

PROGRAMME SPECIFICATION

1	Awarding Institution	Newcastle University
2	Teaching Institution	Newcastle University
3	Final Award	BSc (Hons)
4	Programme Title	Computing Science with Industrial Placement, Computing Science with Industrial Placement (Networked Systems and Internet Technologies), Computing Science with Industrial Placement (Games and Virtual Environments), Computing Science with Industrial Placement (Software Engineering)
5	UCAS/Programme Code	G401, G421, G451, G603
6	Programme Accreditation	British Computer Society (to be applied for in 2008)
7	QAA Subject Benchmark(s)	Computing
8	FHEQ Level	H
9	Date written/revised	23rd October 2007

10 Programme Aims

1. To produce graduates with the in-depth knowledge and skills necessary to exploit computing systems throughout their professional life. Graduates will have a clear understanding of the practical, theoretical and professional foundations of Computing Science. They will have knowledge and experience of the fundamental techniques used in modern software engineering. They will also have an understanding of the architectural concepts underpinning computer and networking hardware platforms. They will be able to apply relevant theory to the solution of practical problems and to the analysis of existing algorithms and techniques, and to recommend techniques and algorithms appropriate to specific circumstances in the areas of fundamental systems and major applications. They will also be able to appreciate, develop and evaluate new algorithms, techniques and other developments within the computing field.
2. To provide a flexible structure that allows students to follow a general programme in Computing Science with Industrial Placement, or to specialise in their final year in one of three areas:
 - a. Students who graduate with a degree in Computing Science with Industrial Placement (Networked Systems and Internet Technologies) will be able to design, build and integrate advanced networked computing systems in a range of application areas, such as mobile and wireless communications, computationally intensive financial and health applications, and business-critical enterprise applications involving multiple businesses and outsourcing. We envisage students growing into architect and chief architect roles for software product groups in start-ups or other enterprises, and being able to initiate and lead consulting efforts for field implementations of networked computing solutions.
 - b. Students who graduate with a degree in Computing Science with Industrial Placement (Games and Virtual Environments) will be able to design, develop and implement computer graphics software and applications on a variety of architectures including games consoles, graphics workstations and advanced

3D virtual reality environments, and to exploit such software and hardware in entertainment, engineering design and scientific visualisation. We envisage graduates pursuing these activities in both the entertainment and the industrial sectors; some may also seek to develop market-niche software in small or start-up companies.

- c. Students who graduate with a degree in Computing Science with Industrial Placement (Software Engineering) will have particular knowledge and skills related to the development of large-scale fundamental and application software systems. They will be equipped to develop as professionals to assume lead technical and team management roles in such developments. We envisage graduates going on to employment in technical positions in software houses and with companies designing and deploying software in specific industry sectors; some may also seek to develop market-niche software in small or start-up companies.
3. To provide a programme that equips students with subject-specific and transferable skills that will enable them to pursue a variety of careers within, and outside, the IT industry, including research.
4. To provide students with the opportunity to develop their skills within an industrial setting.
5. To provide a programme which meets the accreditation requirements of appropriate professional bodies, thus providing the basis for further professional development and lifelong learning.
6. To provide a programme which meets the FHEQ at Honours level and which takes appropriate account of the subject benchmark statements in Computing.

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 Computing.

The strategy of the degree programmes is to give a broad coverage of the subject of Computing Science in Stages 1 and 2, an industrial placement in Stage 3, and then to offer specialisation at Stage 4 in the form of a wide range of optional modules. Those students who specialise in the area of Networked Systems and Internet Technologies, Games and Virtual Environments, or Software Engineering are eligible for the award of the degree of Computing Science with Industrial Placement (Networked Systems and Internet Technologies), Computing Science with Industrial Placement (Games and Virtual Environments), or Computing Science with Industrial Placement (Software Engineering), as appropriate.

The following identifies the generic Intended Learning Outcomes for all programmes and specific outcomes for a particular specialisation. There will be variation depending on the nature of the work placement, and the options taken at Stage 4 and, in particular, on the Stage 4 options that identify a specialisation.

