PROGRAMME SPECIFICATION	

1	**Awarding Institution**	Newcastle University
2	**Teaching Institution**	Newcastle University
3	**Final Award**	MSc, Postgraduate Diploma
4	**Programme Title**	Environmental Engineering
5	**UCAS/Programme Code**	5038 (MSc), 3327 (PgD)
6	**Programme Accreditation**	JBM, CIWEM
7	**QAA Subject Benchmark(s)**	Engineering
8	**FHEQ Level**	M
9	**Date written/revised**	Revised 13th Sept 2007

10 Programme Aims

1) To provide science and engineering graduates from a variety of backgrounds with the advanced conceptual understanding, detailed factual knowledge and specialist technical skills to enable them to follow successful careers as practicing environmental engineers and researchers in the water, waste and environmental industry.
2) To provide an entry route into an appropriate professional institution such as the Chartered Institution of Water and Environmental Management (CIWEM).
3) To ensure that the key skills of our students develop in parallel with 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.

11 Learning Outcomes

The programme provides opportunities for students to develop and demonstrate knowledge and understanding, qualities, skills and other attributes in the following areas. The programme outcomes incorporate elements of the QAA Subject Benchmark Statement for Engineering, particularly the enhanced learning outcomes expected of M level graduates. The learning outcomes most relevant to these are marked (E).

Knowledge and Understanding

On completing the programme students should:

A1 Have an understanding of mathematical and scientific analytical methods appropriate to Environmental Engineering and research investigations

A2 Demonstrate advanced knowledge and understanding of Environmental Engineering theory of physical, chemical and biochemical processes and design in selected areas of study (E)

A3 Have an understanding of applications of IT to the selected fields of study

A4 Know the principles of Integrated Environmental Engineering Design including awareness of design data and the development of a basis of design

A5 Be aware of specific examples of Environmental Engineering design with consideration of principles of Integrated Pollution Prevention and Control

A6 Be aware of management principles and business practices, including professional and ethical responsibilities and aspects of sustainability (E)

A7 Have an understanding of design, construction and operations practice and awareness of requirements for health and safety issues (E)

Teaching and Learning Methods

Acquisition of A1 and A2 is through a combination of lectures, tutorials, example classes, group and individual presentations, laboratory activities and coursework.

Outcome A3 is achieved by lectures, tutorials and, where appropriate, hands-on

computer exercises.

Acquisition of A4 and A5 is partly by lecture and tutorial, but depends increasingly on case studies, student investigations and oral and poster presentations. Individual investigations to greater depth are frequently needed during the design and research projects.

The broader professional outcomes, A6, are taught by lectures and tutorials supporting Integrated Design.

Outcome A7 is covered in lectures and developed in design tutorials, but is also central to experimental project investigations.

Assessment Strategy

Formative assessment occurs through tutorial examples, coursework and a major dissertation. The primary means of assessing factual knowledge is the closed book examination. This is supported by assessed coursework, the Integrated Design Project, and case studies, which involve oral, written and poster presentations.

Intellectual Skills

On completing the programme students should be able to:

B1 Understand and use engineering and scientific principles in the development of solutions to practical problems (E)

B2 Select and apply appropriate designs to solve problems in Environmental Engineering context

B3 Use scientific principles in the modelling and analysis of Environmental Engineering systems and processes (E)

B4 Select and develop appropriate computer based methods for modelling and analysis of problems (E)

B5 Demonstrate an appreciation of the need for multi-disciplinary inputs where appropriate, in the creation of new design criteria and analytical methods

B6 Produce solutions to problems through the application of engineering and scientific knowledge and understanding (E)

Teaching and Learning Methods

Outcomes B1 – B4 are initially encountered in lectures, laboratory and design classes and through case studies, but are developed principally during the Integrated Design and Research projects.

Acquisition of B5 is introduced through lectures and case studies and may form a major part of the project.

B6 is introduced in lectures and developed through tutorials, case studies, the design and the project.

Assessment Strategy

Unseen examinations are used to assess intellectual abilities.

Assessed coursework and designs provides further opportunities to demonstrate intellect and ability.

The project, which is assessed by dissertation, oral and poster presentations, provides final evidence of the levels attained.

Practical Skills

On completing the programme students should be able to:

C1 Use relevant analytical and measurement equipment

C2 Competently carry out experimental laboratory work

C3 Plan, execute and present a research project

C4 Use engineering IT tools where appropriate

C5 Design a system, component or process in an Environmental Engineering context

C6 Test innovative ideas through laboratory work or simulation followed by technical analysis and critical evaluation of results

C7 Search for information and develop ideas further

C8 Apply engineering techniques taking account of environmental, industrial and commercial constraints (E)

Teaching and Learning Methods

Outcomes C1-C3 are acquired principally through laboratory work and experience of the project.

Acquisition of C4 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 C6 and C7, but the project forms the principal vehicle for their acquisition.

