



Computer Science and Engineering

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Programmes	UCAS code
BSc/BEng degree programmes (3 year)	
Computer Science	G400 Mix/CS
Computer Science with Embedded Systems	G410 BEng/CEmb3
Computer Science/Mathematics (Equal)	GG41 BSc/CSM
BSc/BEng degree programmes (4 year with a year in industry)	
Computer Science	G401 Mix/CS4
Computer Science with Embedded Systems	G411 BEng/CEmb4
Computer Science/Mathematics (Equal)	GGK1 BSc/CSM4
MEng/MMath degree programmes (4 year)	
Computer Science with Artificial Intelligence	G4G7 MEng/CSA14
Computer Science with Business Enterprise Systems	G492 MEng/CEnt4
Computer Science with Embedded Systems	G412 MEng/CEmb4
Computer Systems and Software Engineering	G460 MEng/CSSE4
Mathematics/Computer Science (Equal)	GG14 MMath/MCS4
MEng/MMath degree programmes (5 year with a year in industry)	
Computer Science with Artificial Intelligence	G4GR MEng/CSA15
Computer Science with Business Enterprise Systems	G493 MEng/CEnt5
Computer Science with Embedded Systems	G413 MEng/CEmb5
Computer Systems and Software Engineering	G461 MEng/CSSE5
Mathematics/Computer Science (Equal)	GG1K MMath/MCS5

Key facts	
ADMISSIONS TUTOR	
Dr William Smith	
Telephone: +44 (0)1904 325412	
Website: www.cs.york.ac.uk	
Email: admissions@cs.york.ac.uk	
2010 Applications	585
2010 Admissions	106
Typical offers	
MATURE STUDENTS	
Mature students are welcomed and considered individually	
A LEVELS	
AAB	
IB DIPLOMA PROGRAMME	
34 points including HL 6 in essential subjects	
SCOTTISH QUALIFICATIONS	
AAAAB at Higher level and AB at Advanced Higher level	
BTEC	
DDD in National Diploma plus A level Mathematics	
ADVANCED DIPLOMA	
Acceptable for entry. Check our website for key details and acceptable subjects	
OTHER QUALIFICATIONS	
For details of other acceptable qualifications go to www.cs.york.ac.uk/undergraduate	
Essential subjects	
Mathematics	
English as a foreign language	
IELTS 6.5 with at least 6.0 in all units	

In the last three years, 90% of our graduates have gone into employment or into further education within six months of graduation – well above the national average



The new Computer Science building offers dedicated undergraduate software and hardware laboratories with 24/7 access

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Studying Computer Science

For some people, use of computers starts and ends with the web, email and games. For others, it may extend to spreadsheets and databases. But Computer Science is so much more than this and involves a broad range of topics, techniques and applications relating to the science and engineering of computer systems and computation. In addition to learning how to program computers in a principled way, you will learn how typical computers are structured internally, how electronic circuits can implement computation, how operating systems such as Microsoft Windows can schedule several programs to run at the same time and how computers communicate with each other over networks, such as the internet.

In more advanced study, you can learn how to embed computing devices into larger systems to make them operate more efficiently (for example, a car engine management system) or intelligently (for example, a microwave oven that senses when an item is cooked). Such systems are called 'embedded systems'. You can learn about artificial intelligence for games, robots or

expert systems that can, for example, perform medical diagnosis from a pattern of physical symptoms. You can learn about designing computer systems with digital camera inputs, which can recognise images, such as an image of your face, or with microphone inputs, which can recognise and understand what you are saying. You can learn how to build better human-computer interfaces, which don't use a keyboard or mouse, or ubiquitous devices, where the interface is invisible to the user.

There are endless possibilities to exercise your technical ability and creativity and, on graduating, you will be well qualified for a career not only in the IT sector, but also in science, engineering and other sectors, such as the financial sector, where your sharpened numeracy and analytical skills will be invaluable.

Computer Science at York

The Department of Computer Science at York is one of the most highly regarded in the UK. In the most recent Research Assessment Exercise we were recognised for the high quality of our research, with the majority of our staff classified as 'world-leading' or

'internationally excellent'. According to all major league tables, including the *Guardian* and *The Times* newspapers, we are one of the top ten Computer Science departments in the UK.

As a successful York Computer Science graduate, you will be highly sought after by a wide variety of employers. The combination of our collaboration with industry and brand-new facilities ensures our students are up to date on current trends, reflected in our above average employment statistics. Our industrial placement scheme also gives you a head start in the jobs market – many of our placement students secure a job offer before graduation.

