

PROGRAMME SPECIFICATION



1	Awarding Institution	Newcastle University
2	Teaching Institution	Newcastle University
3	Final Award	MEng (Hons)
4	Programme Title	Civil Engineering
5	UCAS/Programme Code	H290
6	Programme Accreditation	ICE, IStructE, IHT
7	QAA Subject Benchmark(s)	Engineering
8	FHEQ Level	Masters
9	Date written/revised	September 2007

10 Programme Aims

1. to provide opportunities for students with high academic ability to undertake a broad-based education in civil engineering;
2. to provide opportunities for students to acquire appropriate knowledge and understanding, and a range of skills, together with a sound grasp of engineering design, an appreciation of sustainability issues and a recognition of the importance of health and safety and the need to manage risk;
3. 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 individual and group design projects;
4. to produce graduates who are aware of 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;
5. to produce graduates who will meet the accreditation requirements of the Joint Board of Moderators for Chartered Engineer status;
6. to provide a programme which meets the FHEQ at Masters level and which takes appropriate account of the subject benchmark statement in Engineering (E).

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 gained knowledge and understanding of:

- A1 The essential facts, concepts, theories and principles of civil engineering at an enhanced level
- A2 The wider multidisciplinary engineering context and its underlying principles (E)
- A3 Mathematical principles necessary to underpin their education in civil engineering and to enable them to apply mathematical methods, tools and notations proficiently in the analysis and solution of engineering problems (E)
- A4 Client and user needs and the importance of aesthetics (E)

A5	The commercial and economic context within which engineering is practised (E)
A6	The management techniques that may be used to achieve engineering objectives (E)
A7	The requirement for engineering activities to promote sustainable development (E)
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 (E#)
A9	The characteristics of particular materials, equipment, processes and products typically used in civil engineering (E#)
A10	The range of functions civil engineers fulfil in the principal areas where they are employed, together with a detailed understanding of the latest operating practices and the limitations of existing approaches
A11	Appropriate codes of practice and industry standards (E)
A12	Contractual and quality issues
A13	The different roles within a team and the importance of leadership
A14	Developing technologies related to the student's chosen specialism (E#)
A15	Mathematical and computer models relevant to civil engineering and an appreciation of their limitations (E#)
A16	Management practices and their limitations, as adopted throughout the project cycle

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 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).

Teamwork (A13) is an important element of the stage 3 multi-disciplinary design project, and the focus in stage 4 on a particular discipline 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 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 (E)
B2	Demonstrate creative and innovative ability in the synthesis of solutions and in formulating designs (E)
B3	Comprehend the broad picture and thus work with an appropriate level of detail (E)
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 (E)
B7	Investigate and define a problem and identify constraints including environmental and sustainability limitations, social matters, health and safety and risk assessment issues (E#)
B8	Manage the design process and evaluate outcomes (E)
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 integrated design modules that require students to recognise constraints and to understand the skills needed for both preliminary and detailed design (B3, B7, B9). Experimental results are generated in laboratory 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 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 equipment to generate data
- C3 Prepare technical drawings
- C4 Apply quantitative methods and computer-based models relevant to civil engineering, to solve engineering problems with an awareness of the limitations of such models (E#)
- C5 Develop and apply safe systems of work
- C6 Identify and manage cost drivers (E)
- C7 Ensure fitness for purpose for all aspects of a project including design, construction, operation, maintenance and decommissioning (E#)
- C8 Produce design solutions for civil engineering projects
- 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 (E)

Teaching and Learning Methods

Students have numerous opportunities to carry out experiments in the School's laboratories, but 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 integrated design 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 CAD systems 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).

The multi-disciplinary 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 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 (E#)
- D4 Search for and use the scientific literature effectively
- D5 Take notes effectively
- D6 Monitor and adjust a personal programme of work (E#)
- D7 Independently learn new theories, concepts, methods etc. in unfamiliar situations (E#)
- D8 Work on projects, both individually and as a member of a team
- D9 Plan self-learning and improving performance as the foundation for life-long learning (E)

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, D8, D9). Integrated design 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.

