

PROGRAMME SPECIFICATION

1	Awarding Institution	Newcastle University
2	Teaching Institution	Newcastle University
3	Final Award	MSc / PGDip
4	Programme Title	Environmental and Petroleum Geochemistry
5	Programme Code	5209F/5209P
6	Programme Accreditation	JBM, Geol Soc (pending)
7	QAA Subject Benchmark(s)	Engineering
8	FHEQ Level	7
9	Last updated	May 2014

10 Programme Aims

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

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

- a The low temperature geochemistry of waters, soils and sediments.
- b The fundamental role played by micro-organisms in catalysing low temperature geochemical reactions.
- c The origins, toxicity and ultimate fates of pollutants.
- d Modern techniques for the analysis of environmental materials.
- e. The impact and geochemistry of oil in the environment

3. To provide a programme that meets the accreditation requirements of the Joint Board of Moderators (JBM www.jbm.org.uk) for Further Learning for a Chartered Engineer (CEng) for candidates who have already acquired an Accredited CEng (Partial) BEng(Hons) or an Accredited IEng (Full) BEng/BSc (Hons) undergraduate first degree.

4. To provide a programme designed to achieve the EC^{UK} Output Standards for Accredited Engineering Programmes and take account of the QAA's FHEQ Qualification Descriptors, the QAA Subject Benchmark Statement for Engineering, and the University's Graduate Skills Framework.

EC^{UK} Output Standards for Accredited Engineering Programmes:

<http://www.engc.org.uk/ecukdocuments/internet/document%20library/AHEP%20Brochure.pdf>

QAA's FHEQ Qualification Descriptors:

<http://www.qaa.ac.uk/AssuringStandardsAndQuality/Qualifications/Pages/default.aspx>

QAA Subject Benchmark Statement for Engineering:

<http://www.qaa.ac.uk/Publications/InformationAndGuidance/Pages/Subject-benchmark-statement-Engineering-.aspx>

University's Graduate Skills Framework:

<http://www.ncl.ac.uk/quilt/modules/gsf.htm>

11 Learning Outcomes

The programme provides opportunities for students to develop and demonstrate knowledge and understanding, qualities, skills and other attributes.

Knowledge and Understanding

On completing the programme students should have gained and be able to demonstrate:

- A1 An advanced knowledge and understanding of the low temperature geochemistry of waters, soils and sediments
- A2 A knowledge and understanding of the physiology and diversity of micro-organisms, and their roles in the environment.
- A3 A knowledge and understanding of the origin, toxicity and fate of key organic and inorganic pollutants
- A4 A knowledge and understanding of modern approaches to pollution and pollution control
- A5 A knowledge of the principles, applications and limitations of modern environmental analytical techniques, and an advanced understanding of some of these techniques
- A6 A knowledge and understanding of key pieces of environmental legislation
- A7 A knowledge of the formation and composition of oil
- A8 An understanding of Geographic Information systems and their use in data presentation

Teaching and Learning Methods

Teaching

Specialist technical knowledge and understanding (A1-A7) are primarily imparted via lecture classes, often supported by web-based reference materials. 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.

Assessment Strategy

Knowledge and understanding (A1-A8) 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, technical reports, and group projects and presentations. Some, or all, of A1-A8 (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.

Intellectual Skills

On completing the programme students should be able to:

- B1 Critically assess the quality of data generated by analytical geochemical techniques
- B2 Present and summarise such data, and to critically appraise its significance, using appropriate statistical techniques
- B3 Critically assess the value and limitations of existing information on a given subject
- B4 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
- B5 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
- B6 Solve relevant logical and numerical problems

Teaching and Learning Methods

Intellectual skills B1-B6 are developed during the lectures, field trips and workshops and mini-projects. All such skills are exercised significantly during the course of the dissertation project, the completion of which is supported by a series of dissertation-related workshops.

Assessment Strategy

Intellectual skills (B1-B6) 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 B1-B6 (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.

