BIOENGINEERING/
COMPUTER SYSTEMS
ENGINEERING/ELECTRONIC
AND COMMUNICATIONS
ENGINEERING

Canterbury
Kent is one of the UK’s leading universities. All of our academic schools produce world-class research, and Kent is rated as internationally excellent, leading the way in many fields of study. Studying Bioengineering, Electronic and Communications Engineering or Computer Systems Engineering at Kent gives you a great opportunity to play an active part in developing state-of-the-art systems, working at the cutting edge of technology.

World-leading research
The School of Engineering and Digital Arts (EDA) is actively engaged in topical research, consistently winning funding from UK research councils, European research programmes and government agencies. We have a broad range of research groups including: Broadband and Wireless Communications; Digital Media, Image and Information Engineering; and Instrumentation, Control and Embedded Systems. The School also regularly hosts research seminars and conferences.

Inspirational teaching
Spectacular advances in electronics, computing and communications have made a huge impact on modern life. We base our BEng and MEng courses on leading-edge research topics, which is vital in a field that advances so quickly. The School has 34 lecturers, with both academic and industrial experience, and we also employ visiting lecturers to provide a more specialist view.

A global outlook
Kent has a reputation as the UK’s European university and has developed international partnerships with a number of prestigious institutions. We have an international community on campus: 27% of our students come from outside the UK, representing 140 different nationalities.

Professional recognition
For over 30 years, our BEng and MEng courses in Electronic and Communications Engineering and Computer Systems Engineering are accredited by the Institution of Engineering and Technology (IET), which enables fast-track career progression as a professional engineer. Our MEng programmes meet the full educational requirements for corporate membership of the IET and registration as a chartered engineer.

DID YOU KNOW?
EDA at Kent was ranked 1st in the UK for overall course satisfaction in Electronic and Electrical Engineering in The Guardian University Guide 2014.
A year in industry
All our BEng and MEng programmes can incorporate an additional year spent in industry. The placement year occurs between the second and third years of study and is suitable for anyone who wants to experience life in a commercial environment. It gives you valuable industrial experience, enhances your employability and provides you with a chance to evaluate a potential employer as well as earn some money. For more information, go to p17.

Flexible entry options
For first-year entry to our BEng and MEng degree programmes, we accept a range of UK and overseas qualifications. Direct entry can be made to the second year of the degree programme by suitably qualified candidates. The School also offers a foundation year, ideal for students who have studied alternative subject areas and who wish to refocus their careers. The foundation year is also designed for overseas applicants or mature students whose education ceased before A-level standard. See p11 for details.

Student sponsorship
The School encourages you to consider industrial sponsorship. As well as the financial benefits such sponsorship brings, it also offers the possibility of vacation employment, giving experience of the industrial environment and the prospect of a job at the end of the degree. A sponsored student may also choose to complete a final-year project that is linked to the company. This is a chance to gain an insight into the problems and rewards of working in a commercial organisation.

A successful future
As well as providing a first-rate academic experience, we want you to be in a good position to face the demands of a tough economic environment. During your studies, you develop key transferable skills considered essential for a successful career. For more information on the careers help we provide at Kent, please go to p8 or visit www.kent.ac.uk/employability
DID YOU KNOW?

Canterbury is consistently rated as one of the safest university cities in England in The Complete University Guide.
SUPERB STUDENT EXPERIENCE

Based on a scenic and well-located campus, you have the use of excellent systems and resources.

The School has been in receipt of a further significant investment totalling £0.9m during summer 2013, which fully complements the £0.8m improvements to the teaching and computer laboratories completed during the summer of 2012. You will therefore become part of a modern and vibrant School, with access to state-of-the-art facilities, enabling an enjoyable and expansive student experience.

The School benefits from a 120-seat, multipurpose engineering laboratory and four air-conditioned computer suites featuring more than 160 high-end computers. As well as extensive professional CAD and development software, we also have PCB and surface-mount facilities. Specialist facilities include a large anechoic chamber, 3D body scanner and motion capture studio.

The School also has a well-equipped mechanical workshop, staffed with skilled mechanical engineers and technicians. In addition to traditional engineering, facilities exist for digital media production, including screen-based media and digital publishing.

For entertainment, you’re spoilt for choice. The campus has its own cinema, theatre and student nightclub. It has a reputation for being a very friendly university with a cosmopolitan environment. There are many restaurants, cafés and bars on campus and there’s a sports centre and gym.

Everything you need on campus is within walking distance including a general store, an off-licence, a bookshop, banks, a medical centre and a pharmacy. From campus, it’s a 25-minute walk or a short bus-ride into town.

Excellent study resources

The study resources on campus are excellent. The Templeman Library has a wide range of publications, films and images. There are also over a thousand PCs on campus and a range of support services for help or advice.

Kent’s Student Learning Advisory Service also provides information and advice on all aspects of effective learning and study skills, and is available to all students from the time they arrive at the University. See www.kent.ac.uk/ult/learning for more information.

