

Quality Assurance

Masters, Postgraduate Diploma, Postgraduate Certificate in Environmental Sustainability and Green Technology

Programme Specification Template: Postgraduate

Information for students: the programme specification is the definitive document summarising the structure and content of your degree programme. It is reviewed and updated every year as part of Keele's Curriculum Annual Review and Development process. The document aims to clarify to potential and current students what you can expect from the study of the subject over the course of your programme.

Names of programme(s):	MSc Environmental Sustainability and Green Technology
Mode of study:	Full time / part time
Framework of Higher Education Qualification (FHEQ) level of final award:	Level 7 (Postgraduate Masters)
Duration:	One year full time / two years part time

Details of professional, statutory and regulatory body (PSRB):



This programme is accredited by IEMA (The Institute of Environmental Management & Assessment). Students who successfully complete this course automatically qualify for GradIEMA professional status which is recognised in the marketplace. Students can also fast track to PIEMA (Practitioner Status) on completion of a work based competence assessment.

External Examiner(s) names: Dr Phillip Murphy (University of Leeds). See <http://www.keele.ac.uk/qa/externalexaminers/> for more details.

1. What is the philosophy of the Programme?

The world is facing increasing environmental threats which are posing severe scientific, social and economic challenges to the human race. These challenges include: the depletion of natural resources, the loss of diversity and the need to develop new forms of energy generation whilst efficiently utilising existing energy sources. Tackling these environmental problems and establishing a sustainable environment requires the adoption of appropriate policies and managerial strategies. The interdisciplinary nature of this postgraduate course provides a broad understanding of these environmental problems whilst embedding the appropriate specialist scientific, managerial and generic skills for a career in the environmental sustainability sector.

The course incorporates Keele University's internationally recognised expertise in research and teaching on environmental issues. It is taught by a team of environmental specialists working in the fields of environmental technologies, climate change science, biological sciences, chemical science, project management, and environmental policy and politics.

The MSc in Environmental Sustainability and Green Technology is designed to provide an interdisciplinary understanding of environmental challenges whilst giving the opportunity to specialise in several sustainability themes related to geosciences, energy generation, biological science, green information technology, environmental policy and politics, and project management. The course is designed to allow students to develop a portfolio of knowledge, experience and skills strongly aligned to support their career aspirations.

Successful students will gain:

- An understanding of knowledge in the areas of science, technology, policy and green political theory relevant to environmental sustainability
- Experience in analytical and computer techniques which would allow them to contribute to the solving of environmental challenges
- A conceptual understanding to evaluate critically current research and advance scholarship in environmental sustainability
- A comprehensive understanding of experimental design, planning and scientific techniques within a research project
- Problem-solving and team-working skills relevant to the implementation of sustainable technologies and policies

Engagement with this programme will enable you to further develop your intellectual, personal and professional capabilities. At Keele, we call these our ten Graduate Attributes and they include independent thinking, synthesizing information, creative problem solving, communicating clearly, and appreciating the social, environmental and global implications of your studies and activities. Whilst you will undoubtedly have already developed these skills and abilities to varying degrees, such existing capabilities can always be deepened and enriched. Our educational programme and learning environment is designed to help you to develop further as a well-rounded postgraduate who is capable of making a positive and valued contribution in a complex and rapidly changing world, whichever spheres of life you engage in during and after your studies at Keele.

Our unique interdisciplinary course leads our graduates into a diverse range of careers. Graduates from this programme have chosen careers in research; in local, regional and national government; multi-national corporations; environmental consultancies and charities. For more information on what our graduates are doing now, visit: <https://www.keele.ac.uk/gge/applicants/postgraduatetaughtpgtcourses/msc-esgt/employmentcasestudies/>.

2. How is the Programme taught?

The course can be completed as a full time course over one year or as a two-year part time programme. Students can start the course either at the start of Semester 1 or at the start of Semester 2. The MSc programme comprises eight taught 15-credit modules and a 60-credit research project, which is undertaken either at Keele University, or in collaboration with an external industrial or public sector collaborator. This structure allows students to obtain a postgraduate certificate (60 credits) or a postgraduate diploma (120 credits) depending on the number of modules studied. Modules are assessed by assignment and/or examination. The research project is based on the submission of a 15-20,000 word report that is undertaken by the student in conjunction with an academic supervisor and, where appropriate, an industrial collaborator.

