UNIVERSITY OF NEWCASTLE UPON TYNE

FACULTY OF SCIENCE, AGRICULTURE & ENGINEERING

DEGREE PROGRAMME SPECIFICATION

1.	**Awarding Institution**	University of Newcastle upon Tyne
2.	**Teaching Institution**	University of Newcastle upon Tyne
3.	**Final Award**	MSc
4.	**Programme Title**	Environmental Biogeochemistry
5.	**Programme Accredited by:**	N/A
6.	**UCAS Code**	N/A
7.	**QAA Benchmarking Group(s)**	N/A
8.	**Date of production/revision**	Thursday, 07 October 2004

9. Programme Aims:

The primary purpose of this programme is to provide biology, chemistry, and Earth and environmental science graduates with the advanced conceptual understanding, detailed factual knowledge, and specialist technical skills appropriate for them to follow successful careers as technically aware scientists in the environmental industry. The training given also forms an excellent introduction to environmental geochemistry for those students wishing to follow a research oriented career path.

Specifically, the course aims to provide an advanced understanding of:

- The low temperature geochemistry of waters, soils and sediments, and of how interactions between aqueous solutions and mineral phases are quantified
- The fundamental role played by micro-organisms in catalysing low temperature geochemical reactions, and of the techniques by which micro-organisms and their activities are studied
- The origins, toxicity and ultimate fates of pollutants, and of how environmental contaminants may be managed using biogeochemical tools
- Modern techniques for the analysis of environmental materials, with practical training in laboratory skills being stressed

In addition to these academic and technical skills, the course also aims to equip its graduates with suite of key skills, including the ability to communicate effectively, the ability to employ IT and library resources appropriately, the ability to prioritise work and to meet deadlines, the ability to work alone and with others, and the ability to use initiative and to solve problems.

The course aims to meet the descriptors, for a qualification at Masters (M) level, published by the Framework for Higher Education Qualifications in England, Wales and Northern Ireland.

10. Intended Learning Outcomes; Teaching and Learning Strategies and Methods; Assessment Strategies and Methods

A Knowledge and understanding

A successful student will have gained and be able to demonstrate:

A1. An advanced knowledge and understanding of the low temperature geochemistry of waters, soils & sediments

A2. A knowledge and understanding of the physiology and diversity of micro-organisms, and an advanced knowledge of their roles in the environment and the biochemical pathways by which they degrade some important pollutant classes

A3. An advanced knowledge and understanding of the origin, toxicity and fate of key organic and inorganic pollutants

A4. An understanding of key pieces of environmental legislation

A5. An understanding of modern approaches to pollution and pollution control

A6. An understanding of the principles, applications and limitations of modern environmental analytical techniques, and an advanced understanding of some of these techniques

Teaching Strategy

Specialist knowledge and understanding (A1-A6) are primarily imparted via lecture classes, often supported by web-based reference materials. The key chemical and microbiological concepts (A1 and A2) are addressed in CIV921 (Aqueous Geochemistry) and CIV922 (Microbiology, Microbial Physiology and Biogeochemistry). Outcome A3 is taught through CIV923 (Sources and Fate of Inorganic Pollutants) whilst A4 and A5 are addressed in later modules such as CIV926 (Microbial Transformations of Organic Pollutants) and CIV971 (Contaminated Land). An understanding of modern analytical technique sis provided in CIV924 and CIV925 (Analytical Geochemistry 1 and 2). The importance of microbial catalysis in many low temperature geochemical reactions is emphasised, as is training in quantitative skills.

Knowledge and understanding are further promoted, where appropriate, by case studies (A3; CIV923), computer-modelling workshops (A1, A5; CIV921, CIV971), field trips (A1, A5, A6; CIV924) and site visits (A3, A5; CIV923, CIV927).

