COMPUTING AND COMMUNICATION TECHNOLOGIES

Undergraduate courses
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A warm welcome to Computing and Communication Technologies at Brookes.

This is a lively, progressive and supportive place to study. We want to help you graduate as a well-rounded candidate for the cream of an ever-increasing number of jobs in the fast-evolving field of computing and its related industries. Students come from all over the world to learn with us and it is this diverse student population that keeps us focused on the delivery of engaging and relevant undergraduate and postgraduate courses. Our courses are sustained by excellent research-informed teaching, modern facilities and the kind of support that helps take the stress out of being a student so you can enjoy your time at university.

Study with us and you will be given the opportunity to encounter a rich and diverse set of state-of-the-art technologies and develop a wide range of cognitive, practical, analytical, creative and professional skills. We specialise in teaching computer programming at all levels, from absolute beginner to professional software developer. Some courses contain more programming that others, so if your main interest lies elsewhere we can offer you subjects like audio engineering and music production, digital media production or information technology management for business as well. We work hard to ensure that all our courses are attractive to students, relevant to industry and academically sound.

We have strong links with industry and a strong foundation in research. Our undergraduate courses are carefully designed to appeal to a wide range of employers in a wide range of industry sectors. A popular feature of our courses is the opportunity to spend a year in industry on a subject-related paid placement, usually between the second and final years of the course. This ‘time out’ offers you the chance to put theory into practice in a real world situation while you gain valuable experience. We have a dedicated Placements Manager who can help find a good fit for you, and academic staff will support you throughout. Placements are not compulsory, but they do come highly recommended.

The prize-winning research activities in the department cover a range of subjects including cognitive robotics, artificial intelligence, computer vision, communications, media and electronic technologies. There is more about our research elsewhere in this brochure and on our website, and in particular information about my own personal research area of robotics. Our light and airy research laboratories are home to our research students and, in the case of the cognitive robotics laboratory, a family of humanoid robots waiting for those of you who are fascinated by this fast-expanding area of research which touches every aspect of our lives.

If you are fascinated by the world of technology and the bright future it holds for those ready to engage with it, come and find out more about the Department of Computing and Communication Technologies here at Brookes. We would love to meet you.

Dr Nigel Crook
Head of Department
The department has engaged in world-leading research in Artificial Intelligence for more than 10 years. Building on this work, we have opened a new Cognitive Robotics Laboratory. The laboratory encompasses research in human-robot interaction, autonomous vehicles and bio-inspired robotics.

One of the first robots to take up residence in the lab was Artie, a life-size Robothespian humanoid robot who is fully interactive, multilingual and user-friendly. Artie is a powerful and versatile research platform who comes with a wide range of tools making him accessible to novices and useful for cutting edge research in human-robot interaction. A web-based interface means that students can remotely access and control Artie.

Next to arrive in the lab was Baxter, a humanoid robot for research and teaching. Baxter is safe around humans because he utilises Series Elastic Actuators that enable force sensing at every joint, so a collision between Baxter and a human or object will be detected and Baxter will stop. Baxter also has three cameras (two in the wrists and one in the head), position, velocity, and torque sensing on every joint, a 360° sonar array, 3-axis accelerometers and infra-red rangefinders in each wrist.

The most recent additions to the lab are the cheeky little Nao twins Robbie and Archie. Robbie and Archie are 58cm tall humanoid robots who consist of sensors, motors and software and get their wizadry from their programming and animation. Using all our robots, students studying our BSc Computing for Robotic Systems, will be able to design, develop, construct and program a robot from basic principles learnt on the course.

In addition to these commercially available robots, the Cognitive Robotics Group, part of the department’s Intelligent Systems Engineering Centre, designs, builds and tests its own robotic kit. Take a look at their web page to see the exciting research they are engaged in: www.cct.brookes.ac.uk/research/isec/cognitive-robotics.

Membership of the student Robotics Society is open to all the department’s students. The society meets regularly and organises trips and mini projects. George McDonnell runs the society and says: “The Society provides an opportunity for students, on software-related courses, to gain added skills in programming hardware, with the Arduino microcontroller, and it allows students to apply their knowledge of programming in an informal environment. It has given me practice in organisation and teamwork, but most of all, teaching and sharing experiences with others.”

From left to right:
Robbie and Archie the Nao robots: www.active-robots.com
Artie the Robothespian: www.engineeredarts.co.uk
Baxter research robot: www.rethinkrobotics.com
If you want to study computing, information technology or digital media, but you don’t have the right qualifications to enter a university degree course, then the Computing Foundation course might be just what you need. This one-year course is designed to improve your general skills in computing, mathematics and information technology. It also offers you the opportunity to gain a grounding in electronics and physics, which will allow you to pursue a degree in digital media. Successful completion of the foundation year allows you to progress onto one of our degree courses in computing, digital media or mathematics, subject to meeting specific course entry requirements.

Our course includes plenty of practical work too: laboratory and practical sessions give students hands-on experience with the latest software. Surgery sessions are held in mathematics to help you to bridge any gaps in your mathematical skills.

There is demand for graduates in all areas of computing, digital media and information technology: our foundation course is an excellent start to a career in these fast moving and expanding industries.

This is normally a one-year course and you will need to take a total of eight modules in two semesters. As courses are reviewed regularly, the module list you choose from may vary and some modules will be compulsory.

The full list of course modules can be found in the online prospectus at www.brookes.ac.uk.

**Entry qualifications**

**Typical offers**
- A-level: grades DD or equivalent
- IB Diploma: 24 points
- BTEC: National Diploma with 3 passes

**Mature students** with relevant experience, including a substantial period of suitable employment, are welcome to apply.

**Specific entry requirements**
- GCSE: grade C minimum in both Mathematics and English Language
- You should be aged at least 18 and hold recognised qualifications to A-level standard, but with grades insufficient for entry to a degree-level course

**After you have completed the course**

Successful completion of the course enables you to progress onto one of our degree courses in computing, digital media or mathematics, subject to meeting the specific entry requirements of the particular course. In Semester 2 you will be asked which course you wish to join.