Outcome C8 is introduced through lectures. Some projects may require further individual learning in this area.

Assessment Strategy

Outcome C1 is assessed in part through coursework from teaching laboratories, and again in the Materials and Methods section of the final Dissertation.

C2 and C3 are assessed in the Project Brief in Research Methods.

C4 is not explicitly assessed, but can add to the value of the Integrated Design and Research projects

Outcomes C5 to C8 are assessed through coursework from individual modules, and especially through the Integrated Design and Research Projects.

Transferable/Key Skills

On completing the programme students should be able to:

D1 Retrieve information from literature/databases and manipulate and present data in a variety of ways

D2 Use scientific evidence-based methods in the solution of problems (E)

D3 Be creative and innovative in problem solving (E)

D4 Effectively communicate

D5 Learn independently in a range of situations, preparing for life long learning

D6 Efficiently use general IT skills

D7 Manage time and resources, plan laboratory-based programmes, assess hazards and risks and work safely (E)

Teaching and Learning Methods

Outcomes D1-D7 may be introduced through examples in lectures. Subsequently, the principal development of transferable skills occurs through involvement in the Integrated Design and research projects.

Assessment Strategy

Skills D1-D3 are essential to complete examination and assignments to a satisfactory standard.

Acquisition of D4 and D5 is demonstrated during the assessment of both the Integrated Design and the research project.

Outcomes D6 and D7 are essential to complete satisfactorily the dissertation and project, which also requires command of outcomes D1-D5.

12 Programme Curriculum, Structure and Features

Basic structure of the programme

The full time MSc Programme is a twelve month programme starting in September. It consists of seven compulsory taught modules, two out of three or more optional modules, and a dissertation project.

The Programme consists of 180 credits. All taught modules are worth 10 credits, except Water Pollution Assessment and Sustainability, which is a 20 credit ‘double’ module, and the Dissertation Project, which is worth 80 credits. 80 credits of taught modules are compulsory, then students select 2 out of 3 additional optional modules.

Most taught modules are delivered as one week intensive short courses, followed by a week

of further reading and coursework.

Students on the full time nine month Diploma Programme will take exactly the same modules as MSc students in the first Semester. If their performance in the first Semester is satisfactory, they will have the opportunity to transfer to the MSc Programme. If students stay on the Diploma Programme, they will undertake a 40 credit Diploma Project in the second Semester instead of the optional modules and Dissertation project, giving a total of 120 credits, and completing at the end of the second Semester in June. The Diploma Project is similar to the Dissertation Project but a smaller piece of work.

The Programme for part time MSc or Diploma students is the same as for full time MSc or Diploma students, but completed in up to 36 months. The intensive one week short course nature of most taught modules makes the Programme ideal for part time attendance. Although most modules are designed to work as 'stand-alone' short courses, some modules (particularly the Integrated Environmental Engineering Design project and the Dissertation or Diploma project) require some prior knowledge from other modules, so the order in which modules are taken needs to be planned in discussion with the Degree Programme Director.

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

Students of the Environmental Engineering MSc and PgD Programme learn how to protect, in a sustainable way, human health and the environment by being able to conceive, plan and communicate ways to collect, treat and distribute clean water, to collect, treat and reuse or dispose of wastewater and wastes, and to remediate and reclaim contaminated land. In addition to the engineering and scientific aspects, we emphasize the social, economic and institutional context, in both developed and in developing countries. Although there other postgraduate programmes in the UK that address some of these issues, this programme is unique in its breadth while maintaining its focus on environmental engineering.

Core knowledge and skills

The core knowledge and skills required by professional Environmental Engineers are covered in the first Semester (September to January), with the following modules: Water Pollution Assessment and Sustainability, Wastewater Engineering, Water Supply Engineering, Solid Waste Management and Environmental Engineering for Developing Countries.

Skills application and strengthening

The Research Methods module is taken by MSc students on several programmes across the School. Lectures and tutorials are spread over Semester 1 and 2, to introduce key skills needed to prepare for and undertake a significant piece of research, including statistical methods. Part of the assessment for this modules is a written piece of coursework, the Project Brief, which forms a key part of preparation for the Dissertation project.

The second Semester begins with the Integrated Environmental Engineering Design Project module, where students work in teams on a practical design problem, building on the knowledge and skills learnt in the first Semester.

Specialist knowledge and skills

Students select two out of the three optional modules: Environmental Risk Management, Contaminated Land and Biological Systems Engineering. The latter was a new module in 2006-7, designed to introduce the engineering application of modern molecular methods to biological systems, which is a key strength in the School’s activities at the forefront of Environmental Engineering research.

With the approval of the Degree Programme Director, students may select alternative modules available within the School or University to a maximum of 20 credits. It is the responsibility of the student to make arrangements to incorporate any alternative module(s) into their study programme.