Attractive location

Canterbury is a lovely city with medieval buildings, lively bars and atmospheric pubs, and a wide range of shops. The attractive coastal town of Whitstable is close by and there are sandy beaches further down the coast. London is less than an hour away by high-speed train.
STUDENT PROFILE

Simon Bright is in his final year of a degree in Electronic and Communications Engineering with a Year in Industry.

What attracted you to studying at Kent?
I was initially attracted to the area – Canterbury is a beautiful place. I’m originally from Carlisle so was keen to experience life in the south.

When I visited Kent, I really liked the look of the University. It’s ranked well in the league tables and the campus is friendly and lively. The course also appealed to me, especially the communication aspect – it’s an upcoming area and the job prospects are good.

You completed a Foundation Year at Kent before joining your degree programme. How did you find the experience?
I hadn’t studied maths at A level so the Foundation Year helped me to prepare for the degree course – it eased me into university life. The transition to the degree was very smooth as well. There were a few of us studying on the foundation course together and we’re still good friends now.

How is your course going?
It’s going really well. I find the teaching staff quite relaxed and the lectures tend to be more personal and interactive. Most classes have a lab component so you have an opportunity to put the theory you’ve learnt into practice. I found this gave more substance to the topic I was studying and helped me to cement my understanding.

What do you think about the level of support in your studies?
The support has been great. The lecturers are always happy to talk to you and if you don’t understand something, they encourage you to speak up in lectures. The teaching technicians are always on hand to help in the lab sessions. It’s a very open environment.

What about your fellow students?
There is a very close-knit community in the School. I’ve made some great friends and we all help each other out.

What’s the social life like?
The nightlife here is brilliant with plenty of bars and other places to socialise. I lived in Darwin in my first year and it was always very lively and energetic. There are lots of clubs and societies you can join, too. I joined the kickboxing club in my first year and I’m doing archery this year. There’s something for everyone.

How did you find your year in industry?
I worked for Thales UK as a hardware engineer in aerospace and defence, and I learnt so much. The placement really helped me to hone my organisational and project management skills, and also taught me how to stick to a routine. The experience was very different to student life. In particular, it opened my mind to the aspects of engineering that I really enjoy and I’m already applying everything I’ve learnt to my final-year project. My career prospects have definitely improved.

What kind of career do you hope to follow when you leave Kent?
I’d really like to undertake a PhD abroad and then move into a more multidisciplinary role, either in academia or research. My plan is to go and work for a year, save some money and then return to university. EDA has a dedicated Employability Officer, who has been very helpful in pointing me towards some suitable courses.

Any advice for potential students?
Don’t leave your work to the last minute and make sure you attend your lectures. There will be plenty of time to go out and have fun. Just remember to prioritise your coursework!

A TOP 20 UK UNIVERSITY
Kent is a leading university and is ranked among the top 20 in the UK according to The Guardian University Guide 2014.

www.eda.kent.ac.uk
A SUCCESSFUL FUTURE

Kent equips you with essential skills to give you a competitive advantage when it comes to getting a job. Computer technology, telecommunications and consumer electronics are rapidly evolving, so expertise in these fields is in great demand.

We are consistently in the top 20 of graduate starting salaries and, six months after graduation in 2012, less than 6% of Kent graduates were without a job or a further study opportunity.

Graduate career paths
In recent years, graduates from our Engineering programmes have found employment in careers as varied as developing the next generation of mobile telephones, creating animated human models, managing the ground segment of a new broadcasting satellite system, and employing computer-based techniques in a hospital environment.

Many graduates have also extended their studies by registering for MSc and PhD programmes. Examples of their research include the remote monitoring of patients in their own homes, the design of small satellites and the development of improved computer-aided integrated circuit design tools.

Key transferable skills
Studying for a degree is not just about mastering your subject area. These days employers are also looking for a range of key skills, and we encourage you to develop these within your degree programme. The ability to analyse situations, troubleshoot problems, and construct written and verbal presentations are all valuable skills, no matter what your final profession.

Careers advice
The Careers and Employability Service can give you advice on how to choose your future career, how to apply for jobs, how to write a good CV and how to perform well in interviews and aptitude tests. It also provides up-to-date information on graduate opportunities before and after you graduate.

Further information
For more information on the careers help we provide at Kent, please see our Employability web page at www.kent.ac.uk/employability
Emma Barden graduated with a degree in Electronic and Communications Engineering in 2012, and now works as a graduate engineer for a technology consultancy.

Why did you choose Kent?
I liked the atmosphere – the people were friendly and there was plenty of green space. I remember seeing the view from campus across Canterbury to the Cathedral and thought this was the place for me!

What attracted you to the course?
The variety of the degree attracted me to the course as I wanted to study on a programme that covered a bit of everything. I didn’t really know the sort of things an electronic engineer could do, so that’s what I wanted to learn. The links to industry and the opportunity to have a placement year were also very important to me.

During the Open Day, I had a really good tour of the School of Engineering and Digital Arts and its facilities, and that just sealed the deal for me.

What was your degree course like?
The course was good; intense at times but I liked that. Again, the variety kept it interesting. I particularly enjoyed the projects and lab time – I think they are important on an engineering course.

How did you find the lecturers?
The lecturers are one of the best things I found about the course. They really know their stuff, and they know where it is used in the real world. Most of all, they are approachable – I always knew where to go if I needed help.

