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Information provided by the University such as in presentations, University brochures and the University website, is accurate at the time of first disclosure. However, courses, University services and content of publications remain subject to change. Changes may be necessary to comply with the requirements of accrediting bodies or to keep courses contemporary through updating practices or areas of study. Circumstances may arise outside the reasonable control of the University, leading to required changes. Such circumstances include, industrial action, unexpected student numbers, significant staff illness (where a course is reliant upon a person’s expertise), unexpected lack of funding, severe weather, fire, civil disorder, political unrest, government restrictions and serious concern with regard to the transmission of serious illness making a course unsafe to deliver. After a student has taken up a place with the University, the University will look to give early notification of any changes and try to minimise their impact, offering suitable alternative arrangements or forms of compensation where it believes there is a fair case to do so. Offers of a place to study at the University will provide up to date information on courses. The latest key information on courses, entry requirements and fees can be found at www.leeds.ac.uk/courses. Please check this website before making any decisions.
Computing underpins modern life. The link between current research in computing and commercial product is critical to the continuing success of the IT industry. Our students are well placed to have both the background knowledge in the research areas and the technical and professional skills required to lead the design and development of future applications.

An active research environment enables us to offer a range of exciting courses taught by experts who are leaders in their fields. Our research themes – which cover fundamental work in computational systems science, artificial intelligence and applied computing in biology, medicine and health – feature prominently in the curriculum. This allows you to gain insights into cutting-edge problems and their solutions.

REPUTATION
We are one of the longest established computing schools in the country, with a international reputation for teaching, research and engagement with industry. We are ranked in the top 20 by the Complete University Guide, and top 10 in the Guardian university league tables 2018. We achieved 99% overall student satisfaction in the 2016 National Student Survey (NSS).

In recognition of our strong and continued commitment to gender equality, we have received a prestigious Athena SWAN Silver Award.

This is awarded by the Equality Challenge Unit, the national body that promotes equality in the higher education sector.

OUR DEGREES:
- APPLIED COMPUTER SCIENCE
- COMPUTER SCIENCE
- COMPUTER SCIENCE WITH ARTIFICIAL INTELLIGENCE
- COMPUTER SCIENCE WITH HIGH-PERFORMANCE GRAPHICS AND GAMES ENGINEERING

JOINT DEGREES:
- COMPUTER SCIENCE WITH MATHEMATICS
- ELECTRONICS AND COMPUTER ENGINEERING

To view all undergraduate degrees offered by the Faculty of Engineering visit engineering.leeds.ac.uk
All our degree courses stem from our research activities, which focus on both the application and the scientific aspects of computing. Our research themes of computational systems science and artificial intelligence feature prominently in the curriculum, enabling you to gain insights into cutting-edge problems and their solutions.

Our courses have a common core of programming, software engineering and computer networking: generic skills for this subject area that support the subjects studied in later years and the specialist project undertaken in year three.

INDUSTRY RELEVANT COURSES
Our engagement with industry is one of the main reasons our graduates are so highly valued. The School has an active Industrial Advisory Board, which helps ensure our courses are up to date with the modern practices and techniques that will enable you to succeed in industry upon graduation.

FLEXIBLE DEGREES
Our courses share a common first year. This means you have the freedom to switch courses up until the end of your first year.

You also have the option of extending your studies by taking an industrial placement year or studying abroad. Visit our ‘Careers and employability’ section on page 06 to find out more about these options.

All our courses have a modular structure where you will be required to study 120 credits per year. A standard module is typically worth 20 credits.

INTEGRATED MASTERS
All our courses are Integrated Masters (MEng, BSc or MSci, BSc) degrees, meaning they provide you with great breadth and depth of study.

If you study for four years, you can graduate with a Masters qualification, which offers you the opportunity to work on a wider range of projects with a high level of industrial involvement. Integrated Masters graduates also typically command higher salaries than those who leave with a BSc degree.

Should you wish to graduate early, you may decide at any point until the middle of the third year to graduate after three years with a BSc.

If you are sure from the start that you only want to study for three years, it is also possible to apply for the BSc version of our courses. The BSc is identical to the first three years of the MEng/MSci course and has the same entry requirements.

