

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:**
4. **Final Award:** M.Sc.
5. **Programme Titles:** M.Sc. in Structural Engineering (5044)
6. **UCAS codes:** N/A
7. **QAA Benchmarking Group** N/A
8. **Date of production / revision** September 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 and abilities in the field of Structural Engineering;
- to provide opportunities for candidates to develop subject-specific skills, cognitive skills, a range of transferable skills and practical skills,
- to offer experience in the planning and execution of an extended research project;
- to provide experience of dissertation writing and other presentational skills;
- to provide a qualification which meets the designated learning outcomes at level 4 of the National Qualifications Framework.

## **10. Programme Outcomes**

*The programme provides opportunities for students to develop and demonstrate knowledge and understanding, skills, qualities and other attributes in the following areas. The typical graduate will have:*

### **A. Knowledge & Understanding**

*Knowledge and understanding of :*

1. Subject specific-areas at an advanced level : including structural analysis, structural design, engineering materials, structural appraisal, reliability, numerical methods and analytical methodologies.
2. Practical and professional skills related to structural engineering (e.g. structural design and design data, structural analysis, mathematical and numerical modelling, and construction issues);
3. Where appropriate to specialisms, applications of IT to the selected fields of study;
4. Where appropriate, mathematical methods and modelling appropriate to Structural Engineering and research investigations;

*Teaching/learning methods and strategies:*

Acquisition of A.1 and A.2 is through a combination of lectures, tutorials, example classes, laboratory activities and coursework.

Outcome A.3 is achieved by lectures, tutorials and, where appropriate, hands-on computer exercises.

Outcome A4 is primarily developed through a major research project and dissertation.

#### *Assessment*

Formative assessment occurs through tutorial examples and coursework. The primary means of assessing factual knowledge is by closed book examination. This is supported by assessed coursework, which involve both written and oral presentations.

In depth individual learning frequently forms part of the project, which is assessed by dissertation and where appropriate *viva voce* examination.

### **B. Intellectual Abilities**

*Higher level ability to :*

Cognitive Skills - higher level intellectual and academic skills - in particular:

1. Critically analyse problems and identify problem constraints
2. Research information and analyse and critically evaluate the work of others.
3. Use scientific principles in the modelling and analysis of engineering systems and structures
4. Select and apply appropriate mathematical methods for modelling and analysing relevant problems;
5. Select and apply appropriate computer based methods for modelling and analysing problems in selected fields;
6. Produce solutions to problems through the application of engineering knowledge and understanding, and present these in a professional manner;
7. Deal with uncertainty and provide practical solutions to problems with incomplete data

Teaching/learning methods and strategies:

Outcomes B.1. – B. 3 are developed in lectures and through case studies, but are acquired primarily through the completion of the project.

Outcomes B.4. – B. 7 are primarily taught in lectures tutorials and where appropriate with hands on computer classes, but may also form a major part of the project.

#### *Assessment*

Unseen and open-book examinations are used to assess intellectual abilities.

Assessed coursework provides further opportunities to demonstrate intellect and ability.

The project, which is assessed by dissertation and *viva voce* examination, provides evidence of the ability to carry out a research project.

### **C. Practical Skills**

*The skills to :*

1. Manage business practices, including the professional and ethical responsibilities of self management;
2. Where appropriate, use relevant test and measurement equipment;
3. Plan, execute and report a research project.
4. Design and conduct experimental laboratory work and case studies;
5. Where appropriate, use engineering IT tools;
6. Design a structures and evaluate the design;

7. Where appropriate, test design ideas through laboratory work, case studies or simulation with technical analysis and critical evaluation of results;
8. Search for information and develop ideas further;
9. Apply engineering techniques taking account of industrial and commercial constraints;
10. Undertake technical risk assessment.

Teaching/learning methods and strategies:

Outcomes C.1 is primarily acquired through lectures, tutorials and case studies.

C.2. – C.4. are acquired principally through experience of the project.

Acquisition of C.5. is initially through lectures, developed through hands-on exercises and assignments. Further individual learning may also form a significant part of the project.

C.6. is introduced through lectures and developed through case studies. It will frequently form a central part of the project.