What extra-curricular activities did you get involved with during your time at Kent?
I did lots of work with the volunteering scheme. It was a good way to give something back to the University and I met a lot of different people that way.

How has your degree laid the foundations for your chosen career path?
I did a year in industry as part of my course and I found it invaluable. My final-year project was also completed in partnership with an industrial partner. But there has been so much stuff that has helped me with my career: working in teams, giving presentations and report writing. It’s funny how much you end up using every day.

Because of the variety of the course, I found myself able to look into all sorts of career paths. It was so interesting to see just how many different jobs an engineering degree can prepare you for.

Could you describe your career path since leaving Kent?
I went straight into a graduate engineer position at a technology consultancy. I am halfway through the graduate programme now and am really enjoying it. It’s a varied role, that’s why I like it so much. I could be coding one week or measuring antennas in an anechoic chamber the next.

What's next for you?
In the future, I would like to focus on a specialism within engineering and become chartered.

Do you have any other happy memories of Kent that you would like to share with us?
There are so many! Mostly the friendships I made, which I’m sure will be part of my life for many years to come. Kent in the snow was also an awful lot of fun!

Finally, what advice would you give to someone thinking of coming to Kent?
Don’t worry about the small stuff so much when trying to compare degrees and universities. You get out what you put in and you can have a great experience anywhere. Just go with your gut instinct. But do visit the university where you are thinking of studying, it can really make a difference.

Kent is a wonderfully supportive environment with a lovely campus. The atmosphere is great and you will spend some of the best years of your life here.
Choosing Your Programme

Our degree programmes reflect our leading-edge research topics. The focus of the programmes we offer ranges from design, through programming to specialist engineering.

Available degrees

Bioengineering
This three-year, full-time BEng programme is offered jointly with the School of Biosciences. It draws on The School of Engineering and Digital Art's established expertise in developing medical-electronic systems and its research synergies with the School of Biosciences. The course will produce engineers with a solid knowledge in biology and medical science, opening up career opportunities in the bioengineering industry and the NHS.

Electronic and Communications Engineering
This programme, which is offered full-time as either a three-year BEng or four-year MEng course, teaches all aspects of electronic engineering, allowing its graduates to enter any branch of electronics. Its broad syllabus includes analogue and digital circuits and systems, mobile and other communications, and computing for electronics.

Computer Systems Engineering
In this programme, you develop the skills and expertise needed to design computer systems. This includes up-to-date detailed knowledge of computer hardware and software and background knowledge of electronics, communications systems and control theory. The programme is offered full-time as either a three-year BEng or four-year MEng course and is jointly taught by EDA and the School of Computing.

The BEng and MEng degrees are fully accredited by the Institution of Engineering and Technology (IET). The MEng programme also meets the educational requirements for Chartered Engineer (CEng) status.

Other degree programmes

The following degrees are also available within our School:

Electronic and Computer Systems
The programme is designed for candidates who already have 240 credits from modules equivalent to those on our Stage 1 and 2 Electronic and Communications Engineering programme. You study full-time for one year to gain the same level of qualification as for students taking a traditional three-year course.

Multimedia, Technology and Design
This programme gives you the opportunity to develop in-depth knowledge in areas such as web design, DVD authoring, 3D modelling, special effects and compositing, and opens up the possibility of a future career in fields such as film animation, multimedia production and website creation.

Digital Arts
This exciting programme provides you with practical skills, creative thinking and design expertise through a multidisciplinary exploration of modules in website design, digital photography, moving image, graphic design, 3D modelling and animation, digital portfolio production and design for print.

Flexible entry routes

Foundation Year
This programme is for students who do not have the qualifications needed for direct entry to the first year of our degree programmes. It covers electronics, computing, physics and mathematics. If you successfully complete the foundation year, you can go on to take either the Electronic and Communications Engineering or Computer Systems Engineering programmes. You may also proceed to the Bioengineering degree programme if you have A2 Biology (or equivalent).

Kent International Foundation Programme (IFP)
Passing the electronics pathway of the Kent IFP, with an overall mark of 60% or over, guarantees you entry on to the first year of the relevant degree programmes. For entry requirements, see www.kent.ac.uk/international-pathways/ifp

Need more information?
For more information on Kent's other degree programmes, go to www.kent.ac.uk/ug
FOUNDATION YEAR

The Foundation Year is designed for those students who do not have the qualifications for direct entry to our degree programmes. If you successfully complete the Foundation Year, you can go to the first year (Stage 1) of any of our BEng programmes (A2 Biology also required for Bioengineering).

The modules you study during your Foundation Year are:
- Algebra and Arithmetic
- Analogue Electronics
- Calculus
- Electrical Principles and Measurements
- Electromagnetics for Engineers
- Graphs, Geometry and Trigonometry
- Introduction to Programming using MATLAB
- Semiconductor and Digital Electronics.

For those who need it, there is also instruction in English.

All the teaching is on campus, so you can take part in all student activities. The teaching is mainly conducted by academic staff from this University and consists of lectures, example classes and laboratory sessions. The knowledge you acquire is, in most cases, equivalent to that of A-level standard.

