Computing

Factfile

Typical entry requirements
A level grades BBB (300 points)

Required subjects
Mathematics to full A level is required for Computer Modelling and Simulation and Computer Science and Engineering.
Mathematics or Computing or Physics to full A level is required for Computer Science.

Other suitable qualifications

AVCE	300 points from 18 units
BTEC National Diploma	DMM (in an appropriate science diploma)
International Baccalaureate	32 points
European Baccalaureate	75%

A wide range of other qualifications will be considered on an individual basis such as HNC/HND, Irish Leaving Certificate, Scottish qualifications and Access courses.

Planned intake
60

Selection process
We invite suitable candidates to visit the University to find out more about the programme and meet staff and students. You may receive an offer and/or be invited for an interview.

Contact Details

For general enquiries:
Tel: 0800 980 3200 or +44 (0)1483 683076
Email: ug-enquiries@surrey.ac.uk

For admissions enquiries:
Tel: +44 (0)1483 689247/686120
Fax: +44 (0)1483 686121
Email: cs.ug@surrey.ac.uk
Web: **www.computing.surrey.ac.uk**

Degree Programmes

BSc (Honours) Degrees

Computing and Information Technology	G560 (3 yrs) / G561 (4* yrs)
Computer Modelling and Simulation	G410 (3 yrs) / G411 (4* yrs)
Computer Science	G400 (3 yrs) / G401 (4* yrs)
Computer Science and Engineering	GH46 (3 yrs) / GHK6 (4* yrs)

** Programme includes a professional training year*

Other degrees you may be interested in
Computer-aided Chemistry
Electronic Engineering
Entrepreneurship in Technology, IT and Business

Professional Recognition

Our degrees are accredited by the British Computer Society (BCS). The BCS Professional Development Scheme is also an integral part of our professional training year. It counts towards the experience required for professional membership of the BCS.

Top for Jobs

Recent graduates entered employment in roles such as:
- Electronic Arts – Tools Programmer
- Fujitsu Siemens Computers – Partner Development Manager
- Marconi – Software Engineer

Starting salaries amongst all known 2004 graduates averaged £21,600.

Why study Computing at Uni**S**?

For anyone who wants to be involved in working at the cutting edge of technological science for the modern age, a degree in computing is a natural first step. Computers are integral to numerous spheres from business and government to the media and research. With sophisticated computing skills you can be at the forefront of innovation and opportunity.

Our degree programmes are developed in close consultation with an advisory board comprising representatives of major IT organisations in the UK. This ensures that they reflect the contemporary concerns and requirements of modern business and industry and provide you with a uniquely relevant programme of study.

Ten Reasons

- Be part of a stimulating and successful Computing Department
- Discover the state-of-the-art in computer technology
- Programmes designed for careers at the forefront of computing
- Innovative syllabuses blend disciplines around a core of computing
- Opportunity to specialise in areas such as business information systems, Internet computing, formal methods or intelligent agents
- Develop core technical skills that will help you throughout your career
- A student-centred environment
- A choice of options to suit your interests throughout your degree
- The opportunity to develop your professional skills through the industrial placement scheme
- Opportunity to spend your second year studying in America

Our Degrees

Computers are essential in almost every walk of life, from aviation to medical diagnosis. In the era of the Internet and increasing globalisation, the applications of computing continue to expand. To cater for this expansion, our programmes fall into two broad categories, delivered around a core syllabus of key computing skills.

Our Information Technology programme examines computer applications for business and management. Mathematics is not a prerequisite. Our technology-oriented programmes focus on the technologies required for modelling and simulation and the engineering of computing and communication. A good grasp of mathematics is required.

There can be little doubt that as technology advances and costs fall, our reliance on computers and the demand for computer scientists will increase further. A key focus of our programmes is to develop your applied knowledge and experience. This ensures that you gain skills applicable to leading-edge developments in the real world.

Our programmes include an optional professional training year during which you can develop your skills and gain experience that will greatly improve your employability.

The best computing specialists understand the capabilities of the most powerful computers and how to harness them effectively to meet an enormously varied range of real-world situations. Our graduates, with their unique combination of computing, business and technical knowledge, are equipped to enjoy significant rewards in the world's most exciting industry.

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BSc Computing and Information Technology

Computing and Information Technology provides a management/business-oriented focus and covers a range of disciplines essential to successful computer applications. Topics covered include business methods and techniques, analysis and design of information systems and new developments in computing, particularly the Internet.

This programme is designed to help you develop all of the skills you will require to contribute, as a professional, to the exploitation of computing systems within organisations. It is an integrated programme, which places equal emphasis on the four fundamental themes of information technology: Internet computing, information systems, quantitative analysis and business methods.

To succeed as an information technologist, you will need to understand the driving forces of the world for which you are building a solution, as well as the intricacies of software systems. For the information technologist it is equally important to understand the vocabulary of organisations and be comfortable with the mathematical techniques that allow the essence of a problem to be represented. This will enable you to communicate effectively with both managers and software engineers, each on their own terms.