Case studies provide initial experience of C.7. and C.8., but the project forms the principal vehicle for their acquisition.

Outcome C.9. is introduced through lectures and developed by case studies. Some projects may require further individual learning in this area.

Outcome C10 is acquired during the project.

#### *Assessment*

Outcomes C.1-C.10 are not explicitly assessed, but are necessary to complete successfully coursework and project requirements.

## **D. General Transferable Skills**

*The skills to :*

1. Communicate effectively;
2. Learn independently in a range of situations, preparing for life long learning;
3. Work as an effective member of a team
4. Create and innovate in problem solving and design;
5. Use scientific evidence based methods in the solution of problems;
6. Manipulate and present data in a professional manner.
7. Use IT, including word processing, use of spreadsheets and databases, e-mail and on-line information sources;
8. Manage time and resources;

*Teaching/learning methods and strategies:*

Outcomes D.1-D.7. are introduced through examples in lectures and tutorials. Subsequently, the principal development of transferable skills occurs through involvement in the project. D.8. will be developed throughout the course.

*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 case studies and the project.

Outcomes D.6 and D.7. are essential to satisfactorily complete 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 90 credits, are taught in Semesters 1 and 2, and the 90 credits associated with the project are notionally allocated to part of the second semester and the summer period.

The programme of study is as defined below:

Module code	Credit	Descriptive Title	Programme Outcomes
<i>Compulsory modules:</i>			
<b>CIV435</b>	10	Structural Dynamics	A1-4; B1-7; C4-9; D4-6
<b>CIV438</b>	10	Specialist Structures	A1-4; B1-7; C4-9; D4-6
<b>CIV481</b>	10	Finite Element Theory for Structural Analysis	A1-4; B1-7; C5-8; D4-7
<b>CIV702</b>	10	Research Methods	A1-3; B1; C1-2, 6-7; D1-2, 6
<b>CIV711</b>	10	Seismic Resistant Design	A1-4; B1-7; C4-9; D4-6
<b>CIV837</b>	10	Advanced Structural Design	A1-4; B1-7; C4-9; D4-6
<b>CIV998</b>	80	Dissertation	A1-4; B1-7; C1-10; D1-8
<i>And modules to the value of 40 credits from the following:</i>			
CIV431	10	Construction Management A	A1, 2; B2, 6; C1, 10; D1-2, 8
CIV482	10	Finite Element Analysis of Complex Problems in Structural Mechanics	A1-4; B1-7; C5-8; D4-7
CIV712	10	Advanced Structural Materials	A1-4; B1-7; C4-9; D4-6
CIV713	10	Structural Risk, Reliability, and Sustainability	A1-4; B1-7; C5-8; D4-7
CIV807	10	Project Management	A1, 2; B2, 6; C1, 10; D1-2, 8
CIV325	10	Geotechnical Engineering	A1; B1-4; C4, 7; D1-3, 6
CIV822	10	Soil Modelling and Numerical Methods	A1, 2; B1-5, 7; C5, 7; D1-2, 4, 5

<b>A – Knowledge and understanding</b>	<b>Modules within which Knowledge and understanding are taught, practised and/or assessed</b>
<b>A1</b> Subject-specific areas at advanced level.	<b>CIV435, CIV438, CIV711, CIV837, CIV712, CIV481, CIV702, CIV998, CIV431, CIV482, CIV713, CIV807, CIV325, CIV822</b>
<b>A2</b> Practical and professional skills related to structural engineering	<b>CIV435, CIV438, CIV711, CIV837, CIV712, CIV481, CIV702, CIV998, CIV431, CIV482, CIV713, CIV807, CIV822</b>
<b>A3</b> Applications of IT	<b>CIV435, CIV438, CIV711, CIV837, CIV712, CIV481, CIV702, CIV998, CIV482, CIV713</b>
<b>A4</b> Mathematical methods and modelling, and research investigations	<b>CIV435, CIV438, CIV711, CIV837, CIV712, CIV481, CIV998, CIV482, CIV713</b>