Foundation modules

Algebra and Arithmetic
Algebra and algebraic manipulation provide you with some of the mathematical tools and skills that are fundamental to engineering design.

Analogue Electronics
This module introduces you to the basic electronic components and their applications in real-life electronic circuits and systems.

Calculus
Both differential and integral calculus are vital to an engineering degree. You also examine simple applications in electronics and physics.

Electrical Principles and Measurements
Supported by practical laboratory work and example classes, you explore the theory and practice of performing and assessing electronic measurements.

Electromagnetics for Engineers
In order to understand modern electronic and communications systems, you explore the basic principles of electromagnetism. Practical work and example classes assist your learning.

Graphs, Geometry and Trigonometry
Your problem-solving skills are enhanced by the basic trigonometry, vectors and graphical methods required to progress to Stage 1 electronic engineering courses.

Introduction to Programming using MATLAB
This introductory module looks at computer programming and its practical application in the field of electronics. During the module, you gain a working knowledge of the MATLAB programming language.

Semiconductor and Digital Electronics
You look at the principles of digital electronics and digital systems, and examine some of today’s most important electronic semiconductor devices.
STUDYING AT STAGE 1

Stage 1 is the first year of your degree programme. All the core material is presented using lectures, supervisions, assignments and laboratory classes.

All students take the following compulsory modules:
- Digital Technologies
- Engineering Analysis
- Engineering Mathematics
- Introduction to Electronics
- Robotics Project.

Other modules vary according to your programme, as listed below.

Bioengineering:
- Introduction to Biochemistry
- Molecular and Cellular Biology
- Skills for Bioscientists.

Electronic and Communications Engineering:
- Computer Systems
- Electronic Circuits
- Introduction to Programming.

Computer Systems Engineering:
- Computer Systems
- Introduction to Object-Oriented Programming
- Web Applications.

Modules: Stage 1

Computer Systems
This module provides you with an understanding of the fundamental behaviour and components (hardware and software) of a typical computer system, and how these collaborate to manage resources and provide services. Starting with a Microsoft/Intel PC attached to the internet via a Local Area Network, you explore two strands: ‘Systems Architecture’ and ‘Operating Systems and Communications’. Quite apart from the academic value of this module, the knowledge you gain will be useful to anyone using a PC.

Digital Technologies
Here, you learn the necessary theoretical background to understand the operation of large-scale digital systems and to develop the necessary skills to design the logic of moderately complex digital circuits. The module forms an introduction to the fundamental theory underlying modern digital technology, covering both combinatorial and sequential logic systems. The techniques introduced will form the basis for future modules. No previous knowledge of digital systems is assumed.

Engineering Analysis
This module expands the introductory mathematics covered in Engineering Mathematics and provides you with the appropriate mathematical tools necessary for the further study of electronic and computer systems. Topics covered include differential equations, the Fourier series, partial differentiation, Laplace, Poisson and wave equations, which will be used to solve problems in the areas of signals, systems and electromagnetic fields. The lectures are supported by assessed example classes, taken in small groups.

Engineering Mathematics
Mathematics is the fundamental language of engineering, allowing complex ideas to be formulated and developed. This module provides you with the sound basis of mathematical techniques and methods required by almost all other modules on the School’s engineering courses. Topics covered include functions and graphs, set theory, complex numbers, calculus, matrices and vectors, and probability. The lectures are supported by assessed example classes, taken in small groups.
Introduction to Biochemistry
This module provides an introduction to biomolecules in living systems. It contrasts the simplicity of the basic building blocks (amino acids, sugars, fatty acids and nucleotides) with the enormous variety and adaptability of the different macromolecules they form (proteins, carbohydrates, lipids and nucleic acids). It highlights the nature of the macromolecules and their interactions within the cellular environment.

Introduction to Electronics
Electronics hardware consists of various components and devices interconnected in such a way that they perform the specific functions. Here you learn about the main electronic components, how they work and what properties they have, their main usage and the practical skills to perform simple measurements and tests. This module also includes a mini-project in which you gain practical laboratory experience in the design and construction of a circuit.

Introduction to Object-Oriented Programming
Software pervades many aspects of most professional fields and sciences, and an understanding of the development of software applications is useful as a basis for many disciplines. This module covers the development of simple software systems. You gain an understanding of the software development process, and learn to design and implement applications in a popular object-oriented programming language.

Introduction to Programming
The module provides you with an introduction to the basic knowledge required to understand, design and write computer programs and the basic principles underlying the process of software engineering. No previous programming experience is assumed, and the module proceeds via a sequence of lectures supported by simple exercises designed to give practical experience of the concepts introduced.

Molecular and Cellular Biology
You are introduced to the major themes and experimental techniques in molecular biology, genetics and eukaryotic cell biology. The module covers basic cell structure, the principles of the cell cycle and cell division, the control of living processes by genetic mechanisms, and techniques for genetic manipulation, such as gene cloning.

Robotics Project
This module is designed to provide experience in the practical and management aspects of project work. It is supported by a lecture course and weekly supervisions. After an initial hands-on introduction to soldering, use of bench equipment and the computer-aided design and manufacture of a printed circuit board, you start the robotics project. This consists of constructing a robot that incorporates an additional circuit board of your own design and software of your own devising.