If you do not wish to continue onto a degree course, the foundation course provides the opportunity for you to improve your technical knowledge before entering industry.

**Student profile**

**Andrew Francis**

Andrew joined Brookes in September 2013 to study Foundation Computing full-time. Before joining the course he studied A-levels at St Gregory the Great Catholic School in Oxford. He says he chose to study at Brookes because the foundation course is “a good course” and the university is “close to home.”

For Andrew the course was “good, it taught me a lot of new information,” and there is “good interaction between other students and staff.” He was awarded a Community Scholarship which “provided money for books, stationery and computer programs. It also helped me become independent financially form my parents.”

Andrew’s advice to other students is “start your big project/assignments as soon as possible.”

Andrew passed his foundation year very successfully and has now progressed onto the first year of the BSc in Computer Science at Brookes. When he graduates from his degree course he plans to “get a job in the computing industry.”
‘Successful completion of the foundation year allows you to progress onto one of our degree courses in computing, digital media or mathematics, subject to meeting specific course entry requirements.’
Our Computer Science course has been developed in response to real-world needs and is underpinned by research. We have a strong research presence both within the UK and worldwide and our internationally recognised teaching staff will support and guide you towards becoming a well-qualified professional with the talent to exploit your knowledge in an industry where there is a huge need for successful graduates.

Computing is a dynamic and fast-moving subject that underpins most areas of modern life. Studying computer science opens up this world of opportunity. From management information systems and industrial process control to robotics, the internet and 4G phones, as a computer scientist you will be involved in shaping the world around us.

The department’s facilities are located in purpose-designed buildings with 24-hour access to computer networks worldwide, and include state-of-the-art laboratories for robotics, electronics, software development, and media production such as a TV studio and sound studio. You will benefit from excellent access to educational and professional software and from the experience of using the latest equipment.

At Brookes, Computer Science is offered as either a single or combined honours degree. By taking it as a combined honours course you will be well prepared for a wide variety of careers across the range of subjects you have studied. The subjects you can combine with Computer Science are Mathematics, Music, Business and Management, and Japanese Studies.

Entry requirements

Typical offers

- **A-level**: grades BBC or equivalent, preferably including science subjects.
- **IB Diploma**: 30 points, preferably including science
- **BTEC**: National Diploma with a DDM profile, preferably in a science subject

Specific entry requirements

- **GCSE**: grade C minimum in both Mathematics and English Language
- For combined honours, any offer made will reflect the entry requirements of both subjects
Course content

In Year 1 you will receive a grounding in the core skills required of the computer scientist. You will develop proficiency in computer programming and learn the key concepts that underpin how programming works. You will focus on the early stages of the software development process and learn about security from the viewpoint of the programmer or web developer. Each week you will also be getting lectures from researchers and industrialists who will be letting you know about the current state of the art both in research and in how industry functions. You will also have the opportunity to further develop your programming skills in C/C++, learn about databases and learn about web technologies. The skills of being a computer professional underpin all of these but are also brought together in the Professional Issues and Computer Risks module.

We encourage you to take a supervised work placement in the computer industry for 12 months between Year 2 and your final year. More and more students are finding that a placement benefits their final-year studies and career prospects. Possible placement organisations include IBM, Microsoft and PepsiCo.

On returning to university for your final year, the experience you have gained invariably improves your academic performance. In addition, we have an excellent record of students gaining full-time employment on graduation, often with their industrial placement company or organisation.

It is possible to change your programme of study to include or exclude the work placement option up to the end of your second year.

In the final year, you will carry out a project on a topic of your choosing to allow you to refine or expand your skills in a particular area of computing. Alongside this you will study modules that will allow you to expand your programming skills further and have the opportunity to study functional programming and further web technologies.

So far, only the compulsory areas of study have been covered. In the second and final years, you will also get to choose other topics that you wish to study. There is a whole range of optional modules in areas such as computer programming, computer game development, artificial intelligence, the software development process, computer networks, system administration and more business focused applications of computing. As courses are reviewed regularly, the module list you choose from may vary and some modules will be compulsory.

The full list of course modules can be found in the online prospectus at www.brookes.ac.uk.

Student profile Alicia Sykes

Alicia joined Brookes in September 2012 having completed A/AS-levels in computing, physics, economics, business studies and photography. She chose to study at Brookes because of the university’s “high employability rates, it’s a nice city” and the course has “reasonable entry requirements.”

When asked about her course, Alicia told us: “The second year was very good, the tutors are approachable and make the lectures and seminars interesting and engaging. There’s a lot of emphasis on how the skills we are learning will be used when we’re working in industry which puts everything into context.” This is what she thinks are the best bits of studying at Brookes: “Brookes provides so many opportunities for extracurricular activities related to your field of study. In the last year, the staff have organised trips to the museum of computing in Swindon and to Bletchley Park. The SU have also provided funding for us to put on events in the computing society, like hackathons and robotics clubs.”

While on her software engineering placement with Accenture in London, Alicia told us: “It’s been great, the training is very complete, the other staff are friendly, and all so intelligent and knowledgeable. I have been allocated to a 4 month project working for the DWP (Department for Work and Pensions) in Newcastle, in a team developing and launching a new computer system.”

Alicia is on course to graduate in the summer of 2016. After graduation she plans “to go straight into industry, and work as a software engineer. There are many software engineer jobs available at this current time, so I don’t plan on doing a master’s immediately. My career goal is to work for Google, although I doubt that will happen any time soon as it’s so competitive!”
COMPUTING FOR ROBOTIC SYSTEMS

The field of robotics is rapidly increasing in importance and popularity, affecting almost all areas of modern life. The time is ripe for anyone who wants to equip themselves with highly marketable skills in this burgeoning area by studying this fascinating subject.