FACILITIES
You will have access to specialist facilities, including a variety of superbly equipped laboratories containing both Linux and Microsoft platforms. Research facilities are especially important to undergraduates undertaking internships and final-year projects. For example, project students have access to a 53 megapixel powerwall display and a dedicated 3D virtual reality suite, a new cloud computing testbed and dedicated laboratories providing high-specification, dual-display Linux workstations, iPad, Mac and Android development areas. Our new study zones provide you with high-quality space for individual study and group work.

They also include online access, flexible space for project meetings and presentations, and room to relax between studies.

RANKED TOP 10 IN THE UK FOR
COMPUTER SCIENCE IN THE
GUARDIAN LEAGUE TABLES 2018
STUDENT SUPPORT
Our personal tutorial system will provide academic and pastoral support. You will have a designated personal tutor throughout your studies at Leeds. He or she will be an academic member of staff: you will have weekly academic tutorials with your tutor throughout your first year, in your tutor group (of typically five students), as well as one-to-one meetings twice per semester.

In addition, our excellent Student Support team is based close to where you’ll work and study to help with anything from academic advice to timetabling and project submission enquiries.

The web-based student portal will enable you to access the University’s student services and information, while our VLE will allow you access to your personal timetables, course materials, academic and social groups, and much more.

HANDS-ON LEARNING
The project work you’ll carry out on your course will take you one step closer to becoming a confident and self-motivated graduate.

Projects are an important feature of all our courses. They provide you with an excellent opportunity to explore topics in depth and enable you to develop essential skills such as problem-solving, communication and teamwork, all of which are vital to success in your chosen career.

Our close links with industry mean that you’ll benefit from industrial input into design projects at a variety of levels.

YEAR ONE
The Programming Project module will require you to individually develop a larger application chosen from a range of suggested projects. This is designed to reinforce your C programming skills and enhance your ability to independently implement code.

YEAR TWO
The second-year project in software engineering is a major software development task undertaken across one semester by teams of five or six students. It’s the first experience that you’ll have of developing a complex piece of software and you’ll do so in close collaboration with others.

YEAR THREE
You’ll be expected to carry out a piece of individual research and will have an academic supervisor who offers guidance throughout. Recent examples of projects include:
- 3D noughts and crosses with Baxter, a humanoid robot
- Design of quad rotor semi-autonomous flight controller software
- The Leeds method of management antibiotic application.

YEAR FOUR
If you do the MEng, you’ll undertake a major group project to further develop your teamworking, project management and research skills in addition to your technical knowledge.

Examples of recent projects include:
- Development of a 3D modelling tool using a haptic device
- Design and development of a tool for monitoring energy measurements in cloud computing
- Exploring the use of NI’s myRIO C++ API and robotics platform to perform robot navigation and obstacle avoidance.
Careers and employability

A degree from the University of Leeds and the wider experience you’ll gain while you’re studying here will help you to stand out from the crowd and secure that all-important graduate job.

REWARDING CAREERS

85% of our recent graduates have successfully secured a professional or managerial role or gone on to further study within six months of graduating (latest Destinations of Leavers from Higher Education (DLHE) survey).

Our graduates can be found working in roles including:

- Software Developer, Amazon
- Business Consultant, BAE Systems
- Cyber Forensic Investigator, Barclays
- Technology Graduate, BSkyB
- Software Engineer, BT
- Graduate Software Engineer, IBM
- IT Graduate, John Lewis
- IT Graduate Scheme, Lloyd Banking Group
- IT Analyst, Morrisons Supermarket
- Capital Plan Analyst, National Grid
- Data Associate, PwC
- Software Engineer, Skype
- Software Developer, X-Lab.

Across the industry, IT professionals earn an average of £38,000, and this can be significantly higher in specialist fields and in different parts of the country. The most recent Association of Graduate Recruiters Survey (2016) found that starting salaries for graduates throughout the sector were about £29,000.

CAREERS SUPPORT

Throughout your time with us our award-winning Faculty Employability team is here to support, guide and advise you. In addition to specialist face-to-face meetings, you’ll benefit from:

- timetabled employability sessions
- ongoing support to find internships and placements
- presentations, careers guidance appointments, and workshops delivered by employers.

