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**	Petroleum Geochemistry
5.	**Programme Accredited by:**	N/A
6.	**UCAS Code**	N/A
7.	**QAA Benchmarking Group(s)**	N/A
8.	**Date of production/revision**	Wednesday, 17th November 2004

9. Programme Aims:

The aims of this programme are fourfold:

(i) To provide the theoretical and practical training necessary to equip Earth science or chemistry graduates with the advanced knowledge and skills appropriate for successful careers in the petroleum, environmental and their service industries.

(ii) To provide the training necessary to allow the conversion of skilled Earth science and chemistry graduates into petroleum geochemists capable of further academic research.

(iii) To allow disciplinary migration into the field of organic geochemistry, an important subject which is not given detailed coverage at undergraduate level.

(iv) To develop and improve our students' key skills alongside their academic and technical abilities. These key skills, include 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 origin of petroleum source rocks and of the processes of oil and gas generation in sedimentary basins
A2. An advanced knowledge and understanding of the processes influencing petroleum migration and trapping
A3. An advanced knowledge and understanding of the geochemistry of petroleum reservoirs
A4. An advanced knowledge and understanding of the geochemistry of molecular marker compounds in sediments and crude oils - their uses and limitations
A5. An awareness of the role played by the petroleum geochemist in the oil and gas industries, and of how geochemistry can influence attitudes towards the prospectivity of sedimentary basins
A6. An understanding of the principles, applications and limitations of the main analytical techniques used in petroleum geochemistry, and an advanced understanding of some of these techniques
A7. An understanding of the theory and practice of microscopy in the study of sedimentary organic matter, and an awareness its value and limitations *vis-a-vis* organic geochemical approaches

Teaching Strategy
Specialist knowledge and understanding (A1-A7) are primarily imparted via lecture classes, often supported by computer-hosted reference materials. Knowledge and understanding in each of these areas are further promoted by workshops covering problem solving and modelling (A1-A6), field trips (including a residential field course in the Wessex Basin; A1-A7), practical classes (A6-A7), and case studies (focussing on the Wessex Basin; A1-A7).

A key philosophy is to provide core knowledge and understanding through formal teaching in early modules (CIV928 *Sedimentary Organic Matter*, CIV929 *Maturation and the Generation of Oil and Gas*, CIV906 *Molecular Marker Compounds*, CIV931 *Migration and Reservoir Geochemistry*, CIV932 *Petroleum and the Environment* and CIV933 *Chemical Analysis of Organic Matter*). Later modules (CIV934, CIV935 and CIV936; *Petroleum Geochemistry of the Wessex Basin 1,2 and 3*) employ a different balance, with much reduced formal teaching and much greater emphasis on developing students own study skills through case-study projects (using the Wessex Basin of southern England as our teaching aid).

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. Active participation in problem solving and modelling workshops (A1-A6; e.g. CIV928, CIV929, CIV906, CIV931), field course exercises and discussions (A1-A7; CIV928, CIV934), and practical classes (A6-A7; CIV928, CIV933), and reflection on case studies (A1-A7; CIV934, CIV935, CIV936) aid the development of understanding.

Assessment strategy
Knowledge and understanding (A1-A7) 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 a laboratory report, essays, data interpretation exercises, field-based course work and the production of PowerPoint poster sets. Some, or all, of A1-A7 (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:

B1. Understand the principles, applications and limitations of the main analytical techniques used in petroleum geochemistry, and will have an advanced understanding of some of these techniques
B2. Understand the theory and practice of microscopy in the study of sedimentary organic matter, and be able to demonstrate an awareness its value and limitations vis-a-vis organic geochemical approaches
B3. Have acquired practical experience of a range of modern optical and organic geochemical techniques, and

advanced experience of some of these techniques
B4. Be able to critically assess the quality of the analytical data generated by these techniques
B5. Be able to present and summarise such data, and to critically appraise its significance, using appropriate statistical techniques

Teaching Strategy
Understanding (B1, B2) and experience (B3) of the main organic geochemical and optical techniques used in petroleum geochemistry are primarily provided by the lectures and practical classes, respectively, of CIV928 (*Sedimentary Organic Matter*) and CIV933 (*Chemical Analysis of Organic Matter*). Interpretation of the significance of the data generated, and its quality and presentation (B4, B5), are also taught in these laboratory, lecture and workshop classes, and in the workshops of CIV906 (*Molecular Marker Compounds*). Problem solving exercises during the residential field course of CIV934 (*Petroleum Geochemistry of the Wessex Basin 1),* and in CIV935 and CIV936 (*Petroleum Geochemistry of the Wessex Basin 2 and 3*) assist students to acquire the ability to integrate diverse geochemical and optical data sets.