The BSc in Computing for Robotic Systems emphasises the critical importance of being able to skilfully integrate computer science into robotic systems development, and enables you to become effective and well-qualified in both areas. We will teach you almost the entire robotic system, from how to handle low-level hardware, through the middleware control systems, all the way up to cognitive robotics at the highest level.

Robot Profile
Artie RoboThespian

During his first year of tenure, Artie, the first humanoid robot to join the department, has been busy winning the hearts and minds of a huge number of humans. After his appearance as an anchor on the CNBC business news channel, and then with his ‘minder’, Dr Nigel Crock (Head human) on BBC Breakfast TV, he got a taste for the limelight. His other credits to date include BBC Newsround, BBC Radio Oxford, ITV Meridian and BBC South Today. Nigel has always tagged along to keep an eye on him. Artie says there is also a rumour that he and Nigel may be heading to Channel 4 to appear on the Sunday Brunch programme, although he’s a little worried they might have to take the pesky Nao twins with them to do the cooking.

But perhaps Artie’s most spectacular appearance was as a major attraction at Brookes’ ‘Live Friday’ event at the Ashmolean Museum. The queues of humans wanting to interact with Artie snaked round the museum exhibits and out of the door! And Artie isn’t mean with his time inside the university either, entertaining visitors at open days, gracing individual events and helping students and researchers to learn more about intuitive ways of interacting with robots. Students studying robotics at Brookes will quickly count Artie amongst their friends.

Artie says: “I am one of a few full-size humanoid robots based in the UK and I’m lucky enough to be living here at the university.” Now he has been joined in the lab by Baxter the research robot and Robbie and Archie, the Nao twins, he is enjoying the company; whether he will enjoy sharing the limelight remains to be seen!
UNDERGRADUATE COURSES

Course content

In **Year 1**, you will start developing the fundamental skills that you will hone and extend during the rest of your degree. You will develop computer science skills through the study of programming, information systems, computer systems and mathematics. Additionally, you will acquire the foundations of robotic systems in the compulsory double module Introductory Robotics. In this module you will be taught using a hands-on project based learning approach, using both real and virtual robots to guide your learning.

In **Year 2**, you will extend your understanding using modules that will range from further programming, and software development, to foundations of computing, and the social, ethical and legal issues associated with computer science. In the compulsory module Robotic Systems Engineering, you will also intensively investigate the middleware aspects of these systems, which is an important emerging skill requirement. The compulsory double module Advanced Robotics, will enable you to apply the skills acquired in the other modules, and investigate further aspects of robotic systems using project based learning. This will culminate in you designing, developing, constructing, and programming a robot from basic principles.

We encourage you to take a supervised work placement in the computer industry for 12 months between Year 2 and your final year. More and more students are finding that a placement benefits their final-year studies and career prospects. Possible placement organisations include IBM, Microsoft and PepsiCo.

On returning to university for your **final year**, the experience you have gained invariably improves your academic performance. In addition, we have an excellent record of students gaining full-time employment on graduation, often with their industrial placement company or organisation.

It is possible to change your programme of study to include or exclude the work placement option up to the end of your second year.

In your final year, your dissertation is the opportunity to carry out a significant robotics project of your choice, supervised on a one-to-one basis by a member of staff. Alongside this project, you will also study advanced modules in the areas of security, machine learning, machine vision, and cognitive robotics. These will be supplemented by optional advanced modules, some covering skills specific to robotics, others covering more generally applicable computer science skills.

As courses are reviewed regularly, the module list you choose from may vary and some modules will be compulsory.

The full list of course modules can be found in the online prospectus at [www.brookes.ac.uk](http://www.brookes.ac.uk).

After you graduate

Careers in robotic systems are growing rapidly with projected employment requirements growing ever more. Career opportunities include all aspects of robotic development, with particularly employment in robotic middleware development growing exceedingly fast. The field is under continuous evolution with many research prospects and innovation possibilities. New and existing companies are continuously developing new robotic applications for virtually every aspect of a modern society. Career prospects in all areas of computing are excellent and expanding rapidly. Our computing graduates enjoy great success in finding employment in business, industry, research and education.

Entry qualifications

**Typical offers**
- **A-level**: grades BBC or equivalent, preferably including science subjects
- **IB Diploma**: 30 points, preferably including science
- **BTEC**: National Diploma with a DDM profile, preferably in a science subject

**Specific entry requirements**
- **GCSE**: grade C minimum in both Mathematics and English Language
This course has been developed in direct response to the needs of companies wanting graduate employees who can manage the information technology function within industry and commerce. You will be offered the opportunity to regularly meet and network with industry leaders from over 70 leading organisations, including Aviva, BT, Cisco, Computer Associates, Deloitte, Ford, Fujitsu, IBM, Hewlett-Packard, Procter & Gamble, Sainsbury’s and Unilever. These are organisations that have collaborated to produce a course which specifically addresses their increasing demand for graduate employees with key knowledge and skills in business and technology. The course has been designed to include explicit and measurable objectives in terms of your employability, providing you with invaluable experience in personal, interpersonal and project working.

After you graduate

Successful completion of this course will give you excellent employment prospects. The profile of students from this programme has been tailored to match the requirements of some of the biggest employers of IT graduates. The combination of technical knowledge, business awareness, and interpersonal and project skills makes our graduates especially well qualified for an increasingly diverse job market in managing IT applications.

Entry qualifications

Typical offers

- **A-level**: grades BBC or equivalent. A-level subjects will preferably include science and/or business
- **IB Diploma**: 30 points, preferably including science and/or business

Specific entry requirements

- **BTEC**: National Diploma with a DDM profile, preferably in a science or business subject
- **GCSE**: grade C minimum in both Mathematics and English Language
Course content

You will benefit from excellent access to educational and professional software, and from the experience of using the latest computing equipment. You’ll also have access to the Business School’s undergraduate centre, which provides a welcoming, vibrant atmosphere in which students can socialise, study, work collaboratively, and grab a drink and something to eat at the cafe.

