

Programme Specification

MSc Energy & Sustainability: Energy, Resources and Climate Change; Energy, Environment and Buildings 2017/18

This specification provides a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if s/ he takes full advantage of the learning opportunities that are provided.

Awarding institution	University of Southampton
Teaching institution	University of Southampton
Mode of study	Full time
Duration	1 year
Accreditation details	Accredited as a Technical MSc, by the Engineering Council as meeting the requirements for Further Learning for registration as a Chartered Engineer
Final award	Master of Science
Name of Award	Energy and Sustainability – Energy, Resources & Climate Change Energy and Sustainability – Energy, Environment & Buildings
Interim Exit awards	Postgraduate Certificate Postgraduate Diploma
FHEQ level of final award	Level 7
UCAS code	Not Applicable
QAA subject benchmark Or other external reference	QAA Benchmark Statement for Engineering Studied at Master's Level Engineering Council UK Standard for Professional Engineering Competence (UK-SPEC), Joint Board of Moderators
Programme lead	Professor A.S. Bahaj
Date specification was written	21 August 2012 (latest revision 2014)
Date programme was validated	July 2014
Date specification last updated	August 2016

Programme Overview

Brief outline of the programme

These MSc programmes are taught by the Faculties of Engineering and the Environment and Physical Science and Engineering, who both conduct world-class research within the University of Southampton.

Developed in collaboration with industry and public sector energy specialists, the MSc in Energy and Sustainability will enhance your career path and value to employers.

The module common to both programmes provides a broad overview of the 'live' issues surrounding sustainable energy and climate change of which all energy professionals should have a broad understanding.

The research project provides the opportunity to work with one of the many industrial partners of this programme-ranging from large utility companies to small consultancies-in order to gain valuable research and development skills.

Learning and teaching

The different subject matter of the modules lends itself to different teaching and learning techniques. These include lectures, seminars, laboratory classes, coursework and projects. Throughout the programme, students are encouraged to refer to the recommended reading material to broaden their understanding of the relevant subjects.

All postgraduate students have access to an extensive library of reference material, including dissertations by former students, help with careers destinations and computer suites, including a comprehensive selection of software.

Many modules include assessed coursework assignments for which students are required to carry out a substantial study of selected topics, individually or in groups. Students are assessed on their ability to use rationally the taught material and show an in-depth understanding of the subject matter. Feedback on progress is given to students on all submitted work.

Assessment

Assessment is through a combination of examination, coursework, assignments, presentations and dissertation. The programme comprises two semesters of formal instruction, followed by a research project, which may be undertaken in collaboration with a company/public body in the field of energy and sustainability.

As a research-led University, we undertake a continuous review of our programmes to ensure quality enhancement and to manage our resources. As a result, this programme may be revised during a student's period of registration; however, any revision will be balanced against the requirement that the student should receive the educational service expected. Please read our [Disclaimer](#) to see why, when and how changes may be made to a student's programme.

Programmes and major changes to programmes are approved through the University's programme validation process which is described in the University's quality handbook.

Educational Aims of the Programme

The aims of this programme are to:

- gain a sound knowledge and understanding of the key issues and processes in energy and sustainability.
- provide education and training to students from the EU region as well as regions outside the EU, relevant to both a developed and developing world context.
- develop your skills in critical appraisal and analysis of energy project options and systems, independent research and oral and written communication.
- achieve an integrated, multi-disciplinary coverage of energy and sustainability education and training at postgraduate level.
- provide relevant in-career postgraduate training for professionals working in energy and sustainability.

Knowledge and Understanding

Having successfully completed this programme you will be able to demonstrate knowledge and understanding of:

- CENV6085** Anaerobic digestion of waste
Composting of waste
How we quantify waste and its potential as a natural resource
Landfilling of waste
The implication of key pieces of legislation and their implications for those in the waste management sector and industry
The management techniques and methods used to introduce schemes for minimisation, reuse, recycle, recovery and disposal
The waste management hierarchy
Thermal processing of waste
Waste: what it is and the definitions that are associated with it
- CENV6090** Energy supply and demand
Fundamental limitations of energy conversion
Interactions and differences between technologies and the need for a diverse energy mix
The relationship between resources, energy generation and use
- ENVS6033** The generic concepts in GIS
The principles underlying the analysis of spatial data
- CENV6141** How to integrate the biological and engineering principles of resource use and productivity in a quantitative manner in order to assess the effectiveness of agricultural and agroforestry biomass production systems
Location of relevant information sources on biomass energy and the critical assessment of the quality of the data and the information source
Clear and concise analyses of benefits and problems relating to the production and use of different forms of biomass energy
The framework within which biomass is considered as a renewable energy source, including the socio-economic, political, historical, and environmental contexts that are relevant
The quantitative outline process and systems design which illustrate the approach that needs to be adopted when considering biomass as a renewable energy source
The main sources of biomass, the origins of these sources, and the means by which they can be exploited for energy generation
The energy-generating potential of biomass as an energy source used in different ways and how to perform analyses of the energy conversion potential from these within the context of a full life cycle approach
In the context of the design choices; make the appropriate assumptions; utilise the right tools and analyses, and select systems that work for the community, the environment and the client
The design basis of biomass-driven power generation
- CENV6145** The development of an urban sustainability concept integrating the various issues required to create a sustainable community
The relationship between urban design, architecture, engineering and sustainability to develop a holistic approach
- CENV6147** The importance of learning from vernacular structures as well as the climatic and environmental conditions for developing modern design solutions which consume minimal resources.