Knowledge and Understanding

On completing the programme students should have gained and be able to demonstrate knowledge and understanding of:

- A1. A diverse range of programming paradigms and languages supported by programming language principles
- A2. The principles of software engineering
- A3. The theoretical and mathematical foundations of Computing Science
- A4. Techniques for the development of data representations and algorithms
- A5. Computer and network organisation and hardware architectures
- A6. Professional issues, including legal and ethical aspects of professional practice, professional development, social roles and effects of computing systems
- A7. Research techniques

A successful student for the degree of Computing Science with Industrial Placement (Networked Systems and Internet Technologies) will additionally have gained and be able to demonstrate knowledge and understanding of:

- A8. Technological foundations of networked systems, in depth and breadth
- A9. Middleware and integration standards and platforms
- A10. Fundamental networked and internet protocols and algorithms
- A11. Techniques for networked and Internet programming
- A12. Solutions for secure and reliable networked and internet computing

A successful student for the degree of Computing Science with Industrial Placement (Games and Virtual Environments) will additionally have gained and be able to demonstrate knowledge and understanding of:

- A13. Technological foundations of computer graphics systems, including computer games and virtual reality platforms
- A14. The mathematical principles and algorithmic basis of computer graphics
- A15. Design issues and development techniques for computer graphics, games and virtual environments
- A16. Human requirements and technical capabilities of modern virtual environments, games and graphics platforms
- A17. Fundamental problems and approaches in artificial intelligence, as applied to computer games, visualisation and virtual environments

A successful student for the degree of Computing Science with Industrial Placement (Software Engineering) will additionally have gained and be able to demonstrate knowledge and understanding of:

- A18. Advanced knowledge of modern software engineering processes
- A19. Understanding of software architectures and their theoretical foundations
- A20. Understanding of design techniques for large-scale and complex software systems
- A21. Knowledge of basic principles of advanced software CASE tools
- A22. In-depth knowledge of validation and verification techniques
- A23. Awareness of software project management techniques
- A24. Understanding of legal issues affecting software projects

Intended learning outcomes A8-A24 may have been achieved by students of other degrees depending on the options taken at Stage 4.

Teaching and Learning Methods

Lectures are the main way of imparting knowledge and understanding (A1-A24), but tutorials are also used. Practical classes feature prominently, especially to support the Stage 1 programming modules (A1, A2). Visiting speakers provide seminars on aspects of being an IT professional (A6). Students are expected to contribute to their own learning experience by independent reading. They are provided with references to books which are categorised as *essential*, *recommended*, and *background* reading, as well as scientific papers and other learning materials including appropriate web URLs. In addition, an industrial placement will involve the development of knowledge within an industrial setting.

Assessment Strategy

Knowledge and understanding are assessed by means of closed and open book written examinations, and coursework, including team and individual project reports and log books (A1-A24).

Intellectual Skills

On completing the programme students should have skills in the areas of:

- B1. Carrying out the process of software development, including: the analysis of system requirements; the production of system specifications using appropriate models and techniques; software validation and verification
- B2. The use of a variety of advanced (especially object-oriented) programming languages and paradigms
- B3. The use of a variety of computer-based (including operating) systems
- B4. The application of theoretical concepts of computing science in the design and analysis of systems and algorithms
- B5. The identification and implementation of appropriate algorithms and data structures
- B6. The use and provision of network information services

A successful student for the degree of Computing Science with Industrial Placement (Networked Systems and Internet Technologies) will have additional skills in the areas of:

- B7. Designing and building realistic networked systems and Internet applications
- B8. Identification and trade-off analysis of issues such as security and reliability in networked systems and internet applications
- B9. Integration of a wide variety of protocols and platforms
- B10. Ability to grasp and articulate the key contributions of emerging and future networked and internet computing technologies

A successful student for the degree of Computing Science with Industrial Placement (Games and Virtual Environments) will have additional skills in the areas of:

- B11. Development and/or implementation of graphics algorithms and applications in standard software environments
- B12. Modelling, rendering and interaction in 3D graphical environments
- B13. Mathematical techniques for the manipulation of 3D geometry
- B14. Implementation of artificial intelligence algorithms in a declarative programming language

A successful student for the degree of Computing Science with Industrial Placement (Software Engineering) will have additional skills in the areas of:

- B15. Validation and verification techniques for designs and software
- B16. Ability to use software Architecture Description Languages
- B17. Ability to make informed choices among software tools and techniques
- B18. Project management skills, including estimation and planning

Intended learning outcomes B7-B18 may have been achieved by students of other degrees depending on the options taken at Stage 4.