At York, Computer Science is taught as a broad subject, where you cover theory as well as practice, and hardware (electronics) as well as software (programs), which are integrated in the design of systems. We encourage you to develop your professional competence as well as your intellectual adventure. The early part of each of our degree programmes is core Computer Science, which gives you a solid foundation in the subject. The structure in later years allows you to select from a set of modules that are closely related to the research activity in the Department. This allows you to sharpen your focus on to what interests you and allows a greater exercise of your creativity. This is especially true of the final year individual project in which your own particular interests can be given full rein. During your time with us, you will have access to excellent computing and other laboratory facilities, which we update regularly.

Our recent move to purpose-built accommodation on Heslington East has allowed us to enhance and expand our facilities, including large dedicated laboratory space for undergraduate students.

Our programmes

Essentially, we provide three groupings of programmes:

- standard Computer Science and Engineering programmes

"This programme offers a great opportunity for students who want to be equipped with well-rounded knowledge and skills in both computer science and business aspects. It provides many exciting hands-on experiences such as building applications for iPad and Facebook, and constructing business cases. Throughout the programme, I have been able to practise team-working and communication skills which will be a great help when applying for jobs. The staff are very friendly and willing to help with any problems we have. I am really enjoying it here."



Lu, Computer Science with Business Enterprise Systems, 2nd year

“My course provided me with a good foundation to pick up the skills that I needed to do my job at IBM”

Computer Science graduate

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- Computer Science and Engineering programmes with a specialism (we have three specialisms)
- combined Computer Science/Mathematics programmes.

The first and second groupings are single subject programmes, which means that they are almost entirely taught, assessed and administered by the Department of Computer Science. The third grouping contains combined programmes, where your time would be split, initially equally, between the Departments of Computer Science and Mathematics. All of our programmes can be studied either with or without a year in industry after the second year of study. If you take a year in industry, the total duration of a Masters programme is five years and of a Bachelors programme is four years.

Standard programmes

Our standard programmes are:

- Computer Systems and Software Engineering, a four-year Masters programme
- Computer Science, a three-year Bachelors programme.

In these programmes, you study software (programs) and hardware (electronics) and how they are integrated into the design of systems. You examine a wide field of applications, to see what systems are needed, and then go into how they can best be provided. In the fourth year of the Masters programme, there is an emphasis on software-related topics and novel concepts in computation.

Programmes with a specialism

All of our programmes with a specialism also provide a solid foundation of core Computer Science material. The three forms of programme with a specialism include:

- Computer Science with Artificial Intelligence. This is available as a four-year Masters programme only and on this you investigate how human reasoning and behaviour

can be imitated, and even surpassed, by computer systems, for example in language understanding, vision and games.

- Computer Science with Embedded Systems. This is available as a four-year Masters programme and also as a three-year Bachelors programme. On these programmes you will learn how software and hardware can be embedded, for example within mobile phones, MP3 players, cars and medical equipment. Here, there is an emphasis on the design and development of encapsulated computing systems dedicated to the control of specific devices, appliances or machinery.
- Computer Science with Business Enterprise Systems. This is available as a four-year Masters programme only and focuses on very large-scale, distributed and highly complex software systems, such as

those which drive modern businesses and government. The programme requires the study of the principles and practices behind building and managing such systems.

All of our programmes, with the exceptions of Computer Science with Business Enterprise Systems and Combined Computer Science/Mathematics, described below, have a common first year, and so you can switch between these programmes at any time before your second year of study.

Combined Computer Science/Mathematics programmes

We offer the following combined programmes:

- Mathematics/Computer Science, a four-year Masters programme
- Computer Science/Mathematics, a three-year Bachelors programme.



A final year project in robotics

In the first two years of study, the split across Computer Science and Mathematics is equal. In later years, there is choice both in the ratio of each subject and in the options that are chosen from each department. See also the Mathematics entry on page 123.

Masters or Bachelors programme?

A Bachelors programme is a standard three years of study incorporating core topics in the first two years and more advanced elements in the third year. A Masters programme provides the benefit of a fourth year of study, allowing you to study more topics at a deeper level, thus connecting you with the cutting edge of current research. Our MEng programmes are eligible for *full* accreditation by the Institution of Engineering and Technology (IET) and by the British Computer Society (BCS), while BEng programmes can carry partial accreditation.

All of our programmes carry accreditation by both institutions.

