MSc Soils and Environmental Pollution

For students entering in 2005

Awarding Institution: The University of Reading
Teaching Institution: The University of Reading
Faculty of Science Programme length: 12 months
Date of specification: 2004
Programme Director: Dr M.E. Hodson
Board of Studies: Dr M.E. Hodson, Professor S. Nortcliff, Dr M. Wood, Dr Petra Dark, Dr Steve Robinson
Accreditation: None

Summary of programme aims

This MSc. aims to provide a thorough understanding of the key principles of Soil Science which are widely applicable to vocational specialisation in contaminated land, remediation, environmental assessment, protection and management.

Transferable skills

The following are provided: experience of Information technology, problem solving skills, research project skills, presentation and writing skills

Programme content

Module code	Module title	Credits	Level
Autumn Term			
SS3B7	Soils, Vegetation and the Atmosphere	10	3
GG333	Geographical Information Systems	20	3
SSMCON	Soil Contaminants	10	M
SSMBIO	Soil Microbiology and Biotechnology	10	M
SSMQAD	Quantitative Analysis of Spatial Data	10	M
SSMTGS	Transferable and generic skills	10	M
Spring Term			
SSMSIR	Site Investigation, and Risk Management	10	M
SSMREM	Remediation	10	M
SSMWEM	Soils, waste and Environmental Management	10	M
SSMSWQ	Soils and Water Quality	10	M
SSMTGS	Transferable and generic skills (continued)	10	M
In break between Spring and Summer terms			
SSMFC	Integrated soil science - Field Class	10	M
After 2nd set of Exams			
SSMRP	Research Project	60	M

Part time / Modular arrangements

Part time participants may either follow all the modules taught in the Autumn term in their first year and all the modules taught in the Spring term in their second year or alternatively may follow half the modules from the Autumn and Spring terms in both their first and second years. The most appropriate arrangements for individual applications will be discussed with the Course Director. Part time students will be encouraged to consider running a long-term research project over the two years that they are registered on the course but may carry out their research project in either their first or second year, again as is appropriate to there circumstances.

Progression requirements
None

Summary of teaching and assessment
Teaching is through a combination of lectures, seminars, practicals, computer-based self-taught exercises, site visits and talks by invited speakers.

Assessment is through a combination of exams, assessed practicals, essays, scientific reports and presentations.

The University's Masters classification is:

Mark	Interpretation
70 % - 100 %	Distinction
60 % - 69 %	Merit
50 % - 59 %	Pass
0 % - 49 %	Fail

In all of the above, marks below 40% in a total of 20 credits will be condoned provided that the candidate has pursued the course for the module(s) with reasonable diligence and has attempted the examination.

Students who gain an average mark of 70 or more overall including a mark of 60 or more for the dissertation and have no mark below 40 will be eligible for a Distinction. Those gaining an average mark of 60 or more overall including a mark of 50 or more for the dissertation and have no mark below 40 will be awarded eligible for a Merit.

A diploma will be awarded to candidates completing modules worth a total of 120 credits and achieving an overall average of 50 %. A certificate will be awarded to candidates completing modules worth a total of 60 credits and achieving an overall average of 50 %.

Normally candidates registered for a diploma will complete the taught courses offered in the Autumn and Spring terms and candidates registered for a certificate will complete either the taught courses offered in the Autumn or the Spring term.

Admissions requirement
Entrants to this programme are normally required to have obtained:
An upper second (2:1) in an Environmental Science-based degree

Admissions tutor: Dr J.S. Robinson. All candidates are normally interviewed by two members of staff.

Support for students and their learning
University support for students and their learning falls into two categories. Learning support includes IT Services, which has several hundred computers and the University Library, which across its three sites holds over a million volumes, subscribes to around 4 000 current periodicals, has a range of electronic sources of information and houses Student Access to Independent Learning (S@IL) computer-based teaching and learning facilities. There are language laboratory facilities both for those students studying on a language degree and for those taking modules offered by the Institution-wide Language Programme. Student guidance and welfare support is provided by Programme Directors, the Careers Advisory Service, the University's Special Needs Advisor, Study Advisors, Hall Wardens and the Students' Union.

Career prospects
On completion of this course graduates may expect to find employment in the "Environmental Sector". Previous students on the course have found employment with consultancies, government research agencies, industry and within academia.

Opportunities for study abroad or for placements
During their research projects students may carry out field work abroad. Additionally during their projects students may be based abroad or within the UK at consultancies, governmental agencies, research institutes or industrial bodies provided that the Course Director is satisfied that suitable facilities and supervision are available to them.

