PROGRAMME SPECIFICATION	

1	**Awarding Institution**	Newcastle University
2	**Teaching Institution**	Newcastle University
3	**Final Award**	BSc (Hons)
4	**Programme Title**	Computing Science Component
5	**UCAS/Programme Code**	NG4K – Computing and Accounting GL4C – Computing and Economics GG41 – Computing and Maths GG34 – Computing and Statistics
6	**Programme Accreditation**	N/A
7	**QAA Subject Benchmark(s)**	Computing
8	**FHEQ Level**	Honours
9	**Date written/revised**	September 2007

10 Programme Aims

The aims of this programme are a subset of those for the Single Honours Degree in Computing Science. As such, students will have less breadth, but they will be able to follow some topics in depth.

1 To produce graduates with the knowledge and skills necessary to exploit computing systems throughout their professional life. Graduates will have an 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 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 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.

Knowledge and Understanding

A successful student will 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. Computing and network organisation

A student will additionally have gained and be able to demonstrate knowledge and understanding of the following, depending on the options taken at Stage 3:
A6. Technological foundations of computer graphics systems
A7. The mathematical principles and algorithmic basis of computer graphics

A8. Design issues and development techniques for computer graphics, games and virtual environments
A9. Human requirements and technical capabilities of modern virtual environments, games and graphics platforms
A10. Fundamental problems and approaches in artificial intelligence, as applied to computer games, visualisation and virtual environments.

Teaching and Learning Methods

Lectures are the main way of imparting knowledge and understanding (A1-A10), but tutorials are also used. Practical classes feature prominently, especially to support the Stage 1 programming modules (A1, A2). 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.

Assessment Strategy

Knowledge and understanding are assessed by means of closed and open book written examinations, and coursework (A1-A10).

Intellectual Skills

On completing the programme students should have:
B1 The ability to conduct investigations using the technical and professional literature
B2 The ability to use and evaluate appropriate tools and techniques
B3 The ability to undertake empirical evaluation of alternative solutions
B4 The ability to formulate problems and identify suitable approaches to solving them
B5 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 (B4), where students need to select, evaluate and apply appropriate tools and techniques (B2). Here and elsewhere students will need to investigate possible alternatives in the technical and professional literature (B1, B3), and to reason about computer systems (B5).

Assessment Strategy

Cognitive skills are assessed by a range of coursework (reports, design documents, etc.) (B1-B5).

Practical Skills

On completing the programme students should be able to understand and undertake:
C1 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
C2 The use of a variety of advanced (especially object-oriented) programming languages and paradigms
C3 The use of a variety of computer-based (including operating) systems
C4 The application of theoretical concepts of computing science in the design and analysis of systems and algorithms
C5 The identification and implementation of appropriate algorithms and data structures
C6 The use and provision of network information services

A student may have skills in the following areas depending on options taken at Stage 3
C7 Development and/or implementation of graphics algorithms and applications in standard software environments.
C8 Modelling, rendering and interaction in 3D graphical environments
C9 Mathematical techniques for the manipulation of 3D geometry
C10 Implementation of artificial intelligence algorithms in a declarative programming language

Teaching and Learning Methods

C1-C10 feature prominently in all modules, where coursework is used to develop these skills.

Assessment Strategy

Subject-specific and professional skills are assessed by coursework (B1-B10).

Transferable/Key Skills

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

D1 Written communication
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 (D1-D10); in particular, written communication in all modules (D1); numeracy is covered by 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).

12 Programme Curriculum, Structure and Features

Basic structure of the programme

A & B Programme Features & Structure

Students study 60 credits of compulsory modules in Stages 1 and 2, and choose from a range of optional modules at Stage 3.

The following combinations of subjects (followed by their UCAS Codes) are permitted:

Accounting and	Computing Science	NG4K
Computing Science and	Economics	GL4C
	Mathematics	GG41
	Statistics	GG34
Geographic Information Science and	Computing Science	GG95

C Programme Curriculum

Stage 1

(a) All candidates shall select, subject to the approval of the Degree Programme Director, modules to a total value of at least 40 credits from each of the subjects of the degree. The choice of modules available in each subject is set out in the relevant Degree Programme Handbook. For Computing Science these are:

Code	*Credits*	*Descriptive title*
CSC1001	(20)	Problem Solving, Program Design and Implementation
CSC1002	(20)	Object-Oriented Program Design and Development
CSC1006	(20)	Computer Environments

CSC1001 and CSC1002 are core and compulsory modules.

(b) All candidates shall select, subject to the approval of the Degree Programme Director, further modules with a total value of 40 credits.

Note: a list of the Stage 0 and Stage 1 modules offered by other schools in the Faculty will be found in the List of Modules *given in the University* Regulations *at www.ncl.ac.uk/regulations on the World Wide Web. Candidates may also, in certain circumstances, be given permission by the Degree Programme Director to study modules offered by schools in other faculties.*

Stage 2

(a) All Stage 2 modules are Honours modules.