Teaching and Learning Methods

B1-B6 feature prominently in all modules. In particular a team project at Stage 2 and an industrial placement between Stages 2 and 3 give students experience of working with others (see D7 below) to engineer a complex piece of software (B2, B4, B5). In many cases the work placement, and an individual project at Stage 3 will require students to develop a large piece of software to a customer's requirements (B1, B2, B4, B5). In all other modules, coursework is used to develop these skills (B1-B18).

Assessment Strategy

Subject-specific and professional skills are assessed by coursework (B1-B18).

Practical Skills

On completing the programme students should have:

- C1. The ability to conduct investigations using the technical and professional literature

- C2. The ability to use and evaluate appropriate tools and techniques
- C3. The ability to undertake empirical evaluation of alternative solutions
- C4. The ability to solve problems by identifying suitable approaches using computer-based systems
- C5. The ability to reason abstractly about the structure and behaviour of computer systems

Teaching and Learning Methods

All modules involve coursework, much of which involves problem solving skills (C4). This is especially so in the team and individual projects, and the work placement, where students need to select, evaluate and apply appropriate tools and techniques (C2). Here and elsewhere students will need to investigate possible alternatives in the technical and professional literature (C1, C3), and to reason about computer systems (C5).

Assessment Strategy

Practical skills are assessed by a range of coursework (reports, design documents, etc.) (C1-C5).

Transferable/Key Skills

On completing the programme students should be able to use the following skills:

- D1. Written communication, particularly technical writing
- D2. Problem solving
- D3. Interpersonal communication
- D4. Initiative
- D5. Oral presentation
- D6. Adaptability
- D7. Teamwork
- D8. Numeracy
- D9. Planning and organisation
- D10. Computer literacy

Teaching and Learning Methods

Key skills feature throughout the programme; teamwork in the Stage 2 team project and the Stage 3 work placement (D7); oral presentation, interpersonal communication, and planning and organisation in the final year research methods and individual project modules, as well as the Stage 2 team project and the Stage 3 work placement (D3, D5, D9); written communication in all modules, but especially in the team and final year projects and the work placement (D1); numeracy is covered by a Mathematics module at Stage 1 and exercises in the programming modules (D8); computer literacy, problem solving, initiative and adaptability are necessarily covered throughout the programme (D2, D4, D6, D10).

Assessment Strategy

Key (transferable) skills are assessed by both written and oral presentations (D1-D10). Teamwork in the Stage 2 team project is assessed both by the module leader at team oral presentations and by a team monitor (a member of teaching staff) who attends team formal meetings (D5, D7). The work placement is assessed by the Module Leader with input from an industrial supervisor and on a pass/fail basis. No resit opportunity is available. Students who fail the placement are able to proceed to Stage 3 of the corresponding "without Industry" programme.

12 Programme Curriculum, Structure and Features

Basic structure of the programme

This programme has 3 Stages and an intercalating year. Students are required to take 120 credits at each Stage (but not during the intercalating year).

Students take six compulsory 20-credit modules in each of Stages 1 and 2. The teaching of these modules is split equally across semesters 1 and 2 so that students study 60 credits in each semester. At Stage 1 students who have taken A-level Mathematics (or equivalent) take MAS1404 Mathematics for Computing Science. Those without this qualification take

CSC1013 Foundation Mathematics for Computing Science. For both sets of students further mathematical concepts are covered as and where necessary in modules at each Stage. However, certain modules at Stage 3, as indicated in the Degree Programme Handbook, may not be available to those students who have taken CSC1013.

Between Stages 2 and 3 there is an intercalating year consisting of an industrial placement.

A wide range of optional modules is available at Stage 3, however all students must take the 40-credit individual project module CSC3095.

