Imperial College London

Programme Specification (Master's Level)

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				
Award(s)	MSc			
Programme Title	Sustainable Energy Futures			
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			
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	2nd cycle			
External Accreditor(s)	N/A			
Specification Details				
Student cohorts covered by specification	2016/17 entry			
Person responsible for the specification	Prof Graham Hughes			
Date of introduction of programme	October 2007			
Date of programme specification/revision	October 2016			

Description of Programme Contents

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 and the Imperial College Business School, 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 though 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 minimum 2.1 Honours degree in Engineering or Physical Sciences.
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	• Formal classroom based teaching • Practical classes • Tutorials • Seminars • Lectures • Workshops • Case studies
E-learning & Blended Learning Methods	N/A
Project and Placement Learning Methods	• Independent project work • Research project
Assessment Strategy	
Assessment Methods	• Reports • Presentations • Literature review • Coursework • Thesis • Examinations
Academic Feedback Policy	
Students will receive feedback: i) Informally, during course tutorials ii) Via assessment of coursework project components of taught courses iii) Via reports on performance of 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 assistants as necessary	
Re-sit Policy	
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/	
Mitigating Circumstances Policy	
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/	

Assessment Structure

Marking Scheme

Degrees may be classified pass, merit or distinction depending on performance in the various elements of the course.

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:

Pass: An average mark of between 50% and 59.9% in taught courses and for the research project.

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%.

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.

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%
Low Carbon Technologies	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
SEF01	Energy Systems Technology	CORE	35	115	0	150	70	30	0	7	6
SEF02	Methods for the Analysis of Energy Systems	CORE	35	115	0	150	70	30	0	7	6
SEF03	Energy Economics and Policy	CORE	35	115	0	150	70	30	0	7	6
SEF04	Seminars/Debating Society Course	CORE	20	30	0	50	0	0	100	7	2
SEF10	Entrepreneurship in Renewable Energy	CORE	36	89	0	125	0	75	25	7	5
SEF05	Urban Energy Systems	CORE	36	89	0	125	0	100	0	7	5
SEF06	Bioenergy	CORE	36	89	0	125	70	30	0	7	5
SEF07	Low Carbon Technologies	CORE	36	89	0	125	70	30	0	7	5
SEF08	Energy Transmission and Storage	CORE	36	89	0	125	75	25	0	7	5
SEF09	Sustainable Transport	CORE	36	89	0	125	0	100	0	7	5
H9A1RES	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-statutes-ordinances-and-regulations/
Imperial College London is regulated by the Higher Education Funding Council for England (HEFCE) http://www.hefce.ac.uk/reg/register/