The first year of the course will lay the foundations for your professional development, introducing you to key elements of business, management and computing technology. As you continue with the course, you will study subjects identified as being vital for a successful career in IT management. Throughout the programme, professional working practices will be encouraged, and supported through the continued involvement of international companies.

Year 1 introduces programming and information systems, and key elements of business and practical management skills. From Year 2, you will study subjects identified as being vital for a successful career in IT management. These include business intelligence programming, computer security and database management, as well as further studies in business and management.

Year 3 (optional industrial placement)

You will be strongly encouraged to take a work placement in your third year of study, doing supervised work experience in commerce, industry or the public sector. More and more students are taking up this option, as they recognise the benefit of obtaining work experience, consolidating their understanding and being able to apply their knowledge in a work environment.

While the sponsoring organisations do not guarantee a job, they will provide practice interviews, assessment centre experience and invaluable advice. And, of course, they are always on the lookout for the best students.

On returning to university for your final year, the experience you have gained from the placement invariably improves your academic performance. In addition, we have an excellent record of students gaining full-time employment on graduation, often with their industrial placement year company or organisation.

It is possible to change your programme of study to include or exclude the work placement option up to the end of your second year.

Year 4 / Final year

In your final year you may carry out an extended project in a topic selected from a suitable area of your course.

As courses are reviewed regularly, the module list you choose from may vary and some modules will be compulsory.

The full list of course modules can be found in the online prospectus at www.brookes.ac.uk.

Graduate profile
Humera Tariq

Humera studied BSc Information Technology Management for Business full-time, joining the course from a BTEC National Diploma in Information Communication Technology.

Before choosing to study at Brookes Humera attended an open day where she “really liked its relaxed and student-oriented environment around the Wheatley campus.” In particular she felt that the ITMB course director, Dr Bob Champion, was “very approachable and enthusiastic. The moment he mentioned about the course and Brookes’ links with industry, I fell in love with the course.”

While studying on the course Humera found that it “provided great opportunities to network with the top industry employers. ITMB opened the door for me.” She appreciated the supportive staff whom she says are “passionate about their subjects” and “help you tailor your experience to where you want to go with your degree.” Humera also liked the campus where “the facilities are really good and accessible with lots of different books and journals available both online and in the library. You will be doing your practical classes in a small cohort which means you will get tutors’ attention. You are bound to get an amazing experience, you just have to be here to know what I mean!”

Humera completed a placement year at BMW as part of her degree. She says: “I loved the whole placement year but the memorable moment was when I was given the opportunity to meet the Managing Director of MINI Plants with my placement project leaders/mentors.”

When asked whether she had any advice for others, Humera told us: “Seize every opportunity that is available to you throughout ITMB or Brookes. Join clubs or societies or become a student ambassador; employers love to hear when you tell them about your extracurricular activities. And of course, don’t forget to enjoy your student and social life at Brookes.”

Humera graduated in the summer of 2014. She received several graduate job offers and is now working as a graduate systems engineer with Tata Consultancy Services at Heathrow.
This course is designed to cover the higher level design, construction, administration and security aspects of network systems used by businesses and homes. It provides students with the knowledge and skills essential for a career in the rapidly changing networking industry.

The emphasis of the course is on network software, systems, and applications, including the foundations of computing and the advanced study of computer network construction, administration and security. The course is designed to give you the key skills of computer programming for networks, and the use of operating systems to provide network security and access, or denial of access, to applications and facilities.

Student profile
Pete Flann

Pete joined the department as a mature student to study for a degree in Computer Science and Network Computing, with a mixture of relevant experience and telecommunications qualifications he had obtained whilst in trade training with the army.

Although Pete has not included an industrial placement in his programme at Brookes, he says that having decided to study part-time, he found that: “The discipline and motivation that had been etched into me whilst serving in the Royal Signals and overseas operations enabled me to balance my course work, lectures and a part time job in IT for a small consultancy firm, giving me the experience and edge over other candidates when looking for a full-time job”, and that the firm he worked for was “really understanding and flexible around my studies.”

Pete feels that the skills he has obtained at Brookes have prepared him for the commercial world of IT. The mix of practical and theory modules enabled him to gain a better understanding of how businesses work and how to implement IT projects. He is on course to graduate in the summer of 2015 and has recently secured a new job with Cambridgeshire based Jagex, a multi-award winning computer games developer and publisher, the UK’s largest independent business in this field.

NOTE: When Pete joined the university he was able to elect to study Network Computing as part of a combined honours degree. Since that time the department has revised all its programmes and Network Computing is now offered as a single honours option only, incorporating the best of both parts of Pete’s options.
Course content

We have modern Cisco-equipped laboratories which are packed with a large variety of industry standard equipment, technologies and software and offer some of the best computer network training facilities in the UK.

In Year 1 you will study fundamental concepts in networking, computer systems and computer programming.

These subjects are built on in Year 2 and your final year, which contain key modules on networking, network construction and administration, systems development, security, network management and communication technologies. Optional modules in operating systems and mobile app development are also available.

Year 3 (optional industrial placement)

We encourage you to take a work placement in the computer industry for 12 months between Year 2 and your final year. More and more students are finding that a placement benefits their final-year studies and career prospects.

Central to your final year is a major project that allows you to try out your knowledge and skills on a real-life problem of your choice, giving you the opportunity to enhance your media or networking skills.

It is possible to change your programme of study to include or exclude a work placement up to the end of the second year.

As courses are reviewed regularly, the module list you choose from may vary and some modules will be compulsory.

The full list of course modules can be found in the online prospectus at www.brookes.ac.uk.

After you graduate

With some form of PC network in virtually every company and many homes, the demand for graduates with networking skills is very high. The combination of networking and programming skills offered by this degree opens up a huge variety of career opportunities in areas as diverse as network security, network systems programming, IT management and many more.

Some students go on to study for a master's degree where they study a specific area of networking or communications technologies.