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 (D6, D7).

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.

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 course normally lasts three years (Stages), although it is possible to take a gap year with the approval of the Head of School.

Every Honours student studies 120 credits in each Stage (or year), resulting in MEng candidates completing 480 credits. Candidates must complete one Stage before proceeding to the next; the only part-time study is limited provision for the repetition of failed modules. There is a Faculty Foundation Year for candidates not adequately qualified to embark on

Stage 1 of engineering degree programmes.

Modules in Stages 1 and 2 are all compulsory. There is a limited choice for 20 credits in Stage 3 and in Stage 4, students have choices in 60 of the 120 credits.

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

This programme is aimed at students who have not decided in which area they wish to specialise, and as such it provides a limited choice of options in Stage 3, followed by an opportunity to select one of the disciplines within civil engineering for a substantial part of their fourth year.

Students who successfully graduate from this programme will have met the accreditation requirements of the Joint Board of Moderators for Chartered Engineer status.

Programme regulations (link to on-line version)

http://www.ncl.ac.uk/regulations/programme/2007-2008/programme/h290_with_foundation_year_h291.php

13 Criteria for admission

Entry qualifications

A/AS Levels and AVCE Qualifications

AAB/ABB from 18 units, including two A levels, of which one must be Mathematics, and excluding General Studies. Physics preferred at A/AS level. GCSE Physics or Dual Award Science (minimum Grade B) required if not offered at A/AS level. AVCE (Double Award) in Engineering accepted if offered with Mathematics A level.

Scottish Qualifications

AA/AB at Advanced Higher including Mathematics. Physics required at Standard Grade 2 (or Intermediate 2) if not offered at Higher or Advanced Higher.

Admissions policy/selection tools

Selection is not judged on academic performance alone. Special cases, for example mature students, students who have achieved a position of authority, students who have worked in the construction industry or in developing countries, or students who come through the PARTNERS route are considered separately on their individual merit.

Some undergraduate students are accepted onto our undergraduate degree programmes with non-A level qualifications. The equivalence of these "non-standard" qualifications are discussed widely at Faculty level, and are set on an annual basis to reflect changes to the qualifications, and also based on our experience of students having gone through the system with such qualifications.

UCAS application forms are received and processed initially by the University's central Admissions Office, and the data is transferred to their database. From there, the forms are sent directly to the Admissions Tutor, or Selector, for the undergraduate programmes. On receipt of the UCAS application forms, the Admissions Tutor makes an initial assessment of the application based on the information supplied on the UCAS application form, that is, on predicted grades, the applicant's personal statement, the referee's report and whether the applicant had any relevant work experience. Applicants who have already achieved their qualifications, but are taking a gap year, are immediately made an offer of a place if they meet our entry criteria. They then receive an invitation to one of our Open Days. UK applicants who have yet to complete their qualifications are invited to an interview, which also forms part of our Open Day. A decision is made directly after the interview, or in the couple of days following interview, and the applicant informed of the decision directly. One of the main reasons we use this approach is to improve our conversion rate and to improve our entry qualifications. International applicants are made an offer on receipt of their application and

are sent a Newsletter giving them appropriate information about the courses, the University and the city, with the invitation to visit informally if they are in the UK prior to starting their studies.

The Open Days and interviews are run to allow applicants to visit and for both parties to make an informed choice. They are also the ideal forum for dealing with applicants' queries, introducing them to life in Newcastle, and establishing their interest and motivation in becoming a professional civil engineer. The Open Day begins with an ice-breaking team-based problem-solving exercise. After a welcome talk, applicants are then interviewed, given a guided tour around the School, campus and city, and shown a number of small presentations from University staff on financial, careers and similar issues. Current students are heavily involved in the tours, which allows our visitors to gain a realistic vision of life as a civil engineering student at Newcastle.