Practical Skills

On completing the programme students should be able to:

- C1 Demonstrate an understanding of the principles, applications and limitations of modern environmental analytical techniques, and an advanced understanding of some of these techniques
- C2 Demonstrate the ability to present and summarise analytical data, and to critically appraise its significance, using appropriate statistical techniques
- C3 Demonstrate the ability to analyse oil samples and their transformation in the environment
- C4 Plan, execute and present a research project
- C5 Deal with complex issues both systematically and creatively
- C6 Demonstrate decision making in complex and unpredictable situations
- C7 Make sound judgments in the absence of complete data
- C8 Demonstrate self-direction and originality in tackling and solving problems
- C9 Act autonomously in planning and implementing tasks
- C10 Apply engineering techniques taking account of environmental, industrial and commercial constraints
- C11 Produce GIS maps using ARCGIS modelling software

Teaching and Learning Methods

Outcomes C1- C11 are acquired principally through laboratory work and experience of the project. Acquisition of C1-11 is initially through lectures, developed through hands-on exercises and assignments. Further individual learning may also form a significant part of the project. C5 is introduced through lectures and developed through case studies. It will frequently form a central part of the project. Lectures and tutorials provide initial experience of C1 – C11, but the project forms the principal vehicle for their acquisition.

Assessment Strategy

Subject specific and practical skills (C1-C3, C11) are assessed by means of coursework reports and by unseen written examination. Some, or all, of C1-C3, C11 (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.

Transferable/Key Skills

On completing the programme students should be able to:

- D1 Effectively communicate with specialist and non specialist audiences
- D2 Retrieve information from literature/databases and manipulate and present data in a variety of ways
- D3 Efficiently use general IT skills
- D4 To plan, organise and prioritise work activities in order to meet deadlines

D5 Exercise initiative and personal responsibility
D6 To solve problems
D7 Work effectively as a part of a team

Teaching and Learning Methods

Key skills D1–D4 are taught formally in CEG8601 (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 (D7) are developed by group exercises. 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 summer dissertation project provides students with further opportunities to develop all of these skills (D1–D7). Students are encouraged to acquire key skills D1–D4 through reflection on the material provided.

Assessment Strategy

Key skills (D1-D4) are assessed via written examinations, the production of a research brief (CEG8601), and the giving of short presentation in CEG8696. 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.

12 Programme Curriculum, Structure and Features

Basic structure of the programme

This is a one-year full-time modular programme. It consists of two parts: a 120-credit *taught component*, which runs from late September until Easter, and an 60-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 11 compulsory modules, ten 10-credit modules and one 20-credit module. Each 10-credit module equates to 100 hours of learning time.

The CEG8696 18 week research project, commencing in mid-April, enables students to apply the subject specific skills and understanding (intended learning outcomes A1-A6), the intellectual skills (intended learning outcomes B1-B6), the practical skills (intended learning outcomes C1-C4) and the transferable/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.

Key features of the programme (including what makes the programme distinctive)

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 distinctive business component, specifically CEG8607 and CEG8608. The programmes focuses on the impact of oil and petroleum on the natural environment (CEG8626) and teaching laboratory skills on the analysis of oils. 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.

Programme regulations (link to on-line version)

<http://www.ncl.ac.uk/regulations/programme/>

13 Criteria for admission

Entry qualifications

A minimum of a second-class Honours degree, or an international equivalent, in an engineering, science or related subject.

Admissions policy/selection tools

Upon receipt of a completed application form via the electronic E2R system, eligible and suitably qualified candidates are made automatic conditional or unconditional offers of places by the PG Admissions team in Kings Gate. Overseas qualifications are assessed by the PG Admissions team in Kings Gate using the database set up by the international office, supported also by NARIC <http://www.naric.org.uk/>. Where uncertainty exists applications are referred to the Degree Programme Director (DPD). The DPD invites all UK-based applicants to visit the School for an introduction to the Programme and tour of our facilities. Applicants not based in the UK are not required to attend an interview. Decisions are based on qualifications, references, any relevant work experience, and the applicants' personal statements.

Non-standard Entry Requirements

Candidates without the typical qualifications will be considered, especially those with relevant professional experience, but there is no Diploma entry route.

Additional Requirements

Level of English Language capability

IELTS 6.5 (or equivalent) with at least 6 in each component.