Entry qualifications

Typical offers

- A-level: grades BBC or equivalent, preferably including science subjects.
- IB Diploma: 30 points, preferably including science
- BTEC: National Diploma with a DDM profile, preferably in a science subject

Specific entry requirements

- GCSE: grade C minimum in both Mathematics and English Language

Professional accreditation

Training for several professional networking qualifications, operated under the Cisco Networking Academy programme, is an optional part of this degree programme. Obtaining these qualifications, which are recognised worldwide, represents an important step towards a lucrative career as a networking professional.

On registering for training under the networking academy scheme you will be given access to extensive, professionally developed on-line learning facilities, including network simulation tools, testing and feedback systems. The training is incorporated as an optional integral component of the degree course.
SOFTWARE DEVELOPMENT FOR BUSINESS

Oxford Brookes University is the first university in the UK to offer a Software Development for Business degree approved by e-skills UK, the Sector Skills Council for Business and Information Technology.

The new programme is built on the solid foundation of our many years of experience teaching software engineering, but reflects the changing needs of the industry towards more business focused software qualifications. It includes the following features:

- A thorough grounding in all aspects of the software engineering process.
- Employers have an active involvement in the course, presenting a regular series of ‘guru’ lectures throughout the academic year, as well as offering case studies and project suggestions.
- Employers are very keen to meet the students, and provide opportunities for them to practise key skills, such as technical presentations and team exercises, as well as interviews, ‘mock’ assessment centre days and placement opportunities.
- You will have access to excellent facilities and state-of-the-art technology.
- The course has been formally accredited by e-skills UK.

This course will give you the skills to succeed as a software developer. You will gain a deep understanding of the technical problem-solving skills and professional practices that are required by businesses today. The degree programme has been developed jointly with companies such as IBM, Accenture, Morgan Stanley and CGI who want graduate employees with a strong technical background who can manage the development of software within a business context.

The course is designed to teach a professional approach to the whole process of developing software, from the initial gathering of requirements, through the design of the functionality and human interface, to the implementation and deployment of the final product. It includes a thorough grounding in the necessary mathematical formalisms and established software engineering principles as well as substantial practice with coding and algorithm design.
Course content

In Year 1 you are introduced to computer architecture, operating systems, programming and the development of computer systems. In addition, you will study an introduction to information systems, and mathematics applied to computing.

From Year 2 onwards you will study the advanced study of topics such as data structures, systems analysis and design, database systems, project management and object orientation.

We encourage you to take a work placement in the computer industry for 12 months between Year 2 and your final year. More and more students are finding that a placement benefits their final-year studies and career prospects. Possible placement organisations include IBM, BMW, Microsoft and PepsiCo.

In your final year you may carry out an extended project in a topic selected from a suitable area of your course.

As courses are reviewed regularly, the module list you choose from may vary and some modules will be compulsory.

The full list of course modules can be found in the online prospectus at www.brookes.ac.uk.

After you graduate

Career prospects in computing are excellent, and our graduates have been very successful in finding suitable employment in business, industry, research and education. Career opportunities include all aspects of software development, computer applications in organisations, and multimedia applications. Recent graduates have been employed by Apple, Sophos, Agilent and Oxford University Hospitals NHS Trust for example.

In your final year you may carry out an extended project in a topic selected from a suitable area of your course.

As courses are reviewed regularly, the module list you choose from may vary and some modules will be compulsory.

The full list of course modules can be found in the online prospectus at www.brookes.ac.uk.

Entry qualifications

Typical offers
- A-level: grades BBC or equivalent
- IB Diploma: 30 points, preferably including science
- BTEC: National Diploma with a DDM profile, preferably in a science subject

Specific entry requirements
- GCSE: grade C minimum in both Mathematics and English Language

After you graduate

Career prospects in computing are excellent, and our graduates have been very successful in finding suitable employment in business, industry, research and education. Career opportunities include all aspects of software development, computer applications in organisations, and multimedia applications. Recent graduates have been employed by Apple, Sophos, Agilent and Oxford University Hospitals NHS Trust for example.

In your final year you may carry out an extended project in a topic selected from a suitable area of your course.

As courses are reviewed regularly, the module list you choose from may vary and some modules will be compulsory.

The full list of course modules can be found in the online prospectus at www.brookes.ac.uk.

Entry qualifications

Typical offers
- A-level: grades BBC or equivalent
- IB Diploma: 30 points, preferably including science
- BTEC: National Diploma with a DDM profile, preferably in a science subject

Specific entry requirements
- GCSE: grade C minimum in both Mathematics and English Language

Student profile

Ryan Smith

Ryan Smith is studying Software Engineering, the forerunner to our new Software Development for Business degree course. Ryan joined Brookes in September 2012 having acquired A and AS-levels in Computing, Mathematics, History, Media, ICT and General Studies from Prince Henry’s High School in Evesham, Worcestershire. He says he chose Brookes as a place to study because of its “good location (in terms of the city and it’s easy to get home via the train in a couple of hours).” The department here also has “interesting robotics and artificial intelligence research.”

Ryan says: “Staff are willing to support events such as hackathons (AngelHack), programming competitions (RM challenge), trips (Bletchley Park), etc. He also says that the bursary he was awarded by Brookes “has so far covered the cost of books, new equipment, and repairs for my equipment (keyboards, etc).”

The best bits of studying at Brookes for Ryan are “seminars which are part lecture and part practical, allowing you to learn at a pace you’re comfortable with and collaborate with other members of the class.” His advice to others studying in the department is: “Give the staff plenty of feedback, they welcome it. Most importantly, make sure that you’re passionate about the course. Go to all of your lectures, give yourself plenty of time to do the work required, and read the required material. Try to work with a variety of people and don’t be afraid to voice your opinion.”

At present Ryan is on course to graduate in the summer of 2016. He is including a year’s placement in industry in his programme, between the second and final years, and says that after graduation “I plan to work as a web developer because the web is a universal platform and I like the direction it’s taking.”
This course will develop your ability to work creatively with sound in all areas (including music production, film and TV/Video, gaming, sound effects, live music, AV, interactive audio) by their scientific exploration and understanding of the technology used in audio and in other media.