CIV702 (*Research Methods*) and a series of summer workshops further address B4 and B5, whilst more advanced training in some, or all, of skills B1-B5, is provided on an individual basis during an 18 week dissertation project (CIV998 *Dissertation Project*) in which the student usually works within one of CEG's existing research groups.

Learning Strategy
Students are encouraged to acquire practical skills B1-B3 through hands-on participation in the organic geochemical and optical practical classes (CIV928, CIV933), and by active participation in data interpretation workshops (B4-B5 e.g. in CIV906)). Completion of exercises during the residential field course of CIV934, and in CIV935 and CIV936, provides a further opportunity for students to acquire an appreciation of the significance and quality of geochemical data (B4-B5). Learning is reinforced, and further developed, as students apply their new skills to the analysis of sedimentary organic matter, and to the appraisal and presentation of the resulting data, in their dissertation projects (some or all of B1-B3; B4-B5; CIV998).

Assessment strategy
Subject specific and practical skills (B1-B5) are assessed by means of coursework reports and by unseen written examination. Some, or all, of B1-B5 (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
Skills C1 and C2 are developed in CIV928 (*Sedimentary Organic Matter*), CIV933 (*Chemical Analysis of Orghanic Matter*) and CIV906 (*Molecular Marker Compounds*), with geochemical data being generated by the students in laboratory practical classes and interpreted by them in subsequent workshops; initial guidance being provided in lectures. Cognitive skills C3-C6 are addressed in the many problem solving and modelling workshops throughout the course (e.g. CIV929 (*Maturation and the Generation of Oil and Gas*), CIV931 (*Migration and Reservoir Geochemistry*), CIV932 (*Petroleum and the Environment*), CIV934, CIV935, CIV936 (*Petroleum Geochemistry of the Wessex Basin 1, 2 and 3*)) whilst exercises during the field component of CIV934 (*Petroleum Geochemistry of the Wessex Basin 1*), involving students interpreting (often conflicting) data and observations, further develop these skills. Attendance at School seminars provides an additional opportunity to acquire skills C3-C5, and all cognitive skills (C1-C6) are exercised significantly during the course of a dissertation project (CIV998 Dissertation Project), the completion of which is supported by a series of related workshops.

Learning Strategy
Following their initial introduction in lecture classes, students are encouraged to acquire cognitive skills C1 and C2 in the laboratory practical classes and workshops of units CIV928, CIV933 and CIV906, by the analysis, interpretation and presentation of data, some of which they have generated themselves. Active participation in the problem solving workshops of succeeding modules (e.g. CIV929, CIV931, CIV932, CIV934, CIV935, and CIV936) promotes the development of skills C3-C6. Students are also expected to acquire cognitive skills by simulating aspects of petroleum systems using simple computer models (C3-C5; CIV929), by participation in, and reflection on, the field course exercises (C1-C6; CIV934), and by discussion of scientific presentations following School seminars (C3-C5). The interpretative and discursive aspects of the lengthy CIV998 dissertation project encourage the further development of cognitive skills C1-C6, but at a more advanced academic level.

Assessment strategy
Cognitive skills (C1-C6) are assessed by means of coursework (a laboratory report, essays, data interpretation exercises, field-based course work and the production of PowerPoint poster sets), 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 team working skills (D5) are developed by group exercises (some of which are field based) in CIV934, CIV935 and CIV936 (*Petroleum Geochemistry of the Wessex Basin 1, 2 and 3*). These also provide 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 CIV934, CIV935 and CIV936 allows students to improve their team working skills (D5), whilst developing solutions to problems arising during field (CIV935) and desk-based exercises (CIV936, CIV937) assists in the advancement of students' problem solving abilities (D6).