Skills for Bioscientists
Subject-based and communication skills are relevant to all bioscience courses. This module allows you to become familiar with practical skills, the analysis and presentation of biological data, and introduces some basic mathematical and statistical skills as applied to biological problems. It also introduces you to the computer network and its applications, and covers essential skills such as note-taking and essay writing.

Web Applications
This module introduces the basic principles of designing both websites and individual web pages, linking client applications to web pages and the basic concepts of data structuring. You use web authoring software and implement a simple database application involving a user interface. You also learn to program components that improve usability, robustness and reliability of a client application.
STUDYING AT STAGE 2

Stage 2 is the second year of your degree programme.

All students take the compulsory modules:
• Computer Interfacing
• Signals and Systems.

Other modules vary as listed below.

Bioengineering:
• Biomechanics
• Human Physiology and Disease
• Image Analysis and Applications
• Introduction to Programming
• Physiological Measurement
• Skills for Bioscientists 2.

Electronic and Communications Engineering:
• Communications Principles
• Digital Implementation
• Electronic and RF Circuit Design
• Electronic Instrumentation and Measurement Systems
• Microcomputer Engineering
• Microwave Circuits and Electromagnetic Waves.

Computer Systems Engineering:
• Communications Principles
• Digital Implementation
• Electronic Instrumentation and Measurement Systems
• Further Object-Oriented Programming
• Image Analysis and Applications
• Microcomputer Engineering.

Communications Principles
The purpose of this module is to provide the fundamental knowledge required to understand communication systems. It concentrates mainly on signal transmission in the presence of impairments and how modulation, coding and detection schemes can mitigate against these impairments. A smaller section of the module introduces you to some core concepts in modern communication networks.

Computer Interfacing
Here, you engage in a major practical project involving both computer hardware and software and a series of supporting lectures, working in a group of four on an allocated application. Applications range from measuring ambient temperature to controlling a simple robot. This project provides an opportunity for you to gain experience not only in technical areas such as PC-based data acquisition, computer interfacing and visual programming but also in transferable skills such as team working, project management, technical presentation and report writing.

Digital Implementation
This module provides an overview of modern digital system implementation. Introducing the hardware description language VHDL, the module then uses a subset of VHDL, to enable the
development of moderately complex behavioural and structural models of digital components. Practical work associated with this course is performed using a Windows-based VHDL compiler and simulator. The exercises complement the lecture material and provide you with the necessary skills to use VHDL in your third-year project.

**Electronic and RF Circuit Design**
This module introduces you to design concepts and develops your analysis skills for important electronic and radio frequency communications circuits. It builds on introductory general circuit analysis ideas.

**Electronic Instrumentation and Measurement Systems**
Covering such technical topics as the principles of measurement and instrumentation, sensors and transducers, signal conditioning and data presentation elements, this module teaches you the role of the various elements of a measurement system and how to specify and evaluate it for a given application. You design, construct and test two basic measurement systems using common sensors and electronic components in addition to undertaking a substantial review of measurement techniques for a specific industrial application.

**Further Object-Oriented Programming**
This module builds on the Stage 1 introductory module to provide a deeper understanding of, and familiarity with, object-oriented program design and implementation. More advanced features of object-orientation, such as inheritance, abstract classes, nested classes, graphical-user interfaces (GUIs), exceptions, input-output are covered. These allow an application-level view of design and implementation to be explored. Throughout the module, the quality of application design and the need for a professional approach to software development is emphasised.

**Human Physiology and Disease**
You consider the anatomy and function of normal tissues, organs and systems in this module. We look at the manifestation of the various conditions at the level of cells, tissues and whole patient, and also discuss diagnosis, available prognostic indicators and treatments.

**Image Analysis and Applications**
You learn about images and image processing, image analysis, security and biometrics. You also discover how neural networks can be used as architectures for image analysis.
STUDYING AT STAGE 2 (CONT)

Introduction to Programming
The module provides you with an introduction to the basic knowledge required to understand, design and write computer programs and the basic principles underlying the process of software engineering. No previous programming experience is assumed, and the module proceeds via a sequence of lectures supported by simple exercises designed to give practical experience of the concepts introduced.

Microcomputer Engineering
This highly practical module starts with the C programming language, looks at software engineering issues, the use of C in the programming of a 16-bit microcontroller and the input/output of data using polling and interrupts. There are supporting practicals and a bus-interfacing experiment.

Microwave Circuits and Electromagnetic Waves
In this module, you are introduced to the concepts of guided and free space transmission as well as microwave circuit fundamentals. You learn about the structures that guide pulsed, RF and microwave signals; and gain an understanding of EM wave behaviour in free space and at dielectric boundaries. The module also covers EM guiding structures, both metallic and dielectric, as well as the basic design, matching and stability of RF amplifiers and the circuits involved in the process of high-frequency signal transmission.

Physiological Measurement
This module introduces you to the different types of physiological parameter and various techniques for measuring these parameters. Basic analogue electronics and instrumentation techniques are included within the module.

