The facts

- Ranked first in the country for research power in computer science
- The birthplace of computer science: the world’s first stored-program computer was created at Manchester, and the first school of Computer Science in the country was established here
- Strong industry contacts ensure cutting-edge course content
- One of the largest schools of computer science, giving you access to a wide range of specialisms
It is with great pleasure that I welcome you to the 2015 edition of our undergraduate brochure. Inside, you will find full details of the courses and teaching that make Computer Science at Manchester one of the top Schools in the country.

Jim Miles
Head of School, Computer Science
Our University
Making things happen

Influential, forward-thinking and down-to-earth, we’ll give you an amazing university experience rooted in a rich academic heritage. We turn enthusiasm into achievement and ground-breaking theory into innovative practice.

We accomplish feats of global significance, from splitting the atom, to giving the world graphene—the two-dimensional wonder material that is one atom thick, but 200 times stronger than steel.

With more Nobel laureates on our staff than any other UK university, and strong links to industry and public services, we vitalise our undergraduate courses with pioneering research.

Learn more about us:
www.manchester.ac.uk

Our city
Always moving forward

Manchester lives on the edge of tomorrow, ever a step ahead in science, industry, media, sport and the arts. The Mancunian character—exemplified by the city’s central role in the industrial revolution—strives for excellence and originality in all walks of life.

This is a city of many accents, having become a cosmopolitan magnet for students and professionals eager to experience its can-do attitude, independent spirit and cultural wealth.

Never content to live on past glories, Manchester has a passion for progress. Join us at the heart of Britain’s most popular student city.
Your experience
More than just a degree

With resources from the hi-tech 24/7 learning environment of our Alan Gilbert Learning Commons, to the countless personal development opportunities and specialist support services we offer, we will empower you to be your best.

Outstanding sport facilities, nearly 300 student societies, supported community volunteering, study abroad pathways, career development programmes, mentoring and much more all enable you to grow and develop outside of the lecture hall, giving you a well-rounded university experience that prepares you for life after graduation.

The only thing you won’t experience is boredom.

Hear from some of our students:
www.manchester.ac.uk/ug/profiles

Your career
On a course to success

We are consistently one of the UK’s most targeted universities by employers, thanks to courses and careers services designed with your employability in mind.

Our problem-based approach to learning inspires you to think critically, creatively and independently. Volunteering, personal development programmes and interdisciplinary learning could also give you a broader perspective and shape the socially responsible leaders of tomorrow.

We have the UK’s best careers service, providing a wealth of advice and skills-development opportunities, and connecting you with employers to put you on a path to career success.
I really like the course; one of the best aspects is the balance it strikes between theoretical Computer Science and practical Computer Science, both of which are fundamental to understanding the subject.

Daniel Kerry
Computer Science with Industrial Experience
Life in the school

Teaching, learning and assessment

At Manchester, we aim to provide a unique experience that gives you the chance to follow your academic curiosity and explore a fascinating subject.

We want you to develop a strong understanding of the underlying principles of computer science, whilst developing practical computing skills and acquiring the appropriate learning, communication and team-working skills that are essential for success in any future career.

You will meet your personal tutor within days of your arrival, and then on a weekly basis throughout the year. The School has a large number of staff members so our staff to student ratio is very low at 1:12, which means we can offer a more personal experience to our students even though the School itself is quite large.

The emphasis throughout is on independent learning, however a significant amount of your work will be project-based teamwork, tackling real problems. This starts right at the beginning of your studies with the first-year team project.

First-year team project

All our students undertake a team project in their first year. This project is designed to help you develop the independent and team-working skills that are essential for any successful student. The final project deliverable is a database-driven website for an application entirely chosen by the group. Examples of previous years’ projects include: Sudokuphy, an online Su Doku game website; CloudBeats, a sharing music platform; and MyPiggyBank, a virtual student savings account.

