

## PROGRAMME SPECIFICATION



1	<b>Awarding Institution</b>	Newcastle University
2	<b>Teaching Institution</b>	Newcastle University
3	<b>Final Award</b>	MSc / PGDip
4	<b>Programme Title</b>	Environmental and Petroleum Geochemistry
5	<b>Programme Code</b>	5209F/5209P
6	<b>Programme Accreditation</b>	JBM, Geol Soc (pending)
7	<b>QAA Subject Benchmark(s)</b>	Engineering
8	<b>FHEQ Level</b>	7
9	<b>Last updated</b>	May 2013

### 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](http://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<sup>UK</sup> 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<sup>UK</sup> 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 CEG8699. 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 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 9 compulsory modules and 2 optional modules. Each 10-credit module equates to 100 hours of learning time.

The CEG8699 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: <https://my.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 Centre (further information is available from the Robinson Library).

#### *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.

#### *Pastoral support*

All students are assigned a personal tutor whose responsibility is to monitor the academic performance and overall well-being of their tutees. In addition the University offers a range of support services, including 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 Union Society 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 Service 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 (BoS). Changes to, or the introduction of new, modules are considered at the BoS and/or the School Learning, Teaching and Student Experience Committee (SLTSEC). Student opinion is sought at the Staff-Student Committee (SSC) and/or the BoS. New modules and major changes to existing modules are subject to approval by the Faculty Learning, Teaching and Student Experience Committee (FLTSEC).

#### *Programme reviews*

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

#### *External Examiner reports*

External Examiner reports are considered by the BoS. The Board responds to these reports through FLTSEC. External Examiner reports are shared with institutional student representatives, through the SSC.

#### *Student evaluations*

All modules, and the degree programme, are subject to review by student questionnaires. Informal student evaluation is also obtained at the SSC, and the BoS. 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 SSC and the BoS.

*Faculty and University Review Mechanisms*

The programme is subject to the University's Internal Subject Review process. Every five years degree programmes in each subject area are subject to periodic review. This involves both the detailed consideration of a range of documentation, and a two-day review visit by a review team which includes an external subject specialist in addition to University and Faculty representatives. Following the review a report is produced, which forms the basis for a decision by ULTSEC on whether the programmes reviewed should be re-approved for a further five 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](http://www.jbm.org.uk) for further information.

The programme is also pending accreditation by the Geological Society (GeoSoc), [www.geolsoc.org.uk](http://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. Limited compensation up to 20 credits of the taught element and down to a mark of 40% is possible and there are reassessment opportunities, with certain restrictions.

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>

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

The School Handbook: <https://ce-gs14.ncl.ac.uk/CeG.Internal/teaching/handbooks/2011-2012/CeG%20School%20Handbook.PDF>

The Degree Programme Handbook: <https://ce-gs14.ncl.ac.uk/CeG.Internal/teaching/handbooks/2011-2012/EE%20Handbook.pdf>

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
CEG8699	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