The engineering Schools within the Faculty of Science, Agriculture and Engineering (SAGe) have a wealth of experience of recruiting international students. Our international offers are based on this knowledge.

Students are permitted to transfer from BEng to MEng at initial registration if they applied for the BEng and were offered a place on the BEng, which they accepted, but have achieved the entry requirements for the MEng and want to change. The Admissions Tutor authorises the transfer, then the School registers the student on the MEng programme. Students are not allowed to transfer after this point until the end of their second year, when their performance is assessed and meets the transfer criteria.

Non-standard Entry Requirements

International Baccalaureate

34 - 36 points in the IB Diploma with Mathematics at Higher Level Grade 5 or above. Physics required at Standard Level Grade 6 if not offered at Higher Level.

Irish Leaving Certificate

Exceptional applicants may be considered for direct entry into Stage 1, provided they meet a very high standard. All applications will be considered on an individual basis.

Access Qualifications

At least 54 credits at Level 3, to include 18 credits at Level 3 in Mathematics (including Calculus) and 18 credits at Level 3 in Analytical/Physical or Engineering Sciences. A Distinction level performance is required, in line with requirements for the BTEC Higher National Diploma and A Levels. All other candidates will be considered for Foundation Year entry.

BTEC National Diploma

Overall DDD in an engineering discipline, to include Distinctions in Further Mathematics for Technicians and Engineering Science. All other candidates will be considered for Foundation Year entry.

BTEC Higher National Diploma

BTEC Higher National Diploma at overall Distinction grade, with a minimum of Distinction in Mathematics and Science units. Mathematics units to Level H required. To be considered for Stage 2 entry candidates should have studied subjects corresponding in syllabus and level to Stage 1 of the degree, (with Distinctions in Mathematics to at least Level NV or H) and have achieved Distinctions in other key engineering science subjects.

PARTNERS - A/AS Levels and AVCE Qualifications

BBC/BCC from 18 units, including two A levels, of which one must be Mathematics, and excluding General Studies, plus successful completion of the Partners Summer School. Physics preferred at A or AS level. AVCE (Double Award) in Engineering accepted if offered with Mathematics A level. GCSE Physics or Dual Award Science (minimum grade B) required if not offered at A or AS level.

PARTNERS - BTEC National Diploma

Candidates offering the BTEC National Diploma will be considered for Foundation Year entry.

Direct Entry Students

Direct entry to Stage 2 of the undergraduate degree programmes is possible for candidates with the appropriate qualifications, both from home and internationally. It is also possible for students to enter into Stage 3 of the MEng programmes, provided they have reached the required standard to progress from Stage 2, i.e. they are likely to have completed Stage 2 of an accredited civil engineering honours programme, or equivalent, at another university.

The University now operates an Accreditation of Prior Learning (APL) Policy which allows Admissions Tutors and Degree Programme Directors to admit students into any of the later Stages, providing the level of their knowledge and skills is appropriate. Details of the APL policy can be seen at http://www.ncl.ac.uk/aqss/qsh/APEL_Policy.pdf

Additional Requirements

Mathematics and Physics or Dual Award Science are required at GSCE Level, minimum Grade B.

Level of English Language capability

An IELTS score of 6.5, or the equivalent, is required.

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 principal 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 (see http://www.ncl.ac.uk/international/coming_to_newcastle/orientation.phtml)

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.

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. Details of the personal tutor system can be found at <http://www.ncl.ac.uk/undergraduate/support/tutor.phtml>

In addition the University offers a range of support services, including the Student Advice Centre, the Counselling and Wellbeing team, the Mature Student Support Officer, and a Childcare Support Officer, see <http://www.ncl.ac.uk/undergraduate/support/welfare.phtml>

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. For further details see <http://www.ncl.ac.uk/disability-support/>

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, see <http://www.ncl.ac.uk/undergraduate/support/acfacilities.phtml>

The School of Civil Engineering & Geosciences has well-equipped laboratories to support teaching in hydraulics, soil mechanics, structural engineering, environmental engineering and geomatics and provides a range of software for teaching in these and other areas.