Current climate change science predictions and the potential impacts of climate change on buildings, settlements and energy demand and supply systems
 Desk-based research using various forms of media spanning the fields of architecture, engineering, history and social sciences
 The relationship of climate, environment, technology, society and its manifestation in buildings and settlement structures

- CENV6148** The production of design recommendations for buildings, to deliver energy efficiency improvements
 The energy and sustainability assessment methods and certificates used in the United Kingdom for domestic and commercial buildings. This includes: BREEAM, EPC, DEC, SAP, SBEM, LEED, Passivhaus and the Code for Sustainable Homes
 The functionality of building performance simulation tools such as TRNSYS
 The policies, economic and societal issues influencing energy performance assessment of buildings
 TER calculations using SAP/SBEM for simple buildings
- SESG6041** Fundamentals of energy and principles of energy conversion
 Principles of heat engines, fuel cells, photovoltaic cells, electromechanical generators
 Pros and cons of different renewable energy technologies
 Environmental and social impact of energy technologies
 The fundamentals of energy economics
 Energy policy from a social science perspective
 The set-up of a scoping study for a selected topic including targets to achieve the goals of the study.
- FEEG6025** Select appropriate experimental or observational design methods with due consideration for practical data collection, sample size/power, data management and ethical considerations
 Design appropriate data collection instruments (e.g. sensors, surveys, monitors etc) in line with study objectives
 Conduct appropriate descriptive and exploratory data analysis and interpret results correctly
 Understand the principles of statistical model selection (AIC, BIC)
 Fit a wide range of linear models to data, including models with categorical predictors, and interpret results correctly.
 Fit logistic and poisson regression models to data and interpret results correctly
 Understand the principles of modelling time series data, including issues such as stationarity, trend and autocorrelation.
 Fit autoregression models to time series data, and interpret results correctly
 Construct and correctly interpret fatigue and rainflow diagrams; fit models for failure time data, and interpret results correctly
 Understand the principles of nonparametric inference and goodness of fit and apply appropriate tests interpreting results correctly
 Understand the principles of and best practice in data management, anonymisation and archiving

Teaching and Learning Methods

Acquisition of core knowledge and understanding is through lectures, seminars, tutorials, field and laboratory classes, workshops, and independent study and research. You are encouraged from an early stage to supplement and consolidate your understanding and knowledge by independent study.

Assessment Methods

Testing of the knowledge base is through a combination of unseen written examinations and assessed coursework in the form of problem solving exercises, laboratory reports, design exercises, presentations, posters, essays and individual and group projects.

Subject Specific Intellectual and Research Skills

Having successfully completed this programme you will be able to:

- CENV6085** Consider the management of wastes in a rational manner.
Critically analyse the limitation of waste management strategies and plans.
Develop outline waste management plans.
Recognise the opportunities for maximising the value in waste.
Recognise waste management processes as part of our engineered infrastructure.
Select and utilise in a quantitative manner information for the design of treatment and disposal processes
- CENV6090** Analyse the environmental and economic risk associated with a given approach.
Defend a chosen engineering solution.
Identify and evaluate an engineering approach to a given problem.
Predict the performance of energy systems, e.g. power station output, wind turbine, PV array.
- ENVS6033** Describe the structures used for spatial data.
Manage data acquisition.
Use GIS in coastal applications.
- CENV6141** Analyse, synthesise and summarize information critically, including prior research.
Collate and integrate lines of evidence from different disciplines to develop and consolidate knowledge and understanding on an objective basis.
Propose reasoned arguments, justifying conclusions and recommendations by reference to appropriate analytical frameworks and supporting evidence.
Use facts and data to support arguments, and assemble and critically evaluate relevant information from several sources and develop a personal point of view.
- CENV6145** Analyse a design task.
Formulate an integrated design / engineering concept and evaluate the solution in response to given requirements.
Analyse the principles and evaluate the constraints to achieve more sustainable communities.
- CENV6147** Analyse and critically assess the climatic, environmental, technical and societal conditions that have led to specific building designs and settlement forms.
Conduct a thorough literature research of a given research topic.
Critically review climate change science predictions.
Defend a chosen engineering solution in terms of its relationship with the climate and environment.
- CENV6148** Link energy policy targets to energy efficiency requirements in buildings.
Conduct a simple SAP/SBEM assessment.
Analyse and critically assess the energy and comfort performance of buildings.
Develop ideas for improving the energy performance of existing buildings.
- SESG6041** Search and critically review technical literature.
Analyse complex energy systems.
Compare different engineering technologies from various perspectives.
Write an essay on a technical topic.
Develop country scale future energy supply scenarios