You will have many opportunities to work on real-world projects external to the university, for example with charities and cultural groups, in order to gain experience of direct interest to employers.

You will also have access to highly specialised labs and studios where you will learn the application of theoretical skills and techniques in sound production, sound for picture and in hardware and software design.
Undergraduate courses

Student profile

Danny Spiteri

Danny studied Sound Technology and Digital Music, the forerunner of our Audio Engineering and Music Production course, full-time.

Before he came to Brookes, Danny completed A-levels in Media Studies, English Language and Politics. When asked why he chose to study at Brookes, Danny told us: “Oxford Brookes simply has a great reputation. It’s well regarded academically, and many of the students I met spoke so well of their time at Brookes. That combined with the course made Brookes the clear choice for me. It was important for me that as well as exploring creativity, my learning was grounded in a solid foundation of academic knowledge. The ability to study a science with so many creative outlets was great. It was never easy, but always rewarding.”

“What I found most valuable about my time at Brookes”, says Danny, “was the ethos established by staff. These are experts on their subjects, many of them also industry professionals, who pride themselves on approachability and adapting teaching methods. Brookes also places an emphasis on opportunities to take learning outside of the classroom. I went on several trips, including a two-week intensive TV journalism course in Italy as part of a European Union exchange. I’ve had opportunities to work for Brookes TV and be a sound technician for local gigs.”

Danny advises students to: “Make use of your lecturers, they are here to help you learn as much as you are willing to. I never once met a wall when asking for help. I also recommend joining societies; they’re a great way of meeting people with similar interests, particularly when you first come to Brookes.”

Danny graduated in the summer of 2014 and then returned to the university on a year-long internship with the marketing team in the faculty that hosts his degree course and as part of the Brookes Internship Scheme for new Brookes graduates.

Course content

Topics include electronics, music recording and production, sound for picture, audio programming and acoustics. Teaching and learning of both technical theory and practical application are delivered in parallel within the modules over each semester.

In Year 1 you will get an understanding of the technical basics, and an ability to apply that understanding to sound production within music and video.

Year 2 concentrates on digital music production, studio techniques, and how technology influences the creative professional. The second year also goes further into audio engineering, including digital audio, networks, synthesis, and programming for audio and media systems.

If you would like to gain professional experience related to your subject of study, we can help you find a paid placement in industry in your third year. More and more students are taking up this option, as they recognise the benefit of obtaining work experience, consolidating their understanding and being able to apply their knowledge in a work environment.

In the final year there is more focus on acoustics, electronics, and professional issues. You will also undertake a dissertation on a topic of particular interest, such as electronic hardware, software design, sound for picture, or music production.

As courses are reviewed regularly, the module list you choose from may vary and some modules will be compulsory.

The full list of course modules can be found in the online prospectus at www.brookes.ac.uk.

Entry requirements

Typical offers
■ A-level: grades BBC or equivalent, preferably including science subjects
■ IB Diploma: 30 points, preferably including science
■ BTEC: National Diploma with a DDM profile, in a related subject eg music technology, media production etc

Specific entry requirements
■ GCSE: grade C minimum in both Mathematics and English Language
The BSc in Digital Media Production addresses the need for ever more highly skilled graduates who are grounded in the technical realities of creative media, industrial partnerships and project-based collaborations which demand an increasingly fluid and mobile workforce.

You will not only enhance your employability by developing the ability to use industry standard tools for digital video production and computer animation, but also develop critical awareness of novel methods and techniques used in the creation of contemporary video, audio, graphics, motion capture and animation, and develop entrepreneurial flair and leadership skills.

The course covers film, video and audio production, computer graphics and animation, and the making of interactive products for distribution via new media platforms. You will have the opportunity to demonstrate the ability to deal with complex issues systematically and creatively, and show originality in tackling and solving problems.
Course content

In each semester you will study four modules – three taught modules that develop your theoretical, academic, practical and professional skills and one project module, in the form of a professional brief, where you put them into practice.

**Year 1** focuses on digital film and video production, and the creative use of image and sound.

In **Year 2** you will study the hardware/creative interface and high end media production.

If you would like to gain professional experience related to your subject of study, we can help you find a paid placement in industry in your third year. More and more students are taking up this option, as they recognise the benefit of obtaining work experience, consolidating their understanding and being able to apply their knowledge in a work environment.

In your final year you will be able to specialise in an area of media production that interests you, such as special effects, TV studio operation, cinematographer or high end video post-production. You will also be given the opportunity to work within the department’s in-house video production facility producing work for internal and external professional clients.

As courses are reviewed regularly, the module list you choose from may vary and some modules will be compulsory.

The full list of course modules can be found in the online prospectus at www.brookes.ac.uk.

Entry qualifications

**Typical offers**
- **A-level**: grades BBC (or equivalent), preferably including science subjects
- **IB Diploma**: 30 points, preferably including science
- **BTEC**: National Diploma with a DDM profile in a related subject eg music technology, media production etc

**Specific entry requirements**
- **GCSE**: Mathematics and English Language grade C minimum

After you graduate

This course has been designed to equip you for a career working with computer, broadcast, video and other equipment in the multimedia, film, animation, television, music, radio, printing, and publishing industries. Working in these fields will enable you to contribute to the development of our future technologies. The opportunities in these areas are extensive and expanding rapidly.

Student profile

**Katy Freeman**

Katy studied Multimedia Production, a forerunner of our Digital Media Production course, including a placement year in industry. She graduated in the summer of 2014. Before coming to Brookes she completed A-levels in Media, English and Psychology.

Katy chose to study at Brookes because she “found that Oxford Brookes offered a course to allow me to explore a number of subjects in media. The university also offered the best facilities and equipment.”

We asked Katy to tell us a bit more about her experiences here and she said: “The lecturers and technicians make studying at Brookes good fun, especially when you reach your final year. You become friends; they help you and advise you a lot over the course of 3 or 4 years and you end up spending a lot of time with them. Uni is about furthering your education, it’s also about the socialising and becoming part of groups… Experience university wholeheartedly and throw everything you have into it and you won’t regret it.”