Signals and Systems
You are introduced to basic methods and techniques for describing and analysing continuous and discrete time signals and systems. You explore notions of linear time-invariant systems and their impulse response. The convolution operation is illustrated as a means for describing the behaviour of such systems. The connection between continuous and discrete time signals is explained through the introduction of the sampling theorem.

Skills for Bioscientists 2
You have lectures on biological techniques complemented by practical classes and supervisions. There are sessions on group work, essay-writing, problem-solving and computer-based procedures to develop your transferable skills. In addition, there are presentations on careers to help you start thinking about future career options.
Our Bioengineering, Electronic and Communications Engineering and Computer Systems Engineering programmes offer a Year in Industry. This is taken between Stages 2 and 3.

Study and career benefits

Employers are very keen to employ graduates who already have work experience, so this year can greatly enhance your job prospects by providing you with real commercial experience. It also allows you to evaluate a particular career path, and gain knowledge of the working environment. If your placement is a success, you may even be offered a job with the same employer after graduation.

The practical experience can also be put to good use in your final year of study, helping you to gain a better degree. It gives you a sense of how the theory works in practice and improves your skills in many areas.

Finding a placement

The School has a dedicated placement officer, who works with the University’s Careers and Employability Service to assist you in identifying businesses and organisations offering placements. Information about opportunities will be made available to you, and the website of the Careers and Employability Service and the national Work Experience Bank at the CSU Prospects website provide helpful material about opportunities and applications.

The Careers and Employability Service provides support in writing CVs and developing skills for placement applications and interviews. It also provides a reference bank of students who have completed successful placements in industry while studying at Kent.

There are frequent visits to Kent by companies who present their placement opportunities and also interview candidates.

Salary and benefits

Students will usually work on placement for the entire calendar year. Salary and holiday entitlements vary according to the employer for whom you work. However, many students find that they earn enough to be able to save some of their income, and this often helps them during their final year of studying at Kent.

Keeping in touch with Kent

The University maintains close contact with you during your year away. The industrial placement year is assessed by a combination of employer feedback and academic evaluation. You are required to keep a log of your training and work experience during the year and to write a report on your placement experience.
STUDYING AT STAGE 3

Stage 3 is the final year of study for our BEng degrees. Whatever your chosen degree programme, the topics that you cover involve a significant amount of specialisation.

All students take the following compulsory modules:
- Product Development
- Project.

Other modules vary according to your programme, as listed below.

Bioengineering:
- Biomaterials
- Digital Control
- Physiology.

You also choose one module from:
- Bioinformatics and Genomics
- Magnetic Resonance in Biosciences and Medicine
- Medical Physics.

Electronic and Communications Engineering:
- Communication Systems
- Digital Communications.

You also choose two modules from:
- Digital Control
- Digital Systems Design
- Embedded Computer Systems.

Computer Systems Engineering:
- Digital Communications
- Digital Control
- Embedded Computer Systems.

You also choose one module from:
- Computer Security and Cryptography
- Digital Systems Design.

**Modules: Stage 3**

**Bioinformatics and Genomics**
The past decade has seen significant advances in our ability to obtain biological data, be it protein structures or genome sequences. The bioinformatics element of this module focuses on modelling the structure, interactions and function of proteins. The genomics element introduces the basic concepts of genome sequencing and what we have learnt from the sequencing of over 1,000 different organisms. Finally, both elements are combined to use protein modelling to identify how genetic variants (such as mutations) lead to disease.

**Biomaterials**
In order to understand the mechanics of biological tissues and artificial implants, you explore the principles of stress analysis, bio-compatibility and tissue integration. Practical work and example classes assist your learning.

**Communication Systems**
This module covers the principles of modern communication systems and how they are applied. You gain specialist knowledge of current systems, including optical, microwave and satellite systems. In addition, you are made aware of the available products, systems, technologies and techniques in the field of communication systems.

**Computer Security and Cryptography**
The importance of computer security has increased greatly in recent years. Here, you cover a range of security systems, from commercial to industrial, and gain an understanding of the main techniques and technologies underlying security, including authentication, encryption and watermarking.

**Digital Communications**
Here, you look at data transmission, including synchronous and asynchronous methods, and the problems of synchronisation, and review the bandwidth of various transmission methods. You study networks, from local to worldwide, and discuss topologies, access protocols and standards.

**Digital Control**
This module builds on the Stage 2 Digital Signal Processing module, to provide an understanding of digital control algorithms, stability and optimisation. The module uses robotic systems as the core delivery vehicle.

**Digital Systems Design**
Continuing from the Stage 2 module Digital Implementation, you study the methodology of designing and implementing large digital systems. You learn how to design reliable digital systems using synchronous design techniques, how to design systems that are easily testable and
use a range of software tools that synthesise digital systems using VHDL.

**Embedded Computer Systems**
You learn the theory and practice of employing computers as the control and organisational centre of an electronic or mechanical system, and examine issues related to time-critical systems. The module also exposes you to practical embedded systems design through substantial practical work. One assignment uses a microcomputer programmed in C to control the ignition timing of a simulated petrol engine.