FEEG6025	<p>Experimental and Observational Study Design: Factorial, RCTs, Natural Experiments, Blinding, Power calculations, sample selection & recruitment, instruments;</p> <p>Descriptive and exploratory data analysis: Mean, mode, median, histograms, box plots, density distributions, skewness, surface/factorial response plots, mosaic plots, correlelograms;</p> <p>Statistical inference: estimation, confidence intervals & hypothesis testing, nonparametric statistical inference, rank tests etc. Goodness-of-fit</p> <p>Statistical models for independent data: Revision of simple and multiple linear regression; prediction and bias/variance trade off; models with categorical predictors, factorial models, logistic and poisson regression, ANOVA models, survival and failure time models, principles of model selection, AIC, BIC</p> <p>Modelling dependent data: Multivariate statistical methods, time series analysis including stationarity, trend and seasonality, autocorrelation and autoregression models</p> <p>Data management, copyright, anonymisation and archiving including open, public and restricted/licensed access data models</p>
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Teaching and Learning Methods

- Intellectual skills are developed through the teaching and learning activities.
- Analysis and problem solving skills are further developed through regular problem sheets issued by module lecturers and through small group teaching.
- Experimental, research and design skills are further developed through coursework exercises, laboratory, and design and research projects.
- Individual feedback is provided on all work submitted.

Assessment Methods

- Analysis and problem solving skills are assessed through unseen written examinations and problem based exercises.
- Experimental, research and design skills are assessed through laboratory reports, coursework exercises, project reports, posters and oral presentations.

Transferable and Generic Skills

Having successfully completed this programme you will acquire the following skills and abilities:

- Concept and design development
- Data analysis
- Critical analysis
- Engineering approach to solving problems
- Graphical presentation of a design concept/approach
- Problem solving and problem analysis
- Research and independent study
- Use of assessment methods to support decisions
- Use of Information Technology and information handling
- Oral and written communication, oral presentation
- Poster presentation
- Report writing
- Plan and organise time and resources
- Independent working, able to make appropriate decisions based on own judgement
- Team and Group working
- Interpersonal skills

Teaching and Learning Methods

The development of transferable skills is embedded in all modules of the programme. Typically, this takes the form of project based work and problem based learning.

Assessment Methods

Skills are formatively assessed through written reports and oral presentations, practical and laboratory reports. Summative assessment is through unseen examinations, extended essays, presentations, posters and completion of a research project, including an interim progress report and presentation.

Subject Specific Practical Skills

Having successfully completed this programme you will be able to:

- CENV6085** Consider the management of wastes in a rational manner.
Critically analyse the limitation of waste management strategies and plans.
Develop outline waste management plans.
Recognise the opportunities for maximising the value in waste.
Recognise waste management processes as part of our engineered infrastructure.
Select and utilise in a quantitative manner information for the design of treatment and disposal processes.
- CENV6090** Produce a graphically interesting and technically concise poster.
Write a well structured, clear and concise report.
Research for further information to develop appropriate ideas in the energy field.
Apply knowledge in energy to convey applicability of certain technologies.
Demonstrate practical skills necessary for the execution of a project.
Assemble appropriate information from the lectures and elsewhere to satisfy the needs for your tasks in the energy field.
Have the ability to condense the findings of a technical study to a short presentation and present to a large group
- ENVS6033** Geographical Information Systems
- CENV6141** Present and defend research.
Compare different bioenergy technologies from various perspectives.
Assemble a technical report.
- CENV6147** Present and defend individual research,
Develop and present a poster design to convey a design/ engineering concept/ approach,
Write a well structured, clear and concise research report,
- CENV6145** Present and defend a projected urban development concept in a team.
Develop clear and concise presentation material to convey your design and engineering ideas,
Research appropriate technologies for your scoping study.
- CENV6148** Construct a basic TRNSYS simulation model,
Use SAP/SBEM tools available for building performance assessment,
Conduct a simple walk through energy performance assessment of a building,
- SESG6041** Write and illustrate a scoping study with appropriate graphs.