Educational aims of the programme
This M.Sc. aims to provide a thorough understanding of the key principles of Soil Science which are widely applicable to vocational specialisation in contaminated land, remediation, environmental assessment, protection and management. The course will provide the students with the intellectual skills required by professionals in environmental consultancy, contaminated land management and land remediation. Graduates from the course will have an in-depth knowledge of the chemical, physical and biological principles of Soil Science, experience of the major types of soil contamination, familiarity with regulatory and commercial aspects of contaminated land and land management and problem solving skills in relation to soil management and remediation.

Programme Outcomes

Knowledge and Understanding

A. Knowledge and understanding of*:*	Teaching / learning methods and strategies
1. Processes by which water and dissolved solutes are transported in soils using physical principles 2. The important chemical properties of soils, including the reasons for and consequences of the electrically charged surfaces of most soil constituents 3. Geographic information systems 4. A general understanding of the pathways of soil contamination 5. The most important groups of inorganic and organic pollutants and chemical properties and processes which govern their environmental fate 6. The major groups of micro-organisms in soils and their role in the cycling of C, N, P and S and their use in bioremediation 7. Classical and bespoke statistical methods that may be applied to environmental data 8. Key areas of environmental law and regulation in England and Wales 9. Techniques and processes involved in site investigation and risk assessment 10. Strategies and objectives of remediation 11. Sources, processing and disposal of waste materials 12. The behaviour of pollutants in soil, losses into water and current method of management to reduce the associated environmental hazards	Lectures, laboratory practicals, seminars, group discussions, videos, presentations by industrial practitioners, data handling exercises, computer based exercises *Assessment* Practical reports, examination, essays, computer and laboratory-based practicals

Skills and other attributes

B. Intellectual skills – able to:	Teaching / learning methods and strategies
1. Predict water and solute transport in soils using physical principles 2. Recognise and explain the important chemical properties of soils 3. Understand controls on mobility and availability of pollutants in soils 4. Outline the importance of micro-organisms in soil systems and their impact on the wider environment 5. Discuss key areas of environmental law and regulation in England and Wales including the impact of EU law 6. Compare and advocate remediation strategies 7. Illustrate sources of and disposal routes for industrial and domestic waste 8. Plan and carry out a research project	Lectures, laboratory and computer based practicals *Assessment* Exams (1 – 7), essays (2 – 4) , presentations (2, 3), computer practicals (1), written reports (5 – 7), project thesis and presentation (8) These skills link directly to specific modules and are assessed both during courses (see module descriptions for details) and in examinations.

C. Practical skills – able to:	Teaching / learning methods and strategies
1. Use computer packages to analysis and explain field data 2. Carry out chemical analysis of soils 3. Calculate toxic and acceptable concentrations of pollutants in soils 4. Isolate and characterise micro-organisms in soils and measure their activity 5. Analyse environmental data using classical and spatial statistical methods 6. Carry out risk assessments and site investigations 7. Describe soils in the field 8. Plan and carry out a research project	Laboratory practicals, seminars, lectures, independent research project *Assessment* Laboratory reports (1, 2, 4, 5), reports in the style of those given to clients (6), exams (3), field reports (7), project thesis and presentation (8) These skills are assessed primarily with reference to specific modules (see module descriptions for details) though (1) is also assessed more generally throughout the course.

D. Transferable skills – able to:	Teaching / learning methods and strategies
1. Produce Word documents containing tables, numbered and bulleted lists, a variety of fonts, graphics and pictures 2. Sort data and perform basic arithmetic and statistical procedures within Excel 3. Produce charts and graphs in a variety of formats using Excel 4. Produce slides for a presentation within the PowerPoint package that include text, bullet points, drawings, use of pre-set animations for the appearance of text 5. Give clear presentations on a scientific topic 6. Produce clearly written scientific reports 7. Work in teams 8. Plan and carry out research projects including managing their time in an efficient fashion	Lectures, self-taught computer packages, seminars, individual research projects, team-based presentations and research projects *Assessment* Ability to produce specimen Word documents (1), Excel charts (2, 3) and PowerPoint presentations (4), course work written and submitted in the style of scientific reports to a client (5, 6), peer-assessed contribution to team-based practicals (7), project thesis and presentation (5, 6, 8) This assessment is carried out directly (see module description dealing with transferable and generic skills) and indirectly throughout the course and forms a component of assessed course work.

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 expect to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. More detailed information on the learning outcomes, content and teaching, learning and assessment methods of each module can be found in module and programme handbooks.