Soils and Sustainability
Course Overview

2015 is an exciting year for soil scientists and students alike, as it has been endorsed as the International Year of Soils. The aim of this is to provide a platform to raise awareness of the importance of sustainable soil management, recognising the wide array of services soils provide. Soils form the basis of all agricultural production, but they also store water, mediate the impact of pollutants, provide biological habitats, have an impact on the accumulation of greenhouse gases in our atmosphere, are involved in dealing with society’s waste, are a source of extractable minerals and provide the foundations for housing and roads that today’s societies depend on.

Soils and their sustainable use lie at the heart of the debate regarding food security. In order to feed a growing global population, it will be critically important to maintain and enhance our natural resource base, of which soils are a vital and non-renewable component. In many parts of the world soil degradation has resulted in loss of productive capacity, and reduction in the ability of soils to provide a wide range of ecosystem services. By contrast, enhancement of soil properties can result in increased productivity alongside improvements in a range of societal benefits such as carbon sequestration, and the buffering and storage of pollutants.

A recent report by the BBSRC identified soil science is an area in which there are critical skills shortages. The British Society of Soil Science is also highly supportive of educational initiatives that support the training of soil scientists in the UK. Although it is generally recognised that soil science is a somewhat specialised discipline at undergraduate level, the provision of Masters courses in this area is highly appropriate given the need for students entering this discipline to have a general scientific background, and appreciation of the application of soil science to a range of stakeholders.

Edinburgh is a unique location to study Soils and Sustainability: there is a long history of collaboration between SRUC, Edinburgh University, major research institutes such as the Centre for Ecology and Hydrology (CEH), the Soils Association, the Contaminated Land Research and Reclamation Centre (CLARRC), and regulatory agencies such as the Scottish Environmental Protection Agency (SEPA). Within these organisations there is a wealth of both research and consultancy expertise, on land use, land contamination, food systems and farming. We make full use of this excellent base for both the taught and the dissertation components of this course.

On completion of the course graduates will:

- Be equipped to provide specialist knowledge and understanding of the nature of soils and their evaluation.
- Have the ability to carry out soil sampling and assessment of soil chemical, physical and biological characteristics.
- Have an understanding of the function of soils in relation to sustainable land use and societal needs.
- Have the ability to integrate relevant knowledge in the development of effective management strategies for sustainable soil management.
- Have gained key analytical skills and critical thinking.
Programme Structure

The taught component of the course, leading to the PgDip, comprises six modules studied over a period of nine months, starting in September. The MSc Programme is made up of core modules, together with recommended and elective modules chosen with the approval of the Director of the programme. Students progressing to the MSc will undertake a further three month period of directed study leading to the production of a dissertation in late August.

The study tour, which takes place in the Spring, is also an integral part of the programme. If you are a part-time student, you can discuss your individual programme of study with the Programme Director.

The PgDip is comprised of three compulsory modules:

**Soil Protection and Management**

In this course students learn about the major functions of soil, the challenges we face in using it and the techniques we can employ to both understand and improve sustainable soil management. The course begins with an introduction to what soil is and why we should take responsibility for it before we consider methods for evaluation of soils and land quality and use. The course covers the legislation governing soil use, why these are important and how society contribute to the maintenance and improvement of various aspects of soil quality and fertility. Management techniques to prevent land degradation by toxic element contamination, salinisation, erosion and techniques to promote restoration of contaminated and disturbed land will be considered. This course will be assessed by means of coursework and examination. The coursework will include an essay of around 3,000 words (37.5% of the total course mark) and a ten minute presentation (12.5% of the total course mark). The essay/presentation topic, on a soil protection and management theme, will be selected by the student and approved by course organiser. The examination will count for the remaining 50% of the total course mark.