The option of a year in industry

Programmes with a year in industry offer rewarding (and paid) work experience between your second and third years of study, where you can exercise your technical skills in a professional environment. In addition, this can lead to final year sponsorship and ideas for your final year project. This industrial placement can be taken with all of our Masters and Bachelors programmes. All placements are salaried and the salary varies from company to company, but is currently in the range of £15,000 to £20,000 per annum. Airbus, IBM, Mercedes GP Petronas and BAE Systems are just a few examples of companies who have offered our students placements. For more companies and student views on placements, please visit our website.

We encourage you to undertake a year in industry. The industrial experience, when added to your academic experience, gives you an advantage in your studies which may be reflected in your examination grades.

Our Industrial Placements Consultant helps you with your applications for placements and visits and supports you during your year in industry. The placement is a structured training programme, recorded by the University, which counts for part of the training you need to become a Chartered Engineer (CEng). While we cannot guarantee to find you a placement, every effort is made to identify suitable employers.

What should I choose?

We strongly recommend that you apply for one of the Masters programmes and/or programmes with a year in industry, although you may not wish to select either of these if you wish to complete within three years. For example, you may be a mature student, who already has work experience and who is keen to get back to the job market. If you are not sure which programme to apply for, we recommend our standard Masters degree, Computer Systems and Software Engineering, which means that you can always transfer to one of our single subject three-year Bachelors programmes later, as the whole of the first year is common to all of these programmes. Note that an initial application to a longer programme is preferable, simply because of your financial planning considerations.

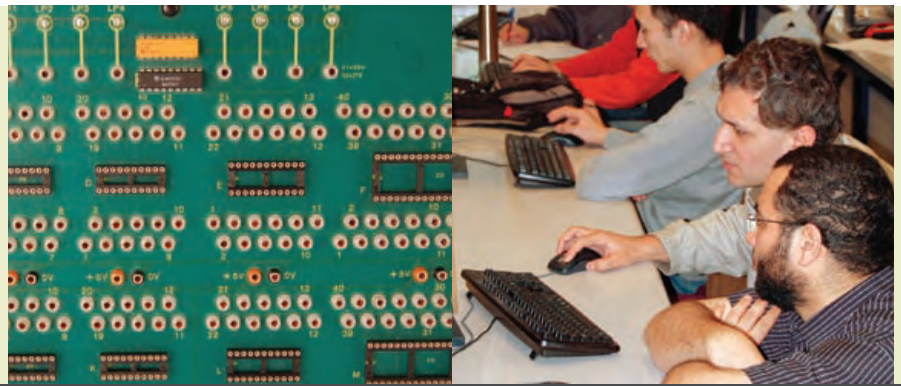
What you study

The first year of all of our programmes lays the foundation for the study of Computer Science. Irrespective of the programme that you are following, you will study modules on:

1. Programming concepts
2. Mathematical and theoretical foundations of Computer Science
3. Computer architecture and digital electronics
4. Academic skills.



Right A logic tutor board
Far right A programming class with
graduate teaching assistants



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In addition, (with the exception of combined Computer Science/Mathematics), you will take a selection of modules from the following:

5. Further study in mathematical and theoretical foundations of Computer Science
6. Further study in computer architecture and digital electronics
7. Human-computer interfaces
8. Management.

For all programmes in Computer Science, Computer Systems and Software Engineering, Computer Science with Embedded Systems, and Computer Science with Artificial Intelligence, you take 5, 6 and 7 above. For the Computer Science with Business Enterprise Systems programme, you take 5, 7 and 8 above.

The second year extends the foundational aspects taught in the first year and introduces opportunities to focus on hardware architectures, software engineering and specialist areas, such as artificial intelligence, computer graphics and computer vision. If you are on a single subject programme, you will undertake at least one team project, constructing either a hardware system or an engineered software application. The software engineering team project is also available if you are following a combined Computer Science/Mathematics programme.

In the third and fourth years of our programmes, there is a wide variety of modules to choose from, in areas such as artificial intelligence, advanced architectures, computer vision, human-computer interaction, programming languages, pattern recognition, information systems, non-standard computation, real-time systems and high integrity systems, all of which are closely related to research activity in the Department. This guarantees both the academic excellence of the content and the freshness of delivery. Finally, both individual and group project work form an important part of your final year of study. Some recent individual final year project titles include: 'Survival of a Lego Robot', 'Real-Time Hand Gesture Recognition from

Video' and 'Recognising Bots in First-Person Shooter Games'.

If you would like fuller details on all of our degree programmes, visit www.cs.york.ac.uk/undergraduate.

Teaching and learning

Our programmes are primarily based on a series of one-hour lectures, with associated laboratory practical classes, problem classes and programming classes. In the first year, we also run small team sessions to allow you to develop the skills, knowledge and independent learning appropriate for a new Computer Science student. We call this the SKIL module.