## **B – Intellectual Abilities**

### **Modules within which Knowledge and understanding are taught, practised and/or assessed**

#### **B1**

Critical analysis and problem constraint identification

**CIV435, CIV438, CIV711, CIV837, CIV712, CIV481, CIV702, CIV998, CIV482, CIV713, CIV325, CIV822**

#### **B2**

Research information and critical analysis/evaluation

**CIV435, CIV438, CIV711, CIV837, CIV712, CIV481, CIV998, CIV431, CIV482, CIV713, CIV807, CIV325, CIV822**

#### **B3**

Use of scientific principles

**CIV435, CIV438, CIV711, CIV837, CIV712, CIV481, CIV998, CIV482, CIV713, CIV325, CIV822**

#### **B4**

Select and apply appropriate mathematical methods for modelling and analysis.

**CIV435, CIV438, CIV711, CIV837, CIV712, CIV481, CIV998, CIV482, CIV713, CIV325, CIV822**

#### **B5**

Select and apply appropriate computer-based methods for modelling and analysis

**CIV435, CIV438, CIV711, CIV837, CIV712, CIV481, CIV998, CIV482, CIV713, CIV822**

#### **B6**

Produce solutions to problems through the application of engineering knowledge

**CIV435, CIV438, CIV711, CIV837, CIV712, CIV481, CIV998, CIV431, CIV482, CIV713, CIV807**

#### **B7**

Deal with uncertainty and provide practical solutions with incomplete data

**CIV435, CIV438, CIV711, CIV837, CIV712, CIV481, CIV998, CIV482, CIV713, CIV822**



## **C – Practical Skills**

### **Modules within which Knowledge and understanding are taught, practised and/or assessed**

#### **C1**

Manage business practices, including the professional and ethical responsibilities of self management;

**CIV702, CIV998, CIV431, CIV807**

#### **C2**

Where appropriate, use relevant test and measurement equipment;

**CIV702, CIV998**

#### **C3**

Plan, execute and report a research project.

**CIV998**

#### **C4**

Design and conduct experimental laboratory work and case studies;

**CIV435, CIV438, CIV711, CIV837, CIV712, CIV998, CIV325**

#### **C5**

Where appropriate, use engineering IT tools;

**CIV435, CIV438, CIV711, CIV837, CIV712, CIV481, CIV998, CIV482, CIV713, CIV822**

#### **C6**

Design a structures and evaluate the design;

**CIV435, CIV438, CIV711, CIV837, CIV712, CIV481, CIV702, CIV998, CIV482, CIV713**

#### **C7**

Where appropriate, test design ideas through laboratory work, case studies or simulation with technical analysis and critical evaluation of results;

**CIV435, CIV438, CIV711, CIV837, CIV712, CIV481, CIV702, CIV998, CIV482, CIV713, CIV325, CIV822**

#### **C8**

Search for information and develop ideas further;

**CIV435, CIV438, CIV711, CIV837, CIV712, CIV481, CIV998, CIV482, CIV713**

#### **C9**

Apply engineering techniques taking account of industrial and commercial constraints;

**CIV435, CIV438, CIV711, CIV837, CIV712, CIV998**

#### **C10**

Undertake technical risk assessment.

**CIV998, CIV431, CIV807**

**D – General Transferable Skills**

**Modules within which Knowledge and understanding are taught, practised and/or assessed**

**D1**

Communicate effectively;

**CIV702, CIV998, CIV431, CIV807, CIV325, CIV822**

**D2**

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

**CIV702, CIV998, CIV431, CIV807, CIV822**

**D3**

Work as an effective member of a team

**CIV998, CIV325**

**D4**

Create and innovate in problem solving and design;

**CIV435, CIV438, CIV711, CIV837, CIV712, CIV481, CIV998, CIV482, CIV713, CIV822**

**D5**

Use scientific evidence based methods in the solution of problems;

**CIV435, CIV438, CIV711, CIV837, CIV712, CIV481, CIV998, CIV482, CIV713, CIV822**

**D6**

Manipulate and present data in a professional manner.