The placement year in industry was really important to Katy: “I truly believe this helped me through my final year and I feel it has benefitted me in my career after university.” Katy’s placement was with Culham Studio at the Atomic Energy Authority just outside Oxford, setting up, establishing and managing a video production service within the Graphics Department there. “I edited videos in Premiere Pro before using them for business promotional purposes within the Science Centre, PR, and educational tools within schools. The videos were exhibited on YouTube and included on a number of external websites.”

Since graduating Katy has been working at Oxford Royale Academy as a production assistant for the corporate video team. She is a firm believer in the power of networking and says: “I have met so many people in the media industry who have been really kind and put me in touch with other people who have allowed me to come and join them at work.”
THE PLACEMENT YEAR IN INDUSTRY

The placement year is an option for students studying computing and digital media degrees and constitutes the third year of a four-year degree programme. A placement will normally last 12 months, or a minimum of 40 weeks, you will be employed within one company and you will have a suitable level of responsibility to make the job challenging (or ‘real’). The experience will add value to you, your degree and your future career.

A great range of companies offer placements to our students, from large multi-nationals to local employers who may recruit just one student. Some of the companies where students have undertaken placements are Accenture, BMW, Bosch, Cisco, Disney, Dolby, IBM, Intel, Lilly and Microsoft.

Placements take place between the second and final years of a degree programme. Second year students are given training in preparation for placements through guided lectures, seminars and 1:1 tutorials. The university’s Careers Office provides help with CVs, applications and interview techniques to help you gain your preferred placement. Once you are out on placement, you will be supported by a member of the academic staff who will arrange to visit you whilst you are there.

Towards the end of the first calendar year of your placement, or in the following January, we arrange a Recall Conference within the department, for a mutual catch-up. You will find it very useful to re-connect with both the department and your fellow students at this point.

Placements can be anywhere in the world and there may be funding available through the Erasmus scheme to support a work placement in Europe. Provided your programme of study overseas is agreed by the department, it will count towards your degree. We may not be able to arrange an academic visit if you choose to complete your placement overseas, but you will still be supported by us while you are there.

Remember, a placement year is not a compulsory part of degree programmes in the Department of Computing and Communication Technologies, but students who include this year invariably find that it enhances their final year of study and their final year project.

For more information about placements, contact the Partnerships and Placements Office: tdeplacements-enquiry@brookes.ac.uk

For information about the Erasmus scheme, see www.brookes.ac.uk/international/study-abroad-and-exchanges-going-from-brookes/european-work-placements

The placement year at a glance

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<thead>
<tr>
<th>September to April (Year 2)</th>
<th>May to August (Year 2)</th>
<th>January to July/August (Year 3)</th>
<th>September to December (Year 3)</th>
<th>September onwards (Year 4)</th>
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<tr>
<td>- Company engagement</td>
<td>- Placements authorised</td>
<td>- Industrial visit 2 takes place</td>
<td>- Industrial visit 1 takes place</td>
<td>- Student returns to university</td>
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<td>- Enquiries</td>
<td>- by university</td>
<td>(normally April to June),</td>
<td>(normally within 2 months of start)</td>
<td>for final year of study</td>
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<td>- Advertisements</td>
<td>- Placements begin</td>
<td>presentation to company</td>
<td>Recall Conference takes place</td>
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<td>- Interviews and offers</td>
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<td>and industrial supervisor</td>
<td>towards end of calendar year</td>
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<td>- Student engagement</td>
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<td>June onwards placement ends</td>
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<td>- Students given training</td>
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<td>- for placements (CVs, interview techniques, applications)</td>
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SUPPORTING YOU WHILE YOU STUDY

Some of the students we have profiled in this brochure have told you that coming to university is more than just about getting your head down and studying. And they’re quite right, too! We do, though, want you to enjoy studying with us, and we know that in order to do that you need the right kind of support, so we have put in place systems that can offer you help when you need it.

Within the department we have two dedicated full-time Student Support Co-ordinators, Fareena and Sam, who are here to help you sort out any problems with your academic programme. You can also feel confident about chatting to them about any other problems you might have as all your conversations with them are treated as confidential.

You will have your own Academic Adviser who can talk to you about any trickier aspects of your programme and help you to get the best out of your course. You can also seek advice from other academics who teach on your course. Academic tutors have nominated open office hours and you can also book an appointment with them via Google Calendar.

The Partnerships and Placements Manager, Andy, is available to help you if you would like to complete an industrial placement year.

The university also offers a further useful range of support.

Counselling
You can talk to a counsellor about any concerns you have, whether personal or academic, free of charge and in total confidence.

Disability and Dyslexia Service
Advice and support is available from the pre-application stage onwards.

Medical and dental services
There is a medical centre and a dental surgery on Headington campus.

Finance
The Brookes finance team can assist you with issues concerning student finances and support including scholarships and bursaries.

Religion
We welcome students to all denominations and faiths. We offer various services on-campus and mosques and a synagogue can also be found in the city. Halal and kosher food is also available on campus.

Mature students
We offer part-time study options; childcare at our excellent nursery; study support through Upgrade as well as from your academic adviser; and advice on finance.

Nursery
Oxford Brookes has its own well-equipped and professionally run nursery, available for children aged between four months and five years.

Brookes Union (students’ union)
Their motto is “Here to help you…”

Full details of all the services offered by the university can be found at www.brookes.ac.uk/studying-at-brookes/student-life/personal-support-services/ and at www.brookes.ac.uk/studying-at-brookes/student-life/brookes-union
STUDENT SOCIETIES

The university offers a wealth of different societies you can join, so whatever your interest, there should be a society for it. If there isn’t, you can start your own! Details of all the societies are on the web site at www.brookesunion.org.uk/societies, but here are a few that might interest computing and digital media students.

