

**Faculty of Engineering and Environment
Department of Computer Science and
Digital Technologies**

BSc (Hons) Computer Science

**Second Year Programme Handbook
2015 - 2016**

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1 Welcome from the Programme Leader

Welcome to the BSc (Honours) Computer Science programme. Your programme leader is Shelagh Keogh. The programme aims to provide an education in the knowledge, skills and techniques necessary for a career in the field of computer science. Detail on the specifics of what you will study can be found in section 5.3.

Did you know it is possible to transfer at the end of your second year onto the MComp Computer Science Integrated Masters programme.

Subject to academic requirements, we can offer you the possibility of supplementing your undergraduate education to Integrated Masters level through undertaking a specialised final year of study – a chance to explore the subject you are passionate about in greater depth and give you an extra edge in today's competitive job market!

Speak to your academic team for further discussion and advice as to what prospects this could open for you! Please contact Shelagh Keogh (shelagh.keogh@northumbria.ac.uk) for further details.

2 Department Introduction

The Department of Computer Science and Digital Technologies at Northumbria University encompasses all of our work in games, robotics, mobile applications, animation and digital visual effects, computer forensics and ethical hacking, network technology and website design. Our students, staff and researchers develop and refine cutting edge technologies that impact on the way we all live our lives. They work cross-discipline, exploring the way that technology can impact on health, travel, security intelligence, artificial intelligence and many other sectors.

3 About this handbook

This handbook is designed to provide a guide to your programme of study at Northumbria. It should be read alongside the University and Faculty Student Handbooks which contain more general information about being a student at Northumbria within the Department of Computer Science and Digital Technologies.

It does not provide all of the information that you will need although it attempts to tell you where to find most of that information. The latest version of much of the further information that you need is to be found in a comprehensive and definitive form on the Northumbria website by clicking on Student Hub on the University home page (<http://northumbria.ac.uk>).

4 Who's Who and Communication?

4.1 Who to go to for help

You will meet a broad range of academic, administrative and technical staff throughout your studies. The majority of staff will be drawn from the various subject areas within the Faculty's departments. However, we also draw upon subject specialisms outside the Faculty and external consultants, industrialists and advisors.

Staff from the department and from the wider university (such as the University Library, IT Services
BSc (Hons) Computer Science

and Student Support and Wellbeing) is here to help you get the most out of your Programme. In this section, we introduce you to some of the key people who will support you at Faculty and subject area level.

Student Support Team

The Student Support Team is available to assist all students requiring information and/or advice. The team is located in B201 Ellison Building.

Opening times: Monday – Thursday 8.30 – 17.00 hours Friday 8.30 – 16.30 hours

Email: ee.studentsupport@northumbria.ac.uk

Telephone: 0191 227 4722

Programme Leader

Name: Shelagh Keogh

Office Location: Pandon Building Room 112 (first floor)

Email: shelagh.keogh@northumbria.ac.uk

Telephone: 0191 2477293



Your Programme Leader is the academic leader for your Programme and is responsible for managing the programme on a day to day basis, working with other Faculty and University staff – academic, administrative and technical – as needed. Your Programme Leader is committed to helping you get the most out of the programme and, where relevant, will liaise with your Module Tutors and other relevant staff to make sure that they are aware of your needs and of how you are doing.

Programme Support Co-ordinator

Your Programme Support Co-ordinator holds all the key information regarding your programme. This is the person who manages such processes as enrolment, option choice, day to day correspondence, confirmation of attendance letters, marks entry, etc. The Programme Support Co-ordinator for BSc Computer Science is Andrew Cox (a.cox@northumbria.ac.uk). Andrew is based in the Pandon Building Admin Office G007.

Second Year Tutor

Name: Alan Maughan

Office Location: Pandon Building Room
248

Email:

alan.maughan@northumbria.ac.uk

Telephone: 0191 243 7653

Your Second Year Tutor is a member of the academic staff and is responsible for students on the second year of the course. They work closely with the programme leader and programme support co-ordinator to support you on your programme. Please contact Alan first with any academic queries.