Within CIV934, CIV935 and CIV936, students improve their communication, library, IT, and time management skills (D1-D4) by researching the geology and geochemistry of the Wessex Basin (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. 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 (a laboratory report, essays, data interpretation exercises, field-based course work and the production of PowerPoint poster sets), 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 for a student to progress to the dissertation.

The taught component of the course consists of a compulsory *Research Methods* module (CIV702) and nine compulsory modules addressing the technical aspects of the programme (CIV928 (*Sedimentary Organic Matter*), CIV929 (*Maturation and the Generation of Oil and Gas*), CIV906 (*Molecular marker Compounds*), CIV931 (*Migration and reservoir Geochemistry*), CIV932 (*Petroleum and the Environment*), CIV933 (*Chemical Analysis of Organic Matter*), CIV934, CIV935 and CIV936 (*Petroleum Geochemistry of the Wessex Basin 1, 2 and 3*)). A characteristic feature is that the technical modules are largely taught in short (generally two-week) blocks. These occupy students, 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.

An innovative aspect of the programme is the deliberate change in teaching styles employed. Initial modules provide students with knowledge and information through formally taught lectures and practical classes. In Semester 2, however, three linked modules (CIV934, CIV935, and CIV936) introduce a case-study teaching style, with students being required to take a more active role in their own learning. This is designed to assist them in the transition to wholly independent learning during the 80-credit research project (CIV998).

These research projects 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 technical modules which make up the taught component of this programme lead the student sequentially and logically through all of the key aspects of a petroleum system.

Firstly, both the deposition (A1), and the qualitative and quantitative analysis of petroleum source rocks and their associated organic matter (A6, A7, B1-B5), are described in CIV928 and CIV933. Newcastle’s "twin track" chemistry-plus-microscopy approach to petroleum geochemistry introduces students to the theory underlying the analytical methods used in organic geochemistry (A6, B1), the optical techniques by which sedimentary organic matter is studied and classified (A7, B2), and provides practical training in these techniques during the "mini-projects" which make up the practical classes (B1-B5). Laboratory classes and workshops present students with interpretative, problem-solving, and modelling exercises, all of which promote the development of students' cognitive skills (C1-C6).

Secondly the processes by which petroleum is generated from these source rocks, migrates and (sometimes!) accumulates in reservoirs (A1, A2, A3) are explored in CIV929 and CIV931, whilst the introduction of molecular marker compounds in CIV906, provides students with geochemical tools to elucidate both the source, and thermal maturity, of organic matter in sedimentary basins (A4). The environmental aspects of petroleum geochemistry are not neglected (CIV932) with many petroleum geochemists gaining employment in this field upon graduation. Once again, workshops in this part of the course present students with further opportunities for the development of cognitive skills (C1-C6).

Lastly, students undertake a lengthy case study of the petroleum geochemistry of the Wessex Basin (CIV934, CIV935, and CIV936). Problem solving and field exercises allow students to consolidate and practise their new knowledge, skills and understanding (A1-A7, B4, B5, C1-C6) and lead to an understand how geochemistry may be used to inform a prospect evaluation.