Learning Strategy

Throughout the taught component of the course, students are encouraged and expected to engage in independent reading, and are supported in this by the provision of individual module reading lists. Short tests at the end of each module (ten-minute-tests) enable students to monitor the progress of their learning. Reflection on case studies (A3; CIV923), active participation in modelling workshops (A1, A5; CIV921, CIV971), and observations and discussions during field trips (A1, A5, A6; CIV924) and site visits (A3, A5; CIV923, CIV927) aid the development of understanding.

Assessment strategy

Knowledge and understanding (A1-A6) are assessed by a combination unseen written examinations and coursework. Both employ a range of approaches in order to accurately assess student abilities. Written papers include essay, calculation, and multi-part questions whilst assessed coursework comprises geochemical calculations, essays, laboratory and technical reports, and group projects and presentations. Some, or all, of A1-A6 (depending on topic) are also examined by means of a dissertation and presentation and possibly (at the discretion of an External Examiner) by *viva voce* examination.

B Subject –specific/professional skills

A successful student will be able to:

B1. Demonstrate an understanding of the principles, applications and limitations of modern environmental analytical techniques, and an advanced understanding of some of these techniques

B2. Develop practical experience of a range of modern biogeochemical analytical techniques, and advanced experience of some of these techniques

B3. Demonstrate the ability to critically assess the quality of the analytical data generated by these techniques

B4. Demonstrate the ability to present and summarise such data, and to critically appraise its significance, using appropriate statistical techniques

Teaching Strategy
Understanding and experience of the geochemical and microbiological techniques used in the study of environmental materials (B1, B2), are provided in the laboratory mini-projects of CIV924, CIV925 and CIV926 (Analytical Geochemistry 1 and 2 and Microbial transformations of Organic Pollutants respectively). These mini-projects consist of a series of desk, field and laboratory practical classes, supplemented by lectures, and focussed on the geochemistry of one or more local sites. Within the mini-projects, workshops and lectures also provide training in the assessment of data quality (B3) and in data presentation and appraisal (B4). CIV702 (Research Methods) and a series of dissertation-related summer workshops further address B3 and B4. More advanced training in some or all of skills B1-B4 is provided, on an individual basis, during an 18 week dissertation project (CIV998) in which the student usually works within one of CEG's research groups.

Learning Strategy
Students are encouraged to acquire skills B1-B4 through active participation in the field sampling, experimental, and interpretative aspects, of the CIV924, CIV925 and CIV926 mini-projects. Learning is reinforced, and further developed, as students apply their new skills to the analysis of environmental materials, and to the appraisal and presentation of the resulting data, in their dissertation projects.

Assessment strategy
Subject specific and practical skills (B1-B4) are assessed by means of coursework reports and by unseen written examination. Some, or all, of B1-B4 (depending on topic) are also examined by means of a dissertation and presentation and possibly (at the discretion of an External Examiner) by *viva voce* examination.

C Cognitive skills

A successful student will be able to:

C1. Critically assess the quality of data generated by analytical geochemical techniques

C2. Present and summarise such data, and to critically appraise its significance, using appropriate statistical techniques

C3. Critically assess the value and limitations of existing information on a given subject

C4. Formulate or recognise key hypotheses, to test hypotheses using logical and consistent quantitative or qualitative arguments, and to identify key data which allow such tests to be made

C5. Critically assess the value and limitations of new data in relation existing information on a given subject, to draw logical conclusions, and to identify appropriate avenues for further study

C6. Solve problems

Teaching Strategy
Cognitive skills C1-C6 are developed during the CIV924, CIV925 and CIV926 mini-projects: C3, C4, and C6 in the initial desk-based research and planning phases; C6 during sample collection and analysis; and C1, C2, C5 and C6 in the subsequent interpretative workshops. Elsewhere in the programme, CIV702 addresses C1 and C2, whilst modelling workshops, exercises on field trips and attendance at School research seminars enable skills C3-C6 to be developed further. All such skills are exercised significantly during the course of the CIV998 dissertation project, the completion of which is supported by a series of dissertation-related workshops.