Module Tutors

For each module of study, you will have a designated Module Tutor. The Module Tutor is responsible for the organisation of the module and supporting your learning and assessment on that module. If you have a problem with your work relating to the module then you should first contact your seminar/lab tutor then the module tutor.

4.2 Communication

Contacting Your Programme Leader and Second Year Tutor

The best way to contact the programme leader and second year tutor is via email, (alan.maughan@northumbria.ac.uk).

Academic staff may teach on many modules and programmes. In addition they may have other roles and responsibilities which take them from their office. Therefore it is advisable to make an appointment if you wish to see them. You can do this via email or you can just turn up at their office. Occasionally you may be able to have an immediate appointment, but don't be disappointed if you are asked to return at a mutually convenient time. Please contact staff to cancel if you are unable to make the arranged appointment.

Email

Email is used extensively throughout the University and is a very effective method of communication between students and staff. You will be automatically allocated an email address by the University once you have enrolled. Do remember that the Northumbria email address is the one that should be used when contacting University and Faculty staff. It is also the one that is used by staff to make contact with you, so do make sure that you check it regularly, particularly if you also use a personal email account. Please be aware that staff may not reply to your email immediately due to their other duties and activities.

eLearning Portal

The eLearning Portal (eLP) is a very important resource for students. You will find specific information related to the modules you are taking, such as copies of lecture and seminar handouts, assignment briefings, instructions, and announcements. Your Programme Leader uses the eLP to pass on information concerning programme matters. It is therefore important that you check the eLP regularly – at least daily – for new announcements and new material.

Plasma TV Screens

The faculty has a number of plasma screens in the Pandon and Ellison buildings. These are also used to display announcements, events and opportunities such as visits from potential placement providers.

PLEASE NOTE: *IT IS REALLY IMPORTANT THAT IF YOU HAVE AN ISSUE YOU CONTACT US AS SOON AS POSSIBLE – WE ARE HERE TO HELP*

5 Programme Information

Here you will find specific information on your programme of study. There is a national requirement that all university programmes of study have a publicly available Programme Specification and this section is based on that programme specification. The full and definitive version of the programme specification can be found at <http://www.northumbria.ac.uk/programmespecs/>

5.1 Programme Aims

The programme aims to provide you with a broad professional education in the theory and practice of computing. It aims -

- to develop your critical abilities and general problem solving skills, and lay a foundation for continuing education and self-improvement;
- satisfy the requirements of the British Computer Society with regard to profession membership and prepare you to progress to Chartered Engineer status.

Once you have graduated you should be able to –

- Identify the need for, elicit the requirements for, specify, design, implement and test computing systems in a range of environments and for a range of problems and thereby adopt a software engineering approach.
- Successfully exploit a range of methods and tools in developing workable solutions to complex computing system problems involving current technologies.
- Critically appraise the suitability of current and emerging computing technologies to support a variety of domains.
- Plan, manage and undertake a substantial piece of individual project work.
- Act in a professional and ethical manner in the development and use of computing systems.
- Work with users in the development and operation of computing systems.
- Plan and manage the development and use of computing systems.
- Use and evaluate a variety of commercial software, tools and techniques relevant to computing systems.
- Specify network and security requirements to support business systems.
- Communicate effectively (in writing and orally) at the appropriate business and technical level with users, management, customers and technical specialists.
- work in teams.

The first year of the programme provides an introduction to databases, object oriented design, web design and development, Java programming and logic.

There is, from the second year onwards, a number of technical topics in computer science, with an emphasis on engineering software for small “embedded” systems such as those found in home appliances, cars, industrial control systems, and so forth. There is a particular emphasis on real-time software engineering and “concurrent” software, in which processes can be running in parallel with one another. In the final year, there is a choice of two pathways: embedded systems and artificial intelligence.

5.2 Programme Learning Outcomes

A. Knowledge and Understanding

On completing the programme we want students to know and understand:

A1: The commercial need for computing applications, their nature and evolution.

A2: Core software technologies, development tools and languages.

A3: Technical, professional, security and business issues surrounding the development, operation and maintenance of computing systems.

A4: Techniques and tools for the specification of requirements, analysis, design and implementation of computing systems, thereby adopting a software engineering approach.