The course is structured into two taught terms and one term where students complete an independent research project and dissertation. The taught component is underpinned by a foundation of core modules covering sustainable technologies and environmental politics, academic and research skills, project planning and management. These modules equip students with relevant analytical and management skills and knowledge necessary to complete their research project under the supervision of a Keele member of the teaching and research staff and, where appropriate an external collaborator from industry.

Students specialise by choosing from a range of options that align their skills and knowledge with their career aspirations. Interdisciplinary combinations are encouraged. Lectures are delivered by staff experienced in relevant research and teaching areas and external experts and industry leaders. This provides students with a real-world context and commercial awareness that enhances their employability. Student-led learning in Case Studies provides the necessary teamwork and problem-solving skills to formulate strategies to address a range of environmental and sustainability challenges.

Virtual support is provided throughout the course. Learning resources and support are made available online via the Keele Learning Environment (KLE).

The course is delivered by Course Director, Dr Sharon George, <http://www.keele.ac.uk/gge/people/sharongeorge/> and the core teaching team:

Professor Chris Fogwill, <https://www.keele.ac.uk/gge/people/chrisfogwill/>,
 Dr Deirdre McKay, <https://www.keele.ac.uk/gge/people/deirdremckay/>,
 Dr Phil Catney, <http://www.keele.ac.uk/spire/staff/catney/>,
 Professor Brian Doherty, <http://www.keele.ac.uk/spire/staff/doherty/>,
 Dr Mario Prost, <http://www.keele.ac.uk/law/people/academicstaff/marioprost/>,
 Dr Dave Scrivener, <http://www.keele.ac.uk/spire/staff/scrivener/>,
 Dr Peter Thomas, <https://www.keele.ac.uk/lifesci/people/peterthomas/>,
 Dr Sarah Taylor, <https://www.keele.ac.uk/lifesci/people/sarahtaylor/> ,
 Dr Jamie Pringle, <https://www.keele.ac.uk/forensic/people/pringle/>,
 Dr Glenda Jones, <https://www.keele.ac.uk/gge/people/>,
 and sessional lecturer, Dr Simon George.

All academic staff are active in relevant research areas and many are involved in collaborations, consultancy work and strategic developments with industrial and commercial development of energy and clean technology nationally and internationally. In addition, many staff are involved in outreach, public engagement and media activities.

3. What is the Structure of the Programme?

The structure of the module is as follows:

Term 1		Term 2		Term 3
Core (2 x 15 credits)	Option (choose 2) (2 x 15 credits)	Option (choose 2) (2 x 15 credits)	Core (2 x 15 credits)	Core (60 credits)
ESC-40034 An Introduction to Sustainable Technologies	ESC-40031 Clean & Green Technologies I: Power from Above the Earth	ESC-40032 Clean & Green Technologies II: Power from Beneath the Earth	ESC-40030 Case Studies in Sustainability	ESC-40029 Research Project & Dissertation
	LSC-40026 Trees, Forests & Global Change Lecture	GEG-40006 Economic Development & Environmental Transformation		
PIR-40106 Dimensions of Environmental Politics	ESC-40015 Natural Hazards	ESC-40047 Green IT	ESC-40048 Research & Business Skills, Project & Portfolio Management	
	LAW-40043 International Environmental Law	ESC-40060 Climate Change Science		
60 credits: PG certificate				
120 credits: PG diploma				
180 credits: MSc				

In exceptional cases, students can elect to take 3 x 15 credit modules from either Term 1 or 2 and 1 x 15 credit module in the other. *Details of individual modules can be viewed online at:*

<http://www.keele.ac.uk/qge/students/mscenvironmentalsustainabilitygreentechnology/>