All new students whose first language is not English are required to take an English Language test in the Language Centre. Where appropriate, in-session language training can be provided. The Language Centre houses a range of resources for learning other languages which may be particularly appropriate for those interested in an Erasmus exchange. See <http://www.ncl.ac.uk/undergraduate/support/facilities/langcen.phtml>

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. Further information is at www.thestudentsurvey.com/ 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, see http://www.ncl.ac.uk/aqss/qsh/internal_subject_review/index.php

Accreditation reports

This programme is accredited by the Joint Board of Moderators.

Additional mechanisms

16 Regulation of assessment

Pass mark

The pass mark is 40

Course requirements

Progression is subject to the University's Undergraduate Progress Regulations (<http://www.ncl.ac.uk/calendar/university.regs/ugcont.pdf>) and Undergraduate Examination Conventions (<http://www.ncl.ac.uk/calendar/university.regs/ugexamconv.pdf>). In summary, students must pass, or be deemed to have passed, 120 credits at each Stage. Limited compensation up to 40 credits and down to a mark of 35 is possible at each Stage and there are resit opportunities, with certain restrictions. To remain on the MEng programme, students must pass Stage 2 at the first attempt with an average mark of 50% or better.

Weighting of stages

The marks from Stages 2, 3 and 4 will contribute to the final classification of the degree

The weighting of marks contributing to the degree for Stages 2,3 and 4 is 20:35:45

Common Marking Scheme

The University employs a common marking scheme, which is specified in the Undergraduate Examination Conventions, namely

	Honours	Non-honours
<40	Fail	Failing
40-49	Third Class	Basic
50-59	Second Class, Second Division	Good
60-69	Second Class, First Division	Very Good
70+	First Class	Excellent

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/undergraduate/>)

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

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

The Degree Programme Handbook

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.

