PROGRAMME SPECIFICATION	

1	**Awarding Institution**	Newcastle University
2	**Teaching Institution**	Newcastle University
3	**Final Award**	MEng (Hons) / BEng (Hons)
4	**Programme Title**	Civil Engineering (CE), Civil Engineering with Year in Industry Civil & Structural Engineering (CSE), Civil & Structural Engineering with Year in Industry Civil Engineering Science (exit award)
5	**UCAS/Programme Code**	H200 (BEng CE) H205 (BEng CE with Year in Industry) H210 (BEng CSE) H206 (BEng CSE with Year in Industry) 1657U (exit award) H290 (MEng CE) H295 (MEng CE with Year in Industry) H242 (MEng CSE) H296 (MEng CSE with Year in Industry) 1658U (exit award)
6	**Programme Accreditation**	JBM (ICE, IStructE, CIHT, IHE), RICS, ICES
7	**QAA Subject Benchmark(s)**	Engineering
8	**FHEQ Level**	Level 6 / Level 7
9	**Last updated**	May 2023

10 Programme Aims

1. To provide distinctive and exciting opportunities for students with high academic ability to be inspired and motivated by a unique integrated multi-theme based education in civil engineering (with an emphasis in structural engineering for CSE programmes);
2. To provide students with a sound grasp of the major challenges of climate change and sustainability, informed by the excellence of the research carried out in the School, and integrated with technical knowledge and skills (particularly in structural engineering for CSE programmes) in the development of integrated design solutions within DSES modules;
3. To provide opportunities for students to acquire appropriate knowledge and understanding, and a range of skills within a set of core themes, together with a sound grasp of engineering design, and a recognition of the importance of health and safety and the need to manage risk;
4. To provide opportunities for students to integrate their knowledge and understanding of mathematics, science, computer-based methods, design, the economic, social and environmental context, and engineering practice to solve a range of complex engineering problems, principally through involvement in group design and individual projects;
5. To produce graduates who are aware and inspired by their responsibilities to society and to the environment and are equipped to enter employment in industry, the professions or public service or to follow a postgraduate route into research, industry or academia, or to apply their skills in areas outside of engineering;
6. For the MEng programmes, to provide a programme that meets the accreditation requirements of the Joint Board of Moderators (JBM www.jbm.org.uk) to fully satisfy the educational base for a Chartered Engineer (CEng), also for a Chartered Surveyor (MRICS) and professional civil engineering surveyor (MCInstCES).

For the BEng programmes, to provide a programme that meets the accreditation requirements of the Joint Board of Moderators (JBM www.jbm.org.uk) to fully satisfy the educational base for an Incorporated Engineer (IEng). To also partially satisfy the educational base for a Chartered Engineer (CEng).

7. For the programmes with Year in Industry, to provide practical experience of the application of both technical and transferable graduate skills in the civil engineering workplace and recording of those skills towards professional qualification.
8. To provide a programme designed to meets the standards set by the Engineering Council's Accreditation of Higher Education Programmes (AHEP3, May 2014). http://www.engc.org.uk/engcdocuments/internet/Website/Accreditation%20of%20Higher%20Education%20Programmes%20third%20edition%20(1).pdf
9. To provide a programme that develops the skills, attributes and values defined in the University's Graduate Skills Framework. http://www.ncl.ac.uk/quilt/modules/gsf.htm

For students on the Careers Placement Year programme:

10. Provide students with the experience of seeking and securing a position with an employer.
11. Facilitate independent self-management and proactive interaction in a non-university setting.
12. Provide a period of practical work experience that will benefit current academic study and longer term career plans.
13. Enable students to ethically apply their knowledge and skills in the work place, reflect upon their development and effectively evidence and articulate their learning in relevant future settings.

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.

Knowledge and Understanding

On completing the programmes students should have gained knowledge and understanding of:

A1 The essential facts, concepts, theories and principles of civil engineering (and structural engineering for the CSE programmes

A2 The wider multidisciplinary engineering context and its underlying principles

A3 Mathematical principles necessary to underpin their education in civil engineering (and structural engineering for the CSE programmes and to enable them to apply mathematical methods, tools and notations proficiently in the analysis and solution of engineering problems

A4 Client and user needs and the importance of aesthetics

A5 The commercial and economic context within which engineering is practised

A6 The management techniques that may be used to achieve engineering objectives

A7 The requirement for engineering activities to promote sustainable development

A8 The need for a high level of professional and ethical conduct in engineering and an awareness of the framework of relevant legal requirements governing engineering activities, including personnel, health, safety, and risk (including environmental risk) issues