The pass mark for postgraduate modules is 50%. Successful completion of modules worth a total of 60 credits leads to the award of a Postgraduate Certificate in Environmental Sustainability & Green Technology. Students must attain all 60 credits to proceed from the Postgraduate Certificate to Postgraduate Diploma stage. Successful completion of semester 1 and semester 2 modules leads to the award of a Postgraduate Diploma in Environmental Sustainability & Green Technology. Students must attain at least 120 credits to proceed from the Postgraduate Diploma to Master's degree stage. Successful completion of all modules leads to the award of Master of Science in Environmental Sustainability & Green Technology. Within the MSc qualification three grades are possible – Pass, Merit and Distinction. A distinction is awarded subject to the following condition: an average mark of 70% or more + 70% or more in the dissertation. Certificates and Diplomas **are not** awarded with distinction and students progressing through the stages cannot claim interim awards nor use the award letters after their names.

Learning Outcomes	Modules in which these are delivered	Principal forms of assessment (of the Learning Outcome) used
1. Demonstrate an understanding of knowledge in the areas of science, technology, policy and green political theory relevant to environmental sustainability	ESC-40034 An Introduction to Sustainable Technologies ESC-40031 Clean & Green Technologies I: Power from Above the Earth ESC-40032 Clean & Green Technologies II: Power from Beneath the Earth ESC-40015 Natural Hazards PIR-40106 Dimensions of Environmental Politics ESC-40030 Case Studies in Sustainability ESC-40029 Research Project & Dissertation LAW-40043 International Environmental Law ESC-40047 Green IT LSC-40026 Trees, Forests and Global Change	<ul style="list-style-type: none"> o Dissertation project plan o Unseen exam o Oral presentation o Poster presentation o Dissertation o Reflective diary o Literature review o Essay
2. Demonstrate competency using analytical and computer techniques which would allow them to contribute to the solving of environmental challenges	ESC-40047 Green IT ESC-40034 An Introduction to Sustainable Technologies ESC-40048 Research & Business Skills, Project & Portfolio Management ESC-40029 Research Project & Dissertation	<ul style="list-style-type: none"> o Dissertation project plan o Research proposal o Project plan and scope o Oral presentation o Dissertation o Essay o Reflective diary o Literature review o Unseen exam
3. Use a conceptual understanding to critically evaluate current research and advance scholarship in environmental sustainability	ESC-40029 Research Project & Dissertation ESC-40048 Research & Business Skills, Project & Portfolio Management ESC-40060 Climate Change Science	<ul style="list-style-type: none"> o Dissertation project plan o Research proposal o Project plan and scope o Dissertation o Literature review o Journalistic article
4. Apply a comprehensive understanding of experimental design, planning and scientific techniques within a research project	ESC-40029 Research Project & Dissertation ESC-40048 Research & Business Skills, Project & Portfolio Management	<ul style="list-style-type: none"> o Dissertation project plan o Research proposal o Project plan and scope o Dissertation o Literature review

5. Use problem-solving and team-working skills relevant to the implementation of sustainable technologies and policies	ESC-40029 Research Project & Dissertation ESC-40048 Research & Business Skills, Project & Portfolio Management ESC-40047 Green IT ESC-40015 Natural Hazards	<ul style="list-style-type: none"> o Research proposal o Oral presentation o Dissertation o Reflective diary o Literature review
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4. How is the Programme assessed?

The variety of assessment in the course ensures students develop employability, research and academic skills, appropriate for a career in research or industry. The assessments promote independent learning, student autonomy and responsibility for personal learning and the development of problem solving skills. Students are tested on more than just their ability to recall information but are taught to develop their ability and confidence in contextualising and using information to solve problems and to discuss complex issues related to sustainability and energy.

The use of essays and written assessments in several modules and a literature review in the Dissertation module gives the students experience in forming academic literacy skills in professional writing, critical evaluation of peer reviewed articles, finding, evaluating and applying information and articulating knowledge.