**CIV435, CIV438, CIV711, CIV837, CIV712, CIV481, CIV702, CIV998, CIV482, CIV713, CIV325**

**D7**

Use IT, including word processing, use of spreadsheets and databases, e-mail and on-line information sources;

**CIV435, CIV438, CIV711, CIV837, CIV712, CIV481, CIV998, CIV482, CIV713**

**D8**

Manage time and resources;

**CIV998, CIV431, CIV807**

During the first two semesters, the primary aims of enhancing knowledge of Structural Engineering (Outcomes A1. – A4. ) are met through a range of appropriate technical modules. The selection may also include IT applications (A3). Those requiring development of mathematical skills may select appropriate Engineering Maths courses (ENM). Candidates wishing to expand their awareness of broader management and ethical issues (C.1.) may select relevant modules.

Intellectual abilities (B.1-B.7) are introduced initially in the lectured modules, but are further developed through case studies and individual assignments in the compulsory modules. Case studies and coursework also develop Practical Skills, (C.5,C.6) and a range of Transferable Skills (D.1-D.8).

The Project, which forms a substantial part of the programme, may involve individual acquisition of knowledge and abilities (A.1-A.4, B.1-B.7). All candidates will receive instruction in and have to perform individual risk evaluations (C.10). Project planning and execution (C.3) is practised throughout the summer period. Experience is also gained of the Practical Skills (C.1-C.10). Satisfactory completion of the dissertation and examination requires ample command of the Transferable Skills outcomes (D.1-D.8).

## **12. 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 or appropriate experience. In particular, they should have already studied Structural Engineering as a module during at least one year of their first degree. Successful candidates should also display clear evidence of motivation and commitment to the field of Structural Engineering.

## **13. Support for Students**

### **Induction**

All students follow an induction programme during the first two weeks of the academic year which includes Faculty and School seminars. The programme focused events are designed to build team working skills through laboratory and field exercises, and to introduce students to the programme and the basic skills needed to complete the programme.

### **Study Skills Support**

All students will have completed a first degree so should have developed appropriate study skills. Professional and employability skills are further developed through coursework.

## **Academic Support**

Core staff are available at pre-arranged times. An open door policy operates.

Services and facilities available to students include the following:

- Personal Tutor;
- Degree Programme Director;
- Administrative staff and services;
- Technical staff;
- Coursework Office;
- Library visits and instruction;
- Degree Programme Handbook;
- University Student Handbook (Web based);
- University Computing Service facilities (including extensive PC and UNIX provision, software applications, e-mail and internet access);
- University (Robinson) Library, including search facilities and inter-library loans;
- Student study room;
- Extensive laboratories and workshop facilities;
- 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: University Student Handbook 2003

<http://www.ncl.ac.uk/internal/documents/studenthandbook.pdf>

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/documents/tutorshandbook.pdf>

## **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 Sheets
- Accreditation Reports
- HEFCE/QAA Reports
- External Examiners' Reports to VC

*Committees with responsibilities related to quality and standards*

- University Teaching & Learning Committee
- Faculty Teaching & Learning Committee
- Faculty Executive Board (for resource issues)
- Board of Studies
- Departmental Teaching Committee
- Departmental Planning & Resources Committee (for resource issues)
- Departmental Staff/Student Committee
- Board of Examiners

**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
- Student Representative on Senate
- Student Representative on Council
- Students' Union

**Staff Development activities**

- All new staff complete Certificate in Teaching & Learning
- Seminars arranged by University Quality Standards Unit for all Departmental staff
- Biennial Appraisal linked to staff development
- Corporate membership of Professional Institutions
- CPD through research activity

**15. Regulation of Standards**

**Assessment rules**

- The Assessment rules are given in the University Examination Regulations "Taught Postgraduate Masters' Degree Entrance and Progress Regulations".
- The minimum pass mark is normally 40%.

- There is limited compensation for marks of 35-40%.

### **Role of the External Examiner**

The External Examiner is 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.

### **16. Indicators of Quality and Standards**

- Annual External Examiners' Reports (School and Faculty Teaching & Learning Committee 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 Faculty Teaching Committee review of student feedback questionnaires recently initiated to be fully operative from 2000/2001
- Biennial University Teaching Committee "Taught Programme Review"
- Quinquennial University Teaching Committee "Subject Review"

### **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.