Our Employability team also organises a Technology, Engineering and Science Careers Fair. This will give you the opportunity to meet graduate recruiters to gain an insight into graduate jobs and to explore work experience and internship opportunities.

STRONG INDUSTRIAL LINKS

Our reputation with industry ensures that we maintain close working relationships with companies that actively recruit Leeds graduates. Our staff work with various companies on a range of teaching, research and consultancy projects, and we organise industrial visits and offer additional seminars delivered by practising IT professionals. This means that you will have direct contact with industry and potential employers from the beginning.

Examples of our involvement with industry:

- IBM contributes to the assessment of the second-year group software engineering project and awards a prize to the best group.
- Deloitte, IBM, CSC and RNLI contribute directly to our first-year Professional Computing module and actively support our programmes.
- Ordnance Survey, the British Library, BT, the Department of Health and Reckitt Benckiser have all contributed ideas for projects in recent years.
- CSC, Deloitte, PricewaterhouseCoopers and Lloyds Banking Group have recently made presentations to our students.

INDUSTRIAL PLACEMENT YEAR

An industrial placement year is a great way to help you decide what kind of career you might like when you graduate. As well as giving you the opportunity to develop your own skills, you’ll gain a real insight into working life in a particular company or sector.

All our degrees allow you to undertake a placement year alongside your degree (either in the third year of the BSc or the third or fourth year of the MEng/MSci).

If you decide to undertake a placement year, this will extend your degree by 12 months. You will be fully supported by our Employability team prior to and during your placement year. On successfully completing your placement year, you will be awarded the ‘industrial’ variant in your degree title to demonstrate your unique expertise to future employers.

STUDY ABROAD

You have the opportunity to apply to spend time abroad, usually as an extra academic year. The University has partnerships with more than 400 universities worldwide and popular destinations for our students include Europe, the USA, Canada, Australia, New Zealand, Singapore, Hong Kong, South Africa and Latin America.

Visit our website to find out more about these and other opportunities engineering.leeds.ac.uk/computing/employability

Students are currently undertaking a placement year at the following companies:

- Goldman Sachs
- Novartis
- BT
- UBS
- CGI
- ARM
- BBC
- IBM
- NEXT

engineering.leeds.ac.uk/computing
My role at Sky involves coding with other developers to make the internet work for Sky customers. I was assigned a web application project that is currently being used by management, and its purpose is to grade all Java developers at SNS based on their technical, business and soft skills.

The placement year has given me an insight into the industry I intend to work in. Additionally, it has allowed me to become a better programmer and get a taste for the ‘real world’. I would advise everyone to do a year in industry; you’ll be surrounded by experts in your field who will be there to guide you."

O’BRIEN ALARIBE
BSc Computer Science (Industrial)
Industrial placement year at BSkyB
Applied Computer Science (MEng, BSc)

Computing is critical to all areas of modern life. This course will give you insight into key theoretical aspects of the subject, as well as emphasising the practical skills needed to develop computing infrastructure and solve computational problems in areas such as engineering, healthcare and the business world.

You’ll learn the fundamentals of software development and how to build secure and efficient systems for desktop, web and mobile environments. You’ll also be able to develop skills in more specialised areas such as data science, cloud computing and robotics. A wide range of optional modules is available, allowing you to study topics that relate to your own interests and career ambitions. You’ll also undertake project work at every level of the course, equipping you with the problem-solving and teamwork skills that you will need in your future career.

In your first year you’ll study the basic principles of programming, develop your mathematical skills and learn about computer architecture.

Optional modules will introduce you to fundamental web technologies. Year two will build on this knowledge base, taking you deeper into more theoretical areas such as algorithms and artificial intelligence, while also giving you practical skills in software engineering and user interface creation.

In year three you’ll have a much wider choice of modules, giving you the chance to study specialist areas such as data analytics and visualisation, security, distributed systems, mobile computing and robotics. You will also undertake a major individual project – an opportunity for you to specialise in an area of your choice.

If you study the MEng qualification, you’ll continue into year four. Options available here cover advanced topics drawn from our research strengths, including big data systems, machine learning, semantic technologies and cloud computing. You’ll take part in a substantial group project on a specific engineering problem that allows you to apply everything you’ve learned during the course.