Presentation skills are important for employability. These are developed and evidenced through the use of oral and poster presentations. This enables students to demonstrate an understanding of knowledge in the areas of science, technology, policy and green political theory relevant to environmental sustainability. Students taking ESC-40060, Climate Change Science, present a complex topic in a journalistic article developing their ability to articulate leading developments in geoengineering effectively and concisely to a public audience.

Research design and project management are key skills in both academia and industry. The Research & Business Skills, Project & Portfolio Management module involves one assessment where students design and submit for assessment a detailed project scope and plan based on a commercial development of green technology and another via the JES online research proposal submission system where students prepare a full research proposal for submission to EPSRC. These two assessments introduce the student to the process and level of detail needed to compete for funding.

The Dissertation module represents the culmination of the programme, providing an opportunity for students to combine key learning outcomes from across the programme and to begin to take real responsibility for the formulation, management, conductance and final interpretation and presentation of a new piece of scientific research.

Reflection is a key tool employed by practicing professionals to evidence their professional development and to identify areas for further development. Students submit a reflective essay during the Case Studies module which allows space to digest and contextualise theoretical and general information during lectures, site visits, class debates around ethically controversial issues related to energy development and sustainability, and class presentations on specific issues. This reflective essay allows the student to articulate their own thoughts and ideas on the subject matter covered in the module and for them to identify their skills and knowledge gaps for further development.

Students build confidence and competency via informal assessment feedback, both written and verbal, on performance throughout the course during student-led debates, presentations and during a non-assessed field course to North Wales where students carry out field-work in a supported environment and without formal assessment. In addition students submit their KUSP for formative assessment.

5. What are the typical admission requirements for the programme?

It is expected that applicants will already hold an honours degree in a scientific discipline appropriate to the chosen research project area although consideration will be given to related programmes. The minimum degree category for entry onto this programme is 2:2, in line with the 50% pass mark required for successful completion of this course. Consideration will be given to candidates who do not meet these criteria, but can evidence appropriate, alternative professional qualifications and/or experience. Applicants who have not had their secondary or tertiary education through the medium of English are expected to have attained the equivalent of an IELTS score of at least 6.5 (with no sub-test lower than 5.5) from an IELTS provider which is approved by Keele University (<https://www.keele.ac.uk/study/postgraduatestudy/apply/>).

6. How are students supported on the programme?

The Course Director, Dr Sharon George is responsible for overseeing the course and organising induction sessions for new students. This includes introductory talks on content, teaching and assessment methods during the course, points of contact for support, library services, avoiding plagiarism, procedures for accessing support and how to access and use the KLE, including a mock assignment so students can gain experience in using the KLE and receiving feedback. This reassures students and sets out clear expectations to students about academic standards and conduct and responsibilities of staff and students. After this initial introduction, students can contact the Course Director directly about problems and concerns either directly during agreed office hours, by appointment and/or by email and telephone.

Each student has access to a personal tutor who acts as an important point of contact for general advice and guidance on academic and career development and other pastoral issues. Tutors meet with their tutees in the first week and at regular points during the course offering advice and support and signposting to other specialist support services in the University where appropriate. The tutor system is run in accordance with the University's Code of Practice for Personal Tutoring which can be seen at: <https://www.keele.ac.uk/personaltutoring/> .

Module leaders are available either directly or indirectly via email for module-specific problems. One-to-one meetings can be arranged as necessary for student consultation. It is the responsibility of module leaders to ensure that appropriate feedback is provided to all students regarding both formative and summative assessment. They will ensure that such feedback is of a high quality and delivered in a timely fashion.

Students are assigned a supervisor and a co-supervisor during the Dissertation module. This ensures that consistent supervision can be provided during the summer months when the dissertation project is carried out even if a supervisor is away for extended periods, for example, on fieldwork. In line with modern and sustainable practices supervision meetings can also be conducted via videoconferencing which can reduce carbon footprint from travel and also allows for continuity of supervision if the supervisor is away or the student has a remotely-based project.

Students are encouraged to participate in the Student Staff Voice Committee (SSVC). This is a student voice mechanism that gives student representatives, elected by their peers, an opportunity to give valuable feedback on the course content and delivery. All students are entitled and encouraged to make use of all central university services, including the Keele Postgraduate Association.