Mapping of Intended Learning Outcomes onto Curriculum/Modules

Intended Learning Outcome	Module codes (Comp/Core in Bold)
A1	CIV1301, CIV1201, CIV1501, SVY1009, CIV2301, CIV2201, CIV2302, CIV2501, SVY2012, CIV2303, CIV2304, CIV3301, CIV3202, CIV3003, CIV3501, CIV3096, CIV3002, CIV3001, CIV3201, CIV3101, CIV4002, CIV4003, CIV4099, GSC8301, CIV8401, CIV8402, CIV8203, CIV8201, CIV8202, CIV8102, CIV8101, CIV8307
A2	CIV1301, CIV1501, CIV1001, CIV1401, CIV2201, CIV2501, CIV2001, CIV3308, CIV3003, CIV3096, CIV3002, CIV3201, CIV4002, CIV4099, CIV4004, CIV8503, CIV8401, CIV8402, CIV8404, CIV8403, CIV8202, CIV8102, GSC8201, CIV8103
A3	CIV1301, CIV2301, ENG1001, CIV2002, CIV2201, CIV2302, SVY2012, SVY1004, CIV2401, CIV3301, CIV3202, CIV3501, CIV3096, CIV3401, CIV3101, CIV4099, GSC8301, CIV8503, CIV8401, CIV8201, CIV8103,
A4	CIV1001, CIV2303, SVY1004, CIV2001, CIV3003, CIV3501, CIV3201, CIV4003, CIV4004, CIV8401, CIV8404, GSC8201, CIV8101
A5	CIV3308, CIV3003, CIV3002, CIV3001, CIV3201, CIV4003, CIV4099, CIV4004, CIV8401, CIV8402, CIV8404, CIV8403, CIV8202, GSC8201, CIV8101
A6	CIV3003, CIV3002, CIV4002, CIV4003, CIV4099, CIV4004, CIV8403, CIV8102, GSC8201
A7	CIV1501, CIV1001, CIV2501, CIV3501, CIV3001, CIV4099, CIV4004, CIV8503, CIV8101, CIV8401, CIV8404, CIV8403, CIV8202, CIV8102, GSC8201
A8	CIV1201, CIV2303, CIV2001, SVY2012, CIV3001, CIV3003, CIV3002, CIV3201, CIV3101, CIV4003, CIV4099, CIV4004, CIV8503, CIV8404, CIV8102, GSC8201, CIV8401,
A9	CIV1301, CIV1201, CIV1501, CIV2301, CIV2201, CIV2302, CIV2501, CIV2303, CIV2001, CIV2304, CIV3301, CIV3308, CIV3003, CIV3096, CIV1101, CIV3101, CIV4002, CIV4099, GSC8301, CIV8203, CIV8201, CIV8202
A10	CIV2303, CIV3003, CIV4002, CIV4003, CIV4004
A11	CIV1201, CIV2201, SVY2012, CIV2303, CIV2304, CIV3202, CIV3003, CIV3096, CIV4099, CIV4004, CIV8503, CIV8203, GSC8201
A12	SVY1009, SVY2012, CIV3003, CIV3096, CIV4003, CIV4004, CIV8403
A13	CIV4004, CIV8401, CIV8404, GSC8201, CIV8103, GSC8201, NCL4001, NCL4004
A14	CIV8101, CIV8102, CIV8103, GSC8201, CIV8201, CIV8202, CIV8203, CIV8401, CIV8402, CIV8403, CIV8404, CIV8501, CIV8503, GSC8301
A15	CIV2002, CIV3301, CIV3003, CIV3501, CIV3096, CIV4002, CIV4099, GSC8301, CIV8503, CIV8401, CIV8201, GSC8201, CIV8103,
A16	CIV3003, CIV4002, CIV4003, CIV4004
B1	CIV1301, CIV1501, SVY1009, CIV1401, , ENG1001, CIV2002, CIV2301, CIV2201, CIV2501, SVY2012, CIV2401, CIV3301, CIV3202, CIV3003, CIV3501, CIV3096, CIV3002, CIV3401, CIV3201, CIV3101, CIV4002,