**Magnetic Resonance in Biosciences and Medicine**
Magnetic resonance (MR) was first proposed and measured in 1938. It remained a fundamental scientific method for several decades and, in the last 25 years, it has found successful applications in bioengineering and medicine through both nuclear magnetic resonance spectroscopy (NMR) and magnetic resonance imaging (MRI). This module is designed for students with an interest in the applications of NMR and MRI, and our approach uses current research papers and reviews to reveal the utility of these methods across bioengineering, bioscience and medicine.

**Medical Physics**
Here, you gain a broad overview of the role of physics and the physicist in modern medicine. This module sets out the physical and mathematical essentials of major diagnostic and therapeutic techniques such as radiology, MRI and ultrasound. The module involves several contributors from the Department of Medical Physics at the Kent and Canterbury Hospital.

**Physiology**
You develop a more detailed understanding of particular physiological systems in this module, and relate this to relevant disease processes and their detection. The role of research and laboratory methods in understanding human disease is also introduced at this stage.

**Product Development**
In this module, you examine the development of commercial electronic and software products, covering design, production techniques, reliability and the commercial aspects of a company.

**Project**
The project is conducted on an individual basis, on a topic that interests you. Projects in the Computer Systems Engineering programme may come from either the computing or electronics subject areas. Bioengineering projects are specific to the unique nature of this degree programme.
STUDYING AT STAGE 4 (MEng)

Stage 4 is the final stage of our MEng degrees. Whatever your chosen degree programme, the topics that you will cover involve a significant amount of specialisation.

All students take the following compulsory modules:
- Business Strategy
- Systems Group Project.

Other modules vary according to your programme, as listed below.

Electronic and Communications Engineering:
- Communication Networks.

You also choose two modules from:
- Advanced Control Systems
- Broadband Networks
- Signal and Communication Theory
- Wireless/Mobile Communications.

Computer Systems Engineering:
- Computer and Reconfigurable Architectures
- Embedded Real-Time Operating Systems.

You also choose one module from:
- Biometric Technologies
- Communication Networks
- Digital Signal Processing
- Fundamentals of Image Analysis
- Mobile and Ubiquitous Computing.

Advanced Control Systems
This module is concerned with the design of practical feedback controllers. Feedback is used in a control system to enhance the performance of the plant or process, and to reduce the sensitivity of the system to uncertainty from external effects and model uncertainty. If the performance specifications are achieved in the presence of the expected uncertainties, then the control is said to be robust. This module provides an overview of a number of techniques for robust control, with an emphasis on design and simulation to enhance learning.

Biometric Technologies
You gain a detailed treatment of the implementation of biometric systems, including examples, and an analysis of modality-specific features and feature extraction, selection and classification strategies. Topics covered in the module include: state-of-the-art in sensor technologies; spoofing and counter-measures; and analytical approaches to the performance of biometric systems.

Broadband Networks
This module provides you with knowledge of broadband network operation, from access networks (xDSL, UWB, WiMAX, DOCSIS) to multi-service provision in IP networks using differentiated services, MPLS, reservation protocols (such as RSVP) and protocols for real-time information transfer (RTP/RTCP), to optical networking and switching. Seminars from industry-linked speakers stimulate interest in particular areas.

Business Strategy
Business Strategy enables you to develop your skills of strategic analysis and your ability to think about the selection and implementation of appropriate strategies in industry and non-profit and public sector organisations. The nature of the topic is constantly changing and evolving; therefore, the module will be subject to continual refinement according to external developments.
Communication Networks
This module takes you through communication network protocols, as used in local-area networks and wide-area networks. It includes the protocols used in the wireless LAN (WiFi) standards, Ethernets and IP networks. The analysis of network performance is also covered. A network simulator (OPNET) is used to reinforce the material, and to provide you with a means of 'visualising' protocol operation and network performance.

Computer and Reconfigurable Architectures
Here, you are introduced to some fundamental and advanced computer and reconfigurable computing architectures, including CISC, RISC and VLIW. FPGA technology is used as the basis for describing different forms of reconfigurable computing architectures that are becoming increasingly important in many consumer and industrial applications. Specific emphasis is given to the understanding of computer arithmetic architectures and methods, which are used in the design of embedded systems. The module uses practical design examples using both C and VHDL to illustrate the material.

Digital Signal Processing
In this module, you are taken through digital signal processing to the processing of images and video/audio in the MPEG standards. The transmission of digital video packets is also covered. These issues, of course, are of increasing interest following the switchover to all-digital broadcasting, and the emergence of mobile handheld video/TV equipment (such as in the DVB-H standard, which is also covered). Extensive use of MATLAB enables you to grasp the subjects more readily.

Embedded Real-Time Operating Systems
This module introduces real-time operating systems (RTOS) and their implementation and use in embedded systems. The concepts of scheduling algorithms, threads, multitasking and interprocess communication are discussed in detail using practical examples and case studies. It includes advanced topics in hardware/software co-design together with a review of compilation technologies and compiler techniques for specialised architectures.

Fundamentals of Image Analysis
This module provides an introduction to the principles of identity authentication based on biometrics and the fundamental underlying theoretical and practical skills required for their development.