7. Learning Resources

The programme is taught in modern teaching rooms across the University which have computers, internet access and projection equipment. Rooms may be arranged either in traditional lecture format or more informally to allow students to work together in small groups. Much of the teaching for the MSc in Environmental Sustainability & Green Technology takes place at the Keele University Sustainability Hub in the inspiring Home Farm Complex. Students have access to flexible teaching spaces, a dedicated computer suite and a range of rooms for study and group study with Wi-Fi access. Students are also able to interact with the on-site technologies including:

- Solar thermal and PV
- Climate control, underfloor heating and smart lighting systems
- Rainwater harvesting and waterless urinals
- Ground source heat via six one hundred meter boreholes in the Hub courtyard
- Bio-fuel woodchip burner
- Vertical axis wind turbine

The Sustainability Hub acts as a focus for the research into, teaching of, and management of sustainability and green technology that takes place at Keele University.

The Course Handbook provides information and guidance on procedures, module information and points of contact for advice. Individual module handbooks provide a recommended reading list, which comprise both traditional text-based resources and a range of electronic multimedia resources that are accessed through the KLE. Discussion boards available on KLE are also used to enhance student the student experience, learning and support during the period of engagement and provide a forum for the exchange of ideas and discussion of issues that arise.

Talks are given by guest speakers from industry and the public sector on a range of issues from policy and economics to technology challenges. This gives the students a commercial awareness that enhances their employability and gives them insight to help them make informed decisions on career development.

The Library has many resources relevant to the course, both on campus and online. Further information about the library can be found at: <https://www.keele.ac.uk/library/>. Students obtain a username and password from the computer helpdesk in order to access online library services. Students are encouraged to build a research profile on sites such as www.researchgate.net, useful networking tools and sources of published peer-reviewed literature. Students have access to the IT Services at the University located in the library building. IT Services is responsible for the computing infrastructure in the university and for the support of all staff and students undertaking academic computing tasks. There is a large number of open access PCs available for students. All student PCs use a standard platform, which includes software such as Microsoft Office, web browsers, and other standard applications you may need. Printing facilities are available either in Schools or in the library building.

8. Other learning opportunities

Students are encouraged to take full advantage of the research seminar opportunities taking place in the School or across the University. In addition, students are encouraged to work with external collaborators during their dissertation project.

Students are invited to attend a three day field course to North Wales, staying at Bangor University and visiting key sites around the region including Parys Mountain copper mine, Electric Mountain hydropower scheme and other relevant sites depending on availability of venues. There is no additional cost for this visit. Details of the trip are provided to students via a hardcopy handbook.

Individual taught modules can be accessed as CPD modules and students completing individual components can gain credits towards a higher qualification.

9. Quality management and enhancement

The MSc in Environmental Sustainability and Green Technology Programme Board, chaired by the Programme Director, Dr Sharon George, is made up of academic staff teaching on the programme representing all modules on the course. This group, responsible for the day to day management of the programme meets once a semester. The group reports to the Head of the School of Geography, Geology and the Environment.

To ensure that the MSc programme maintains the highest possible standards and ensures the effective management and continuous enhancement of the quality of learning and teaching, the following procedures are employed:

- Student evaluation of teaching; students have the opportunity to evaluate each module and the programme as a whole. Data from the evaluations is reported at regular programme board meetings.
- Staff Student Voice Committee; this is an integral part of the monitoring and review procedures and provides a valuable source of management data for the programme team.
- Learning and Teaching Committee meetings; the Programme Board is an integral part of the School of Geography, Geology and the Environment's Learning and Teaching Committee. This committee meets on a regular basis and is responsible for the continual reviewing and monitoring of quality management and enhancement procedures and activities across the School.
- Peer observation of teaching; the staff responsible for delivering the programme undertake regular peer observation of teaching that is used to identify teaching strengths and areas of development.
- Annual Programme Review; individual modules and the programme as a whole are reviewed and enhanced every year as part of the University's Curriculum Annual Review and Development (CARD) process. A range of data is used to inform the annual programme review, it comprises student evaluations, external examiners report and internal programme review and monitoring data.
- The programme will be run in accordance with all applicable policies and will be reviewed as part of the Internal Quality Audit for the School of Geography, Geology and the Environment, which takes place every five years.
- All programmes in the Faculty of Natural Sciences are supported by a Director of Postgraduate Taught Programmes who represents PGT students at Faculty and University levels.
- The School of Geography, Geology and the Environment currently holds an Athena SWAN Bronze Award for commitment to recruiting and progressing women in science, engineering and technology (SET)
- The course is evaluated and accredited by the Institute of Environmental Management and Assessment.

