UNIVERSITY
OF
NEWCASTLE UPON TYNE

DEGREE PROGRAMME SPECIFICATION

1. Awarding Institution:	University of Newcastle upon Tyne
2. Teaching Institution:	University of Newcastle upon Tyne
3. Programmes Accredited by:	CIWEM
4. Final Award:	M.Sc.
5. Programme Titles:	M.Sc. in Environmental Engineering (5038)
6. UCAS codes:	N/A
7. QAA Benchmarking Group	N/A
8. Date of production / revision	October 2004

9. Educational Aims of the Programme

The programme aims:

- to provide opportunities for candidates with first degrees in a range of scientific and engineering disciplines to enhance their knowledge of Environmental Engineering;
- to offer experience in the planning and execution of an extended research project;
- to provide experience of dissertation writing and other presentational skills including oral and poster;
- to meet the requirements of the relevant Chartered Engineering Institutions(*)
- to provide a qualification which meets the designated learning outcomes at level 4 of the National Qualifications' Framework.

10. Programme Outcomes

The programmes provide opportunities for students to develop and demonstrate knowledge and understanding, skills, qualities and other attributes in the following areas. The typical (modal) student will have:

A. Knowledge & Understanding

A.1. Where appropriate, mathematical and scientific analytical methods appropriate to Environmental Engineering and research investigations;
A.2. An advanced knowledge and understanding of Environmental Engineering theory of physical, chemical and biochemical processes and design in selected areas of study;
A.3. Where appropriate, knowledge of applications of IT to the selected fields of study;
A.4. Principles of Integrated Environmental Engineering Design including awareness of design data and the development of a basis of design;
A.5. Specific examples of Environmental Engineering design with consideration of principles of Integrated Pollution Prevention and Control;
A.6. Principles of Environmental Impact Assessment and Environmental Management Systems;
A.7 Where appropriate, management principles and business practices, including professional and ethical responsibilities and aspects of sustainability;
A.8. Design, construction and operations practice and awareness of requirements for health and safety issues.

Teaching/learning methods and strategies:

Acquisition of A.1 and A.2 is through a combination of lectures, tutorials, example classes, group and individual presentations, laboratory activities and coursework.
Outcome A.3 is achieved by lectures, tutorials and, where appropriate, hands-on computer exercises.
Acquisition of A.4 and A.5 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.
Outcome A.6 depends primarily on lectures, case studies and coursework.
The broader professional outcomes, A.7, are taught by lectures and tutorials supporting Integrated Design;
Outcome A.8 is covered in lectures and developed in design tutorials, but is also central to experimental project investigations.

Assessment
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.

B. Intellectual Abilities

B.1 Understanding and use of engineering and scientific principles in the development of solutions to practical problems;
B.2. Ability to select and apply appropriate designs to solve problems in Environmental Engineering context, demonstrating an appreciation of the need for multi-disciplinary inputs where appropriate.
B.3. Use of scientific principles in the modelling and analysis of Environmental Engineering systems and processes;
B.4. Where appropriate, ability to select and develop appropriate computer based methods for modelling and analysis of problems;
B.5 Demonstrating an appreciation of the need for multi-disciplinary inputs where appropriate, in the creation of new design criteria and analytical methods;
B.6. Ability to produce solutions to problems through the application of engineering and scientific knowledge and understanding;
B.7. Ability to undertake environmental risk assessment.

Teaching/learning methods and strategies:

Outcomes B.1 – B.4. 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 B.5. is introduced through lectures and case studies and may form a major part of the project.
B.6. is introduced in lectures and developed through tutorials, case studies, the design and the project.
Outcome B.7. is included in lectures, and the Integrated Design as well as being considered on an individual basis as part of the project supervision.

Assessment

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 and possibly *viva voce* examination, provides final evidence of the levels attained.

C. Practical Skills

C.1. Use of relevant analytical and measurement equipment;
C.2. Experimental laboratory work;
C.3. Planning, execution and presentation of a research project.
C.4. Where appropriate, the ability to use engineering IT tools;
C.5. Ability to design a system, component or process in an Environmental Engineering context;
C.6. Practical testing of innovative ideas through laboratory work or simulation followed by technical analysis and critical evaluation of results;
C.7. Ability to search for information and develop ideas further;
C.8. Ability to apply engineering techniques taking account of environmental, industrial and commercial constraints;

Teaching/learning methods and strategies:

Outcomes C.1-C.3. are acquired principally through laboratory work and experience of the project.
Acquisition of C.4. is initially through lectures, developed through hands-on exercises and assignments. Further individual learning may also form a significant part of the project.
C.5. 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 C.6. and C.7., but the project forms the principal vehicle for their acquisition.
Outcome C.8 is introduced through lectures. Some projects may require further individual learning in this area.