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

12 Regulations for the Degree of MSc in Petroleum Geochemistry 2004/2005

Code: 5034

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
CIV928	(10)	1	Sedimentary Organic Matter
CIV929	(10)	1	Maturation and the Generation of Oil and Gas
CIV906	(10)	1	Molecular Marker Compounds
CIV931	(10)	1	Migration and Reservoir Geochemistry
CIV933	(10)	1	Chemical Analysis of Organic Matter
CIV932	(10)	1	Petroleum in the Environment
CIV934	(10)	2	Petroleum Geochemistry of the Wessex Basin 1
CIV935	(10)	2	Petroleum Geochemistry of the Wessex Basin 2
CIV936	(10)	2	Petroleum Geochemistry of the Wessex Basin 3
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 origin of petroleum source rocks and of the processes of oil and gas generation in sedimentary basins	**CIV928, CIV929, CIV934, CIV935, CIV936, (CIV998)**
A2	An advanced knowledge and understanding of the processes influencing petroleum migration and trapping	**CIV931, CIV934, CIV936, (CIV998)**
A3	An advanced knowledge and understanding of the geochemistry of petroleum reservoirs	**CIV931, CIV934, CIV936, (CIV998)**
A4	An advanced knowledge and understanding of the geochemistry of molecular marker compounds in sediments and crude oils - their uses and limitations	**CIV906, CIV934, CIV935, CIV936, (CIV998)**
A5	An awareness of the role played by the petroleum geochemist in the oil and gas industries, and of how geochemistry can influence attitudes towards the prospectivity of sedimentary basins	**CIV931, CIV934, CIV935, CIV936 (CIV998)**
A6	An understanding of the principles, applications and limitations of the main analytical techniques used in petroleum geochemistry, and an advanced understanding of some of these techniques	**CIV933, CIV929, CIV906, CIV935, CIV936, (CIV998)**
A7	An understanding of the theory and practice of microscopy in the study of sedimentary organic matter, and an awareness its value and limitations *vis-a-vis* organic geochemical approaches	**CIV928, CIV929, CIV934, CIV935, (CIV998)**
B1	Understand the principles, applications and limitations of the main analytical techniques used in petroleum geochemistry,	**CIV933, CIV929, CIV906, CIV935, CIV936, (CIV998)**

	and will have an advanced understanding of some of these techniques	
B2	Understand the theory and practice of microscopy in the study of sedimentary organic matter, and be able to demonstrate an awareness its value and limitations vis-a-vis organic geochemical approaches	**CIV928, CIV929, CIV934, CIV935, (CIV998)**
B3	Have acquired practical experience of a range of modern optical and organic geochemical techniques, and advanced experience of some of these techniques	**CIV928, CIV933, (CIV998)**
B4	Be able to critically assess the quality of the analytical data generated by these techniques	**CIV928, CIV933, CIV906, CIV934, CIV935, CIV936, (CIV998)**
B5	Be able to present and summarise such data, and to critically appraise its significance, using appropriate statistical techniques	**CIV928, CIV933, CIV906, CIV934, CIV935, CIV936, CIV702, (CIV998)**
C1	Critically assess the quality of data generated by analytical geochemical techniques	**CIV928, CIV933, CIV906, CIV934, CIV935, CIV936, (CIV998)**
C2	Present and summarise such data, and to critically appraise its significance, using appropriate statistical techniques	**CIV928, CIV933, CIV906, CIV934, CIV935, CIV936, CIV702, (CIV998)**
C3	Critically assess the value and limitations of existing information on a given subject	**CIV934, CIV935, CIV936, CIV929, CIV931, CIV932 (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	**CIV934, CIV935, CIV936, CIV929, CIV931, CIV932 (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	**CIV934, CIV935, CIV936, CIV929, CIV931, CIV932 (CIV998)**
C6	Solve problems	**CIV934, CIV935, CIV936, CIV929, CIV931, CIV932, (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	**CIV934, CIV935, CIV936, (CIV998)**
D6	To solve problems	**CIV934, CIV935, CIV936, CIV929, CIV931, CIV932, (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, and Earth science. Other relevant science degrees are also acceptable.

Chemistry at A level, or evidence of having studied (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 (6 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, it 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 Review of Advanced Courses in Geochemistry noted that this programme addresses "subjects rarely taught in first degree programmes". Staff qualifications and experience were described by the panel as "excellent", and the teaching staff were also noted to be "committed and enthusiastic with a good balance of industrial and academic experience". As regards curriculum, the panel recognised that the course is specialised but noted that it "has a good balance of subject matter". Overall, the panel summarised the course as "a good specialised course with excellent facilities and supported by a strong teaching and research team". The panel further recommended that support be maintained at a level of 5 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 an increase in funding; NERC being committed to providing 6 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, 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=292)

The Degree Programme Handbook for the MSc in Petroleum Geochemistry 2004-2005

HEFCE Quality Assessment Report Q118/95, University of Newcastle upon Tyne, Geology