Programme outcomes for different exit points

Level 7

Much of the study undertaken at Masters level reflects research at the forefront of Civil Engineering. You will have shown originality in the application of knowledge, and you will understand how the boundaries of knowledge are advanced through research. You will be able to deal with complex issues both systematically and creatively, and show originality in tackling and solving problems individually and as part of a team. You will have the qualities needed for employment in circumstances requiring sound judgement, personal responsibility and initiative, in complex and unpredictable professional environments.

Programme Structure

The University uses the European Credit Transfer Scheme (ECTS) to indicate the approximate amount of time a typical student can expect to spend in order to complete successfully a given module or programme, where 1 ECTS indicates around 20 nominal hours of study. Previously, Credit Accumulation and Transfer Scheme (CATS) points were used for this purpose where 1 CATS credit was 10 nominal hours of study.

The teaching is structured on a semester pattern. You study modules comprising 90 ECTS (180 CATS). The course is only available full-time.

In addition to the final award, there are the following exit points:

- Postgraduate Certificate of Higher Education, following successful completion of 30 ECTS (60 CATS).
- Postgraduate Diploma of Higher Education, following successful completion of 60 ECTS (120 CATS).

Each module is a self-contained part of the programme of study and carries a credit rating.

You will study a number of compulsory and option subjects during both semesters (see Appendix 1 for details). These provide sound preparation for the final part of the degree, the Research Project (core).

Programme details

The programme follows University guidelines for inclusivity and flexibility and provides an array of teaching and learning approaches that will enable any student who meets the entry requirements to access the curriculum and demonstrate achievement of all the intended learning outcomes.

Additional Costs

Students are responsible for meeting the cost of essential textbooks, and of producing such essays, assignments, laboratory reports and dissertations as are required to fulfil the academic requirements for each programme of study. Costs that students registered for this programme typically also have to pay for are included in Appendix 3.

In some cases, coursework and/or projects may be submitted electronically. Where it is not possible to submit electronically students will be liable for printing costs, which are detailed in the individual Module Profile and can be found in Appendix 2.

Progression Requirements

The programme follows the University's regulations for Progression, Determination and Classification of Results : Standalone Masters Programmes as set out in the University Calendar <http://www.calendar.soton.ac.uk/sectionIV/sectIV-index.html>) and in particular at <http://www.calendar.soton.ac.uk/sectionIV/progression-regs-standalonemasters.html> and <http://www.calendar.soton.ac.uk/sectionIV/credit-bearing-progs.html>

Faculty specific regulations for Standalone Masters can be found here <http://www.calendar.soton.ac.uk/sectionVIII/fee-sam.html>

Intermediate exit points

You will be eligible for an interim exit award if you complete part of the programme but not all of it, as follows:

Qualification	Minimum overall credit in ECTS/CATS credits	Minimum ECTS/CATS credits required at level of award
Postgraduate Diploma	at least 60/120	45/90
Postgraduate Certificate	at least 30/60	20/40

Support for Student Learning

There are facilities and services to support your learning some of which are accessible to students across the University and some of which will be geared more particularly to students in your Faculty or discipline area.

The University provides:

- library resources, including e-books, on-line journals and databases, which are comprehensive and up-to-date; together with assistance from Library staff to enable you to make the best use of these resources.
- high speed access to online electronic learning resources on the Internet from dedicated PC Workstations onsite and from your own devices; laptops, smartphones and tablet PCs via the Eduroam wireless network. There is a wide range of application software available from the Student Public Workstations.
- computer accounts which will connect you to a number of learning technologies for example, the Blackboard virtual learning environment (which facilitates online learning and access to specific learning resources).
- standard ICT tools such as Email, secure filestore and calendars.
- access to key information through the MySouthampton Student Mobile Portal which delivers timetables, Module information, Locations, Tutor details, Library account, bus timetables etc. while you are on the move.
- IT support through a comprehensive website, telephone and online ticketed support and a dedicated helpdesk in the Student Services Centre.
- Enabling Services offering assessment and support (including specialist IT support) facilities if you have a disability, dyslexia, mental health issue or specific learning difficulties.
- the Student Services Centre (SSC) to assist you with a range of general enquiries including financial matters, accommodation, exams, graduation, student visas, ID cards.
- Career Destinations, advising on job search, applications, interviews, paid work, volunteering and internship opportunities and getting the most out of your extra-curricular activities alongside your degree programme when writing your CV.
- a range of personal support services : mentoring, counselling, residence support service, chaplaincy, health service.

- a Centre for Language Study, providing assistance in the development of English language and study skills for non-native speakers.