14 Support for Student Learning

The Student Services portal provides links to key services and other information and is available at: <http://www.ncl.ac.uk/students/>

Induction

During the first week of the first semester students attend an induction programme. New students will be given a general introduction to University life and the University's principle support services and general information about the School and their programme, as described in the Degree Programme Handbook. New and continuing students will be given detailed programme information and the timetable of lectures/practicals/labs/ tutorials/etc. The International Office offers an additional induction programme for overseas students.

Study skills support

Students will learn a range of Personal Transferable Skills, including Study Skills, as outlined in the Programme Specification. Some of this material, e.g. time management is covered in the appropriate Induction Programme. Students are explicitly tutored on their approach to both group and individual projects.

Numeracy support is available through Maths Aid and help with academic writing is available from the Writing Development Centre (further information is available from the Robinson Library).

Academic and Pastoral support

Each undergraduate and taught postgraduate student will be assigned a personal tutor.* A personal tutor is one part of a wider network of advice and guidance available to students to support their personal and general academic development. The module leader acts as the first point of contact for subject-specific academic advice. Thereafter the Degree Programme Director or Head of School may be consulted. Issues relating to the programme may be raised at the Student-Staff Committee, and/or at the Board of Studies. Within the academic unit, students may also receive additional academic and pastoral advice from a range of other student-facing staff including degree programme directors, dissertation/project supervisors, and administrative support staff.

*Arrangements may vary for students taking special types of provision.

The University also offers a wide range of institutional services and support upon which students can call, such as the Writing Development Centre, Careers Service and Student Wellbeing Service. This includes one-to-one counselling and guidance or group sessions / workshops on a range of topics, such as emotional issues e.g. stress and anxiety, student finance and budgeting, disability matters etc. There is specialist support available for students with dyslexia and mental health issues. Furthermore, the Student Union operates a Student Advice Centre, which can provide advocacy and support to students on a range of topics including housing, debt, legal issues etc.

Support for students with disabilities

The University's Disability Support team provides help and advice for disabled students at the University - and those thinking of coming to Newcastle. It provides individuals with: advice about the University's facilities, services and the accessibility of campus; details about the technical support available; guidance in study skills and advice on financial support arrangements; a resources room with equipment and software to assist students in their studies.

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.

All new students whose first language is not English are required to take an English Language Proficiency Test. This is administered by INTO Newcastle University Centre on behalf of Newcastle University. Where appropriate, in-session language training can be provided. The INTO Newcastle University Centre houses a range of resources which may be particularly appropriate for those interested in an Erasmus exchange.

15 Methods for evaluating and improving the quality and standards of teaching and learning

Module reviews

All modules are subject to review by questionnaires which are considered by the Board of Studies. Changes to, or the introduction of new, modules are considered at the Board of Studies and/or the School Teaching and Learning Committee. Student opinion is sought at the Student-Staff Committee and/or the Board of Studies. New modules and major changes to existing modules are subject to approval by the Faculty Learning, Teaching and Student Experience Committee.

Programme reviews

The Board of Studies conducts an Annual Monitoring and Review of the degree programme and reports to Faculty Learning, Teaching and Student Experience Committee. The FLTSEC takes an overview of all programmes within the Faculty and reports any Faculty or institutional issues to the Faculty Learning, Teaching and Student Experience Committee.

External Examiner reports

External Examiner reports are considered by the Board of Studies. The Board responds to

these reports through Faculty Learning, Teaching and Student Experience Committee. External Examiner reports are shared with institutional student representatives, through the Student-Staff Committee.

Student evaluations

All modules, and the degree programme, are subject to review by student questionnaires. Informal student evaluation is also obtained at the Student-Staff Committee, and the Board of Studies. The results from student surveys are considered as part of the Annual Monitoring and Review of the programme and any arising actions are captured at programme and School / institutional level and reported to the appropriate body.

Mechanisms for gaining student feedback

Feedback is channelled via the Student-Staff Committee and the Board of Studies.

Faculty and University Review Mechanisms

Every six years degree programmes in each subject area undergo periodic review. This involves both the detailed consideration of a range of documentation, and a review visit by a review team (normally one day in duration) which includes an external subject specialist and a student representative. Following the review a report is produced, which forms the basis for a decision by University Learning, Teaching and Student Experience Committee on whether the programmes reviewed should be re-approved for a further six year period.