Assessment

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 plan for the research project.
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.

D. General Transferable Skills

D.1. Information retrieval for literature/databases and manipulation and presentation of data in a variety of ways;
D.2. Use of scientific evidence based methods in the solution of problems;
D.3. Use of creativity and innovation in problem solving;
D.4. Effective communication;
D.5. Learn independently in a range of situations, preparing for life long learning;
D.6. Use of general IT skills;
D.7. Time and resource management, planning laboratory-based programmes, assessing hazards and risks and working safely.

Teaching/learning methods and strategies:

Outcomes D.1-D.7 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

Skills D.1-D.3 are essential to complete examination and assignments to a satisfactory standard.
Acquisition of D.4. and D.5 is demonstrated during the assessment of both the Integrated Design and the research project.
Outcomes D.6 and D.7. are essential to complete satisfactorily the dissertation and project, which also requires command of outcomes D.1-D.5.
The above Learning Outcomes have been compared with the QAA Framework for Higher Education Qualifications Descriptor for a qualification at Masters (M) level. They are believed to meet or exceed the requirements of that Descriptor.

11. Programme structures: credits, modules, levels and awards.

The normal undergraduate year, extending from the end of September to the middle of June, is approximately 31 weeks, arranged in three terms and currently divided into two Semesters. In contrast, the M.Sc. year occupies the full 12-month period, with the summer period (June-September) essentially constituting an additional semester.

Every M.Sc. student studies 180 credits over the academic year. The academic courses, comprising 100 credits, are taught in Semesters 1 and 2, and the 80 credits associated with the project are notionally allocated to parts of the first and second semesters and the summer period.

The programme of study is as defined below:

Module code	Credit	Descriptive Title
Compulsory modules:		
CIV702	10	Research Methods
CIV705	10	Management of Hazardous Wastes, Industrial Wastewaters and Contaminated Land
CIV818	10	Solid Waste Management
CIV904	10	Environmental Risk Management
CIV911	10	Water Supply Engineering
CIV912	10	Wastewater Engineering
CIV913	20	Environmental Assessment and Sustainability
CIV914	10	Integrated Environmental Engineering Design Project
CIV998	80	Dissertation
And modules to the value of 10 credits from the following:		
CIV817	10	Urban Pollution Management
CIV905	10	Environmental Modelling
CIV908	10	Environmental Engineering for Developing Countries

During the first two semesters, the primary aims of enhancing knowledge of Environmental Engineering (Outcomes A.2, A.4, A.5, A.6, A.8) are met through a range of appropriate technical modules. The selection may also include IT applications (A.3).

Intellectual abilities (B.1-B.6) are introduced initially in the lectured modules, but are further developed through Integrated Design individual assignments and the research project.

The Project, which forms a substantial part of the programme, may involve individual acquisition of knowledge and abilities (A.1-A.8, B.1-B.6). All candidates will receive instruction in, and have to perform individual risk evaluations. Project planning and execution (C.3) is practised throughout the course. Experience is also gained of the Practical Skills (C.1-C.7). Satisfactory completion of the dissertation and examination requires ample command of the Transferable Skills outcomes (D.1-D.7).

12. Support for Students

Services and facilities available to students include the following:

- Personal Tutor;
- Degree Programme Director;
- Administrative staff and services;
- Student/Staff ratio of 6:1;
- Library visits and instruction;
- Student Handbook (Web based);
- University Computing Service facilities (including extensive PC and UNIX provision, software applications, e-mail and internet access);
- Dedicated computer room for exclusive use by MSc Environmental Engineering students
- University (Robinson) Library, including search facilities and inter-library loans;
- Burstall study room (including Departmental tutorial solutions and other support materials);
- Extensive laboratories and technical assistance;
- Mechanical Engineering Fabrication Workshop;
- University Housing Office (which makes an offer of University accommodation to each first year student);
- University Careers Service;
- University Counselling Service;
- University Language Centre;
- Students' Union services, including societies, refectories and Student Advice Centre;
- Centre for Physical Recreation and Sport;
- Student Progress Office;
- International Office;
- University Chaplaincy;
- Saville Medical Practice.