The Students' Union provides:

- an academic student representation system, consisting of Course Representatives, Academic Presidents, Faculty Officers and the Vice-President Education; SUSU provides training and support for all these representatives, whose role is to represent students' views to the University.
- opportunities for extracurricular activities and volunteering
- an Advice Centre offering free and confidential advice including support if you need to make an academic appeal
- support for student peer-to-peer groups, such as Nightline.

Associated with your programme you will be able to access:

- Induction programme for orientation, introduction of the programme and staff and dissemination of materials.
- Student Handbook, including guidance on selection of study programmes.
- Access to all administrative and academic material on the Faculty, Programme and individual module web sites and/or Blackboard.
- Allocation of personal tutor to assist with organisational and personal matters. This role is taken over by the project supervisor when the research project starts.
- Careers advisor and dissemination of available job advertisements.
- Personal e-mail account and e-mail access to staff via University system.
- Faculty library and study resources.
- Access to Faculty cluster of computers with relevant specialist software.
- Formal progress monitoring during research project.
- Out of hours access to facilities including weekends.
- Support for international students.

Methods for Evaluating the Quality of Teaching and Learning

You will have the opportunity to have your say on the quality of the programme in the following ways:

- Completing student evaluation questionnaires for each module of the programme
- Acting as a student representative on various committees, e.g. Staff:Student Liaison Committees, Faculty Programmes Committee OR providing comments to your student representative to feed back on your behalf.
- Serving as a student representative on Faculty Scrutiny Groups for programme validation
- Taking part in programme validation meetings by joining a panel of students to meet with the Faculty Scrutiny Group

The ways in which the quality of your programme is checked, both inside and outside the University, are:

- Regular module and programme reports which are monitored by the Faculty
- Programme validation, normally every five years
- External examiners, who produce an annual report
- Professional body accreditation/inspection
- A national Research Assessment Exercise (our research activity contributes directly to the quality of your learning experience)
- Higher Education Review by the Quality Assurance Agency

Faculty specific:

Feedback from Student:

- There is a Staff-Student Liaison Committee for PGT Energy in the Faculty. At these meetings student concerns may be raised via the student representative for the Energy and Sustainability MSc.
- A SUSU-elected student representative of the UG and PGT programmes attends the Faculty Programme Committee meetings and brings comments and suggestions.
- The MSc Coordinator meets regularly with students during the taught component in order to deal informally with problems as they arise.
- Students are encouraged to contact the Programme Director directly if they feel this is an appropriate route.

In addition to continuous monitoring of their own modules by individual lecturers, the following processes operate within the Faculty:

- Discipline Annual Review.
- Informal subject panel (Energy) meetings twice per year take note of student feedback. In addition, a subject area is identified each year for detailed review by a working group.
- Examination question papers are all moderated by a second academic staff member before being sent to the External Examiner.

The External Examiner:

- Monitors the standard and assessment of the taught component and the research project.
- Attends the relevant Examiners' Board.
- Checks marking standards by examining a sample of scripts, assignments and dissertations.

The objective is to evaluate the standard of the programme and the achievement of students, against nationally and internationally recognised standards of excellence in the field.

Criteria for Admission

The University's Admissions Policy www.southampton.ac.uk/admissions_policy applies equally to all programmes of study. The following are the typical entry criteria to be used for selecting candidates for admission. The University's approved equivalencies for the requirements listed below will also be acceptable. The entry criteria for our programmes are reviewed annually by the Faculty. Those stated below were correct as of July 2016. Applicants should refer to their specific offer conditions on their offer letter.

Qualification	Grade/GPA	Subjects requirements	Specific requirements
Bachelor's degree	2.1	Engineering, Science, Technology, Geography, Environmental, Transportation Engineering/Management, Civil Engineering Mathematics. Other subjects may be considered on an individual basis if accompanied by evidence from relevant work experience.	

Recognition of Prior Learning (RPL)

The University has a [Recognition of Prior Learning Policy](#). This Programme is not suitable for recognising prior learning.

English Language Proficiency

As per the University's Admissions policy on English Language requirements, found here, www.southampton.ac.uk/admissions-language the requirements for this programme are:

International English Language Testing System (IELTS) – Band C

Overall	Reading	Writing	Speaking	Listening
6.5	5.5	5.5	5.5	5.5

University Commitment

The University will at all times seek to operate admissions regulations that are fair and are in accordance with the law of the United Kingdom, and the University's Charter, Statutes, Ordinances and Regulations.

This includes specific compliance with legislation relating to discrimination (e.g. Equality Act 2010) and the University's Equal Opportunities Policy Statement. This includes a commitment that the University will:

- actively assist groups that experience disadvantage in education and employment to benefit from belonging to the University
- actively seek to widen participation to enable students that do not traditionally participate in Higher Education to do so;
- ensure that admission procedures select students fairly and appropriately according to their academic ability and that the procedure is monitored and regularly reviewed.