	CIV4003, CIV4099, GSC8301, CIV8503, CIV8401, CIV8402, CIV8203, CIV8201, CIV8202, GSC8201, CIV8103
B2	CIV1501, CIV1001, CIV2501, CIV2001, CIV2401, CIV2304, CIV3308, CIV3501, CIV3096, CIV3002, CIV3401, CIV3201, CIV3101, CIV4003, CIV4099, CIV4004, CIV8401, CIV8402, CIV8404, CIV8101, CIV8103
B3	CIV1001, CIV1401, CIV2001, CIV2401, CIV3003, CIV3501, CIV3096, CIV3001, CIV3401, CIV4099, CIV4004, CIV8401, CIV8402, CIV8404, CIV8403, CIV8102, GSC8201, CIV8101, CIV8103,
B4	CIV1201, CIV1001, CIV3096, CIV4002, CIV4099, CIV4004, CIV8401, CIV8402, CIV8404, CIV8403, CIV8203, CIV8102, GSC8201
B5	CIV1301, CIV1501, CIV2201, CIV2302, CIV2501, CIV2401, CIV3202, CIV3096, CIV4099, GSC8301, CIV8503, CIV8401, CIV8402, CIV8203, CIV8201, GSC8201, CIV8103,
B6	CIV1301, CIV2002, CIV2301, CIV2501, CIV2304, CIV3202, CIV3096, CIV3002, CIV4099, GSC8301, CIV8401, CIV8402, CIV8203, CIV8201, CIV8103,
B7	CIV1201, CIV1501, CIV1001, CIV2501, CIV2001, CIV2401, CIV3308, CIV3003, CIV3096, CIV3001, CIV3401, CIV3201, CIV3101, CIV4003, CIV4099, CIV4004, CIV8404, CIV8203, CIV8102, GSC8201, CIV8101, CIV8103
B8	CIV1001, CIV2001, CIV3201, CIV4004, CIV8103
B9	CIV3003, CIV3002, CIV4003, CIV4004, CIV8404, GSC8201
C1	CIV1301, CIV1501, SVY1009, CIV2201, CIV2501, SVY2012, CIV4099, CIV8203
C2	CIV1301, CIV1501, SVY1009, CIV2201, CIV2501, SVY2012, CIV3096, CIV4099, CIV8203
C3	SVY1003, CIV1001, CIV3201, CIV3101, CIV4099
C4	CIV1301, CIV1501, SVY1003, CIV1401, CIV2002, CIV2301, CIV2501, SVY1004, CIV2304, CIV3202, CIV3501, CIV3096, CIV3401, CIV4099, GSC8301, CIV8503, CIV8401, CIV8201, GSC8201, CIV8103,
C5	CIV2303, CIV4099, CIV4004, CIV8102
C6	CIV1001, CIV3003, CIV4004, CIV8404, CIV8202, GSC8201, CIV8101,
C7	CIV1001, CIV2304, CIV3202, CIV3201, CIV3101, CIV4004, CIV8401, CIV8202
C8	
C9	CIV3003, CIV4003, CIV4004, CIV8404, GSC8201, GSC8201
C10	CIV3096, CIV4099, CIV8503, CIV8404, CIV8201, CIV8101, CIV8103
D1	CIV1201, CIV1301, CIV1501, SVY1003, CIV1001, CIV1401, CIV2002, CIV2302, CIV2501, CIV2303, CIV2001, CIV2401, CIV3301, CIV3202, CIV3308, CIV3003, CIV3501, CIV3096, CIV3002, CIV3001, CIV3201, CIV3101, CIV4002, CIV4003, CIV4099, CIV4004, CIV8503, CIV8401, CIV8402, CIV8404, CIV8403, CIV8203, CIV8102, GSC8201, CIV8101, CIV8103, NCL4001, NCL4004
D2	SVY1009, CIV1001, CIV2501, SVY2012, CIV2001, CIV2401, CIV3308, CIV3096, CIV3001, CIV3201, CIV4099, CIV8503, CIV8401, CIV8404, CIV8403, GSC8201, CIV8101, CIV8103,
D3	CIV1201, CIV2201, CIV2501, CIV2001, CIV3301, CIV3202,

	CIV3501, CIV3096, CIV3201, CIV4003, CIV4004, CIV8503, CIV8404, CIV8203, CIV8201, CIV8202, CIV8103
D4	CIV2302, CIV3096, CIV3201, CIV4099, CIV4004, CIV8401, CIV8404, CIV8403, GSC8201, CIV8103
D5	CIV1201, CIV1301, CIV1501, SVY1009, CIV1401, ENG1001, CIV2002, CIV2201, CIV2302, CIV2501, SVY2012, CIV2401, CIV3202, CIV3002, CIV3401, CIV3101, CIV4004, CIV8402, CIV8404, CIV8403, CIV8202, CIV8102, CIV8101,
D6	CIV3096, CIV4099, CIV4004, CIV8402, CIV8404, GSC8201, NCL4001, NCL4004
D7	SVY1009, SVY2012, CIV3501, CIV3096, CIV3002, CIV4099, CIV4004, CIV8402, CIV8403, CIV8201, GSC8201, CIV8101, CIV8103, CIV8403, CIV8201, GSC8201, NCL4001, NCL4004
D8	CIV1301, CIV1501, SVY1009, CIV1001, CIV2501, SVY2012, CIV2303, CIV2001, CIV3001, CIV3201, CIV3101, CIV4004, CIV8401, CIV8404, CIV8403, GSC8201, CIV8101, CIV8103, NCL4001, NCL4004
D9	CIV4099