PROGRAMME SPECIFICATION	

1	**Awarding Institution**	Newcastle University
2	**Teaching Institution**	Newcastle University
3	**Final Award**	MSc
4	**Programme Title**	Structural Engineering
5	**Programme Code**	5044F/5044P
6	**Programme Accreditation**	JBM
7	**QAA Subject Benchmark(s)**	Engineering
8	**FHEQ Level**	7
9	**Last updated**	June 2012

10 Programme Aims

1) The primary purpose of this programme is to provide graduate civil engineers (or students with other suitable and appropriate backgrounds) with the advanced, up-to-date conceptual understanding, detailed factual knowledge and specialist technical skills appropriate for continuing success as a practicing structural engineer.

2) The aim of the programme is to provide both new graduates and more experienced practising engineers, with:

- opportunities to enhance and update their knowledge, skills and abilities in fields of structural engineering not available to them in their previous education or careers
- an understanding of advanced numerical, computational and analytical techniques
- an understanding of new and complex material and structural behaviours
- an awareness of modern project management techniques
- an awareness of the business and consultancy aspects of the structural engineering industry

3) In addition to these academic and technical skills, the programme also aims to equip its graduates with a suite of transferable skills, including 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.

4) On successful completion of the programme, you will have acquired a much deeper knowledge and understanding of Structural Engineering than would be expected at undergraduate level, together with many new skills.

Specifically, students will be able to:

- Demonstrate a comprehensive knowledge of subject-specific areas including structural analysis, structural design, structural appraisal, reliability, analytical methodologies, numerical methods, construction project management and enterprise for construction. These are defined through the degree programme regulations and the module summaries;
- Demonstrate *cognitive skills* – higher level intellectual and academic skills (e.g. analysis, synthesis, critical evaluation);
- Demonstrate *subject-specific skills* – practical or professional skills related to Structural Engineering (and Consultancy Skills), e.g. structural design, structural analysis, mathematical / numerical modelling, construction planning, etc.);

- Demonstrate *core skills* – generic skills transferable to a range of employment settings (e.g. communication, planning & organising, independent working, teamwork, project management, etc.)
- Demonstrate *career management skills* – personal skills required to manage self and career development (e.g. decision-making, self-analysis, occupational awareness, etc.)
- Approach professional problems and challenges with initiative, responsiveness, decisiveness and tenacity.

5) 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.

6) 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 in the following areas. The programme outcomes have references to the benchmark statements for Engineering.

Knowledge and Understanding

On completing the programme students should have:
A1 An advanced knowledge and understanding of subject specific-areas: including structural analysis, structural design, engineering materials, structural appraisal, reliability, numerical methods and analytical methodologies.
A2 An advanced knowledge and understanding of practical and professional skills related to structural engineering (e.g. structural design and design data, structural analysis, mathematical and numerical modelling, and construction issues)
A3 A knowledge and understanding of aspects of construction practice and project management techniques, and health and safety issues
A4 A knowledge and understanding of applications of mathematical methods and modelling appropriate in structural engineering
A5 A knowledge and understanding of applications of IT and computational analysis techniques in structural engineering
A6 A knowledge and understanding of the business and consultancy aspects of the structural engineering industry

Teaching and Learning Methods

Knowledge and understanding is primarily delivered through lectures and tutorials, backed up by private study including related reading and problems. Computer based tutorials are used as appropriate (A2, A4, A5). The Field Class provides an opportunity for 'active learning' and is used to apply much of the engineering theory covered in other modules to real engineering structures (A1-A6). Material testing practicals provide hands-on experience where appropriate (A1).

Assessment Strategy

Assessment is by a combination of written examination (A1-A5), individual and group coursework (A1-A6), presentations and oral examination (A1-A3).

Intellectual Skills

On completing the programme students should be able to:
B1 Research information and analyse and critically evaluate the work of others.
B2 Use scientific principles in the modelling and analysis of engineering systems and structures
B3 Select and apply appropriate mathematical methods for modelling and analysing relevant problems
B4 Select and develop appropriate computer based methods for modelling and analysis of problems
B5 Produce solutions to problems through the application of engineering knowledge and understanding, and present these in a professional manner
B6 Deal with uncertainty and provide practical solutions to problems with incomplete data

Teaching and Learning Methods

Research methods (B1) are introduced in lectures and are developed through private study under the guidance of the Dissertation supervisor. Approaches to modelling and analysis and their limitations (B2-B4) are covered in detail in lectures and tutorials in technical modules, with problem solving being practiced in tutorial questions and design work. Uncertainty (B6) is treated formally in lectures, and applied on the Field Trip where conclusions must be reached with limited information.

Assessment Strategy

Intellectual skills (B1-B6) are required to successfully apply 'knowledge and understanding' (A1-A6), and so are assessed in tandem. Research skills (B1) are assessed in detail in the Dissertation, as are several of B2-B6 depending on the Dissertation topic.

