Artificial Intelligence, Cybernetics, Electronic Engineering and Robotics at Reading

As a professional engineer, you will be at the forefront of technology, working on the latest inventions.
In today’s high technology society, we are dependent upon a great variety of complex systems for manufacturing, entertainment, transport, security, healthcare. These can be intelligent electronic systems, robotic systems, or systems where machines enhance humans significantly.

Engineers are the driving force behind such technology. In Systems Engineering we offer degrees in Artificial Intelligence, Cybernetics, Electronic Engineering and Robotics to help train the people who will take these systems to the next level.

Future innovation presents a real challenge: how do we make different technologies work seamlessly as one? For example, a robot is the sum of its parts, requiring power electronics, sensors, wireless communications, control loops and software that produces intelligent decision making. We are set up to tackle this challenge. Within the School of Systems Engineering at Reading, we bring together artificial intelligence, cybernetics, electronic engineering and robotics, allowing you to focus on your subject in a unique environment for cross-disciplinary learning and research.

In artificial intelligence, cybernetics, electronic engineering, and robotics we are set up to tackle this challenge. Within the School of Systems Engineering at Reading, we bring together artificial intelligence, cybernetics, electronic engineering and robotics, allowing you to focus on your subject in a unique environment for cross-disciplinary learning and research.

There is a strong emphasis on practical and laboratory work in all our courses. Every student undertakes at least one major project during their degree that provides an exciting opportunity to put all the theory into practice.

Students can choose their own projects, with advice from academics, and often our industrial partners get involved as well. Our MEng programmes include a major project in the third year and then a six-month industrial placement or a research project in the fourth year. We recognise the importance of industrial experience to employers.

Because of this, we have a dedicated Placements Team who assist students in finding placements, and visit every placement student in their place of work. Our Placements Team also helps students with writing CVs, interview skills and the psychometric tests used by many employers.

All courses are available as three-year, full-time bachelor degrees (BSc or BEng) and as four-year, full-time MEng degrees. There is the possibility to transfer from a BSc/BEng to an MEng and vice-versa should you meet the requirements. All our bachelor courses also have the option of an extra year in industry after the second year and these courses have specific UCAS codes. Our degrees lead to a large variety of jobs in industry and business as the skills you will learn are transferable.

All of our degree programmes are fully accredited by the relevant professional bodies, including the Institution of Engineering and Technology (IET), the Institute of Measurement and Control, and/or the British Computer Society (BCS).
Artificial Intelligence

Have you ever wanted to make intelligent machines or explore human intelligence? We offer a practical artificial intelligence course teaching modern techniques and naturally inspired algorithms, such as evolutionary computation, neural networks, swarm intelligence and artificial life. These are used to solve real world complex problems beneficial to science, business and industry, which may be too difficult to accurately express or solve analytically.

The course aims to provide you with valuable skills that can be used in Electronics and Computing industries as well as in Robotics, Pattern Recognition and Signal Processing disciplines. They may also be applicable to the Biological sciences (e.g. motif identification in genomic sequences) and Medicine as well as to model Environmental processes. You will also learn to develop machine-learning systems for the next generation computer games, and we emphasise the animal side of intelligence, including psychology and cognition.

Cybernetics

Our cybernetics degree is one of only a handful of such degrees in the UK. Its unique nature and strong focus on systems and their control will enable you to learn a diverse range of skills that are crucial to industry. Cybernetics would suit you if you want to control the future! Its principles can be applied in many contexts and have a major impact on life. Cybernetics can help to create autonomous vehicles, to understand brain rhythms, to design intelligent control systems, to provide better interfaces between humans and technology and to assess our impact on the environment.

What is particularly useful about studying Cybernetics is that its fundamental principles are applicable to very many systems, technological, biological, electronic, environmental, economic or a mixture of such systems. Principles used in one system can be readily applied to other systems.

Real understanding and innovation often come from experimentation and so the design, build and test of practical systems is an essential part of the course. The interdisciplinary nature of the subject suits students with wide interests. Students choose cybernetics at Reading because of the unique focus we place on the subject, our world-renowned research and the wide range of cutting-edge technologies you can learn.

Electronic Engineering

Electronic engineering is a vast and exciting discipline and is behind many modern inventions: from mobile telephones to digital television, from active suspension units in Formula 1 cars to supercomputers, from media players to industrial robots, from virtual reality games to healthcare devices. All of these systems require intelligent embedded systems to perform complicated and often innovative tasks.