Learning Strategy
Students are encouraged to acquire cognitive skills during the CIV924, CIV925 and CIV926 mini-projects by analysis of information gathered about the site during the desk-based research phase (C3); by designing a sampling and analysis strategy for the site, which addresses the issues identified (C4); by appraising the quality of the data collected (C1, C2); and by reflection upon the value of these data, and upon the conclusions to which the data lead (C5). Problem solving skills (C6) are employed at all stages (planning, field and laboratory work, interpretation). Students are also expected to acquire cognitive skills by simulating environmental systems using computer models (C3-C6), by reflection on field exercises (C3-C6) and by discussion of scientific presentations following School research seminars (C3-C5). The lengthy dissertation project encourages the development of cognitive skills by similar means as the mini-project, but at a more advanced academic level.

Assessment strategy
Cognitive skills (C1-C6) are assessed by means of coursework (calculations, essays, laboratory and technical reports, and group projects and presentations), and unseen written examinations. Some, or all, of C1-C6 (depending on topic) are also examined by means of a dissertation and presentation and possibly (at the discretion of an External Examiner) by *viva voce* examination.

D Key (transferable) skills

A successful student will be able to:

D1. Communicate by means of well prepared, clear and confident presentations and concise and grammatical written documents

D2. To use library and other information sources skilfully and appropriately

D3. To use IT resources skilfully and appropriately

D4. To plan, organise and prioritise work activities in order to meet deadlines

D5. To work independently, with initiative, and also in teams

D6. To solve problems

Teaching Strategy
Key skills D1-D4 are formally taught in CIV702 Research Methods. Management of workload in order to meet deadlines (D4) is also promoted by means of a strict coursework timetable, whilst teamworking skills (D5) are developed by group exercises in the CIV924, CIV925 and CIV926 mini-projects. This also provides opportunities for students to improve their problem solving abilities (D6), and to extend their communication, library, IT, and time management skills (D1-D4). The 18 week CIV998 dissertation project, and associated workshops, provides students with further opportunities to develop all of these skills (D1-D6).

Learning Strategy
Students are encouraged to acquire key skills D1-D4 through reflection on the material provided in CIV702. Participation in the team components of the CIV924, CIV925 and CIV926 mini-projects (e.g. whilst researching a site and planning a sampling strategy) allows students to improve their teamworking skills (D5), whilst developing solutions to problems arising during field and laboratory work assists in the advancement of students' problem solving abilities (D6). Within the mini-projects, students improve their communication, library, IT, and time management skills (D1-D4) by researching the site (D2, D3), communicating their information to their colleagues (D1, D3), manipulating the data generated (D3), and reporting their findings in a timely fashion; D1, D4). The dissertation project provides similar opportunities for skill development through the construction of a research plan for the dissertation (D4), during the literature searching and data handling components (D2, D3), as the field and laboratory work is performed (D5, D6), and by participation in the dissertation workshops (D1, D3).

Assessment strategy
Key skills (D1-D4) are assessed via written examinations, the production of a research brief, and the giving of short presentation in CIV702 Research Methods. Communication (D1), library (D2) and IT (D3) skills, and the ability to meet deadlines (D4) work independently (D5) and solve problems (D6) are indirectly assessed by other coursework items (geochemical calculations, essays, laboratory and technical reports, and group projects and presentations), and all key skills (D1-D6) are examined by means of a dissertation and presentation, and possibly (at the discretion of an External Examiner) by *viva voce* examination.

11 Programme Features, Structure and Curriculum

A Programme Features

This is a one-year full-time modular programme. It consists of two parts: a 100-credit *taught component*, which runs from late September until Easter, and an 80-credit *research project*, for which a dissertation is submitted in mid-August. Successful completion of the taught component is required in order for a student to progress to the dissertation project.