Final-year project

A major activity in the final year of all our courses is the project. This is an individual piece of work, often involving the construction of a significant piece of software or hardware. You will be assigned a personal supervisor for this project, and you will have weekly project meetings together.

Final Year project examples

**Matchmaking CV Skills Using OWL Ontologies**

Imagine what an employer has to cope with when hundreds of CVs flood across their desk - how do they pick out the people that match the skill-set they need? Different phrasings are often used—“I am an excellent communicator” versus “I am experienced in public speaking” is easy enough to read. But what about technical phrases in Computer Science such as “I am experienced in Java SWING development” versus “I have studied JAVA GUI design extensively”? Both mean virtually the same thing (the design and programming of user interfaces) but only a human knows that - or do they? An OWL ontology is a method of structuring human knowledge so it can be used to search through large bodies of data automatically. In this project an OWL ontology was designed for CV skillsets, allowing the user to search through CVs and rank them just as web pages are ranked on Google. The approach followed standard employer recruitment procedures, and can easily rank hundreds or thousands of candidate CVs for their job suitability.

**Gesture Recognition using Microsoft’s Kinect**

How can you change the TV channel with a shrug of your shoulders? Modern TVs are just starting to recognise gestures, such as a wave of the hand to change the channel - but the gestures are fixed, pre-programmed per TV. Our student decided this was not enough. Instead she used “machine learning” techniques to automatically learn new personalised gestures from the user. No existing retail device has this capability, yet she managed to build it during a five-month final year project.

Find out more about first year and final year projects on our website:

[www.cs.manchester.ac.uk/study/undergraduate/experience/student-projects](http://www.cs.manchester.ac.uk/study/undergraduate/experience/student-projects)
Study resources and facilities
As you would expect from leaders in the field, we offer some of the most up to date facilities in the world, including collaborative working labs complete with specialist computing and audio visual equipment to support group working. We also provide Java and C++ development environments (IDEs) for software development, and commercial electronic system design tools and development boards in our specialist computer engineering laboratories.

To find out more, visit our website: www.cs.manchester.ac.uk/study/undergraduate/services-and-student-facilities

Peer Assisted Study Sessions (PASS)
We have a very active scheme in which second and third year students support students in their first and second years. In this PASS scheme, older students meet weekly with groups of less experienced students to assist them with any course problems and help them adjust to university life. This is a great opportunity for you to learn from those who have had a very recent experience of the sort of problems that you might face. Evaluations have shown this scheme to make a real difference to the performance and confidence of first and second year students. PASS leaders also found that they too had improved confidence and transferable skills to enhance their CV.

Student-led activities - student societies
Our Computer Science Society (CSSoc) is a student-run group set up to encourage socialising within the School and interaction with other Schools within the University. CSSoc works with sponsors from the School’s Industry Club to organise a great variety of events throughout the year, beginning with Welcome Week social activities, and culminating with the annual summer ball. Manchester Ultimate Programming (1-UP) and The Coding Dojo are student activities which focus on programming and problem-solving. Students organise hackathons and staff-student competitions to pit their wits against each other with some friendly rivalry. The Coding Dojo has had national and international success this year, with our students reaching the Northwestern European Regional Contest final in Holland.

Student blogging
To find out what life is really like at the School of Computer Science, why not lift the lid and visit our online students’ blog page?

“Being a student at the University of Manchester is a great experience, but University is not just about studying. I believe it’s about enjoying the experience with the most interesting people you have ever met.

Edoardo Moreni
2nd year MEng Computer Science”

To find out more about Edoardo’ experiences and to read other students’ stories, visit their blog pages:
http://studentblog.cs.man.ac.uk
Career opportunities

There are significant employment opportunities in the traditional IT industry, but our Computer Science graduates are in demand from a very broad range of employers, as they come to depend increasingly on computer-based products, services and ways of working. Opportunities exist in fields as diverse as finance, films and games, pharmaceuticals, healthcare, consumer products and public services—virtually all areas of business and society. Increasingly, employers are seeking graduates with a high level of computing skills and the ability to apply these in innovative ways to solve the problems facing their organisations.