Accreditation reports

At the date of publication, the continuation of accreditation by the Joint Board of Moderators (Institution of Civil Engineers, Institution of Structural Engineers, Chartered Institution of Highways and Transportation, and the Institute of Highway Incorporated Engineers) as meeting the requirements for Further Learning for a Chartered Engineer (CEng) for candidates who have already acquired an Accredited CEng (Partial) BEng (Hons) or an Accredited IEng (Full) BEng/BSc (Hons) undergraduate first degree, is pending final approval (July2012). See www.jbm.org.uk for further information.

The programme is also pending accreditation by the Geological Society (GeolSoc, www.geolsoc.org.uk).

Additional mechanisms

16 Regulation of assessment

Pass mark

The pass mark is 50%

Course requirements

Progression is subject to the University's Masters Degree Progress Regulations, Taught and Research and Examination Conventions for Taught Masters Degrees. There are reassessment opportunities, with certain restrictions. Limited compensation up to 40 credits of the taught element and down to a mark of 40% is possible for candidates who commenced their programme in 2013/14 or earlier. For students starting their programme in 2014/15 or later, no compensation is possible.

The University employs a common marking scheme, which is specified in the Taught Postgraduate Examination Conventions, namely:

Summary description applicable to postgraduate Masters programmes

<50	Fail
50-59	Pass
60-69	Pass with Merit
70 or above	Pass with Distinction

Role of the External Examiner

An External Examiner, a distinguished member of the subject community, is appointed by FLTSEC, following recommendation from the BoS. The External Examiner is expected to:

- i. See and approve assessment papers
- ii. Moderate examination and coursework marking
- iii. Attend the Board of Examiners
- iv. Report to the University on the standards of the programme

In addition, information relating to the programme is provided in:

The University Prospectus: <http://www.ncl.ac.uk/postgraduate/>

The School Website: <http://www.ncl.ac.uk/ceg/study/postgraduate/taught/index.htm>

The School Brochure <http://www.ncl.ac.uk/marketing/services/print/publications/ordering/>

Degree Programme and University Regulations: <http://www.ncl.ac.uk/regulations/docs/>

The Module Catalogue: <http://www.ncl.ac.uk/module-catalogue/>

Please note. 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.

Annex

Mapping of Intended Learning Outcomes onto Curriculum/Modules

Module	Type	Intended Learning Outcomes			
		A	B	C	D
CEG8601	Compulsory		1,2,3,4,5,6	2,4,5,6,7,8,9	1,2,3,4,5,6
CEG8621	Compulsory	1,2,3,5,7	1,2,3,4,5,6	2,5,6,7,8,9	1,2,3,4,5,6
CEG8632	Compulsory	1,2,3,5,7	1,2,3,4,5,6	2,3,5,6,7,8,9	1,2,3,4,5,6,7
CEG8634	Compulsory	1,2,3,4,5,6,	1,2,3,4,5,6	1,2,5,6,7,8,9,10	1,2,3,4,5,6,7
CEG8604	Compulsory	1,2,3,5,	1,2,3,4,5,6	1,2,5,6,7,8,9,	1,2,3,4,5,6
CEG8605	Compulsory	1,2,3,4,5,	1,2,3,4,5,6	1,2,3,5,6,7,8,9,	1,2,3,4,5,6
CEG8606	Compulsory	1,2,3,4,5,6,	1,2,3,4,5,6	1,2,3,5,6,7,8,9,	1,2,3,4,5,6
CEG8405	Compulsory	3,4,5,6,7,8	1,2,3,4,5,6	1,2,3,4,5,6,7,8,9	1,2,3,4,5,6,7
CEG8626	Compulsory	1,2,3,4,5,6,7	1,2,3,4,5,6	1,2,3,5,6,7,8,9	1,2,3,4,5,6
CEG8608	Compulsory	1,2,3,4,5,6,7	1,2,3,4,5,6	1,2,5,6,7,8,9,10	1,2,3,4,5,6,7
CEG8705	Compulsory	1	1,2,4,5,6	3,4,5,6	1,2,3,4,5,6
CEG8696	Compulsory	1,2,3,4,5,6,7	1,2,3,4,5,6	1,2,3,4,5,6,7,8,9,10	1,2,3,4,5,6