We welcome applications from candidates who are enthusiastic about and committed to their studies. To be accepted on the programme, you should have a good record of academic achievement (see below) in a subject or subjects that provide an appropriate academic background. Applications are not restricted to candidates with first degrees in specific subjects; all applicants

are considered individually. Applications from mature candidates and candidates resident in other European countries and overseas are welcome and will be considered on an individual basis. We welcome discussion of your individual needs should you have any concerns about your fitness to undertake the full programme of study.

Our normal entry criteria include:

- First degree in an appropriate discipline (e.g. physical sciences, engineering) with upper second class honours and awarded by a UK Higher Education Institution, or:
- Qualifications equivalent to upper second class UK honours degrees from recognised Higher Education Institutions in Europe and Overseas, in an appropriate discipline.
- Satisfactory references from two referees, including at least one referee able to provide an appraisal of the candidate's suitability for postgraduate academic study.

Additional requirements:

- If your first degree qualifications do not meet the prescribed levels, other evidence from relevant work experience may be taken into account.
- Candidates whose first language is not English must also satisfy the University's English Language requirements.

- Applicants are normally expected to have A-level maths at grade C or above. An appropriate level of achievement in mathematics modules taken as part of a bachelors degree programme can be acceptable in some cases.

Note that applications are individually assessed, and if you do not match the standard profile but have a lower academic qualification with extensive experience in the Civil Engineering sector, then you are encouraged to apply.

Equality and diversity:

In accordance with the University's Equality and Diversity Policy, all reasonable effort will be made to ensure that no prospective or existing student is treated less favourably on the grounds of age, race, colour, nationality, ethnic origin, creed, disability, HIV status, sexual orientation, gender, marital or parental/carer status, political belief or social or economic class, or any other type of discrimination.

Disabled applicants will be treated according to the same procedures as any other applicant with the added involvement of Enabling Services to assess their needs. The programme may require adaptation for students with disabilities (e.g. hearing impairment, visual impairment, mobility difficulties, dyslexia), particularly the practical laboratory sessions, and we will attempt to accommodate students wherever possible.

Career Opportunities

After successfully graduating from this MSc programme, you may consider a career path in the energy industry, for example with large energy utilities or with new and renewable energy consultancies. Depending on the Pathway chosen, you might also find employment with Infrastructure and Engineering consultants, or in Architecture. Another set of options would be employment in Government departments and public bodies, formulating policy and giving advice in this topical and controversial field.

External Examiners(s) for the programme

Name	Dr Dan Brett
Institution	UCL

Students must not contact External Examiner(s) directly, and external examiners have been advised to refer any such communications back to the University. Students should raise any general queries about the assessment and examination process for the programme with their Course Representative, for consideration through Staff: Student Liaison Committee in the first instance, and Student representatives on Staff: Student Liaison Committees will have the opportunity to consider external examiners' reports as part of the University's quality assurance process. External examiners do not have a direct role in determining results for individual students, and students wishing to discuss their own performance in assessment should contact their personal tutor in the first instance.

Please note: This specification provides a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if s/he takes full advantage of the learning opportunities that are provided. More detailed information can be found in the programme handbook at <http://www.southampton.ac.uk/student-services/academic-life/faculty-handbooks.page> and at http://www.southampton.ac.uk/engineering/postgraduate/taught_courses/engineering/msc_energy_and_sustainability_buildings.page?

MSc Energy and Sustainability – Energy, Resources & Climate Change

Appendix 1

Programme Structure

The information within this Appendix is liable to change in minor ways from year to year. It is accurate at the time of writing.

This Program consists mainly of **compulsory** modules

Module code	Title	Semester	ECTS/CATS
CENV6090	Energy Resources and Engineering	SEM 1	7.5/15
CENV6147	Climate Change, Energy and Settlements	SEM 1	7.5/15
FEEG6025	Data Analysis and Experimental Methods for Civil and Environmental Engineering	SEM 1	7.5/15
SESG6041	Introductions to Energy, Environment and Sustainability	Non-Standard SEM 1	7.5/15
ENVS6033	Geographical Information Systems	SEM 2	7.5/15
CENV6085	Waste Resource Management	SEM 2	7.5/15
CENV6141	Bioenergy	SEM 2	7.5/15
FEEG6012	Research Project (Core)	Full Academic Year	30/60

You will be required to select one of the following:

Module code	Title	Semester	ECTS/CATS
CENV6145	Climate Design of Buildings and Cities	SEM 2	7.5/15
CENV6148	Energy Performance of Buildings	SEM 2	7.5/15

MSc Energy and Sustainability – Energy, Environment and Buildings

Appendix 2

Programme Structure

The information within this Appendix is liable to change in minor ways from year to year. It is accurate at the time of writing.