A5: Hardware platforms, network architectures, technologies and standards, used in and to support computing systems.

A6: Techniques, tools and issues involved in management of systems, including those impacting upon system security.

A7: Supporting and current techniques and technologies.

A8: The professional, ethical, social and legal issues involved in the development and operation of computing systems.

A9: Techniques for the application of mathematical principles to the computing domain.

B. Intellectual Skills

The most important intellectual skills developed on the programme are to:

B1: Select, plan and manage individual and team-based development projects.

B2: Discuss and critically evaluate available development tools, methods, and technologies and associated user and professional issues.

B3: Identify a problem and select and apply effective methods and tools for its solution.

B4: Select the most appropriate methods and tools for the solution to a given problem.

B5: Analyse a simple problem domain, and build an effective software solution to given problems in that domain.

B6: Integrate and evaluate information and data from a variety of sources.

B7: Demonstrate and exercise independence of mind and thought.

B8: Reflect on the professional and ethical issues surrounding computing applications development and use.

C. Practical Skills

The most useful practical skills, techniques and capabilities developed are:

C1: Analyse, design, build and test software solutions, adopting a software engineering approach, to increasingly complex and varied computing problem domains.

C2: Use a range of tools, techniques, knowledge and technologies in the development of computing applications.

C3: Design and build high quality, secure computing applications with appropriate interactive components, networking and database support.

C4: Use appropriate techniques and tools to support effective management of the development and operation of software systems.

C5: Manage the development of a computing system and evaluate the effectiveness of the system and development process.

D. Transferable/Key Skills

The student will be able to:

D1: communicate information, ideas, problems and their solution, in both written and oral form.

D2: manage their time and resources efficiently.

D3: work effectively both individually and as a member of a team.

D4: exercise initiative and personal responsibility.

D5: learn independently using a diverse range of resources.

D6: evaluate and criticise their own learning experience.

D7: apply appropriate mathematical skills to the design, building and testing of software systems.

5.3 Programme Structure

Year 1				
S1	Programming 1 CG0047	Relational Databases CM0429	Web Technologies EN0407	Computing Fundamentals CM0433
S2	Programming 2 CG0048			Systems Analysis CM0432
Year 2				
S1	Professional Software Engineering Practice CM0571	Program Design & Development CM0570	Small Embedded Systems CM0506	Operating Systems & Concurrency EN0572
S2		Computer Networks EN0574		Mobile Application Development CM0573
Year 3				
Placement Year				
Year 4				

Embedded Systems pathway

S1	Individual Project CM0645 OR	Embedded Systems Specification and Design CM0604	Embedded Systems Engineering CM0605
S2	Computing Research Project CM0674	Professionalism and Industrial Case Project EN0617	Machine Learning and Computer Vision CM0669

Artificial Intelligence pathway

S1	Individual Project CM0645 OR	Artificial Intelligence and Affective Computing CM0671	Experimental Design for Interactive Applications CM0673
S2	Computing Research Project CM0674	Professionalism and Artificial Intelligence Case Project CM0672	Machine Learning and Computer Vision CM0669

5.4 Module Information

A full and detailed breakdown of each module on the programme can be found at: <http://nuweb.northumbria.ac.uk/live/webserv/mod.php>. On this site enter the module code and you will find the module descriptor. On the first week of each semester the module tutor will present more detailed information for each module on the eLearning platform, Blackboard.

5.5 Learning Teaching and Assessment Strategy

The programme aims to provide students with a wide range of learning opportunities in an exciting, challenging, stimulating and dynamic quality learning environment. The programme learning outcomes are aligned with module learning outcomes and the learning methods applied to address the module learning outcomes are specified in module descriptors. Students have a variety of learning opportunities including lectures, seminars, tutorials, practicals, research, case studies, online using eLP, guest / expert input and task based learning in guided and independent study modes. The variety includes methods for individual as well as group learning. Students will be encouraged to develop independent learning skills and techniques in Level 4 and these will be used increasingly in levels 5 and 6. Students will be supported in their skills development in each module and through reference to the University's "Skills+" programme. At levels 5 and 6 students are increasingly expected to incorporate critical analysis and critical evaluation into their learning. Students will be supported in developing these skills throughout the programme. The development of transferable skills permeates the whole of the programme.