The taught component of the course consists of the compulsory Research Methods module (CIV702) and nine compulsory modules addressing the technical aspects of the programme (CIV921-CIV927, CIV710, and CIV971). An innovative feature is that the technical modules are taught in short (generally two-week) blocks. These occupy students, largely full-time, until the module has been completed and students then progress to the next module. This structure enhances student learning by allowing later units to build on the concepts, knowledge and skills gained during those taught earlier. The programme has a large practical component which is taught in CIV924, CIV925 and CIV926 (Analytical Geochemistry 1 and 2 and Microbial transformations of Organic Pollutants respectively)

Research projects (CIV998) are often laboratory based, but may also involve desk or literature studies, or modelling work. During the project, students are usually based in the School, working alongside PhD students and post-doctoral research associates in one of our established research groups, but the dissertation might entail working elsewhere, in collaboration with another industrial or academic partner. We encourage and support students who wish to publish the results of their dissertations, and several past M.Sc. students have been successful in this area.

B Programme Structure

Following optional introductory level biology, chemistry and geology training, offered as part of programme induction, the modules which make up the taught component of this programme fall into three parts. These lead the student sequentially and logically from the "pure" science through to its environmental applications, and promote the conversion of relatively inexperienced graduates into competent consultants and researchers.

The first part, consisting of CIV921, *Aqueous Geochemistry*, CIV922, *Microbiology, Microbial Physiology and Biogeochemistry*, and CIV923, *Sources and Fate of Inorganic Pollutants*, presents the key chemical and microbiological concepts of low temperature geochemistry (intended learning outcomes A1 and A2) and describes the origin, toxicity, and eventual fate of the major organic and inorganic pollutant classes (intended learning outcome A3). The importance of microbial catalysis in many low temperature geochemical reactions is emphasised, as is training in quantitative skills.

The second part, comprising CIV924, *Analytical Geochemistry 1*, and CIV925, *Analytical Geochemistry 2*, provides training in the application of modern laboratory techniques to the study of environmental materials (intended learning outcomes A6, B1-B4). The mini-projects occurring here are also used as a framework within which students' cognitive skills (intended learning outcomes C1-C6), teamworking skills (intended learning outcome D5), and their problem solving abilities (intended learning outcomes C6, D6) are developed. Other key skills such as library and IT skills, scientific writing skills, and presentation skills (intended learning outcomes D1, D2, D3) are advanced in CIV702, *Research Methods*, whilst a strict coursework timetable emphasises the importance of managing workloads in order to meet deadlines (intended learning outcome D4).

In the third part, made up of CIV926, *Microbial Transformation of Organic Pollutants*, CIV927, *Biogeochemistry of Pollution Control*, CIV710, *Groundwater Assessment*, and CIV971, *Contaminated Land*, key environmental legislation is introduced (intended learning outcome A4), and biogeochemistry and the uses of biogeochemical tools are discussed within the contexts of groundwater, contaminated land, and pollution control (intended learning outcome A5). Biochemical pathways of pollutant degradation (intended learning outcome A5) are studied in detail, and the uses of microorganisms for remedial purposes (intended learning outcome A5) are also considered.

The CIV998 18 week research project, commencing in mid-April, enables students to apply the subject specific skills and understanding (intended learning outcomes A1-A6), the practical skills (intended learning outcomes B1-B4), the cognitive skills (intended learning outcomes C1-C6) and the key skills (intended learning outcomes D1-D6) gained during the taught component, to a geochemical research problem. Dissertations often involve a significant laboratory component, but may take the form of desk or literature studies, or modelling work.

C Programme Curriculum

Degree of Master of Science in Environmental Biogeochemistry 2004/2005

Code: 5035

1. The programme of study begins annually in September and candidates shall take modules to a total value of 180 credits over three semesters.