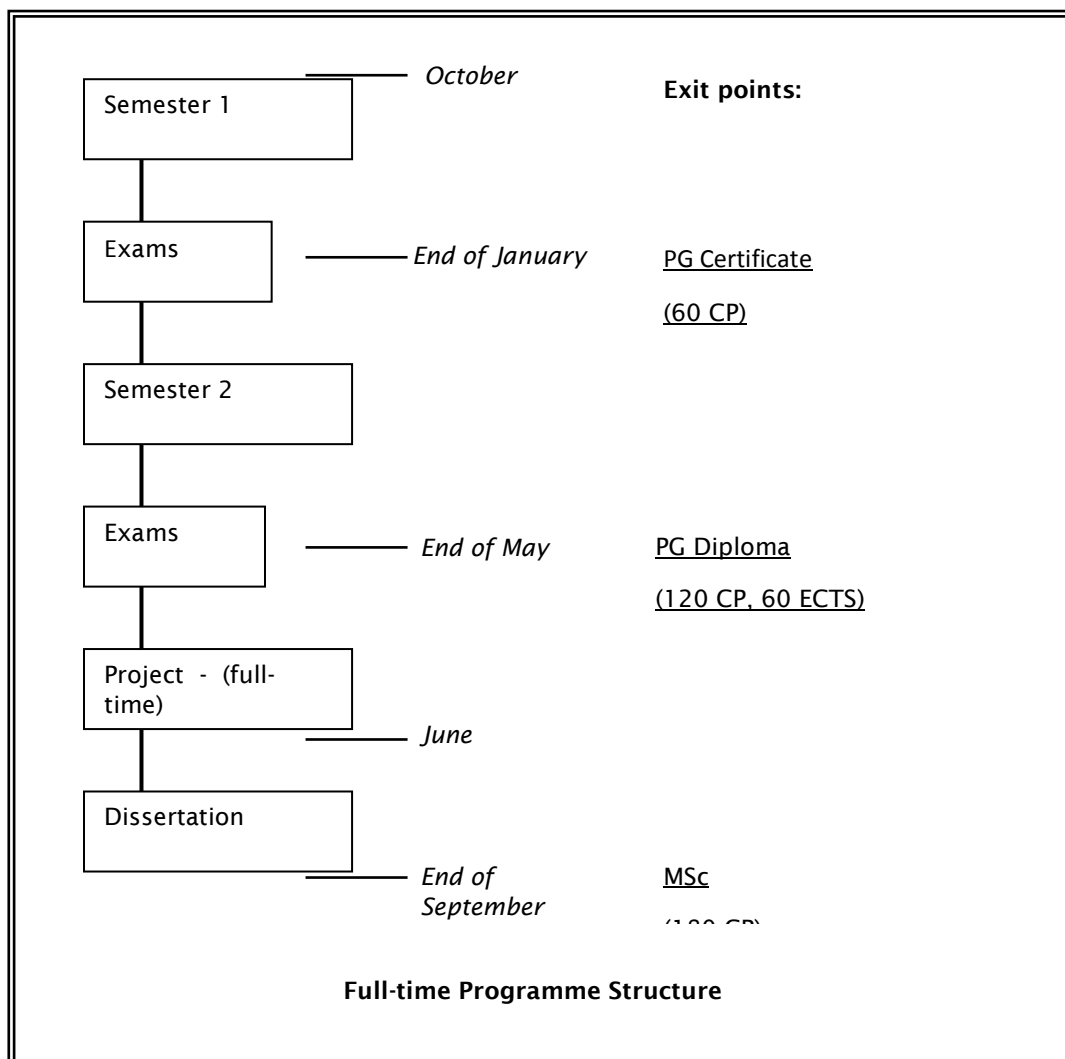
This Program consists mainly of **compulsory** modules

Module code	Title	Semester	ECTS/CATS
CENV6090	Energy Resources and Engineering	SEM 1	7.5/15
CENV6147	Climate Change, Energy and Settlements	SEM 1	7.5/15
FEEG6025	Data Analysis and Experimental Methods for Civil and Environmental Engineering	SEM 1	7.5/15
SESG6041	Introductions to Energy, Environment and Sustainability	Non-Standard SEM 1	7.5/15
ENVS6033	Geographical Information Systems	SEM 2	7.5/15
CENV6145	Climate Design of Buildings and Cities	SEM 2	7.5/15
CENV6148	Energy Performance of Buildings	SEM 2	7.5/15
FEEG6012	Research Project (Core)	Full Academic Year	30/60

You will be required to select one of the following:

Module code	Title	Semester	ECTS/CATS
CENV6141	Bioenergy	SEM 2	7.5/15
CENV6085	Waste Resource Management	SEM 2	7.5/15

The MSc award depends on passing the examinations and on successful completion of a dissertation on the project. The diagram below shows the overall structure and alternative exit points.