Employers—from large multinational firms, to small local organisations—actively target our students, recognising that Manchester Computer Science graduates are equipped with the skills they need. Organisations across the spectrum recognise that the grounding our students receive in analytical thinking, problem solving and team working enables them to excel in a whole host of positions, including many that are not traditionally associated with computing graduates.

Industrial placements

Participation in higher education has risen dramatically over the last ten years and students are increasingly looking for ways to differentiate themselves in the graduate jobs market. An excellent way of doing this is by opting for an industrial placement as part of your degree. This involves undertaking a one-year work placement in industry between the second and third years of your study at Manchester.

Sarah King
Computer Science and Mathematics with Industrial Experience

The benefit of a degree in Computer Science from Manchester is that you become so employable.

Laura Howarth-Kirke
BSc Computer Science with Industrial Experience (2013 graduate, now working for the BBC within their ‘Future Media’ graduate scheme).

My industrial year as a software engineer at IBM has given me the opportunity to put the knowledge I gained at university into practice. It’s one thing to follow a programming exercise and another to design, structure and develop your own code! This knowledge has been furthered through my assigned projects. I have learnt new technical skills from scratch, such as AJAX, Android Development and IBM specific software.

I genuinely believe the School has prepared me for my future career. It’s given me all the technical and soft skills I need, the support to find a graduate job and the opportunities to fill in any blanks on my CV with clubs and events inside and outside the School.

Computer Science
www.manchester.ac.uk/cs
Course details

Computer Science
BSc 3yrs UCAS Code G400
MEng 4yrs UCAS Code G401

Computer Science with Industrial Experience
BSc 4yrs UCAS Code G405
MEng 5yrs UCAS Code I100

Software Engineering
BSc 3yrs UCAS Code GG6K
MEng 4yrs UCAS Code GG64

Software Engineering with Industrial Experience
BSc 4yrs UCAS Code G603
MEng 5yrs UCAS Code I300

Artificial Intelligence
BSc 3yrs UCAS Code G700
MEng 4yrs UCAS Code G702

Artificial Intelligence with Industrial Experience
BSc 4yrs UCAS Code G701
MEng 5yrs UCAS Code G703
Computer Systems Engineering  
BEng 3yrs UCAS Code HH66  
MEng 4yrs UCAS Code GH4P

Computer Systems Engineering with Industrial Experience  
BEng 4yrs UCAS Code HHQ6  
MEng 5yrs UCAS Code H650

Computer Science (Human Computer Interaction)  
BSc 3 yrs UCAS Code I140  
MEng 4yrs UCAS Code I142

Computer Science (Human Computer Interaction) with Industrial Experience  
BSc 4yrs UCAS Code I141  
MEng 5yrs UCAS Code I143

Computer Science with Business and Management  
BSc 3yrs UCAS Code G4N2

Computer Science with Business and Management with Industrial Experience  
BSc 4yrs UCAS Code GNK1

Computer Science and Mathematics  
BSc 3yrs UCAS Code GG14

Computer Science and Mathematics with Industrial Experience  
BSc 4yrs UCAS Code GG41

Typical offer
A-level  
A*AA-AAA  
(Please note that all courses require A-level Mathematics or equivalent, with the exception of Computer Science (Human Computer Interaction) which requires two science and/or mathematics subjects studied at A level or equivalent)

IB 38-35

For full details of our entry requirements, visit: www.manchester.ac.uk/ugcourses
Choosing your course

Computer Science course

All of our courses combine the study of core computer science principles with the development of a high level of practical skills. You will also develop a range of non-technical skills that are important in any working environment. Among these are the ability to analyse problems and propose and evaluate solutions, to work effectively as part of a team and to plan a significant-sized project, managing conflicting demands on your time.