Students who take CSC3101 Distributed Systems, CSC3102 System and Network Security, CSC3103 Internet Technologies and E-Commerce and CSC3104 Middleware and Web Services are eligible for the award of a degree in Computing Science with Industrial Placement (Networked Systems and Internet Technologies).

Students who take CSC3201 Graphics, CSC3202 Computer Games Development, CSC3203 Artificial Intelligence for Games, and CSC3204 Advanced Graphics and Virtual Environments are eligible for the award of a degree in Computing Science with Industrial Placement (Games and Virtual Environments).

Students who take CSC3301 Software Architectures, CSC3302 Software Development Technologies and Tools, and CSC3303 Software Project Management, are eligible for the award of a degree in Computing Science with Industrial Placement (Software Engineering).

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

Students may elect to study one or two semesters of their final year abroad at one of our ERASMUS partner institutions.

Students will undertake an industrial placement year between Stages 2 and 3.

Accreditation by the BCS will be sought when they next visit in 2008.

Programme regulations (link to on-line version)

<http://www.ncl.ac.uk/regulations/programme>

13 Criteria for admission

Entry qualifications

Minimum Grade B GCSE Mathematics

A-Level Subjects and Grades

Typical ABC at A2. We do not require any particular A-Level subjects to have been taken. Those without A-Level Mathematics will take CSC1013 in Stage 1.

We accept applications for APL.

Alternative entry qualifications

We accept a wide range of alternative qualifications, such as IB 30 points, Distinction at GNVQ, BTEC to include 6 merits, Scottish Highers BBBB and appropriate Access, Bridging and Foundation programmes.

Admissions policy/selection tools

Applicants are invited to visit the School for interview and to see the University and to meet staff current undergraduates on the programme. Attendance is strongly encouraged but not compulsory and applicants who are not based in the UK are not expected to attend.

Additional Requirements

None.

Level of English Language capability

For applicants whose first language is not English we ask for IELTS 6.5 or TOEFL 233 (computer-based).

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 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 (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 this 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 team 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>

Industrial Placement

During the industrial placement students will have a supervisor from the School as well as an industrial supervisor as detailed in the School's Placement Handbook.

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 Computing Science has well equipped computer laboratories consisting of networked PCs with dedicated labs for each stage of the programme. In particular the School hosts a videoconferencing suite, funded through the HEFCE Centre of Excellence in Teaching and Learning programme. Key software used in the support and delivery of the programme is available to students free of charge. The School has its own library which is mainly used for the support of advanced topics in the later stages of the programme. The University's Robinson Library has available multiple copies of all recommended undergraduate texts.

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 Staff Student Committee and 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.

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

The programmes G400 and G600 were last accredited by the British Computer Society in November 2003. A further accreditation visit is planned during 2008.

Additional mechanisms

None.

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.

Weighting of stages

The marks from Stages 2 and 3 will contribute to the final classification of the degree
The weighting of marks contributing to the degree for Stages 2 and 3 is 50 : 50

Common Marking Scheme

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

	Modules used for degree classification	Modules not used for degree classification
<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
(see <http://www.cs.ncl.ac.uk/teaching/undergraduate/index.php>)

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

Notes:

1. MAS1404 and CSC1013 are alternative compulsory modules.
2. Modules qualified by (NSIT), (GVE) and (SE) are compulsory for students wishing to have the title Computing Science with Industrial Placement (Networked Systems and Internet Technologies), Computing Science with Industrial Placement (Games and Virtual Environments), and Computing Science with Industrial Placement (Software Engineering) respectively, and are optional for all other programmes.