The assessment methods used in the programme aim to reflect the wide range of teaching and learning practices, and diversity of subject matter across the discipline of Computing and the subject domain of Computer Science. Assessments are designed to align with the module learning outcomes and assess the learning outcomes of each module in the most appropriate way whilst ensuring a full-range of assessment methods across the programme.

Whilst learning and the measurement of learning will be linked closely to assessment, it is hoped that the learning environment and learning opportunities presented to students will encourage students to be motivated to learn for educational reasons, and not simply to pass summative assessments. The aim is to avoid surface learning and focus on the need for learning opportunities that elicit a deeper more reflective learning response from students.

Formative assessment and feedback is incorporated into modules wherever appropriate and students are encouraged to participate in formative activities through linking those activities to PDPs and using the formative activities to develop the skills, techniques and expectations of summative assessment. Summative assessment methods include exams, technical reports, case study analyses, presentations, portfolio and project work.

5.6 Feedback

Formative assessment (this is not marked but rather is designed to help you improve your work) and feedback is incorporated into modules wherever appropriate and students are encouraged to participate in formative activities through linking those activities to PDPs and using the formative activities to develop the skills, techniques and expectations of summative assessment. Summative

assessment methods include assignments, exams, technical reports, case study analyses, presentations, portfolio and project work.

5.7 Student Feedback

Student Representatives are elected in Induction Week. Being a Student Representative is a responsible task and one that is important, not only to help the University operate effectively, but also to make sure that you and your fellow students are getting the best experience possible whilst at Northumbria. The students in your Year Group elect the Student Representatives for the coming academic year. The Reps' commitment will be to gather 'issues and ideas' from fellow students and feed these back each semester at Staff Student Liaison Committee (SSLC) meetings with the Year Tutors and Programme Leader and at Programme Committee Meetings with the Programme Management Team. The results of such discussion between the Reps and programme team may then be auctioned as appropriate, and results fed back via published minutes and through the Reps.

The main role of the Student Rep is to represent the students in the Faculty on programme related matters at the programme committees, however their role need not be limited to participation in programme committees, nor need they wait for the committee to meet to act on any issues affecting the student body. They can represent students at various meetings in the Students Union, including the Student Council as well as the annual General Meeting.

6 External Examiner Information

The external examiner for this programme is Professor Peter Smith from the University of Sunderland.

7 Placement Opportunities

You will have the opportunity to undertake a year-long paid placement in their third year of your study. A dedicated Placement team based in the Faculty is there to offer support in all stages of the placements process. Both the placement team and the University Careers Service can help with CV preparation and checking as well as interview techniques.

8. Programme and Assessment Schedule

8.1 Course Dates 2015-16

Semester One		
Student enrolment	Thursday 10 September to Friday 2 October 2015	3 weeks and 2 days
Welcome/Induction Week	Monday 14 September to Friday 18 September 2015	1 week
Teaching Weeks	Monday 21 September to Friday 11 December 2015	12 weeks
Winter Break (student self-directed time)	Monday 14 December 2015 to Friday 1 January 2016	3 weeks
Assessment Weeks	Monday 4 January to Friday 15 January 2016	2 weeks
Semester Two		
Teaching Weeks	Monday 18 January to Friday 18 March 2016	9 weeks
Spring Break (student self-directed time)	Monday 21 March to Friday 8 April 2016	3 weeks
Teaching Weeks	Monday 11 April to Friday 29 April 2016	3 weeks
Assessment	Tuesday 3 May to Friday 20 May 2016	3 weeks
Results Published via email and or on your "My Northumbria"	To be Confirmed	1 day
Summer Award Congregations (<i>provisional</i>)	Wednesday 8 July to Tuesday 14 July 2015	1 week
Reassessment Period	Monday 22 August to Friday 26 August 2016	1 week

Students must note the above dates and ensure their availability to fulfil all academic requirements for their programme of study.