In a typical week, you may have about 20 contact hours of study, which could break down as 13 hours of lectures, six hours of practical or programming class and one hour of SKIL (or, later, individual research project supervision).

During your practical sessions, you will work individually, in pairs and in small teams (of around five students).

Exercises carried out in unscheduled time, such as the writing of essays and programs, play an important role; such activities are

allowed for in your workload. There are problem classes in the second year and weekly, individual project supervisions in the third and fourth years.

Each student has a supervisor, who is responsible for guiding his or her studies. You will meet with your supervisor on an individual basis at the start and end of every term, but you can also meet them at other times, whenever you need to do so. Throughout the programme, you are encouraged to reflect on your own approach to study and to develop your study skills.

Our students ranked us in the top ten for the quality of our teaching in the latest National Students Survey.

Study abroad

We run an overseas exchange scheme, where you can apply to spend a year studying in North America, Asia or Australia. The year abroad replaces the corresponding year of your degree programme at York, and the marks obtained abroad count towards the classification of the York degree. Bachelors students can spend their second year abroad; Masters students can spend either

"York's Department of Computer Science is at the forefront of its field. Its vibrant atmosphere, mixed with its intellectual, outgoing faculty members and students, make it one of the most interesting and stimulating places to develop academically. All the lecturers are approachable, making it easy to ask questions, and the course provides a solid foundation of theoretical knowledge balanced with practical experience. Later, a variety of specialist options become available. I particularly enjoy the parts of the course which focus on software, and I hope to study this further."

Amit, Computer Science, 2nd year



Right Human intelligence
Far right Artificial intelligence



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their second or third year abroad. If you are interested, you do not need to indicate this in your application. You can discuss it with your supervisor when you arrive.

Assessment

All assessments, except in the final year, are qualifying assessments which you must pass in order to continue into the next year of study. Approximately 60 per cent of your degree programme will be assessed by means of closed examinations. In addition there is a range of programming assignments, demonstrations and project reports associated with modules, to be carried out in unrestricted conditions with a time limit ranging from a week to several weeks. These are known collectively as open assessments and make up the remaining 40 per cent of assessment. The most significant open assessment in terms of the contribution to your final mark will be the report of your final year individual project.

Scholarships

We offer a number of scholarships, each worth £1,000, to the most outstanding UK/EU students entering the Department each year. Students who gain three A grades at A level, Scottish Advanced Higher level or equivalent will be considered.

No separate application is necessary. An internal panel will assess your grades, your performance at interview (if appropriate), and any other indicator of your academic or creative excellence.

Admissions

Selection is a two-stage process, including scrutiny of all UCAS applications, followed by an invitation to interview for selected candidates. It is our policy to make an offer only following an interview, making an exception in cases where it would be unreasonable for a candidate to travel to York (for example, when they are overseas). The visit has two functions: first, we can form a

Destinations of York Computer Science graduates 2007/09

Destination	%
Postgraduate (research)	12.2
Postgraduate (taught)	6.4
Other further study	2.0
Computing/IT	34.6
Education	3.4
Financial services	11.2
Health work	0.7
Hospitality/sales	5.4
Industry	5.1
Law/accountancy/consultancy	3.1
Logistics/telecommunications	3.7
Media/creative	0.7
Other social and business	0.7
Public administration	7.1
Recreation/culture	0.7
Research and development	2.4
Social/community work	0.7

This chart shows the sorts of further study and kinds of employment taken up by York graduates from this department over the past three years.

For more information see: www.york.ac.uk/careers/destinations

better opinion of you than we can from just the UCAS form; second, it is important that you should visit the place where you might be spending the next three or four years of your life and discuss your choice of programme with us.

Other qualifications

For full details of our entry requirements, please visit our web pages.

Mature applicants

The Department welcomes applications from mature candidates and has admitted many such students. Such applications are considered on their individual merits and all suitable candidates will be interviewed before a decision is taken. Mature applicants should contact the Admissions Tutor for an informal discussion and to obtain more information and advice before applying.

After you finish

Our programmes provide you with a variety of skills attractive to a wide range of employers. The demand for computer scientists and software engineers from the rapidly expanding field of information technology has created job opportunities within a broad cross-section of employers, particularly in the electronics and software industries. Other graduates take advantage of the continuing expansion in the use of computers in commercial and financial operations to find employment. Here, your sharpened numeracy and analytical skills will have prepared you well.

A recent 'destination survey' of graduates with Computer Science degrees has shown that York graduates have 96 per cent employment within the top three occupational classifications, as compared with a national average of 75 per cent.