Our Computer Science courses provide broad coverage of computational principles, techniques and applications—and, after the first year, offer considerable choice, enabling you to specialise in areas of particular interest.

Our interdisciplinary and joint courses combine core material from different disciplines, equipping graduates for jobs that require rich skill sets and cross traditional topic boundaries.

You can study our courses in the following variants:

- Three-year BSc—the fastest route to graduation
- Four-year BSc with Industrial Experience—provides an industrial placement within your course
- Four-year MEng—designed to fulfil the highest professional requirements and challenge the ablest of students
- Five-year MEng with Industrial Experience, combines the four-year MEng with an additional industrial placement year in the third year

Most of our courses are accredited by the major professional bodies—the British Computer Society (BCS) and the Institution of Engineering and Technology (IET).

Successful completion of our MEng courses gives exemption from the Engineering Council professional examinations, the first step towards becoming a chartered engineer.

You can find the precise accreditation status for each course on our School website: www.cs.manchester.ac.uk/study/undergraduate/courses

Flexible options for changing courses

Undergraduate teaching is modular, with core course units shared by the different courses. This means that, with some exceptions, it is possible to change between courses up to the end of your first year, and (grades permitting) transfer to the MEng or Industrial Experience variant of your course.

Computer Science

By developing new applications in science, engineering and business, computer science is changing people’s lives. Our Computer Science course combines the study of software and hardware, and information and communication technologies, to provide you with the skills needed for a challenging and evolving career. The course is the most flexible that we offer and allows you to adapt your studies to reflect your developing, possibly changing, interests. Core topics include object-oriented (Java) and imperative (C) programming paradigms, software development techniques, databases and computer architecture. You can mix these with general computing subjects such as graphics, networking and computer vision. You can also combine them with the themes that support one or more of the specialised courses in software engineering, artificial intelligence and computer systems engineering.

Software Engineering

Software systems are at the heart of all successful modern businesses. These systems are complex and long-lived, and must be robust and adaptable. By studying software design and production techniques on our course, you will be equipped with the skills needed to follow a career specifying and developing such systems.

Software engineering techniques consider the whole lifecycle of an application, from its specification and design, through its implementation and testing, to its maintenance and adaptation. Central to these techniques is the use of specifications and models, which support analysis of solutions for correctness and the generation of skeleton implementation code.

Current achievements include image and voice recognition, and NASA’s Mars Rovers.
**Artificial Intelligence**

One of the challenges in computing is to make computers think, or be intelligent, so that they can solve new problems, or cope with the unknown.

By combining the study of AI and traditional computing techniques with an understanding from psychology of how humans learn, these course units prepare you for a career applying computing in challenging applications. AI-specific topics include the key techniques of machine learning, which are built upon knowledge representation and reasoning. Our course gives you the opportunity to study these techniques in the context of general computing, and their application in areas such as computer vision, natural language processing and robotics.

**Computer Systems Engineering**

Sophisticated electronic systems permeate all aspects of life - including MP3 players, games consoles, mobile phones, vehicle control systems and radar. All of these are embedded systems, which typically contain one or more microprocessors, memory, a communications capability, and application-specific hardware and software. We need a wide range of knowledge and skills to support their development, including digital electronics, software engineering, computer architecture and digital signal processing.

This course involves the study of subjects crucial to the design and implementation of embedded systems, and the opportunity for involvement in leading-edge research and development projects, often sponsored by industry. All graduates will have skills in both software and hardware development and will be capable of contributing effectively to the development of embedded system.

**Computer Science (Human Computer Interaction)**

Human Computer Interaction (HCI) is radically changing the way in which we experience our world, optimising the interaction between computer systems and their human users. HCI is truly interdisciplinary, at the intersection of computer science, behavioural sciences and social science. Here at Manchester we equip you with the skills needed to contribute to this exciting and rapidly evolving field. We provide you with the highest level of education in understanding and improving future generations of user interfaces and interactions. Our course attempts to delve much deeper than other HCI related courses, in that key course units are delivered by specialists in their field, from neurophysiology to advanced social network analysis, from complex software engineering and application development to qualitative research design and methods.