(b) Subject to the approval of the Degree Programme Director for the relevant Honours programmes, all candidates shall select modules to a total value of 60 credits in each subject of the degree. The choice of modules available in each subject is set out in the relevant Degree Programme Handbook. For Computing Science these are:

Code	*Credits*	*Descriptive title*
CSC2001	(20)	Advanced Programming
CSC2002	(20)	Requirements Analysis and Database Design
CSC2006	(20)	Algorithm Design and Analysis

Note: the Degree Programme Director for the Joint Honours degree may, where appropriate, permit a candidate to substitute modules up to the value of 20 credits offered by another

school.

Stage 3

(a) All Stage 3 modules are Honours modules.

(b) Subject to the approval of the Degree Programme Director for the relevant Honours programmes, all candidates shall select modules to a total value of 60 credits in each subject of the degree. The choice of modules available in each subject is set out in the relevant Degree Programme Handbook. For Computing Science these are:

Code	*Credits*	*Descriptive title*
CSC3002	(10)	Reliability and Fault Tolerance
CSC3003	(10)	Human-Computer Interaction
CSC3004	(10)	Understanding Programming Languages
CSC3006	(10)	Evolution of Complex Systems
CSC3201	(10)	Graphics
CSC3202	(10)	Computer Games Development
CSC3203	(10)	Artificial Intelligence for Games
CSC3204	(10)	Advanced Graphics for Virtual Environments

Note: the Degree Programme Director for the Joint Honours degree may, where appropriate, permit a candidate to substitute modules up to the value of 20 credits offered by another school.

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

Programme regulations (link to on-line version)

NG4K: http://www.ncl.ac.uk/regulations/programme/2007-2008/programme/ng4k.php
GL4C: http://www.ncl.ac.uk/regulations/programme/2007-2008/programme/gl4c.php
GG41: http://www.ncl.ac.uk/regulations/programme/2007-2008/programme/gg41.php
GG34: http://www.ncl.ac.uk/regulations/programme/2007-2008/programme/gg34.php

13 Criteria for admission

Entry qualifications
A-Level Subjects and Grades
This varies according to particular JH combination, but typically BBB at A2 to include Mathematics

Admissions policy/selection tools
Applications are considered by the Degree Programme Director for the Joint Honours degree. Suitable applicants are usually made an offer without interview as soon as possible after their application forms have been received and considered. In some cases, however, e.g. where an applicant has non-standard qualifications, an interview may be necessary before a decision is made. Applicants are invited to a JH Visit Day, during which they are able to visit the relevant Schools to see the University and to meet staff and 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.

Non-standard Entry Requirements
We accept a wide range of alternative qualifications, as long as they are supported by an A2 pass at Mathematics (or equivalent).

Additional Requirements
None

Level of English Language capability

14 Support for Student Learning

Induction
The first week of the first term/semester is an Induction Week with no formal teaching. During this period all students attend an induction programme in which they will be given detailed programme information and the timetable of lectures/practicals/labs/ tutorials/etc. In particular all new students will be given general information about the School and their programme, as described in the Degree Programme Handbook. 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 Student Counselling Service, the Mature Student Support Service, 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

All new students whose first language is not English are required to take an English Language test in the Language Centre. Where appropriate, in-sessional 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

Additional mechanisms

Review Mechanisms:

Student Questionnaires
Degree Programme Review
Internal Subject Review
QAA Academic Review

Committees For Monitoring Quality

Faculty Board for Co- and Multi-disciplinary Degree Programmes
Co- and Multi-disciplinary Staff-Student Committee
Awards Board for Co- and Multi-Disciplinary Degree programmes
Subject Area Boards of Studies
Subject Area Boards of Examiners
Subject Area Staff-Student Committees
Faculty Teaching and Learning Committee
University Teaching and Learning Committee

16 Regulation of assessment

Pass mark
The pass mark is 40 (Undergraduate programmes)

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.

Progression is subject to the University's Masters Degree Progress Regulations, Taught and Research (http://www.ncl.ac.uk/calendar/university.regs/tpmdepr.pdf) and Examination Conventions for Taught Masters Degrees (http://www.ncl.ac.uk/calendar/university.regs/tpmdeprexamconv.pdf). Limited compensation up to 40 credits of the taught element and down to a mark of 40 is possible and there are reassessment 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 1:1

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.