Intended Learning Outcome	Module codes (Compulsory in Bold)
A1	CSC1011, CSC1012, CSC1014, CSC1016, CSC2011, CSC2012, CSC2013, CSC2014, CSC2015 , CSC3004, CSC3005, CSC3095 , CSC3101 (NSIT), CSC3103 (NSIT), CSC3202 (GVE)
A2	CSC1011, CSC1012, CSC1014, CSC2011, CSC2012, CSC2013, CSC2014, CSC2015, CSC2016 , CSC3001, CSC3002, CSC3003, CSC3005, CSC3095 , CSC3201 (GVE), CSC3202 (GVE), CSC3301 (SE), CSC3302 (SE), CSC3303 (SE),
A3	CSC1013/MAS1404, CSC1016, CSC2012, CSC2014, CSC2015, CSC2016 , CSC3004, CSC3101 (NSIT), CSC3201 (GVE), MAS1404
A4	CSC1011, CSC1012, CSC2011, CSC2012, CSC2015, CSC2016 , CSC3002, CSC3005, CSC3006, CSC3101 (NSIT), CSC3201 (GVE)
A5	CSC1016, CSC2013 , CSC3001, CSC3002, CSC3003, CSC3005
A6	CSC1015, CSC2015 , CSC3002, CSC3003, CSC3006, CSC3101 (NSIT), CSC3202 (GVE), CSC3303 (SE)
A7	CSC3095
A8	CSC3101 (NSIT)
A9	CSC3104 (NSIT)
A10	CSC3101 (NSIT), CSC3104 (NSIT)
A11	CSC3103 (NSIT), CSC3104 (NSIT)
A12	CSC3101 (NSIT), CSC3102 (NSIT), CSC3104 (NSIT)
A13	CSC3201 (GVE), CSC3202 (GVE), CSC3204 (GVE)
A14	CSC3201 (GVE), CSC3202 (GVE), CSC3204 (GVE)
A15	CSC3202 (GVE), CSC3203 (GVE), CSC3204 (GVE)
A16	CSC3201 (GVE), CSC3202 (GVE), CSC3204 (GVE)
A17	CSC3203 (GVE), CSC3204 (GVE)
A18	CSC3301 (SE), CSC3302 (SE), CSC3303 (SE)
A19	CSC3301 (SE)
A20	CSC3302 (SE)
A21	CSC3302 (SE), CSC3303 (SE)
A22	CSC3302 (SE)
A23	CSC3303 (SE)
A24	CSC3303 (SE)
B1	CSC1011, CSC1012, CSC1014, CSC1016, CSC2011, CSC2012, CSC2014, CSC2015 , CSC3001, CSC3002, CSC3003, CSC3004, CSC3005, CSC3095 , CSC3103 (NSIT), CSC3201 (GVE), CSC3202 (GVE), CSC3303 (SE)
B2	CSC1011, CSC1012, CSC1014, CSC1016, CSC2011, CSC2015 , CSC3005, CSC3095 , CSC3102 (NSIT), CSC3103 (NSIT)