**HANDS-ON LEARNING**

- Forecasting box office sales revenue from film reviews
- Predicting the popularity of news articles from headlines
- Developing a big data solution to enable analysis of UK-wide company data
- Developing a multi-user management information system for property recovery
- Creating an interactive learning resource for teaching Scratch using Kinect
- Developing an activity-tracking android mobile app with image tagging and web functionalities
- Visualisation of clinical audit data
- Scheduling train crews via a graphical user interface
- Developing a user-adaptive system to support automated medical appointment scheduling.

**REWARDING CAREERS**

Our graduates have excellent job prospects. With the continuing application of computer technologies, rapid growth of hardware and software technologies, their allied industries and widespread application, the demand for our graduates is set to continue for the foreseeable future.
This course will equip you with the core technical and problem-solving skills to tackle current and emerging challenges in the crucial and fast-changing field of IT and computing.

Our course includes the core topics of programming, software engineering and computer networking.

In addition, specialist areas focusing on computationally challenging problems are developed and analysed through teaching and project work.

In your first year you will learn about the fundamentals of programming and the underlying mathematical principles of computer science while developing skills in software engineering.

Year two allows you to deepen and broaden your knowledge of computer science, with core modules introducing you to topics such as artificial intelligence and developing your understanding of algorithms and operating systems. You’ll also select optional modules to focus on topics that suit your interests or career plans.

You’ll build on this in year three, when you’ll have far greater choice in your optional modules. You could study robotics, build your skills in computer graphics or mobile app development, or explore cryptography and the challenges of secure computing among others.

If you continue to year four to gain the MEng qualification, you can also select modules on topics such as natural language processing, knowledge representation or bio-computation, and you’ll take part in a substantial group project on a specific engineering problem that allows you to apply everything you’ve learned during the course.

This course is accredited by the British Computer Society.

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I have undertaken several work experience placements in various sectors, including finance and computing. I did a placement at Barclays HO in Canary Wharf in Legal and Compliance Operations and also did a summer placement with a company called Human Recognition Systems at Wavertree Technology Park in Liverpool, where I was a software intern.

On these placements I gained insight into how large companies function, I was able to discuss key functions with senior members of staff, and during one of my placements I learnt new programming and computing skills which worked very well alongside my degree.

HANNAH HENRY
BSc Computer Science

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HANDS-ON LEARNING
Project work is used extensively at all levels to allow you to study individual topics in more depth. Recent examples include:

- Designing high-performance parallel programs
- Developing efficient mathematical algorithms, which can be applied to problems in areas such as finance, weather prediction and biology
- Understanding problem complexity and mathematical techniques for improving the efficiency of solution approaches
- Exploring the uses and security of large-scale system architecture
- Cloud computing
- Mobile app development
- Graphics and visualisation.

REWARDING CAREERS
Our graduates find employment in the IT industry, ranging from startups to international organisations, and across a range of other sectors including technology, retail, finance, public authorities and consultancies.

Recent graduate destinations include Barclays, BT Group – Openreach, CSC, EMIS, Ernst & Young, Fujitsu, Goodrich ISR Systems, Imagination Technologies, Microsoft and PepsiCo.
Computer Science with Artificial Intelligence (MEng, BSc)

Artificial intelligence is increasingly important to computer games, web search, biometric systems and many other areas of modern IT.

This course will allow you to gain fundamental skills such as programming, mathematics, network architectures and project management, while studying specialist artificial intelligence topics such as machine learning, image analysis, text analytics and their applications in areas from vision to automated reasoning.

Drawing on our internationally leading research and development in the School of Computing and the University’s £4.3m National Facility for Innovative Robotics Systems, you’ll also explore how artificial intelligence is being applied to important economic and societal issues in fields such as medicine, health, transport and smarter cities through case studies from ongoing research projects.

In addition to covering the foundations of artificial intelligence in your first year, you will develop fundamental technical and professional skills such as programming, mathematics, system and network architectures, and project management.

In year two you’ll build on this foundation to develop your knowledge of algorithms and operating systems among other key areas. You’ll also gain more about the ideas and techniques involved in different approaches to artificial intelligence, the basics of knowledge representation and key aspects of data mining.