**Computer Science (67%) with Business and Management (33%)**

Delivered in collaboration with Manchester Business School, this course takes a different approach to the relationship between computing and business. Instead of addressing the issues of systems development within a business context, it complements the study of computer systems development with the study of the underlying principles and practices of business and management.

These business aspects will give you an appreciation of the whole business environment, from management and marketing, through the financial aspects and human resource management, to the development of technology for application to new products, processes and services. We combine these with core computer science topics in programming, software development and database management, and give you the opportunity to study topics from specialised areas, such as distributed computing and artificial intelligence.

**Computer Science (50%) and Mathematics (50%)**

Mathematics and Computer Science have always been closely related, each providing support and suggesting new problems to the other. This joint honours course enables you to acquire a useful combination of mathematical and computer science knowledge and skills. Topics studied develop your knowledge and understanding of important mathematical ideas, including the concepts of rigorous argument, formal proof and the power of abstract formulation of problems. These are combined with core computer science topics on programming and software engineering, together with a study of the mathematical principles underpinning the foundations of computing.

More detailed information about our courses, and course units can be found on our website: [www.cs.manchester.ac.uk/study/undergraduate/courses](http://www.cs.manchester.ac.uk/study/undergraduate/courses)
Find out more online

Accommodation
Discover your new home:
www.manchester.ac.uk/accommodation

Admissions and applications
Everything you need to apply:
www.manchester.ac.uk/ug/howtoapply

Alan Gilbert Learning Commons
Take a look around our 24/7, independent learning space:
www.manchester.ac.uk/library/learningcommons

Careers
Take control of your career:
www.manchester.ac.uk/careers

IT Services
Online learning, computer access, IT support and more:
www.manchester.ac.uk/itservices

Library
We have one of the UK’s largest and best-resourced university libraries:
www.manchester.ac.uk/library

Maps
Find your way around our campus, city and accommodation:
www.manchester.ac.uk/aboutus/travel/maps

Prospectus
Download or order a copy of our prospectus:
www.manchester.ac.uk/study/undergraduate/prospectus

Childcare
Balancing your studies with your caring responsibilities:
www.manchester.ac.uk/childcare

Disability support
Talk to us about any support you need:
www.manchester.ac.uk/dso

Funding and finance
Get to grips with fees, loans, scholarships and more:
www.manchester.ac.uk/studentfinance

Careers
Take control of your career:
www.manchester.ac.uk/careers

International students
Let us help you prepare for your time here:
www.manchester.ac.uk/international

Sport
Get active with our clubs, leagues, classes and facilities:
www.manchester.ac.uk/sport

Support
Let us help with any academic, personal, financial and administrative issues:
my.manchester.ac.uk/guest

Students’ Union
Immerse yourself in societies, events, campaigns and more:
manchesterstudentsunion.com

Videos
Learn more about us on our YouTube channel:
www.youtube.com/user/universitymanchester

Find out more online
Contact details

For further information about the courses, or about qualifications, please contact:

**Address**
Admissions Officer  
School of Computer Science  
The University of Manchester  
Oxford Road  
Manchester  
M13 9PL  
United Kingdom  
tel +44 (0)161 275 6124  
email ug-compsci@manchester.ac.uk

For the most up-to-date course information, please visit our website:  
[www.manchester.ac.uk/cs](http://www.manchester.ac.uk/cs)

Disclaimer
This brochure is prepared well in advance of the academic year to which it relates. Consequently, details of courses may vary with staff changes. The University therefore reserves the right to make such alterations to courses as are found to be necessary. If the University makes an offer of a place, it is essential that you are aware of the current terms on which the offer is based. If you are in any doubt, please feel free to ask for confirmation of the precise position for the year in question, before you accept the offer.
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