A9 The characteristics of particular materials, equipment, processes and products typically used in civil engineering (and structural engineering for the CSE programmes)

A10 The range of functions civil engineers (and structural engineers for the CSE programmes) fulfil in the principal areas where they are employed, the latest operating practices and the limitations of existing approaches

A11 Appropriate codes of practice and industry standards

A12 Contractual and quality issues

On completing the MEng programmes, students should also have gained knowledge and understanding of:

A13 The different roles within a team and the importance of leadership

A14 Developing technologies related to structural engineering (for the CSE programmes) or the student's chosen specialism (for the CE programmes)

A15 Mathematical and computer models relevant to civil engineering (and structural engineering for the CSE programmes) and an appreciation of their limitations

A16 Management practices and their limitations, as adopted throughout the project cycle

For students on the Careers Placement Year programme:

A17 Apply personal and professional development strategies to prioritise, plan, and manage their own skills development and learning.

A18 Research, select and apply relevant knowledge aimed at enhancing their own skills and effectiveness in specific duties at their placement.

A19 Demonstrate an understanding of a work environment, how it functions and their contribution to it.

A20 Relate their work based learning to other areas of personal development, including academic performance.

Teaching and Learning Methods

Knowledge and understanding is mainly imparted through lectures, which for some outcomes (parts of A8 and A10), are given by external speakers with particular specialisms. Tutorials are typically used where students need to practise methods and techniques (A1 and A3) and laboratories and field classes help to reinforce messages that have been initially conveyed in lectures. The integrated design modules in stages 1 and 2 help students to see the wider picture (A2) and also expose them to a range of other concerns (A4, A5, A7), while site visits aid their appreciation of some of the roles engineers fulfil (A10).

For the MEng Programmes, teamwork (A13) is an important element of Sustainable Engineering Design project, and the focus in stage 4 on Structural Engineering (MEng CSE programme), or a particular civil engineering discipline (MEng CE programme) allows students to become conversant with latest developments (A14, A15).

Assessment Strategy

The primary means of assessment of knowledge and understanding is by unseen written examinations. These are supplemented by assessed coursework, consisting mainly of project reports and laboratory / field class reports.

Intellectual Skills

On completing the programme students should be able to:

B1 Apply appropriate quantitative science and engineering principles and tools to the analysis of problems

B2 Demonstrate creative and innovative ability in the synthesis of solutions and in formulating designs, especially within Design for Sustainable Engineering Systems theme

B3 Comprehend the broad picture and thus work with an appropriate level of detail

B4 Plan, conduct and report a major programme of investigative work

B5 Analyse experimental or computational results and determine their strength and validity

B6 Identify, classify and describe the performance of systems and components through the use of analytical methods and modelling techniques
B7 Investigate and define a problem and identify constraints including environmental and sustainability limitations, social matters, health and safety and risk assessment issues
B8 Manage the design process and evaluate outcomes

On completing the MEng programmes, students should also be able to:
B9 Recognise commercial risks and understand how managers can respond

Teaching and Learning Methods

Intellectual skills are acquired through the teaching and learning programme outlined in section 12. In particular, analysis and problem solving skills (B1, B6) are developed through example classes, tutorials and coursework, and design skills are developed through coursework activities and design projects (B2, B8). These include the Design for Sustainable Engineering Systems modules that require students to recognise constraints and to understand the skills needed for both preliminary and detailed design (B3, B7, plus B9 for the MEng programmes). Experimental results are generated in laboratory and field work and students are expected to analyse and make sense of their data (B5). All students undertake a major individual project in their final year that will require them to scope a particular project that is associated within a wider theme based subject areas and produce a detailed report (B4).

Assessment Strategy

Written coursework assignments, which include group project reports, laboratory reports and a report on a substantial individual project, are the principal means of assessment for these skills, although some may also be assessed by examinations, which in some circumstances are open book exams.