2. Candidates shall take the following compulsory modules:

Code	*Credits*	*Semester*	*Descriptive title*
CIV702	(10)	1	Research Methods
CIV710	(10)	2	Groundwater Assessment
CIV921	(10)	1	Aqueous Geochemistry
CIV922	(10)	1	Introduction to Microbiology, Microbial Physiology and Biogeochemistry
CIV923	(10)	1	Sources and Fate of Pollutants
CIV924	(10)	1	Analytical Geochemistry 1
CIV925	(10)	1	Analytical Geochemistry 2
CIV926	(10)	2	Microbial Transformations of Organic Pollutants
CIV927	(10)	2	Biogeochemistry of Pollution Control
CIV971	(10)	2	Contaminated Land
CIV998	(80)	2+3	Dissertation

Candidates may select alternative modules to those listed above to a maximum of 10 credits and with the approval of the Degree Programme Director.

3. Candidates will be assessed on the basis of examinations, course work assignments and the dissertation in deciding on the award of the MSc degree.

Development of specific Intended Learning Outcomes occurs through the following modules (compulsory modules in bold text, optional modules in normal, italic text)

A1	An advanced knowledge and understanding of the low temperature geochemistry of waters, soils & sediments	**CIV921, CIV710, (CIV998)**
A2	A knowledge and understanding of the physiology and diversity of micro-organisms, and an advanced knowledge of their roles in the environment and the biochemical pathways by which they degrade some important pollutant classes	**CIV922, CIV926, (CIV998)**
A3	An advanced knowledge and understanding of the origin, toxicity and fate of key organic and inorganic pollutants	**CIV923, CIV926, (CIV998)**
A4	An understanding of key pieces of environmental legislation	**CIV927, CIV971, (CIV998)**
A5	An understanding of modern approaches to pollution and pollution control	**CIV926, CIV927, CIV710, CIV971, (CIV998)**
A6	An understanding of the principles, applications and limitations of modern environmental analytical techniques, and an advanced understanding of some of these techniques	**CIV924, CIV925, (CIV998)**
B1	Demonstrate an understanding of the principles, applications and limitations of modern environmental analytical techniques, and an advanced understanding of some of these techniques	**CIV924, CIV925, CIV926, (CIV998)**
B2	Develop practical experience of a range of modern biogeochemical analytical techniques, and advanced experience of some of these techniques	**CIV924, CIV925, CIV926, (CIV998)**

B3	Demonstrate the ability to critically assess the quality of the analytical data generated by these techniques	**CIV924, CIV925, CIV926, (CIV998)**
B4	Demonstrate the ability to present and summarise such data, and to critically appraise its significance, using appropriate statistical techniques	**CIV924, CIV925, CIV926, CIV702, (CIV998)**
C1	Critically assess the quality of data generated by analytical geochemical techniques	**CIV924, CIV925, CIV926 (CIV998)**
C2	Present and summarise such data, and to critically appraise its significance, using appropriate statistical techniques	**CIV924, CIV925, CIV926, CIV702, (CIV998)**
C3	Critically assess the value and limitations of existing information on a given subject	**CIV924, CIV925, CIV926, (CIV998)**
C4	Formulate or recognise key hypotheses, to test hypotheses using logical and consistent quantitative or qualitative arguments, and to identify key data which allow such tests to be made	**CIV924, CIV925, CIV926, (CIV998)**
C5	Critically assess the value and limitations of new data in relation existing information on a given subject, to draw logical conclusions, and to identify appropriate avenues for further study	**CIV924, CIV925, CIV926, (CIV998)**
C6	Solve problems	**CIV924, CIV925, CIV926, (CIV998)**
D1	Communicate by means of well prepared, clear and confident presentations and concise and grammatical written documents	**CIV702, (CIV998)**
D2	To use library and other information sources skilfully and appropriately	**CIV702, (CIV998)**
D3	To use IT resources skilfully and appropriately	**CIV702, (CIV998)**
D4	To plan, organise and prioritise work activities in order to meet deadlines	**CIV702, (CIV998)**
D5	To work independently, with initiative, and also in teams	**CIV924, CIV925, CIV926,(CIV998)**
D6	To solve problems	**CIV924, CIV925, CIV926,(CIV998)**

12 Criteria for Admission:

Entrance Criteria

A 2nd class degree from a UK University, or its overseas equivalent, is the minimum qualification for entry. Preferred first degree subjects are chemistry, Earth science, environmental science, environmental engineering, or microbiology, but other relevant science degrees may also be acceptable.