Revision History

1. February 2008 (MH)
2. Updated regulations March 2013 (D Mead)
3. Updated March 2014 (CQA)
4. CQA_130614
5. CQA_FPC_addition_of_disclaimer_statement_Aug_2015
6. Update to Programme Overview (CMA changes) - September 2015
7. Annual textual updates - CQA - August 2016

Appendix 3:

Additional Costs

Students are responsible for meeting the cost of essential textbooks, and of producing such essays, assignments, laboratory reports and dissertations as are required to fulfil the academic requirements for each programme of study. In addition to this, students registered for this programme typically also have to pay for the items listed in the table below.

In some cases you'll be able to choose modules (which may have different costs associated with that module) which will change the overall cost of a programme to you. Details of such costs will be listed in the Module Profile. Please also ensure you read the section on additional costs in the University's Fees, Charges and Expenses Regulations in the University Calendar available at www.calendar.soton.ac.uk.

Main Item	Sub-section	PROGRAMME SPECIFIC COSTS
Approved Calculators		Candidates may use calculators in the examination room only as specified by the University and as permitted by the rubric of individual examination papers. The University approved models are Casio FX-570 and Casio FX-85GT Plus. These may be purchased from any source and no longer need to carry the University logo.
Stationery		You will be expected to provide your own day-to-day stationary items, e.g. pens, pencils, notebooks, etc). Any specialist stationery items will be specified under the Additional Costs tab of the relevant module profile.
Textbooks		<p>Where a module specifies core texts these should generally be available on the reserve list in the library. However due to demand, students may prefer to buy their own copies. These can be purchased from any source.</p> <p>Some modules suggest reading texts as optional background reading. The library may hold copies of such texts, or alternatively you may wish to purchase your own copies. Although not essential reading, you may benefit from the additional reading materials for the module.</p>
Materials and Equipment	Design equipment and materials:	Standard construction/modelling materials will be provided where appropriate, unless otherwise specified in a module profile.

Main Item	Sub-section	PROGRAMME SPECIFIC COSTS
		<p>For customisation of designs/models calling for material other than standard construction/ modelling materials, students will bear the costs of such alternatives.</p> <p><u>FEEG6012</u> Reasonable expenses for travel and materials of up to £300 may be reclaimed through the Faculty Student Office. For project costs in excess of £300 students should discuss possible sources of funding with their supervisor and should not proceed with any expenditure until a further funding source has been agreed. http://www.southampton.ac.uk/engineering/undergraduate/modules/feeg6012_msc_research_project.page?</p>
Clothing	Lab Coats	
	Protective Clothing: Hard hat; safety boots; hi-viz vest/jackets;	
	Fieldcourse clothing:	You will need to wear suitable clothing when attending fieldcourses, e.g. waterproofs, walking boots. You can purchase these from any source.
Printing and Photocopying Costs		<p>In some cases, coursework and/or projects may be submitted electronically. Where it is not possible to submit electronically students will be liable for printing costs, which are detailed in the individual Module Profile.</p> <p><u>FEEG6012</u> Students are expected to cover the costs associated with the printing and binding of reports, including any drawings and graphic presentations. Two copies will need to be submitted. Depending on the quality of printing and binding chosen students can expect to pay approximately £25-30 per copy, totalling approximately £50-60 for both copies. http://www.southampton.ac.uk/engineering/undergraduate/modules/feeg6012_msc_research_project.page?</p>
Fieldwork: logistical costs	Accommodation:	
	Insurance	
	Travel costs	

Main Item	Sub-section	PROGRAMME SPECIFIC COSTS
	Immunisation/vaccination costs	
	Other:	<p><u>ENVS6033</u></p> <p>The cost of travel, accommodation and required safety equipment, along with breakfast and dinner if required, will be paid for by the University.</p> <p>Costs to you: You will need to provide and wear your own suitable clothing when attending field courses, e.g. waterproofs, walking boots. You can purchase these from any source and costs will vary depending on your preference. You will be expected to purchase your own lunch and any additional refreshments.</p> <p>http://www.southampton.ac.uk/engineering/undergraduate/modules/envs6033_gis_for_engineers.page?</p>
Optional Visits (e.g. museums, galleries)		Some modules may include additional optional visits. You will normally be expected to cover the cost of travel and admission, unless otherwise specified in the module profile.