Source: Course Dates 2015-16 - <https://www.northumbria.ac.uk/sd/central/ar/spa/dates/coursedates2015/?view=Standard>

7.1 Assessment Schedule

The 2015-16 Level 5 (second year) Assessment Schedule template for this programme can be found with this handbook, see appendix one.

To help your study during the academic year it is **essential** that you make a note of **all** assessment submissions dates to help you plan your workload.

8 Absence Monitoring

Attendance is monitored via use of swipe cards in scheduled teaching sessions (e.g. in workshops). These allow registers to be created per class which are used to monitor attendance. If students are found not to be attending they will be contacted to determine the reason. If there is a problem causing poor attendance it may be that the University can help. Experience shows that that good attendance helps students to pass and do well.

Please note that continued non-attendance can result in the student being asked to leave their programme of study.

9 Resources and Laboratories

Two computing labs, rooms F1 (first floor) and S2 (second floor) in Pandon Building, have specialist hardware and software for the Computer Science programme.

In both rooms, the PC dual-boot, and can be run in Windows (with the all the standard Computing application software) or Linux with a large suite of application software and a connection to our UNIX server.

A lot of specialist application software is provided to support the programme – some on the UNIX server and some Windows-based software installed in the individual machines.

Lab S2 contains several sets of specialist hardware that can be connected to the PCs, mainly small microprocessor and microcontroller experiment board running real-time embedded system software compiled using PC-based tools and downloaded to the specialist hardware. These include at the present time:

- Motorola HC08-based boards
- Motorola 32-bit processors and peripherals.
- Micaz “Motes” – wireless sensor network nodes
- Two types of ARM-based embedded processor boards and development software.

Lab F1 contains five pods each with model “production cell” containing two robotic arms and a conveyor belt with associated sensors and Motorola HC08-based controllers networked by Controller Area Network. The PCs are 4 to a pod and can be used to program the production cell as well as for general Computer Science programme use.

In your final year you can take a module (Professionalism and Industrial Case Project) in which, working in groups, you will develop control software for the cell.

You might also choose to do a final year project based on developing a small embedded or real-time system and we have an ever-growing collection of specialist kit (not generally available in the labs) for you to borrow and use for this – please ask.

10 Other Programme Specific Information

Programme Information: <https://www.northumbria.ac.uk/study-at-northumbria/courses/computer-science-ft-uuscsc1/>

11 Professional Bodies

The programme has full accreditation from the British Computer Society (BCS), more information can found at the following link -

http://www.northumbria.ac.uk/sd/academic/ee/accreditation/bcs_accreditation/?view=Standard.

Northumbria Students' Union (NSU) is here to make sure you have the best experience possible. NSU is one of the largest and most exciting Unions in the country and that's all because of YOU. We represent you, the student, on all levels, on the issues students are concerned about; receiving a great academic experience, being very employable when you graduate, being safe on campus and in the city and having a fantastic time while a student.

NSU is run by students for students. You can have your say in what NSU does and how it is run, by contacting your [Sabbatical Officers](#) or by coming along to [Student Council](#)

MEMBERSHIP: As a student of Northumbria University you are automatically a member of the Students' Union. We also sell NUS Extra Card from the Students' Union at both [Coach Lane](#) and [City Campus](#) giving you discounts in shops and online, but you don't need one to use any of our services.

DIVERSE: Your Students' Union is a place which brings together students from all walks of life, all parts of the country and the world and many different cultures. NSU provides lots of opportunities for you to [Get Involved](#), make lasting friendships, increase employability and have FUN!

INDEPENDENT: NSU is independent of the University, with its own staff, services and decision-making structure. Run by students for students, providing the best services and opportunities for students we push for change from the University to deliver for students. Find out more at our [You Said, SU Did](#) page. If you need advice about academic appeals or other issues, we can help. Check out the [Advice Page](#).

VALUE: Your NSU offers the best value for money, and everything you spend goes straight back into the Students' Union to fund all the activities that we run for you.

If you would like more information check out the website www.mynsu.co.uk or come and see us at our [offices](#) in City, Coach Lane and London.

The libraries at City Campus and Coach Lane provide access to a wide range of print and electronic resources including over half a million print books, over 700,000 eBooks and more than 50,000 electronic journals. More details can be found on the University Library website: <http://library.northumbria.ac.uk/home>

City Campus Library (number 14 on City Campus map) is housed near the Student Union building (number 30 on City Campus map).