Chemistry at A level, or evidence of having studied bio/geo/chemistry during the first degree is preferred.

Applicants for whom English is not a first language must provide evidence of a satisfactory command of English, preferably by means of a TOEFL score of 575 or greater, or by an IELTS score of 6.5 or greater.

Applicants with Non-Standard Qualifications

Applicants who hold non-standard qualifications, and/or have relevant experience, will be considered on an individual basis.

Admissions Policy

Upon receipt of a completed application form, UK-based applicants are invited to visit the School, to meet current students, and to attend an informal interview. Offers of places are made to suitably qualified candidates following the interview/visit and are conditional upon the applicant achieving a minimum of a 2nd class degree (if they do not hold such a degree at the time of the interview), and upon the provision of a satisfactory reference (if one has not already been provided). NERC studentships (5 awards), and any other funding, are awarded on a competitive basis, taking degree grade (actual or predicted), reference, experience and interview performance into account.

Applicants not based in the UK are not required to attend an interview.

13 Support for Students and their Learning:

Induction
An Induction Week with no formal teaching occupies the first week of the programme. During this week new students are given general information about the School, detailed information regarding their programme, their teaching timetable, and their Degree Programme Handbooks. Induction activities also include:

- An icebreaker social event to allow students to meet colleagues and staff in a social atmosphere. Students are introduced to their tutors and buddies (see below for details of roles of tutor and buddy).
- An initial meeting - students meet as a group with the DPD for welcome and introduction to the programme.
- An introduction to the facilities and services of the University Careers Service.
- An introduction to the facilities and services of the University Enterprise Centre.
- Optional introductory lectures - non-specialists are taught relevant chemical, biochemical and geological principles in Geological Principles for non-Earth Scientists and Chemical and Biochemical Principles for non-Chemists.

The International Office offers additional induction for overseas students (see: http://www.ncl.ac.uk/international/coming_to_newcastle/orientation.phtml).

Study skills support
Students learn a range of Personal Transferable Skills, including Study Skills, as outlined in the Programme Specification. CIV702 *Research Methods*, and the workshops supporting MSc Dissertation projects are central to such training.

Academic support
The initial point of contact for a student is with a lecturer or module leader, or their tutor (see below) for more generic issues. Thereafter the Degree Programme Director or Head of School may be consulted. Issues relating to the programme may be raised at the Staff/Student Committee, and/or at the Board of Studies.

The School also provides each student with at least one academic member of staff to personally supervise their dissertation project and to advise them on the production of their dissertation. Frequency of meetings is variable, but typically at least weekly during the dissertation write-up. As students typically work within one of the School's research groups, students also usually have contact with PhD students and PDRAs working on related research.

Pastoral support
All students are assigned a personal tutor whose responsibility is to monitor the academic performance and overall well-being of their tutees. Formal meetings with tutors, for the discussion of progress, are held termly and all students have personal and email access to their tutors should problems arise. Tutors also feed back the results of end-of-module tests to students, allowing them to monitor the progress of their learning. Difficulties highlighted by these are discussed with tutors. Details of the personal tutor system can be found at http://www.ncl.ac.uk/undergraduate/support/tutor.phtml.

Students are also provided with a specific PhD student buddy who is usually a graduate of the programme. The buddy can provide general advice and information, as well as being someone else that the student can approach in the case of problems.