A systems design that illustrates the use of the skills developed on this programme can be shown by a recent professional placement project for one of the world's largest pharmaceutical companies. The student developed a database system fundamental to the management of autonomous robots utilised in the testing of pharmaceutical compounds. The project achieved a successful outcome by combining the techniques and principles of database theory, managing information systems and computer architectures.

BSc Computer Modelling and Simulation

One of the major uses of computing is to build models. You can use these models to learn about some part of the real world, or to learn how to control something. Examples include climatic models to explore global warming, financial models to predict the behaviour of stock markets, and virtual reality models for use in games. The same principles apply to these as to any other computing system – they must actually behave as required.

This programme adopts a multidisciplinary approach to help you develop the skills which you will need, as a professional, to build reliable models and simulations of computational systems. Within the programme you will be given a broad grounding in mathematical and modelling techniques, as well as studying the core computing modules. You will explore techniques in chaos and fractal theory of computer systems which are relevant to climate modelling and stock market behaviour. You will develop your core skills in data analysis and operations research that are particularly relevant to the management of large-scale organisations.

A systems design that illustrates the use of the skills developed on this programme can be shown by a final-year project to design a neural network to predict the response of patients with diabetes to particular drug treatments. This project achieved a successful outcome by combining the techniques and principles of neural network theory, machine intelligence and cognitive processes.

BSc Computer Science

Computer Science aims to provide you with a balance of knowledge and skills to design and implement software and systems to a professional standard. It is designed to equip you for a career at the forefront of innovation in software technologies.

The programme will provide you with a thorough understanding of the principles and concepts underpinning computing systems. This will both enable you to analyse and resolve issues with today's software systems, and provide a foundation on which to design the next generation of computational systems. This might mean designing quantum computers, inventing the next worldwide web or building intelligent robots.

You will study modules that cover a wide range of topics including artificial intelligence, telecommunications, digital logic and computational mathematics. You will be introduced to techniques for developing operating systems, chip designs and computer networks and gain the necessary mathematical skills for analysing, validating and verifying these systems.

A systems design that demonstrates the application of these techniques can be shown by a final-year project for simulating an ant colony. This project was designed to discover how emergent behaviour in the colony as a whole could be extrapolated from simulating the behaviour of individual ants. This project achieved a successful outcome by combining the techniques and principles of artificial intelligence, network theory and mathematical modelling.

BSc Computer Science and Engineering

The Computer Science and Engineering programme offers core computer science modules covering chip design, networking and data communications combined with specialist engineering modules. You will be introduced to semiconductors and other devices, to digital logic, and to the complexities of computer architectures and operating systems. You will still explore mathematical techniques for studying digital devices, but will find that there is a greater emphasis on the engineering aspects compared to the Computer Science degree.

Computing systems are powered by 'chips', 'processors' and many other components. These components are made of exotic materials, some of which are still emerging from research labs. The components have to be organised and related in particular ways to realise their full potential. Thus, no matter whether the computing system sits on your palm or is used to power up an Intranet, the knowledge of the material and its deployment is crucial to the development and maintenance of computing systems.

A systems design that illustrates the use of the skills developed on this programme can be shown by a final-year project to design a real-time network management system. This project achieved a successful outcome by combining the techniques and principles of network theory, chip design and digital signal processing.

Programme Overview

All of our programmes are available as four-year BSc degrees including a professional training year, or as three-year BSc degrees without professional training.

Our programmes provide multidisciplinary content that allows you to cover both the core elements of computing and the fundamental themes appropriate to the individual programme pathways. In addition you will have the opportunity to develop a range of personal and professional skills that will provide you with an edge upon entering the job market.

Our Professional Studies modules will equip you with strong teamworking, communication and presentation skills and you will have opportunities to manage a number of relevant projects throughout your degree programme. Employers see these personal development skills as giving you an added value in addition to your technical competence and they will help give you a headstart in the job market.

During **Level 1** and **Level 2** you will study core content that focuses on skills and knowledge for research and development and large-scale systems integration. Level 1 offers a broad base with much of the content common across the four programmes. You will also be introduced to topics specific to your specialist pathway. Level 2 develops and deepens your understanding of the core areas and focuses in more detail on developing your specialist skills and knowledge.

We will develop your understanding of the foundations of computing and the design and analysis of computational systems alongside intelligent systems, programming and web technologies. This will underpin the specialist knowledge you will gain from the programme-specific modules. In addition you will be able to choose from a range of optional modules that complement the core content and the specialist modules required for your degree pathway.

This provides you with the flexibility to choose the areas of broader interest that you undertake. We will also prepare you for your professional training should you choose to undertake a placement.

During **Level 3**, your will undertake an individual project that contributes approximately 35 per cent of the marks for this year. The project is your opportunity to explore a topic of your choice in greater depth. It may build on an interest that was awakened during your professional training period or during another part of your degree programme.

The remainder of the year provides you with the opportunity to pursue a number of specialist options, ranging from Software Engineering to Multimedia Information Systems, and from Artificial Intelligence to Web Technologies.