In year three you’ll learn more about robotics and parallel computing while choosing from a wide range of optional modules. You could focus on data science, web services, visualising information or user-adaptive intelligent systems, allowing you to gain a broad base of knowledge and build further specialist skills.

If you continue to year four for the MEng qualification, you’ll take Masters-level modules in areas such as machine learning, image analysis and language processing to enhance your knowledge of the ways in which computer systems can process, represent and analyse different types of complex data.

HANDS-ON LEARNING

Project work is used extensively at all levels to allow students to study individual topics in more depth. Recent examples include:

- Final-year projects that apply artificial intelligence techniques to problems in areas such as healthcare and crime prevention, for example:
  - Grading cancer in histopathology
  - Using SLAM with LEGO Mindstorms to explore and map an environment
  - Evolving robots in a simulated domain

- Module coursework developing computer vision systems that will recognise and track objects

- Web-based natural language processing and computerised approaches to language translation

- Developing bio-inspired algorithms derived from biological systems and computational biology

- User-adaptive methods to tailor systems to individuals and groups.

REWARDING CAREERS

Intelligent systems range from domestic appliances and internet search engines to robots exploring Mars. Our graduates find employment in the IT industry, ranging from startups to international organisations, and across a range of other sectors including computer games, technology, retail, finance, public authorities and consultancies.

“ I completed my Computer Science degree and PhD in Artificial Intelligence at Leeds in the early 90s. I moved to Silicon Valley, first working for Apple, then at a series of startups, culminating in co-founding Blurb. I joined Google and spent five years leading teams in search, ads and mobile. I’m now CTO of Songkick, one of London’s leading tech startups.

I came to Leeds because of the excellent computer science course and to live outside London. I loved my time here: my course, the broader student life and living in the city. I still use the computer science I learned every day – from algorithms and data structures to the information retrieval techniques I worked on in my PhD. It was an essential grounding for my career.”

DAN CROW
BSc Computer Science; PhD in Artificial Intelligence
Chief Technology Officer, Songkick

engineering.leeds.ac.uk/computing
Communications, information, visualisation and sensing technologies are increasingly being integrated in smartphones, advanced manufacturing, electronic healthcare and other areas. As a result, the interface between electronics and computing is a key growth area for the technology industry.

Taught by the School of Electronic and Electrical Engineering alongside the School of Computing, this course has been designed to meet this need. You’ll study the foundations of electronics and computing, from programming languages to electronic circuit design, and learn how the whole hierarchy of digital electronics and software fits together.

You’ll study the foundations of electronics and computing in your first two years, including electronic circuit design, communications systems, computer program design and programming languages. You’ll also learn more about the hierarchy of digital electronics and software, from individual components to billion-transistor chips, and on to full computer systems, data routing and software applications.

This learning will provide the basis for your studies in year three, when you’ll take more specialised modules in fields like digital communications and embedded systems. You’ll also have the chance to select optional modules that suit your interests and career ambitions, on topics such as secure computing, mobile computing and artificial intelligence.

For MEng students, the fourth year provides a wide range of choice in advanced areas such as digital signal processing, network security and cloud computing. You’ll also complete a dissertation on a particular aspect of the industry to help you prepare for professional life.

For module information, please visit:
engineering.leeds.ac.uk/computing/undergraduate/electronics-computer-engineering-degree

**HANDS-ON LEARNING**

Potential student projects cover a very wide range because modern electronics and computing engineering are so intertwined. Student projects vary from a hardware focus, where computer engineering expertise can allow high functionality, to software-focused projects using highly flexible processors such as powerful computers. Project examples include:

- The performance of TCP over wireless links
- Implementation of a high-resolution surface-penetrating detection system
- Quantum computing cryptography.

The speed at which technology develops has always interested me. I’ve always wanted to know what the next big technological development will be, and how it will affect us in our everyday life. This interest, coupled with my creative and academic qualities, drove me towards a computer science degree.

However, when I came across the Electronics and Computer Engineering course at Leeds, and visited the department on an open day, I found myself not only wanting to write software but also work with electronics and hardware. This new-found interest, and the University’s outstanding reputation, made Leeds the clear choice for me.”

