertake independent research both in industry and in the university environment.

Knowledge and Understanding of:

1. The major topics, facts and issues related to global energy demand and utilisation, key energy production, storage, transmission and utilisation technologies, key energy economics, environmental and policy issues, and their interdisciplinary nature.

2. The underlying scientific principles and computational methodologies for quantitative analysis and evaluation of the above aspects as part of complex energy systems, including sustainability aspects over their life cycle.
3. The application of quantitative analysis and evaluation methods for the solution of typical, practical energy systems problems.
4. Research techniques which might include information retrieval, experiment and data analysis, modelling, economic and environmental impact assessment, and ethical aspects of research, as required generating an independent piece of research.
5. Management and communication skills, including problem definition, project design, decision processes, negotiation, written and oral reports, scientific publications.

Intellectual Skills:

1. Analyse and solve problems using a multidisciplinary approach, applying professional judgments to balance performance, costs, benefits, safety and social and environmental impact.
2. Integrate and critically evaluate information.
3. Formulate and apply appropriate solutions.
4. Plan, generate and complete a programme of independent research.

Practical Skills:

1. Retrieve and critically analyse basic data in respect of energy sources, production, transformation and demand.
2. Formulate complex energy problems involving aspects of efficiency, risk, environmental impact, and economics quantitatively, making relevant assumptions.
3. Have the theoretical awareness to be able to select and/or practically utilise a wide range of research methodologies and analysis techniques.
4. Use selected software tools to evaluate and solve individual and combined aspects for a range of complex energy systems problems.
5. Analyse results and make recommendations.
6. Prepare technical reports.
7. Give technical presentations.
8. Manage resources and time.
9. Use the scientific literature effectively.

Transferable Skills:

1. Communicate effectively through written and oral presentations.
2. Work in groups and exercise interpersonal skills.
3. Bridge techniques and solutions from one discipline to another.
4. Understand complex processes that depend on the interplay of both technical and other aspects.
5. Learn to self-learn and gather information.
6. Develop entrepreneurship skills.

Entry Requirements

Academic Requirement

Normally a 2.1 UK Bachelor's Degree with Honours in Engineering or Physical Sciences (or a comparable qualification recognised by the College).

Non-academic Requirements	None
English Language Requirement	Higher requirement IELTS score of 7.0 overall (minimum 6.5 in all elements).
Learning & Teaching Strategy	
Scheduled Learning & Teaching Methods	<ul style="list-style-type: none"> • Formal classroom based teaching • Practical classes • Tutorials • Seminars • Lectures • Workshops • Case studies
Project and Placement Learning Methods	<ul style="list-style-type: none"> • Independent project work • Research project
Assessment Strategy	
Assessment Methods	<ul style="list-style-type: none"> • Reports • Presentations • Literature review • Coursework • Thesis • Examinations
Academic Feedback Policy	
<p>Students will receive feedback:</p> <ul style="list-style-type: none"> i) Informally, during course tutorials ii) Via assessment of coursework project components of taught courses iii) Via January and summer exams iv) Via regular meetings with research project supervisors v) By assessment of a research literature survey report vii) Via meetings with the course director and course administrator as necessary 	
Re-sit Policy	
<p>The College's Policy on Re-sits is available at: http://www.imperial.ac.uk/student-records-and-data/for-current-students/undergraduate-and-taught-postgraduate/exams-assessments-and-regulations/</p>	
Mitigating Circumstances Policy	
<p>The College's Policy on Mitigating Circumstances is available at: http://www.imperial.ac.uk/student-records-and-data/for-current-students/undergraduate-and-taught-postgraduate/exams-assessments-and-regulations/</p>	

Programme Structure					
Full-time	Pre-session	Term One	Term Two	Term Three	Term Four
Core Modules	0	5	6	0	0
Elective Modules	0	0	0	0	0
Projects	0	0	0	1	1
Assessment Dates & Deadlines					
Written Examinations		January & May			
Coursework Assessments		Continuous			
Project Deadlines		End of August/Beginning of September			
Practical Assessments		Not applicable			
Assessment Structure					
Marking Scheme					
<p>Degrees may be classified pass, merit or distinction depending on performance in the various elements of the course.</p> <p>The Sustainable Energy Futures MSc has two elements. The first is the total mark awarded for the taught courses SEF01 – 10, and the second is the research project. Successful candidates will therefore be awarded the degree in one of the following categories:</p> <p>Pass: An average mark of between 50% and 59.9% in taught courses and for the research project.</p> <p>Merit: An average mark of between 60% and 69.9% in taught courses and for the research project. It should not be awarded in cases where either element falls below 60%.</p> <p>Distinction: An average mark of 70% or better in taught courses and for the research project. It should not be awarded in cases where either element falls below 70%. Merit and Distinction marks on individual components (course, research) will also be recorded and reported.</p>					
Module Weightings					
Module			% Module Weighting		
Energy Systems Technology			6%		
Methods for the Analysis of Energy Systems			6%		
Energy Economics and Policy			6%		
Debating and Non-technical / soft skills development			2%		

Entrepreneurship in Renewable Energy	5%
Urban Energy Systems	5%
Bioenergy	5%
Nuclear Energy	2.5%
Data Science and Digitalisation in the Energy Sector	2.5%
Energy Transmission and Storage	5%
Sustainable Transport	5%
Research Project	50%

Indicative Module List											
Code	Title	Core/ Elective	L&T Hours	Ind. Study Hours	Place- ment Hours	Total Hours	% Written Exam	% Course- work	% Practical	FHEQ Level	ECTS
MECH97036	Energy Systems Technology	CORE	35	115	0	150	70	30	0	7	6
MECH97037	Methods for the Analysis of Energy Systems	CORE	35	115	0	150	70	30	0	7	6
MECH97038	Energy Economics and Policy	CORE	35	115	0	150	70	30	0	7	6
MECH97039	Seminars/Debating Society Course	CORE	20	30	0	50	0	0	100	7	2
MECH97040	Entrepreneurship in Renewable Energy	CORE	36	89	0	125	0	75	25	7	5
MECH97041	Urban Energy Systems	CORE	36	89	0	125	0	100	0	7	5
MECH97042	Bioenergy	CORE	36	89	0	125	0	100	0	7	5
MECH97043	Nuclear Energy	CORE	18	44	0	62	0	100	0	7	2.5
NEW	Data Science and Digitalisation in the Energy Sector	CORE	18	44	0	62	0	100	0	7	2.5
MECH97044	Energy Transmission and Storage	CORE	36	89	0	125	75	25	0	7	5
MECH97045	Sustainable Transport	CORE	36	89	0	125	0	100	0	7	5
MECH97046	Research Project	CORE	0	1000	0	1000	0	100	0	7	40

Supporting Information

The Programme Handbook is available at: <http://www.imperial.ac.uk/energy-futures-lab/our-msc/>

The Module Handbook is available at: <http://www.imperial.ac.uk/energy-futures-lab/our-msc/>

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: <https://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".
<http://www.imperial.ac.uk/admin-services/secretariat/college-governance/charters/charter-and-statutes/>

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<https://www.officeforstudents.org.uk/>