Signal and Communication Theory
This module provides you with knowledge in communications theory. It covers optimal receiver design, advanced modulation such as QAM, transmission and performance analysis over wireless multipath fading channels, spread spectrum and multicarrier transmission, and advanced channel coding such as Turbo and LDPC coding. Simulink modelling of a digital communication system enhances your understanding of how the concepts are applied.

Mobile and Ubiquitous Computing
In this module, you discuss the characteristics and limitations of hardware devices, communication and software infrastructures and environments used on small devices and in mobile and ubiquitous computing contexts.

Systems Group Project
This is the MEng final project that accounts for half of the work of this year and is conducted on a group basis. It involves the application of technical skills and knowledge, and requires group and project management skills.

Wireless/Mobile Communications
Here, you concentrate on the latest mobile and wireless communication technologies, techniques and protocols, covering cellular networks from GSM to 3G and 4G mobile systems. The latest protocols for next generation wireless networks, and the techniques which will enable them, such as microcellular mobile concepts and interference, adaptive modulation and coding, soft handoff, wireless multiple access techniques, multiuser detection, multiuser diversity/scheduling, wireless resource allocation and MIMO systems, are covered.
VISIT THE UNIVERSITY

Come along for an Open Day or a UCAS Visit Day and see for yourself what it is like to be a student at Kent.

Open Days
Open Days are held in the summer and autumn for potential students, and their families and friends, to have a look round the campus. The day includes a wide range of subject displays, demonstrations and informal lectures and seminars, and the chance to tour the campus with current students to view accommodation and facilities. For more information, see www.kent.ac.uk/opendays

UCAS Visit Days
UCAS Visit Days take place between January and April and include a tour of the campus with a student guide, lunch in one of the colleges and a talk about University life. You also have the chance to talk to one of the academics and discuss any queries about the course. For more details, see www.kent.ac.uk/visitdays

Scholarships and bursaries
For details of scholarships and bursaries at Kent, see www.kent.ac.uk/ugfunding

More information
For more information about the University, or to order another subject leaflet, please contact the Information and Guidance Unit.

Tel: +44 (0)1227 827272
Freephone (UK only): 0800 975 3777
www.kent.ac.uk/ug

You can also write to us at:
Information and Guidance Unit,
The Registry, University of Kent,
Canterbury, Kent CT2 7NZ.

Terms and conditions: the University reserves the right to make variations to the content and delivery of courses and other services, or to discontinue courses and other services, if such action is reasonably considered to be necessary. If the University discontinues any course, it will endeavour to provide a suitable alternative. To register for a programme of study, all students must agree to abide by the University Regulations (available online at: www.kent.ac.uk/regulations).

Data protection: for administrative, academic and health and safety reasons, the University needs to process information about its students. Full registration as a student of the University is subject to your consent to process such information.
Location
Canterbury.

Award
BEng (Hons), MEng (Hons).

Degree programmes
- Bioengineering BEng (3D9J)
- Bioengineering BEng with a Year in Industry (05C3)
- Computer Systems Engineering BEng (H618)
- Computer Systems Engineering BEng including a Foundation Year (H614)
- Computer Systems Engineering BEng with a Year in Industry (H615)
- Computer Systems Engineering MEng (H613)
- Computer Systems Engineering MEng with a Year in Industry (H617)
- Electronic and Communications Engineering BEng including a Foundation Year (H605)
- Electronic and Communications Engineering BEng (H619)
- Electronic and Communications Engineering BEng with a Year in Industry (H604)
- Electronic and Communications Engineering MEng (H607)
- Electronic and Computer Systems BEng (H691)

Entry Requirements
BEng/BEng with a Year in Industry
3D9J, 05C3: ABB at A level inc Mathematics and Biology at grade B, plus Electronics/Physics/Computing/Chemistry AS or A level grade B;
IB Diploma 34 points inc Mathematics 5 at HL or 6 at SL (not Mathematics Studies) and 5 at HL or 6 at SL in a science subject, or IB Diploma with 16 points at Higher inc Mathematics 5 at HL or 6 at SL (not Mathematics Studies) and 5 at HL or 6 at SL in a science subject, or IB Diploma National Diploma Engineering: DDD inc a merit in the Maths III or Maths for HE modules.

H604, H615, H618, H619: BBB at A level inc Mathematics and a science/technology subject (Physics, Computing or Electronics) at grade B;
IB Diploma 34 points inc Mathematics 5 at HL or 6 at SL (not Mathematics Studies) and 5 at HL or 6 at SL in a science subject, or IB Diploma with 15 points at Higher inc Mathematics 5 at HL or 6 at SL (not Mathematics Studies) and 5 at HL or 6 at SL in a science subject, or IB Diploma National Diploma Engineering: DDM inc Further Mathematics for Technicians module.

Year in Industry
You have the option of spending a year working in industry between Stages 2 and 3.

Professional recognition
Accredited by the Institution of Engineering and Technology (IET).

Offer levels and entry requirements are subject to change. For the latest course information, see www.kent.ac.uk/ug
COME AND VISIT US

We hold Open Days at our Canterbury and Medway campuses.

For more information, see: www.kent.ac.uk/opendays