(Ref: Newcastle University and You: http://www.ncl.ac.uk/services/welfare/nu.and.you/
University Student Handbook 1999;
Student Welfare Handbook http://www.ncl.ac.uk/services/welfare/whb /
University Student Handbook International Supplement 1999;
International Students' Handbook
Destination Newcastle 1999;
Student Accommodation 1999/2000 http://www.ncl.ac.uk/services/accom/
the Careers Service Guide 1999;
UCS: http://www.ncl.ac.uk/ucs/
The Language Centre http://www.ncl.ac.uk/langcen/
Newcastle University Library http://www.ncl.ac.uk/library
Tutor's Handbook: http://www.ncl.ac.uk/internal/thb)

13. Criteria for Admission

Students wishing to be accepted on to the M.Sc. course should have a good (II.2 Honours or better) first (Bachelor) degree in a relevant science or engineering subject. Successful candidates should also display clear evidence of motivation and commitment to the field of Environmental Engineering.

14. Methods of evaluating and improving the quality and standards of teaching, learning and assessment

Mechanisms for review

- Subject review
- Taught Programme Review
- Module Review (including University Questionnaire Service returns)
- Annual Revision of Regulations
- Annual Revision of Module Data Sheets
- Accreditation Reports
- HEFCE/QAA Reports
- External Examiners' Reports to VC

Committees with responsibilities for quality and standards

- Programme Board of Studies
- Programme Board of Examiners
- School PGR&T BoS
- School Staff/PGR&T Student Committee
- University Teaching Committee
- Faculty Teaching Committee
- Faculty Planning & Resources Committee (for resource issues)

Mechanisms for student feedback

- University Questionnaire Service returns
- Departmental Staff/Student Committee
- Student representation on Board of Studies
- University Staff/Student Committee
- Student representation on University Teaching Committee
- Personal Tutors
- Annual Board of Studies review of module delivery

Staff Development activities

- All new staff complete Certificate in Teaching & Learning
- Seminars arranged by University Quality Standards Unit for all Departmental staff in 1999/2000
- Biennial Appraisal linked to staff development

(Refs: Preparing for Subject Review
Guidelines for Taught Programme Review 1999
Module Boxes
DTC minutes
FTC minutes
FP&RC minutes
Degree Programme Handbook: http://www.ncl.ac.uk/mmmeng/ugrad/Deg-Prog-Hbk
I.Mech.E. report, 21st May, 1996; subsequent DTC Minutes
HEFCE Quality Assessment Report Q22/93, May, 1993: http://www.niss.ac.uk/education/hefce/qar/q22-93.html
Confidential Minutes, maintained by Faculty Asst. Registrar
BoS. Minutes file, Departmental Records Room
Staff/Student Minutes file, Departmental Records Room
Exam. Board Minutes file, Departmental Records Room
The nature of these records is such that many are not in the public domain.)

15. Regulation of Standards

Assessment rules

- The Assessment rules are given in the "Taught Postgraduate Masters' Degree Entrance and Progress Regulations".
- The minimum pass mark is normally 50%.
- There is limited compensation for marks of 45-50%.

Role of the External Examiner

The External Examiners are involved in assessment of the course. Duties will normally include:

- Approval of Examination Papers
- Vetting in-course assessments and examination scripts
- Interviewing candidates prior to the Final Examination Board
- Attending the Final Board and participating in its deliberations
- Reviewing any subsequent special cases, either by correspondence or in special circumstances by subsequent visits to Newcastle.
- Returning a confidential report to the VC.

(Ref: University Regulations,
Handbook for External Examiners of Undergraduate Examinations)

16. Indicators of Quality and Standards

- Annual External Examiners' Reports (Departmental and FTC reviews)
- Annual review of student destinations
- Annual Module and Stage Review process reported to Board of Studies
- Staff / Student Committee Minutes reviewed by Board of Studies
- Annual FTC review of student feedback questionnaires recently initiated to be fully operative from 2000/2001
- Biennial UTC "Taught Programme Review"
- Quinquennial UTC "Subject Review"

(Ref: University Careers Service reports)

Warning

This specification provides a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve if they take advantage of the opportunities provided. More detailed information on the specific learning outcomes, indicative content and teaching, learning and assessment can be found in the Degree Programme Handbook and other University documentation.

It should be noted that there may be variations in the range of learning opportunities reflecting the availability of staff to teach them. While every effort will be made to ensure that the module or modules described in the programme specification are available, this cannot be guaranteed.

The information from this document may be selectively extracted and included in documents that are more appropriate for non-academic audiences, for example, students, intending students and employers.