**CALUM BOUSTEAD**
BEng Electronics and Computer Engineering
Computer Science with High-Performance Graphics and Games Engineering (MEng, BSc)

By studying this course you’ll be well placed to join one of the most performance-driven applications of computer science – the multibillion-pound global games industry. As a graduate, you will work at the top-end of the games industry and will develop computer graphics on high-performance platforms, or write engines for the next generation of games.

Developed in collaboration with a prestigious steering group from industry, this course focuses on computer graphics, where programmers must push computing resources to the limit, using deep understanding of architecture and high-performance programming to generate new levels of graphical realism and visual effects on cutting-edge hardware platforms.

You’ll gain proficiency in low-level programming (C++, graphic and compute shaders), a thorough understanding of multi-core and many-core programming techniques, game engine and tool development techniques, and fundamental insight into graphics and the practical techniques used in games.

SPECIALIST FACILITIES
You’ll have access to laboratories equipped with high-end unix workstations with dual monitors and platforms for teaching mobile computing (Android/iOS devices) and robotics.

During your fourth year, you will use workstations with high-end GPUs to act as DirectX12 and Vulkan games development platforms and will have access to other specialist hardware including the latest virtual reality headsets for experimenting on. For learning games engine design and exploring new rendering techniques, students will be working with the source code of a leading game engine, Epic’s Unreal Engine 4.

THE GLOBAL GAMING MARKET IS SET TO REACH $113 BILLION BY 2018

96% OF OUR RECENT GRADUATES HAVE SECURED EMPLOYMENT OR GONE ONTO FURTHER STUDY WITHIN SIX MONTHS OF GRADUATING (DLHE)

This course has been developed in collaboration with a prestigious steering group from industry comprising:
- Barog Game Labs
- Double Eleven
- Epic Games
- NVIDIA
- Team 17
- Sumo Digital
- Weaseltron.

engineering.leeds.ac.uk/computing
There is a shortage of highly skilled graduates in this field, so once you’ve completed this course it’s highly likely that you will be in demand. You’ll be well placed to join the multimillion-pound global games industry in positions such as:

- Software Developer
- Technology Leader for Graphics and Rendering
- Games Development Team Leader
- Technical Director.

Outside the games industry, the programming skills you develop during this course would allow you to secure a position in other performance-driven industries, for example embedded systems. Your computer graphics expertise could lead to opportunities in the animation and visual production industries.

“This new course from the University of Leeds is a way to provide great education early on and gives the entire industry an ever stronger bed of talent to build on, with the required skill set to lead the next generation of research in many areas.”

Phil Scott, Developer Technology Evangelist, NVIDIA

There is a real shortage of technical talent, which is a limiting factor in the growth of the UK games industry. I expect that students on these new programmes will graduate with exemplary expertise in graphics technologies, ready to step into key positions in the gaming and related industries. They’ll be snapped up.”

Paul Porter, CTO and founder, Sumo Digital

47% OF UK COMPANIES IN THE GAMES SECTOR ARE EXPERIENCING A SKILLS SHORTAGE

REWARDING CAREERS
# Modules

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<th>Computer Science</th>
<th>Applied Computer Science</th>
<th>Computer Science with Artificial Intelligence</th>
<th>High-Performance Graphics and Games Engineering</th>
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<td>Computer Architecture</td>
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<td>Fundamental Mathematical Concepts</td>
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<td>Introduction to Discrete Mathematics</td>
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<td>Procedural Programming</td>
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<td>Professional Computing</td>
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<td>Programming Project</td>
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<td>Programming for the Web</td>
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<td>Introduction to Web Technologies</td>
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<td>Social and Mobile Web Application Development</td>
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* c = compulsory, o = optional
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<th>Year 3</th>
<th>Computer Science</th>
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<th>High-Performance Graphics and Games Engineering</th>
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<td>Decision Modelling</td>
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<th>High-Performance Graphics and Games Engineering</th>
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<td>Animation and Simulation</td>
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<tr>
<td>Software Engineering</td>
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</table>

These are typical modules/components studied and may change from time to time.
Mathematics is the underlying language of computer science, and many of its applications are in the field of computer science. Taught by the School of Computing and the School of Mathematics, this course allows you to study core topics in both subjects while specialising in areas that link the two at Leeds.