Coach Lane Library is situated on the East Side of the Campus, in F Block (number 16 on Coach Lane Campus map).

City Campus library is open 24/7 during term time and from 9am to midnight during vacation times. Coach Lane library is open 7am until midnight (Monday to Friday), 9am until midnight (Saturday and Sunday). Opening hours are prominently displayed in the foyers of the library buildings, any changes are advertised on the Library website and on social media. Opening hours vary during bank holidays and are subject to change, so please check before you travel.

You will need to keep your smartcard with you to gain access to and leave the libraries. Your Smartcard is a universal card which not only gives access to the Libraries and other University buildings, but it also allows you to print, copy, scan, borrow books and make cashless payments.

The Library Catalogue can be accessed on and off-campus through the University Library website and the dedicated catalogue computers on each floor of both Libraries. The catalogue can be used to search for books and eBooks located in the University Library. It is quick and easy to use and will give you the information you need to locate the material on the shelves or read online. eBooks can be read on and off-campus, anytime, anywhere. NORA can be used to search for, and retrieve, up-to-date scholarly materials including articles, reports and statistics that are relevant to your studies. You can browse through all the online resources relating to your subject in one place including databases, journals and websites.

Students are entitled to borrow up to 15 items at any one time. Items can be issued using the self-issue machines on the ground floor of City and Coach Lane Libraries. You can renew your library books online through the MyLibrary section of MyNorthumbria or via the Library Catalogue.

Northumbria students can use other libraries such as the Robinson Library at Newcastle University and Newcastle City Library using the SCONUL access scheme. For more information see the Library SCONUL information page: <http://library.northumbria.ac.uk/sconul-holiday>

The Northumbria Skills Programme is a comprehensive skills programme designed to develop the key skills you need to succeed at university and beyond provided by the Library. It runs throughout the year and provides classroom style skills sessions on many topics including academic writing skills, giving accomplished presentations, and referencing your work correctly, as well as regular drop in surgeries. Some sessions are bookable; simply consult the timetable on the Northumbria Skills Programme website: <http://library.northumbria.ac.uk/skillsdev-nsp>

Skills Plus is the Library's collection of online learning materials, with a focus on digital literacy and study skills that can be accessed on and off-campus. Using these resources is an excellent way to develop your skills through a range of online tutorials with quizzes, video demonstrations and printable help guides. <http://nuweb2.northumbria.ac.uk/library/skillsplus/topics.html?l3-0>

If you need help or advice, on or off campus, you can contact Ask4Help. The Ask4Help service provides you with help and support to access a range of University services including Library, Disability Support, Student Finance and Careers. The quickest way to find answers to some of the most popular questions asked by students is to look at Ask4help online. You can also contact us by phone and speak to a member of our dedicated enquiry team or email us your questions.

www.northumbria.ac.uk/ask4help

ask4help@northumbria.ac.uk

0191 227 4646

Appendix 1 - Assessment schedule Semester One Assessment Schedule

Teaching Week	Time Table week	Professional Software Engineering Practice CM0571	Program Design & Development CM0570	Small Embedded Systems CM0506	Operating Systems & Concurrency EN0572
Induction	9				
Semester 1, week 1	10				
2	11				
3	12				
4	13				
5	14				
6	15				
7	16				
8	17				
9	18				
10	19				
11	20				
12	21				
<i>Winter Break</i>	22				
<i>Winter Break</i>	23				
<i>Winter Break</i>	24				
Assessment and Feedback week	25				
Assessment and Feedback week	26				

Appendix 1 – Assessment schedule Semester two Assessment Schedule (students to complete)

Teaching Week	Time Table week				
Semester 2, week 1	27				
2	28				
3	29				
4	30				
5	31				
6	32				
7	33				
8	34				
9	35				
<i>Spring Break</i>	38				
<i>Spring Break</i>	36				
<i>Spring Break</i>	37				
10	39				
11	40				
12	41				
Revision and Assessment	42				
Revision and Assessment	43				
Revision and Assessment	44				