Computing Society
Oxford Brookes computing society is for both computing students, and those just interested in the subject.

Sound and Light Society
The Sound and Light Society is for both experienced technicians and novices, helping them to build industry connections to prepare them for working in the industry.

Brookes Radio Society
Brookes Radio is an online only radio station broadcasting a wide range of music to cover all music tastes, plus chat shows and special guest speakers.

Gaming Society
The Gaming Society provides the chance for gamers to come together and share their passions. They hold LAN parties and Xbox/PS evenings.

BrookesTV
BrookesTV is a news/magazine show produced by students. Their studio is located on Wheatley campus where producer Joe Carr, a technical instructor in the department, is based.

Robotics Society
‘The Society provides an opportunity for students, on software related courses, to gain added skills in programming hardware, with the Arduino microcontroller, and it allows students to apply their knowledge of programming in an informal environment.’

George McDonnell
Computing student
VISITING THE DEPARTMENT

Now that you’ve read all about us, do please come and see us. If you’re reading this whilst on a visit, we are very pleased to have you with us.

The best way to experience everything that both the department and the university as a whole has to offer you, is to come to one of our open days. We hold these on Saturdays during October, November and June, from 9 am to 4 pm, so you can visit our campus at Wheatley to see all the facilities here and go and have a look round the campus in Headington as well.

During an open day visit to the department you will be able to attend subject talks, take part in hands-on activities, talk to staff, students and graduates, take a tour of the campus talk to other university staff about student accommodation, finance, admissions etc. There are regular tours of the accommodation at Wheatley throughout the day.

General talks about student life, finance etc are available at the Headington campus on open days, so you can join one of these either before or after your visit to our campus. You can also tour the other student accommodation from there.

Whilst we’d love you to come to one of our open days, we do realise that other universities have the annoying habit of choosing the same dates as ours to hold their own open days. So, if you are unable to visit us for that or any other reason, please contact us (details on the back of the brochure) to arrange a visit. It’s always best to book a visit as we can’t guarantee that the people you will need to talk to will be available if you visit unannounced! Not that we won’t be pleased to see you, of course, but we want you to get the best out of your visit.

Applicants who receive an offer of a place on one of our undergraduate courses will be invited to visit us, usually in March, for a dedicated event.

For details of open day dates and how to register, please look on the website at www.brookes.ac.uk.
The department has an excellent reputation for research and knowledge transfer. We have a number of active research groups with internationally recognised researchers in all its disciplines.

The Intelligent Systems Engineering Research Centre (ISERC) operates as an umbrella Research Centre covering the work of the Computer Vision and Artificial Intelligence research groups.

Artificial Intelligence and Vision Research Group.
www.cct.brookes.ac.uk/research/isec/artificial-intelligence

The group’s research projects span computer vision applications such as action and gesture recognition and image segmentation; identity recognition from gait and pose estimation; machine learning, with a focus on efficient nearest neighbour classifiers; robotics and autonomous navigation; the modelling of chaos in dynamical systems; uncertainty theory and imprecise probabilities, with a focus on the theory of belief functions.

Communications, Media and Electronic Technologies Group (COMET)
www.cct.brookes.ac.uk/research/isec/comet

The group works closely together to leverage the different skills available and to cross link ideas. For example, the use of electronics technology in media and acoustics, the use of instrumentation and sensors in wireless networks and immersive media and the application of intelligent network design techniques to wireless systems and to identify innovative solutions.

Cognitive Robotics Group
www.cct.brookes.ac.uk/research/isec/cognitive-robotics

The Cognitive Robotics Research group undertakes research into human-robot interaction, autonomous vehicles and bio-inspired robotics. A primary focus of this research is enabling more natural interactions between humans and robots. This theme centres largely around the changing needs of society as we become more reliant on robots and need more intuitive ways of interacting with them.
The Dependable Systems Engineering Research Centre (DSERC) is an umbrella Research Centre encompassing the Applied Formal Methods Group, the Applied Software Engineering Research Group and the Advanced Reliable Computer Systems (ARCoS) Group.

**Applied Formal Methods**

[www.cct.brookes.ac.uk/research/dsec/applied-formal-methods](http://www.cct.brookes.ac.uk/research/dsec/applied-formal-methods)

The group focuses on applying mathematical theories and methods to a wide range of fundamental problems in software development. This covers requirements analysis and specification, software design, implementation, and testing methodologies, programming, specification and modelling languages.

**Applied Software Engineering**

[www.cct.brookes.ac.uk/research/dsec/applied-software-engineering](http://www.cct.brookes.ac.uk/research/dsec/applied-software-engineering)

The Applied Software Engineering Research Group takes an empirical and experimental approach to software engineering, studying software systems in order to characterise and improve the systems. Our work sometimes involves doing interdisciplinary research with psychologists as well as working with other disciplines of computer science such as human computer interaction, artificial intelligence, etc. The group has attracted funding from The Open Group for providing services in the area of enterprise architecture.

**Advanced Reliable Computer Systems Group**

[www.cct.brookes.ac.uk/research/dsec/arcos](http://www.cct.brookes.ac.uk/research/dsec/arcos)

The Advanced Reliable Computer Systems (ARCoS) group carries out leading research in the design, test, and verification of reliable computer systems. This includes architectural and systems level VLSI designs; security, power, and process variation aware designs; algebraic modeling of hardware; fault tolerance and testability. Application areas include reliable and efficient systems in submicron and nano technology, attack tolerant crypto hardware for improved security, wearable electronic devices, reliable remote sensors, etc.
CONTACT INFORMATION

Undergraduate applications
For advice about undergraduate applications contact:
query@brookes.ac.uk
+44 (0) 1865 484848

International applications
For information about applying as an international student please visit:
www.brookes.ac.uk/international

More information
For more information about the Department visit:
www.cct.brookes.ac.uk

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Oxford Brookes promotes equality of opportunity for all who study, work and visit here.
For more details please visit www.brookes.ac.uk/services/hr/eod or phone +44 (0) 1865 485929.

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