You’ll explore topics such as logic, algorithms, graph theory, optimisation, scientific computing, big data and complexity science in depth, and consider how they are applied to meet some of the major challenges facing the modern world. Optional modules will allow you to focus on one of three individual specialisms: discrete mathematics, scientific computation or complex systems.

Your first year will introduce you to a range of fundamental topics in both computing and mathematics, including computer programming, systems, modelling, applied mathematics, pure mathematics and statistics.

This will lay the foundations for the next two years, when you’ll build on your skills in core modules focusing on numerical computation and algorithms.

Your third year will also give you the chance to research a related topic in depth, when you complete an individual project under the guidance of your academic supervisor.

In your fourth year you have a wide range of choices from specialised modules in mathematics and computing. These modules expose you to current research developments and equip you with analytic skills and in-depth knowledge in one of the three specialisms: discrete mathematics, scientific computation or complex systems.

HANDS-ON LEARNING
Project work is used extensively at all levels to allow students to study individual topics in more depth.

Recent examples include:
- Analysis of shortest path algorithms
- Parallel contour tree computation
- Graphs with no cycle with a unique chord
- Algorithms for graphs of bounded tree width.

REWARDING CAREERS
This course is ideal if you are wishing to pursue a career in, for example, the Met Office, GCHQ or Shell, or in engineering, government or finance, including the stock market. It draws together a practical understanding of software engineering and systems, and the skills of analysis and modelling to investigate particular problems in computing.

THIS COURSE IS TAUGHT BY BOTH
THE SCHOOL OF COMPUTING AND
THE SCHOOL OF MATHEMATICS
## Year 1

### Compulsory modules:
- Computer Architecture
- Computer Processors
- Fundamental Mathematical Concepts
- Introduction to Discrete Mathematics
- Procedural Programming
- Object Oriented Programming
- Numbers and Vectors
- Introductory Linear Algebra
- Modelling with Differential Equations

### Optional modules:
- Programming for the Web
- Databases
- Financial Mathematics 1
- Probability and Statistics I
- Probability and Statistics II

## Year 2

### Compulsory modules:
- Numerical Computation
- Algorithms and Data Structures I
- Algorithms and Data Structures II
- Mathematical Logic 1
- Real Analysis
- Groups and Vector Spaces
- Rings, Fields and Polynomials
- Vector Calculus
- Linear Differential Equations and Transforms
- Nonlinear Differential Equations

### Optional modules:
- Operating Systems
- Networks
- Formal Languages and Finite Automata
- Artificial Intelligence
- User Interfaces

## Year 3

### Compulsory modules:
- Individual Project
- Graph Algorithms and Complexity Theory
- Distributed Systems
- Parallel Computation
- Cryptography
- Programming Languages and Compilation
- Computer Graphics
- Combinatorial Optimisation
- Graph Theory
- Number Theory
- Proof and Computation
- Models and Sets
- Combinatorics
- Coding Theory

### Optional modules:
- Transformation Geometry
- Mathematical Methods
- Linear and Non-Linear Waves
- Dynamical Systems
- Introduction to Entropy in the Physical World
- Numerical Methods
- Modern Numerical Methods
- Mathematical Biology
- Philosophy of Logic and Mathematics
- Advanced Models and Sets
- Advanced Coding Theory
- Advanced Mathematical Methods
- Advanced Linear and Nonlinear Waves
- Advanced Dynamical Systems
- Advanced Entropy in the Physical World
- Advanced Modern Numerical Methods
- Advanced Mathematical Biology

## Year 4

### Compulsory modules:
- Algorithms

### Optional modules:
- up to 60 credits of optional modules from the School of Computing,
- up to 70 credits of optional modules from the School of Mathematics.

These are typical modules/components studied and may change from time to time.
Entry requirements and how to apply

Our standard entry requirements are listed below. Lower offers can be made based on demonstrated interest and aptitude for the subject (typically AAB).