Practical Skills

On completing the programme students should be able to:
C1 Carry out experiments safely
C2 Use laboratory and field equipment to generate data
C3 Prepare technical drawings
C4 Apply quantitative methods and computer-based models relevant to civil engineering (and structural engineering for the CSE programmes), to solve engineering problems, and with an awareness of the limitations of such models
C5 Develop and apply safe systems of work
C6 Identify and manage cost drivers
C7 Ensure fitness for purpose for all aspects of a project including design, construction, operation, maintenance and decommissioning
C8 Produce design solutions for civil engineering projects (and structural engineering projects for the CSE programmes,)

On completing the MEng programmes, students should also be able to:
C9 Produce project plans and recognise the need to revise and update as circumstances change
C10 Ability to extract data pertinent to an unfamiliar problem, and apply in its solution using computer based engineering tools when appropriate

Teaching and Learning Methods

Students have numerous opportunities to carry out experiments in the School's laboratories, and must attend induction programmes to reinforce the need to conduct themselves safely before beginning work (C1, C2, C5). Specific design skills are developed in a range of disciplines and the Design for Sustainable Engineering Systems modules bring these together, requiring a holistic view of the selected project that includes an awareness of costs and the complete project cycle (C5, C6, C7, C8). Technical drawings are produced as an essential part of these design exercises and students are introduced to computer software to enable them to produce professional output (C3). Particular industry-standard software is

introduced in the relevant modules, some of which students will have a chance to use themselves (C4).

For the MEng programmes, the Sustainable Engineering Systems Design project in stage 3 is a team effort that requires groups of students to collect information to develop a solution to the open-ended problem set. This will, necessarily, involve plans being produced that will later need to be revised in the light of new information (C9, C10).

Assessment Strategy

The ability to use practical skills is mainly assessed by means of written assignments, including drawings, design calculations, laboratory and field class reports, project reports and the report from a substantial individual project.

Transferable/Key Skills

On completing the programme students should be able to:

D1 Communicate effectively in writing, verbally and through drawings and presentations
D2 Gather and use information using Information and Communications Technology
D3 Work with incomplete information and technical uncertainty
D4 Search for and use the scientific literature effectively
D5 Take notes effectively
D6 Work on projects, both individually and as a member of a team

D7 Plan self-learning and improving performance as the foundation for life-long learning

On completing the MEng programmes, students should also be able to:

D8 Monitor and adjust a personal programme of work
D9 Independently learn new theories, concepts, methods etc. in unfamiliar situations
D10 Record and reflect on technical and transferable graduate skills towards professional qualification

For students on the Careers Placement Year programme:

D11 Reflect on and manage own learning and development within the workplace.
D12 Use existing and new knowledge to enhance personal performance in a workplace environment, evaluate the impact and communicate this process.
D13 Use graduate skills in a professional manner in a workplace environment, evaluate the impact and communicate the personal development that has taken place.

Teaching and Learning Methods

Many of the transferable skills are practised in the numerous coursework exercises students must undertake and advice on specific aspects will be given in particular modules (D1, D5). The individual and group projects require students to gather information, search literature and recognise and develop areas where their knowledge may be deficient (D1, D2, D3, D4, D6, D7). Design for Sustainable Engineering Systems coursework is a good example of the above, which is carried out in groups and forces the teams to not only use information they have been given, but also to search out and understand aspects of their designs on which they have received no instruction.

For the MEng Programmes, the project in stage 4 will require students to further their understanding in specific specialised areas and to project manage their individual work and report submission (D8, D9). Awareness of the process of professional qualification is developed through the Stages (D10), particularly in the Design of Sustainable Engineering Systems team project modules.

Assessment Strategy

Most pieces of coursework will include an element to cover transferable skills and a number of modules require students to make oral presentations to an audience, which will also contribute to the assessment for the particular modules. Many of these skills are also assessed in the major individual project that all students undertake. Students are required to keep log books and write reflective reports on the progressive development of their professional skills (e.g. ICE CEng attributes), through the Design of Sustainable Engineering Systems teams project modules in particular.

12 Programme Curriculum, Structure and Features

Basic structure of the programme

The normal Undergraduate year is approximately 31 weeks, arranged in three terms and currently divided into two semesters. The MEng programmes normally last four years, and the BEng programmes three years, although for the programmes with Year in Industry the duration will be 9-12 months longer. The only part-time study is limited provision for the repetition of failed modules and under exceptional circumstances.

Every Honours student studies 120 credits in each Stage (year), resulting in MEng candidates completing 480 credits (600 credits for the with Year in Industry variant) and BEng candidates completing 360 credits (480 credits for the with Year in Industry variant). Candidates must complete one Stage before proceeding to the next.

There is a Faculty Foundation Year for candidates not adequately qualified to embark on Stage 1 of engineering degree programmes.

All modules at Stage 1 and 2 are compulsory on all six programmes. The CE and CSE programmes have common Stages 1 and 2.