Mechanisms for review and evaluation of teaching, learning, assessment, the curriculum and outcome standards

- Subject area reviews (Geography, Geology and the Environment and SPIRE)
- Course Committee review
- External examiner review

Committees with responsibility for monitoring and evaluating quality and standards

- Student Staff Voice Committee (2 staff members, min 2 student representatives): meets once per semester; minutes go to MSc Programme Board.
- MSc Programme Board (all MSc teaching staff); meets four times per year; minutes go to School Learning & Teaching Committee
- Board of Examiners (all teaching staff, External Examiner for final meeting only): meets three times per year

Mechanisms for gaining student feedback on the quality of teaching and their learning experience

- Staff-Student Liaison Committee
- Questionnaire evaluation of modules
- Informal ad-hoc feedback to Module Leaders and Course Director

The External Examiner

A single senior member of academic staff from another university is appointed by the University's Senate to act as an External Examiner on all the programmes. The primary function of the External Examiner is to:

- Participate in all summative assessments including approving examination questions, ratifying course work marks and confirming all marks that contribute to a student's final award

- Arbitrate or adjudicate on problem cases such as the rare occasions where there is a substantial disagreement between first, second and third markers
- Review and offer practical advice on the programme content, balance and structure, and assessment procedures

Our current external examiner is Dr Phillip Murphy from the University of Leeds.

10. The principles of programme design

The aims of the MSc are based on the Quality Assurance Agency's (QAA) descriptors for Masters Level qualifications in the 2008 Framework for Higher Education Qualification in England, Wales and Northern Ireland, which can be found at: https://www.qaa.ac.uk/docs/qaa/quality-code/academic-credit-framework.pdf?sfvrsn=940bf781_12

The course is designed and operates in terms of teaching and learning in accordance with the University regulation C7 on Modular Postgraduate Courses: <https://www.keele.ac.uk/regulations/regulationc7/>.

The ethos and impact of the course are closely aligned with the University's Strategic aims.

- **Strategic Aim 2:** Through the Distinctive Keele Curriculum provide high quality discipline-based education and a unique portfolio of personal development in the context of a sector leading student experience
- **Strategic Aim 4:** To contribute positively to the society, economy, culture, health and well-being of the communities we serve
- **Strategic Aim 5:** To promote environmental sustainability in all that we do

In addition the course supports the University Strategic Objectives by engaging employers to ensure timely, commercially relevant content with a basis in practice and management. Students develop high level employability and research skills through Research and Business Skills and the Dissertation module. IT skills development is integrated into the course through the specific Green IT module and also the use of modelling software and online communication and presentation tools such as Skype and Google Hangout. This high level of IT competency, project management and professional working is developed during the teaching phases of the course then practiced in the dissertation phase when students work either independently on a given topic or in collaboration with external employers often on strategic plans related to energy and/or community project development.

More information on our Learning and Teaching Strategy can be found at:

www.keele.ac.uk/strategicplan/learningandteachingstrategy

11. Programme Version History

Version History	Date	CHANGES / NOTES
Date first created (if known)	October 2009	
Date last reviewed / revised	14/09/2018	Revised to reflect current modules offered Staff list updated Addition of IEMA accreditation information
Last reviewed by ?	Dr Sharon George	
Date last approved at SLTC	12/09/2018	
Date last approved at FLTC	27/03/2015	