<table>
<thead>
<tr>
<th>Degree title</th>
<th>UCAS code</th>
<th>Duration (years)</th>
<th>A-level</th>
<th>BTEC</th>
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<tbody>
<tr>
<td>MEng, BSc Applied Computer Science</td>
<td>I400</td>
<td>4</td>
<td>AAA excluding General Studies or Critical Thinking. GCSE Mathematics grade B or above is also required.</td>
<td>D**+D plus GCSE Mathematics grade B or above.</td>
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<tr>
<td>BSc Applied Computer Science</td>
<td>I402</td>
<td>3</td>
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<tr>
<td>MEng, BSc Computer Science</td>
<td>G402</td>
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</tr>
<tr>
<td>BSc Computer Science</td>
<td>G400</td>
<td>3</td>
<td>AAA including Mathematics or Computer Science and excluding General Studies. Grade B or above in GCSE Mathematics is required if no Mathematics A-level is taken.</td>
<td>D**+D with distinctions in all Mathematics units. Mathematics units must usually include Further Maths and/or other appropriate maths units. Some may be optional on your BTEC but are required by the Faculty. Please contact us for further information.</td>
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<tr>
<td>MEng, BSc Computer Science with Artificial Intelligence</td>
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<tr>
<td>BSc Computer Science with Artificial Intelligence</td>
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<td>MEng, BSc Computer Science with High-Performance Graphics and Games Engineering</td>
<td>I6K8</td>
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<tr>
<td>MSci, BSc Computer Science with Mathematics</td>
<td>G4G2</td>
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<tr>
<td>BSc Computer Science with Mathematics</td>
<td>G4G1</td>
<td>3</td>
<td>AAA including Mathematics, and excluding General Studies or Critical Thinking.</td>
<td>D**DD with distinctions in all Mathematics units, plus grade A in A-level Maths. Mathematics units must usually include Further Maths and/or other appropriate maths units. Some may be optional on your BTEC but are required by the Faculty. Please contact us for further information.</td>
</tr>
<tr>
<td>MEng, BEng Electronics and Computer Engineering</td>
<td>G4G1</td>
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<tr>
<td>BEng Electronics and Computer Engineering</td>
<td>G4G1</td>
<td>3</td>
<td></td>
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</tr>
</tbody>
</table>

*Lower offers may be made based on demonstrated interest and aptitude for the subject (typically AAB). Where maths or computing are required, this must be at grade A. Where an A-level science subject is taken, we require a pass in the practical science element, alongside the achievement of the A-level at the stated grade.*
ACCESS TO LEEDS
The University of Leeds has a policy of welcoming applicants from non-traditional academic backgrounds. If you do not meet our entry criteria above, you may be eligible via the Access to Leeds scheme.

www.leeds.ac.uk/a2l

INTERNATIONAL FOUNDATION YEAR
Our International Foundation Year (IFY) is intended for international students who do not yet have the formal qualifications required for entry to year one of our degree courses.

internationalfoundationyear.leeds.ac.uk

LANGUAGE CENTRE
Our Language Centre provides the Academic English for Undergraduate Studies pre-sessional course, which is designed to help international students develop the necessary language and academic study skills for undergraduate study.

www.leeds.ac.uk/languages

HOW TO APPLY
All undergraduate applications should be made through the Universities and Colleges Admissions Service (UCAS). Full instructions on how to apply are available at www.ucas.com.

OFFER PROCESS
Suitable applicants will be invited to an applicant day, for which we strongly encourage attendance, as this gives you the opportunity to meet our students, academic and admissions staff, and find out more about your course. You’ll take part in a practical computing activity followed by a student-led tour.

An interview with an academic will normally form part of this process. This will give you the chance to discuss your application in more detail, check that it’s the right course for you and your career plans, have your questions answered and find out more about studying at Leeds.

We offer a number of scholarships within the School. Please visit our website for further details.

engineering.leeds.ac.uk/scholarships

CONTACT US
If you require any further information prior to making a formal application, please contact our Undergraduate Admissions team.

School of Computing
University of Leeds
Leeds LS2 9JT, UK
tel: +44 (0)113 343 5440
email: ugpcomp@leeds.ac.uk

FIND US ONLINE
To find out more about the University and the School of Computing visit:

engineering.leeds.ac.uk/computing

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@engineeringleeds
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