Students on the Careers Placement Year programme will take their placement in the penultimate year of studies.

At Stage 3, all modules are compulsory, but there is a 40 credit difference in the set of modules taken by each of the six programmes.

At Stage 4, students on the CE and CSE MEng programmes take three common compulsory modules (60 credits) and select a further 20 credits from a choice of three common optional modules.

Students on the MEng CSE programme take a further 20 credits of compulsory specialist modules, and select a further 20 credits from a choice of three specialist optional modules.

Students on the MEng CE programme select a specialist area in which to take a further four 10 credit specialist optional modules.

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

The Civil Engineering, Civil and Structural Engineering programmes are systems-based integrated programmes with sustainable development at their heart, engaging with the environmental, social and economic dimensions of this unifying concept in the design, implementation, and rehabilitation of all civil engineering interventions within the Earth system. This challenges students to think not only about the technically demanding subjects but also about the future challenges of climate change, sustainable development, democracy, equity, poverty alleviation, and the lifelines of energy, food and water.

Design of Sustainable Engineering Systems (DSES) is central to the Programmes, which challenge the students to integrate all of the knowledge gained in the taught modules within a holistic sustainable development framework that focuses on the delivery of sustainable solutions at a range of scales, from individual structures to whole cities.

Within the themes at Stages 1 to 2, the programmes provide a basis in each of the disciplinary pillars on which the training of all civil engineers must be founded, the most significant of which is the structures discipline. At Stage 3, students on the CSE programmes begin to specialise in this area, while students on the CE programme continue with a more diverse curriculum. Students on the BEng programmes have the opportunity to specialise in the individual project.

Students on the MEng CSE programme concentrate on structures for a substantial part of Stage 4, including an individual research project. Students on the MEng CE programme have the opportunity to specialise in one of four disciplines (geotechnics, transport, water, environmental engineering) for a substantial part of Stage 4, including an individual research project.

In designing and delivering the programme, strong links with industry are crucial to ensure that our programme is aligned with industry trends and that graduates emerge with the skill sets that industry needs and the capacity to tackle the challenge of sustainable development in the 21st century. Our Industrial Advisory Panel strongly influence our curriculum and DSES modules in particular. Members of the panel, along with many other industrial collaborators, provide guest speakers, site visits, project support and industrial placements.

Students who successfully graduate from these programmes will have met the accreditation requirements of the Joint Board of Moderators for Chartered Engineer status. From the start of the Programmes, students are encouraged to become student members of both ICE and IStructE.

All BEng and MEng students have the opportunity to undertake a Year in Industry if they can secure a placement and demonstrate suitable performance and motivation by the end of Stage 1, which is again reviewed at the end of Stage 2. Our Industrial Liaison officer will support interested students in their efforts to secure a placement. Some students will therefore transfer between programmes with and without the Year in Industry.

For students on the MEng CE and CSE programmes who can demonstrate suitable performance and motivation by the end of Stage 2, there are opportunities to study Stage 3 abroad at an approved institution, usually with teaching in English (e.g. Sweden, Singapore, Hong Kong and Colorado), dependent on availability of Study Abroad places and suitable equivalent modules.

Programme regulations (link to on-line version)

H200-1657U: -RH200-1657U
H290-1658U: -RH290-1658U

13 Support for Student Learning

Generic information regarding University provision is available at the following link.
Generic Information

14 Methods for evaluating and improving the quality and standards of teaching and learning

Generic information regarding University provision is available at the following link.

Generic Information

Accreditation reports

The CE and CSE programmes are accredited 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) in fully satisfying the educational base for a Chartered Engineer (CEng) [MEng], fully satisfying the educational base for an Incorporated Engineer (IEng) [BEng], or partially satisfying the educational base for a Chartered Engineer (CEng) [BEng]. See www.jbm.org.uk for further information and details of Further Learning programmes for CEng. It is anticipated that the CSuE

programmes will also be accredited by both the Royal Institution of Chartered Surveyors (RICS) and the Chartered Institution of Civil Engineering Surveyors (CICES). It is anticipated that the CE and CSE "with Year in Industry" programmes will become accredited by the JBM, and the CSuE "with Year in Industry" programmes will become accredited by RICS and CICES.

Additional mechanisms

Strategic and pedagogical review takes place annually via School Learning and Teaching Away Days.

15 Regulation of assessment

Generic information regarding University provision is available at the following link.

Generic Information

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

The University Prospectus: http://www.ncl.ac.uk/undergraduate/degrees/#subject

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

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.