**Soil Ecology and Taxonomy**

This course will allow students to gain more specific in-depth knowledge of soil biodiversity and ecology with regards to taxonomy and response to environmental change (such as erosion, acid and nitrogen deposition, and agriculture to name a few). The role that microbes play in ecosystem function and globally significant C and N fluxes will be outlined, together with the functional role of biodiversity.
Soils Science Concepts and Application

The course will provide an introduction to soil biology, physics and chemistry through a series of lectures and associated laboratory classes and field visits aimed at providing a foundation in the essential components of soil science. Students will be introduced to soil classification and techniques used in soil surveying as well as the basic lab skills required to conduct soils research, sampling analysis and reporting across the biological, chemical and physical aspects of the discipline. Students will develop an understanding of the importance of soils analysis and evaluation to sustainable use.

The Soil Science Concepts and Application course will be assessed through coursework consisting of four sets of laboratory notes (15%) and scientific paper (40%) exploring a topic pertinent to practical soil assessment.

A further four modules are chosen from a range of options:

- Environmental Geochemistry
- Geodiversity Conservation and Interpretation
- Principles of Geographical Information Science
- Project Appraisal
- Principles of Environmental Sustainability
- International Development
- Human Dimensions of Environmental Change and Sustainability
- Culture, Ethics and Environment
- Ecosystem Dynamics and Functions
- Environmental Impact Assessment
- Land Use/Environmental Interactions
- Participation in Policy and Planning
- Management of Sustainable Development
- Sustainability of Food Production
- Environmental and Natural Resource Economics
- Ecosystem Values and Management

The above modules are delivered by a range of departments across the University of Edinburgh and SRUC including the School of Geosciences and the College of Science and Engineering.

MSc Project (taken following successful completion of taught modules)

The purpose of the dissertation is to allow students to focus on an aspect relevant to the Soils and Sustainability degree programme and by completing a piece of research and presenting it in dissertation form to enhance their knowledge and skills to a professional level in the discipline.
Study Tour

An obligatory Study Tour is held between the end of the taught component of the programme and the beginning of the dissertation and normally occupies between 7 and 10 days. It may occur over the Easter vacation and as such students should consult with the Programme Director before booking trips over this period. It aims to illustrate topics covered in the taught courses, and can be taken as an elective module to provide (10 Credit points) working well with both the Analysing the Environment and Environmental Geochemistry module electives (10 Credits each).

The tour should be enjoyable as well as informative so time is set aside for cultural activities and tourism related activities such as a visit to a farmers market or white water rafting. Over the last three years this trip has taken students to the Cévennes region in the South of France for 10 days.

Entry Qualifications and Applications

Preferably a UK 2:1 honours degree, or its equivalent in any subject. Students whose first language is not English must provide evidence of proficiency in English (IELTS 7 or equivalent).

Applications for this course should be made online through the University of Edinburgh at www.ed.ac.uk/studying/postgraduate/applying

Fees and Funding 2015-16

For UK and EU students: £9,650
Overseas students: £21,350
Additional course costs (all students): £1,600

Information on funding and possible studentships can be found on the website: www.ed.ac.uk/studying/postgraduate/fees-finance
Career Opportunities

Areas where soils scientists contribute include advising on government policy, archaeological excavations and laboratory analyses, forensics, and landscape design. Government (DEFRA, RERAD) and regulatory organisations (SEPA, EA) also provide opportunities for careers for soils scientists.

Employment of conservation scientists is expected to grow by 12 per cent during the 2008-18 decade, about as fast as the average for all occupations. Demand for soil and water scientists, whose main function is providing technical expertise to farmers, will increase as the safety and sustainability of the food supply becomes more of a concern.

Student Profiles

Deirdre Kerdraon Byrne (Graduated 2013)
“The course has prepared me for my future by giving me the basic training skills that I will need for my PhD, and also by giving me the chance to meet researchers that are doing the job that I would like to do.”

Sergio Warnick (Graduated 2013)
“I would recommend Soils and Sustainability to other students 100%, it has great teachers and provides great facilities.”

Course Contact Details

For further information, please contact:

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