Dissertation project

The Dissertation Project module aims to enable students to apply and strengthen the skills learnt in other modules, and to develop specialist knowledge and skills in a chosen area of interest. From April onwards, full time students are free to work full time on these projects, which are substantial pieces of research work carried out in our own well equipped laboratories, UK field sites, in industry or overseas. We offer a wide range of potential projects related to both taught modules and to research being carried out by staff across the School. It is also possible for students to propose their own project related to their work experience or interests, subject to approval by the Degree Programme Director.

Programme regulations (link to on-line version)

MSc: http://www.ncl.ac.uk/regulations/programme/

Diploma: 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 or science subject. Other qualifications or relevant professional experience will also be considered.

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 Graduate School. Overseas qualifications are assessed by the Graduate School using NARIC http://www.naric.org.uk/ and the 2006 Nigerian NUC university and course accreditation ratings http://www.nucnigeria.info/accre.htm. 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; this is done on an individual ad hoc basis to avoid delays. 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 may be accepted for the Diploma and, subject to satisfactory performance, transferred to the MSc at the end of the first semester.

Level of English Language capability

Applicants whose first language is not English normally require IELTS 6.5, TOEFL 575 (paper-based) or 233 (computer-based), or equivalent.

14 Support for Student Learning

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 School induction programme includes health and safety and an introduction to the Research Methods module. The Programme induction programme includes a one day 'Chemistry for non-chemists' course, a tour of facilities, a welcome reception, and at least one field trip. 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.

A Maths tutorial sheet is given to students in Induction Week, and numeracy support is available through Maths Aid.

Help with academic writing is available from the Writing Centre.

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 eg. 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-sessional 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 School Teaching and Learning Committee and at the Board of Studies. Student opinion is sought at the Staff-Student Committee and/or the Board of Studies. New modules and major changes to existing modules are subject to approval by the Faculty Teaching and Learning Committee.

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

Student evaluations
All modules, and the degree programme, are subject to review by student questionnaires. Informal student evaluation is also obtained at the Staff-Student Committee, and the Board of Studies. The National Student Survey is sent out every year to final-year undergraduate students, and consists of a set of questions seeking the students' views on the quality of the learning and teaching in their HEIs. With reference to the outcomes of the NSS and institutional student satisfaction surveys actions are taken at all appropriate levels by the institution.

Mechanisms for gaining student feedback
Feedback is channelled 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 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 University Teaching and Learning Committee on whether the programmes reviewed should be re-approved for a further five year period.

Accreditation reports
Programme approved as a period of further learning by the Joint Board of Moderators (JBM, http://www.jbm.org.uk/) for intakes up to 2011.

Programme accredited by the Chartered Institution of Water and Environmental Management (CIWEM, http://www.ciwem.org/education/accreditation) as contributing to the academic requirements for the appropriate CIWEM membership grade for students that graduate from the Programme from 2006-7 to 2012-13.

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 40 credits of the taught element and down to a mark of 40 is possible and there are reassessment opportunities, with certain restrictions.

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

Summary description applicable to postgraduate Masters programmes		**Summary description applicable to postgraduate Certificate and Diploma programmes**	
<50	Fail	<50	Fail
50-59	Pass	50 or above	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 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 Board of Examiners
Report to the University on the standards of the programme

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

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

The School Brochure (contact enquiries@ncl.ac.uk)

The University Regulations (see http://www.ncl.ac.uk/calendar/university.regs/)

The Programme website (see http://www.ceg.ncl.ac.uk/postgrad/pgt/courses/ee%205038.htm)

The Degree Programme Handbook (available from the School Office and to download from the Programme website

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

		Intended Learning Outcomes			
Module	**Type**	**A**	**B**	**C**	**D**
CIV8001	Compulsory	1,3,8	4,5,6	3,4,7	1,4,5,6,7
CIV8101	Compulsory	2,5,6,7	5,6	5,7,8	1,3,4,5,6
CIV8104	Compulsory	2,5,6,7	1,3,6	4,5	2,5
CIV8105	Compulsory	2,4,5	2,6	1,5,8	4,5,6
CIV8106	Compulsory	2,4,5	2,6	5,8	2,5
CIV8107	Compulsory	1,2,6	3,5,6	1,2,4,7	1,2,4,5,6
CIV8018	Compulsory	3,4,6,7	1,2,4,5,6	4,5,8	3,4,5,6
CIV8099	Compulsory (MSc)	1,2,3,6,7	1,3,4,6	1,2,3,4,5,6	1,2,3,4,5,6,7
CIV8098	Compulsory (PgD)	1,2,3,6,7	1,3,4,6	1,2,3,4,5,6	1,2,3,4,5,6,7
CIV8102	Optional (MSc)	5,6	3,5	7,8	1,5
CIV8103	Optional (MSc)	1,2,3	1,3,4,6	7,8	1,2,3,4,5,6
GSC8201	Optional (MSc)	1,2,6	1,3,5,6	7,8	1,2,3,4,5,6