Programme Structure and Modules

Level 1

Core modules include:

- Web Publishing
- Professional Studies
- Programming Languages
- Systems Analysis and Design
- Foundations of Computing

Specialist and optional modules:

- Business Economics
- Introduction to Management
- Quantitative Methods
- Data Analysis
- Cognitive Processes
- Mathematical Methods
- Techniques in Calculus
- Computational Maths
- Vector Calculus
- Computer Logic
- Signals and Communications

Level 2

Core modules include:

- Network Technologies
- Algorithms and Data Structures
- Information Modelling
- Computer Technology
- Object-oriented Software Engineering
- Usability Engineering
- Modelling and Simulation

Specialist and optional modules:

- Marketing Principles
- Computational Operations Research
- Modelling Multimedia Information Systems
- Introduction to Groups
- Intelligent Systems
- Language Engineering
- Computational Methods
- Electronic Devices
- Maths for Engineering
- Networks and Data Communications
- Digital Engineering
- Computational Perception

Level P

- Optional professional training year

Level 3

Specialist and optional modules:

- Multimedia Information Systems
- Artificial Intelligence
- Neural Networks
- Web Technologies
- Advanced Simulation
- Managing Information Systems
- Languages and Computability
- Computer Safety and Security
- Statistics for Business
- Chaos and Fractals
- Formal Models and Systems
- Computer Architectures
- Telecommunications Theory
- Machine Intelligence
- Digital Signal Processing
- Software Engineering

- Professional Project (counts for about 35 per cent of the year)

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Lisa Lungley

Professional Training

Professional training with an employer is available as an integral part of all our programmes and is organised by the Department. We have placements at a wide range of companies, with roles covering a broad spectrum of computer-related activities. Companies that have participated in the scheme include Quintiles, IBM, Eli Lilley, Symbol Technologies, Reuters and Accenture Technologies.

At the end of their professional training, many students receive offers of employment from their placement employers for when they graduate.

The experience and skills gained on placement really do equip our students for success, and their enhanced employment prospects can be seen in our outstanding employment record. Many students continue their collaboration with their placement employers by basing their final-year project on work related to their placement. This results in a project with a strong industrial focus that can demonstrate their ability to apply their academic knowledge to real-world problems.

The professional year counts towards the experience required for professional membership of the British Computer Society (BCS).

Teaching

Teaching styles vary from large group lectures to small group tutorials and computer laboratory sessions. You will benefit from an integrated range of learning methods that includes tutorials, case studies, projects, coursework, and practical and discussion classes.

Methods of teaching and assessment in the early stages of the programmes aim to ensure your acquisition of techniques and relevant knowledge, including practice in finding information and deciding whether it is relevant. The methods adopted in Level 3 are influenced by the need to broaden and deepen the knowledge you have gained at the earlier levels, and develop the higher order skills you will need as a professional.

You will be allocated a personal tutor to help with any problems or questions concerning your degree programme, or personal matters, throughout your period of study at the University.

Assessment

You will be assessed through examinations and by coursework (which is about 30 per cent of the total mark). Examinations take place at the end of each semester on the modules studied during that semester. Marks from Level 2 onwards count towards the final total, forming the basis of the degree award. If you undertake a professional placement you will also be assessed on your performance during the professional stage of your degree. Your final-year project accounts for 35 per cent of the marks for Level 3.

Career Opportunities

Computing skills are the foundation of numerous professional careers in many dynamic sectors. Our programmes are designed to prepare you for working at the cutting edge of computing and its applications, and our graduates can take many routes into rewarding careers.

Employers are increasingly seeking people with a broad range of skills that encompass management and leadership skills as well as technical ability. Our programmes produce graduates with this well-rounded skills-set of strong academic knowledge and professional training.

Our students are highly regarded and in many areas of business and industry. Information technology, the focus of one of our degrees, combines business and computation skills that are particularly in demand across Europe. Computer simulation and modelling, another programme focus, is in demand in the games and defence industries, for industrial control and for biological development. Computer Science and Computer Science and Engineering graduates will be highly sought after in a wide range of roles including those within the software, consumer electronics and telecommunications industries.

Former Uni**S** students are now involved in all areas, from writing programs and building simulation systems to devising IT strategies and managing organisations. Recent employers include the Department of Trade and Industry, Eli Lilley, IBM, Fujitsu Siemens, Inland Revenue, McLaren Cars and Reuters.

Graduate Profile

Lisa Lungley
BSc Computing and Information Technolgy Graduate

My main reasons for choosing the University of Surrey were the excellent opportunities offered by the professional training placement, the broad nature of the programme and the guarantee of University accommodation for my first year. I also liked the fact that Uni**S** is a campus-based university with academic departments, a Union, accommodation and other facilities all within easy walking distance.

The programme covers a wide variety of topics within the field of computing, and other areas such as business and communications. Additionally, the professional training year offers the opportunity to put into practice the skills learnt during the first two years and gain some real-world experience. Lecturers are easy to contact and the Department has a friendly atmosphere. My personal tutor has been very helpful and supportive throughout my time at Uni**S** for all queries, work-related or not. The professional training year improved both my technical and personal skills, such as how to interact in a team-working environment. There were over 60 placement students at Pfizer, so I made a lot of new friends too. The experience helped enormously in my final year with group projects and presentations.

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