Practical Skills

On completing the programme students should be able to:
C1 Manage business practices, including the professional and ethical responsibilities of self management
C2 Critically assess the value and limitations of existing information on a given subject
C3 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
C4 Critically assess the value and limitations of new data in relation to existing information on a given subject, to draw logical conclusions, and to identify appropriate avenues for further study
C5 Where appropriate, use relevant test and measurement equipment
C6 Use engineering IT tools where appropriate
C7 Design a structure and evaluate the design
C8 Apply engineering techniques taking account of industrial and commercial constraints
C9 Undertake technical risk assessment

C10 Solve problems

Teaching and Learning Methods

Practical skills are introduced in lectures (C1, C2, C3, C5, C7, C9) are practiced and developed through material testing practicals (C4, C5), coursework (C1,C6,C7,C8) and in the Dissertation through private study (C2,C3,C9) and computational analysis (C3,C4,C6,C10) and/or practicals (C3,C4,C5,C9,C20), guided by the project supervisor. The Field Trip provides practical consideration of large scale engineering structures (C7,C8,C9).

Assessment Strategy

Assessment is by a combination of written examination, individual and group coursework including a practical write-up, presentations, oral examination and dissertation.

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 Manage time and resources, plan laboratory-based programmes, assess hazards and risks and work safely
D5 To work independently, with initiative, and also in teams as required
D6 Be creative and innovative in problem solving

Teaching and Learning Methods

Communication skills (D1) are practiced and assessed through presentations, oral examinations and written reports. Immediate feedback after presentations allows students to identify their shortcomings and improve, as does watching other students' presentations. Other transferable skills (D2-D6) are practiced extensively in all modules through a requirement for independent background reading, planning of work, use of IT systems and working both independently and in groups. The Dissertation provides application of all of these key skills (D1-D6), under the guidance of the project supervisor.

Assessment Strategy

Assessment is by a combination of written examination, individual and group coursework including a practical write-up, presentations, oral examination and dissertation.

12 Programme Curriculum, Structure and Features

Basic structure of the programme

This is a one-year full-time modular programme. It consists of 80 credits of compulsory, technical modules, 20 credits of optional modules and an 80 credit Dissertation. The taught component runs from late September to Easter, with the Dissertation submitted in August. Successful completion of the taught component is required in order for a student to progress to the Dissertation. All modules are taught in two week blocks (= 10 credits) or four weeks (= 20 credits) allowing students to become deeply immersed in a subject, and facilitating part-time study by students abroad or in industry.

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

The technical modules which make up the taught component of this programme lead the student sequentially and logically from the principles of structural engineering through to its applications. Modules are advanced and specialist, going well beyond standard engineering practice. The technical content of the course is closely aligned with the research interests of the staff, enabling the modules to include cutting edge material which is constantly updated.

The course is run by the 'Geotechnical and Structural Engineering' group in the School of Civil Engineering and Geosciences. Combined expertise in geotechnics and structures enables advanced consideration of soil-structure interaction and soil modelling to be included in the MSc in Structural Engineering.

The Field Trip at the end of Semester 2 allows the content of the technical modules to be applied and explored in the context of a wide range of engineering structures.

The taught component of the Dissertation introduces the generic skills required in order to successfully initiate, carry out, and report on a significant research project and provides training in the use of appropriate statistics for data analysis and interpretation. With the guidance of the project supervisor each student will practice and develop the majority of the key skills in the course of their dissertation. Dissertations are closely aligned to the research interests of the Group and School, and may have input from industry research collaborators.

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-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 (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 for further information.

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

		Intended Learning Outcomes			
Module	**Type**	**A Knowledge & understanding**	**B Intellectual skills**	**C Practical skills**	**D Transferable / key skills**
CEG8205 Soil Modelling and Numerical Methods	C	1,2,4,5	2,3,4,5,6	2,6,7,10	1,2,3,4,5,6
CEG8302 Specialist Structures	C	1,2,3,4,5	1,2,3,4,5	6,7,8,10	1,2,3,4,5,6
CEG8304 Structural Reliability	C	1,2,4,5	2,3,4,5,6	3,6,7,10	1,2,3,4,5,6
CEG8305 Finite Element Analysis in structural Mechanics	C	1,2,4,5	2,3,4,5,6	3,6,7,8,10	2,3,4,5,6
CEG8306 Engineering Mechanics of Composites	C	1,2,4,5	2,3,4,6	3,5,6,7,10	1,2,3,4,5,6
CEG8307 Structural Engineering Field Trip	C	1,2,3,4,6	1,2,5,6	2,3,4,7,8,10	1,2,3,4,5,6
CEG8308 Seismic Resistant Design	C	1,2,3,4,5	2,3,4,5	2,3,4,5,6,7,8	1,2,3,4,5,6
CEG8391 MSc Project and Dissertation in Structural Engineering	C	1,2,3,4,5,6 (dependent on Dissertation topic)	1,2,3,4,5,6	2,3,4,5,6,7,9,10	1,2,3,4,5,6
CEG8002 Construction Project Management	O	3,6	-	1,2	1,2,3,4,5,6
CEG8004 Enterprise for Construction	O	3,6	1	1,2,3,10	1,2,3,4,5,6
CEG8505 Climate Change – Earth Systems	O	1	2,3,6	2,3,4	1,2,3,4,5,6
CEG8514 Climate Change – Impacts	O	1	2	2,3,4	1,2,3,4,5,6

C = Compulsory
O = Optional