Annex

Mapping of Intended Learning Outcomes onto Curriculum/Modules

Development of specific Intended Learning Outcomes occurs through the following modules (compulsory modules in bold text, optional modules in normal, italic text)

A1.	A diverse range of programming paradigms and languages supported by programming language principles	**CSC1001, CSC1002, CSC1006, CSC2001, CSC2002,** *CSC3004, CSC3202.*
A2.	The principles of software engineering	**CSC1001, CSC1002, CSC2001, CSC2002, CSC2006***, CSC3003, CSC3002, CSC3201, CSC3202.*
A3.	The theoretical and mathematical foundations of Computing Science	**CSC1006, CSC2002, CSC2006,** *CSC3004, CSC3201.*
A4.	Techniques for the development of data representations and algorithms	**CSC1001, CSC1002, CSC2001, CSC2002, CSC2006,** *CSC3002, CSC3006, CSC3201.*
A5.	Computing and network organisation	**CSC1001, CSC1006,** *CSC3002, CSC3003.*
A6.	Technological foundations of computer graphics systems	*CSC3201, CSC3202, CSC3204.*
A7.	The mathematical principles and algorithmic basis of computer graphics	*CSC3201, CSC3202, CSC3204.*
A8.	Design issues and development techniques for computer graphics, games and virtual environments	*CSC3202, CSC3203, CSC3204.*
A9.	Human requirements and technical capabilities of modern virtual environments, games and graphics platforms	*CSC3201, CSC3202, CSC3204.*
A10.	Fundamental problems and approaches in artificial intelligence, as applied to computer games, visualisation and virtual environments	*CSC3203, CSC3204.*
B1.	The ability to conduct investigations using the technical and professional literature	**CSC1006, CSC2002,** *CSC3003, CSC3002, CSC3006,CSC3201, CSC3202.*
B2.	The ability to use and evaluate appropriate tools and techniques	**CSC1002, CSC1006, CSC2001, CSC2002, CSC2006,** *CSC3003, CSC3004, CSC3006, CSC3201, CSC3202,*
B3.	The ability to undertake empirical evaluation of alternative solutions	**CSC1001, CSC1002, CSC1006, CSC2001, CSC2002, CSC2006,** *CSC3003, CSC3202, CSC3006, CSC3201,*
B4.	The ability to formulate problems and identify suitable approaches to solving them	**CSC1001, CSC1002, CSC1006, CSC2001, CSC2002, CSC2006,** *CSC3002, CSC3003, CSC3006, CSC3201, CSC3202.*
B5.	The ability to reason abstractly about the structure and behaviour of computer systems	**CSC2001, CSC2002, CSC2006,** *CSC3002, CSC3004, CSC3006, CSC3202.*
C1.	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	**CSC1001, CSC1002, CSC1006, CSC2001, CSC2002,** *CSC3003, CSC3002, CSC3004, CSC3201, CSC3202.*
C2.	The use of a variety of advanced (especially object-oriented) programming languages and paradigms	**CSC1006, CSC2001.**

C3.	The use of a variety of computer-based (including operating) systems	**CSC1001, CSC1006, CSC2001, CSC2002,** *CSC3002, CSC3202.*
C4.	The application of theoretical concepts of computing science in the design and analysis of systems and algorithms	**CSC1002, CSC1006, CSC2002, CSC2006,** *CSC3003, CSC3004, CSC3201.*
C5.	The identification and implementation of appropriate algorithms and data structures	**CSC1001, CSC1002, CSC2001, CSC2006,** *CSC3002, CSC3201, CSC3202.*
C6.	The use and provision of network information services	**CSC1001, CSC1006, CSC2002,** *CSC3003, CSC3202.*
C7.	Development and/or implementation of graphics algorithms and applications in standard software environments.	*CSC3201, CSC3202, CSC3204.*
C8.	Modelling, rendering and interaction in 3D graphical environments	*CSC3201, CSC3202, CSC3204.*
C9.	Mathematical techniques for the manipulation of 3D geometry	*CSC3201, CSC3202, CSC3204.*
C10.	Implementation of artificial intelligence algorithms in a declarative programming language	*CSC3203.*
D1.	Written communication	**CSC1001, CSC1002, CSC1006, CSC2002**, *CSC3002, CSC3003, CSC3006, CSC3201, CSC3202.*
D2.	Problem solving	**CSC1001, CSC1002, CSC1006, CSC2001, CSC2002, CSC2006,** *CSC3002, CSC3004, CSC3006, CSC3201, CSC3202,*
D3.	Interpersonal communication	*CSC3004, CSC3006.*
D4.	Initiative	**CSC1002, CSC1006, CSC2002,** *CSC3003, CSC3004, CSC3006, CSC3201, CSC3202.*
D5.	Oral presentation	*CSC3006.*
D6.	Adaptability	**CSC1002, CSC1006, CSC2006,** *CSC3006, CSC3202.*
D7.	Teamwork	*CSC3004, CSC3006.*
D8.	Numeracy	**CSC2006,** *CSC3202, CSC3201.*
D9.	Planning and organisation	**CSC1001, CSC1002, CSC1006, CSC2002,** *CSC3003, CSC3006, CSC3201, CSC3202.*
D10.	Computer literacy	**CSC1001, CSC1002, CSC1006, CSC2002, CSC2006**, *CSC3002, CSC3003, CSC3201, CSC3202.*