In addition the University offers a range of support services, including the Student Advice Centre, the Student Counselling Service, the Mature Student Support Service, and a Childcare Support Officer, see http://www.ncl.ac.uk/undergraduate/support/welfare.phtml.

Support for Special Needs
Support for students with special needs is provided as required and the University's Disability Support Service can be consulted where appropriate. Supportive resources include:

- Dyslexia Tutor
- Co-ordinator for Deaf and Hearing-impaired Students

- Technical Support Advisor

The Disability Unit can:

- Discuss individual particular needs
- Advise on physical accessibility
- Arrange an early visit to the campus for assessment of needs
- Advise on special allowances, including the Disabled Students Allowance
- Advise on special equipment

For further details see http://www.ncl.ac.uk/undergraduate/support/disability.phtml.

Learning resources

The University's main learning resources are provided by the Robinson and Walton Libraries (for books, journals, online resources), and Information Systems and Services, which supports campus-wide computing facilities, see http://www.ncl.ac.uk/undergraduate/support/acfacilities.phtml.

Within the School, MSc students are provided with a dedicated MSc Resource Centre in the Drummond Building. This is equipped with PCs and wireless networking for laptops. The Resource Centre also provides seating, tables and storage space for students engaged in group and project work.

Dedicated MSc teaching laboratories are available to support the MSc programme and these are equipped for both organic and inorganic geochemistry, and microbiology.

The School provides access to an extensive range of analytical facilities e.g.: GC, GC-MS, HPLC, AAS, Ion-Chromatography, UV-Vis, XRD, PCR, DGGE, together with the high level of technical expertise necessary to maintain these facilities efficiently.

All new students whose first language is not English are required to take an English Language test in the Language Centre. Where appropriate, in-sessional language training can be provided. The Language Centre houses a range of resources for learning other languages which may be particularly appropriate for those interested in an Erasmus exchanges. See http://www.ncl.ac.uk/undergraduate/support/langcen.phtml.

14 Methods for Evaluating and Improving the Quality and standards of Teaching and Learning:

Module reviews

On completion of each module in the taught component of the course, student opinion is gathered by means of two module evaluation questionnaires. The first of these addresses issues related to the module, whilst the second assesses the performance of the individual lecturers responsible for its delivery. Module feedback data are considered by the Board of Studies.

Changes to, or the introduction of new, modules are considered at the Board of Studies and at the School Teaching and Learning Committee. New modules and major changes to existing modules are subject to approval by the Faculty Teaching and learning Committee.

Student opinion is also sought/may be given at the Staff/Student Committee and/or the Board of Studies.

Programme reviews

The Board of Studies conducts an Annual Monitoring and Review of the degree programme and reports to Faculty Teaching and Learning Committee.

External examiner reports

External Examiner reports are considered by the Board of Studies under Reserved Business, in the absence of the student representatives. The Board responds to these reports through Faculty Teaching and Learning Committee.

Accreditation reports

There is no professional body appropriate for accreditation purposes and so the programme is not accredited. However, but was reviewed by the Natural Environment Research Council (NERC) for funding purposes in 1996 and 2000

Feedback mechanisms
Feedback to students is effected via the Staff/Student Committee and the Board of Studies.

Faculty and University Review Mechanisms
The Programme is subject to the University's Internal Subject Review programme, see http://www.ncl.ac.uk/internal/academic-quality/qualityhome.htm#2.

15 Regulation of Assessment:

Pass Marks
The pass mark, as defined in the University's Postgraduate Examination Conventions (http://www.ncl.ac.uk/calendar/university.regs/tpmdeprexamconv.pdf), is 50.

Course Requirements
Progression is subject to the University's Postgraduate Entrance and Progress Regulations (http://www.ncl.ac.uk/calendar/university.regs/tpmdepr.pdf) and Postgraduate Examination Conventions (http://www.ncl.ac.uk/calendar/university.regs/tpmdeprexamconv.pdf). In summary, students must pass 180 credits for the MSc. Limited compensation down to 40 is possible and there are resit opportunities, with certain restrictions.