B3	CSC1011, CSC1012, CSC1014, CSC1016, CSC2011, CSC2012, CSC2013, CSC2015, CSC3001, CSC3002, CSC3005, CSC3095, CSC3103 (NSIT), CSC3202 (GVE)
B4	CSC1012, CSC1013/MAS1404, CSC1014, CSC1016, CSC2012, CSC2014, CSC2015, CSC2016, CSC3003, CSC3004, CSC3005, CSC3201 (GVE)
B5	CSC1011, CSC1012, CSC1014, CSC1016, CSC2011, CSC2014, CSC2015, CSC2016, CSC3001, CSC3002, CSC3005, CSC3103 (NSIT), CSC3201 (GVE), CSC3202 (GVE)
B6	CSC1011, CSC1012, CSC1014, CSC1015, CSC1016, CSC2012, CSC2013, CSC2015, CSC3003, CSC3005, CSC3101 (NSIT), CSC3103 (NSIT), CSC3104 (NSIT), CSC3202
B7	CSC3101 (NSIT), CSC3103 (NSIT)
B8	CSC3101 (NSIT), CSC3102 (NSIT)
B9	CSC3103 (NSIT), CSC3104 (NSIT)
B10	CSC3102 (NSIT), CSC3103 (NSIT), CSC3104 (NSIT).
B11	CSC3201 (GVE), CSC3202 (GVE), CSC3204 (GVE)
B12	CSC3201 (GVE), CSC3202 (GVE), CSC3204 (GVE)
B13	CSC3201 (GVE), CSC3202 (GVE), CSC3204 (GVE)
B14	CSC3203 (GVE)
B15	CSC3301 (SE), CSC3302 (SE)
B16	CSC3301 (SE)
B17	CSC3301 (SE), CSC3302 (SE), CSC3303 (SE)
B18	CSC3303 (SE)
C1	CSC1015, CSC1016, CSC2012, CSC2013, CSC2014, CSC2015, CSC3001, CSC3002, CSC3003, CSC3006, CSC3095, CSC3102 (NSIT), CSC3103 (NSIT), CSC3201 (GVE), CSC3202 (GVE)
C2	CSC1011, CSC1012, CSC1013/MAS1404, CSC1014, CSC1015, CSC1016, CSC2011, CSC2012, CSC2013, CSC2014, CSC2015, CSC2016, CSC3001, CSC3003, CSC3004, CSC3005, CSC3006, CSC3095, CSC3101 (NSIT), CSC3102 (NSIT), CSC3103 (NSIT), CSC3201 (GVE), CSC3202 (GVE)
C3	CSC1011, CSC1012, CSC1014, CSC1015, CSC1016, CSC2011, CSC2012, CSC2014, CSC2015, CSC2016, CSC3003, CSC3006, CSC3095, CSC3102 (NSIT), CSC3103 (NSIT), CSC3201 (GVE), CSC3202 (GVE)
C4	CSC1011, CSC1012, CSC1013/MAS1404, CSC1014, CSC1016, CSC2011, CSC2012, CSC2014, CSC2015, CSC2016, CSC3002, CSC3003, CSC3005, CSC3006, CSC3095, CSC3101 (NSIT), CSC3102 (NSIT), CSC3103 (NSIT), CSC3201 (GVE), CSC3202 (GVE)
C5	CSC1016, CSC2011, CSC2012, CSC2013, CSC2014, CSC2015, CSC2016, CSC3001, CSC3002, CSC3004, CSC3006, CSC3103 (NSIT), CSC3202 (GVE),
D1	CSC1011, CSC1012, CSC1014, CSC1015, CSC1016, CSC2012, CSC2013, CSC2014, CSC2015, CSC3002, CSC3003, CSC3006, CSC3095, CSC3201 (GVE), CSC3202 (GVE), CSC3303 (SE)
D2	CSC1011, CSC1012, CSC1013/MAS1404, CSC1014, CSC1015, CSC1016, CSC2011, CSC2012, CSC2013, CSC2014, CSC2015, CSC2016, CSC3001, CSC3002, CSC3004, CSC3005, CSC3006, CSC3095, CSC3101 (NSIT), CSC3102 (NSIT), CSC3103 (NSIT), CSC3201 (GVE), CSC3202 (GVE)

D3	CSC1015, CSC2014, CSC2015 , CSC3004, CSC3006, CSC3095 , CSC3303 (SE)
D4	CSC1011, CSC1012, CSC1013/MAS1404, CSC1014, CSC1015, CSC1016, CSC2012, CSC2014, CSC2015 , CSC3002, CSC3003, CSC3004, CSC3005, CSC3006, CSC3095 , CSC3102 (NSIT), CSC3201 (GVE), CSC3202 (GVE)
D5	CSC1015, CSC2015 , CSC3006, CSC3095
D6	CSC1011, CSC1012, CSC1013/MAS1404, CSC1014, CSC1015, CSC1016, CSC2015, CSC2016 , CSC3006, CSC3095 , CSC3102 (NSIT), CSC3202 (GVE)
D7	CSC1015, CSC2015 , CSC3004, CSC3006, CSC3303 (SE)
D8	CSC1013/MAS1404, CSC2014, CSC2015, CSC2016 , CSC3005, CSC3102 (NSIT), CSC3201 (GVE), CSC3202 (GVE)
D9	CSC1011, CSC1012, CSC1014, CSC1015, CSC1016, CSC2012, CSC2014, CSC2015 , CSC3003, CSC3006, CSC3095 , CSC3201 (GVE), CSC3202 (GVE), CSC3303 (SE)
D10	CSC1011, CSC1012, CSC1014, CSC1015, CSC1016, CSC2011, CSC2012, CSC2014, CSC2015, CSC2016 , CSC3001, CSC3002, CSC3003, CSC3005, CSC3095 , CSC3103 (NSIT), CSC3201 (GVE), CSC3202 (GVE)