Common Marking Scheme
The University employs a common marking scheme, which is specified in the Postgraduate Examination Conventions (http://www.ncl.ac.uk/calendar/university.regs/tpmdeprexamconv.pdf), namely

	Classification
<50	Fail
50-60	Pass
60-70	Merit
>70	Distinction

Role of the External Examiner
An External Examiner, a distinguished member of the subject community, is appointed by Faculty Teaching and Learning Committee, after recommendation from the Board of Studies. The External Examiner is expected to:

See and approve examination papers
Moderate examination and coursework marking
Attend the September Board of Examiners
Report to the University on the standards of the programme

16 Indicators of Quality and Standards:

Professional Accreditation Reports
The course is not accredited by a specific professional body, but was reviewed by the Natural Environment Research Council (NERC) for funding purposes in 1996 and 2000:

- The 1996 NERC MSc Course Review stated that "the Review Panel was impressed by the quality, content and success" of the course and noted that the course was "very carefully planned to train graduates of varying backgrounds in environmental chemistry and microbiology". The Review Panel also recommended that NERC support be maintained at a level of two studentships per year, for the academic years commencing 1996-2000.
- The 2000 Review of MSc Course Provision confirmed continuing support for the course, and announced a

major increase in funding; NERC being committed to providing five studentships per year, for the academic years 2001-2005.

Internal Review Reports

This programme was reviewed internally as a part of the 1999-2000 Taught Programme Review scheme, through the 2003 Annual Monitoring and Review Scheme, and as a part of the University's 2001 Internal Subject Review of Fossil Fuels and Environmental Geochemistry. Following the latter, the programme was approved by the Science Faculty Teaching and Learning Committee and University Teaching and Learning Committee.

After the 1999-2000 Taught Programme Review, the Science Faculty Teaching Committee commended, as exemplary, the explicit links between teaching and research, and felt that Fossil Fuels and Environmental Geochemistry "had undersold itself considerably" with the student handbooks being "innovative, containing a wealth of information, especially in relation to student induction".

The programme is due for Internal Subject Review again in November 2004 (See the timetable at http://www.ncl.ac.uk/internal/academic-quality/schdlisr.doc)

Previous QAA Reports

The quality of educational provision has not been reviewed under the current or immediately preceding QAA scheme, but was independently reviewed by HEFCE as a part of the 1994 Quality Assessment Exercise. The outcome of this review process was the award of an "excellent" score by the HEFCE review team. Significant strengths included:

- "A strong group of enthusiastic academic staff with an impressive commitment to teaching and learning"
- "A well documented, up-to-date and vocationally relevant curriculum"
- "An excellent research record which enhances the learning environment and provides good opportunities for challenging projects"
- "Close collaboration with industrial and professional colleagues which ensures that courses include modern, applied aspects"
- "The excellent analytical laboratories deployed to give students advanced practical skills"
- "An appropriate library provision"
- "A good range of assessment strategies"
- "A flexible system which provides a framework to match the educational opportunities provided by the research-oriented staff"

This specification provides a concise summary of the main features of the programme and of the learning outcomes that a typical student might reasonably be expected to achieve if she/he takes full advantage of the learning opportunities provided. The accuracy of the information contained is reviewed by the University and may be checked by the Quality Assurance Agency for Higher Education.

17 Other Sources of Information:

The University Postgraduate Prospectus (see http://www.ncl.ac.uk/postgraduate/)

The School Prospectus (see http://www.ncl.ac.uk/postgraduate/subjects/geochemistry)

The University and Degree Programme Regulations (see http://www.ncl.ac.uk/calendar/pdf/uniregs.pdf and http://www.ncl.ac.uk/regulations/regulations.html?id=291)

The Degree Programme Handbook for the MSc in Environmental Biogeochemistry 2004-2005

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