The Electronic Engineering degree programme enables you to learn the skills necessary to pursue a successful career as a professional electronic engineer, whilst also allowing you the flexibility of branching towards other topics such as computer science or robotics through a wide range of optional modules. At Reading, the Electronic Engineering degree programme has a specific focus on embedded systems and communications. While learning a broad range of fundamental electronic topics, the exciting research at Reading enables us to deliver teaching on the state of the art in embedded electronics. The programme focuses on wireless communications, microprocessors, programmable logic, computer architecture, embedded systems in C/C++ and linux and programming different languages on many types of systems, enabling students to be highly employable.

Robotics

Robotics is about designing, building, operating and controlling embedded autonomous agents or robots. These can be ‘real world’ mechanical devices or virtual entities and can mimic humans or particular tasks.

Our robotics degrees emphasise the technological aspects of cybernetics, and take into consideration the design of robotic systems, their control, communication, relevant artificial intelligence and virtual reality. The degrees also include key topics in computing, such as programming, algorithms, computer vision and networking. Appropriate topics from electronic engineering, such as circuit theory, sensors and signal processing, are also incorporated.

As with all our degrees, robotics includes substantial practical and project work, where students can design, build and test practical robotic systems. Students choose this subject at Reading because of the unique cross-disciplinary focus we place on robotics as well as the world-renowned nature of our research into the subject and the quality of industrial support we receive.
Teaching

Our staff are friendly and passionate about their subject. We are a centre of educational distinction at the heart of the UK’s high-tech and IT industries. Our hands-on approach to teaching engineering has been internationally recognised and our graduates have a reputation for excellence.

Lecturers in the School are all experts in their fields; many of them conduct world-renowned research in areas such as alternative energy, mobile telecommunications, computer vision, artificial intelligence, cybernetics and robotics. Indeed some of the lecturers are also leading consultants to industry, running educational workshops or technical consultancies for companies such as Texas Instruments, Fujitsu, Oracle and the BBC.

‘Very good and passionate staff. Always at hand and helpful when needed.’
Maximilian Zangs, 2013

You will become part of an extremely friendly environment with staff and students working well together.

Come to our open days and see for yourself! The School has superb links with industry. Many large blue chip IT and engineering companies are based in and around Reading and regularly sponsor both us and you – we get new equipment to support your learning and you get placement opportunities.

You can work closely with companies such as Microsoft and IBM who regularly offer events and assistance to our students. You will be assessed in a variety of ways, including examinations, on-line tests, laboratory practicals, individual and group projects.

Facilities

The School provides its own dedicated computing laboratories, solely for use by its students. The workstations run both Windows and Linux operating systems and host a range of software packages supporting the computing/engineering curriculum. These include tools for software/app development, systems modelling, Computer Assisted Design, mathematical manipulation and more. Some of these labs are available in the evenings and at weekends. Access to a Windows terminal server is also provided. Students have free access to a range of commercial software packages/ servers from the likes of Microsoft, Oracle and VMware.

The School has two electronics workshops, including one with a focus on robotics. These labs are well equipped with electronic test equipment and there are facilities for making printed circuit boards. In addition to the general computing labs, these labs feature the same computing resources and tools as development of embedded code for a range of robotic or consumer devices. There is a school workshop, which includes a 3D printer as well as more industrial machine tools for the manufacture of parts for projects.

As a research-intensive School, Systems Engineering has a number of research platforms which some undergraduate students access as part of advanced teaching or project work. These include a virtual reality CAVE, a haptic laboratory and a sixteen node research computing cluster.

There is a long tradition of computing projects making general use of the infrastructure, for example to turn a whole computing laboratory into an interactive demonstration or providing system wide status of the School’s computing systems. Many projects, particularly on the Robotics side, build real robots.

Here at Reading, we have formed an excellent relationship with our industrial neighbours. For example, Microchip Technology Inc, a world-leading provider of microcontrollers and analogue semiconductors, has recently sponsored a flagship computing systems. Many projects, particularly on the Robotics side, build real robots.

‘The Student Information Centre is exceptionally good.’
Arron Kerai, 2013

Support

It is important to us that whilst studying at Reading, support is available for your health, social and study needs.

All students have a Personal Tutor and within the School there is a Student Information Centre, where students can get help, support and advice.

To help make the transition to higher education as smooth as possible, each of our Part 1 students are introduced to two Part 2 students who have volunteered to support them, with supervision from a member of academic staff.

We are proud of our long history of ensuring the correct measures are in place for our students with disabilities to succeed. Our disability representative works closely with the University’s Student Disability Office. For more information please visit: www.reading.ac.uk/disability

Campus life

We actively encourage and develop social networking software that allows you to find your friends with similar interests, ask for help with problems, or just blog about any topic that interests you.

The University campus is set in 130 hectares of beautiful parkland and has its own nightclub, cinema, and sports centre, as well as a real community feel. You will become part of a vibrant student community with halls of residence on campus, superb nightlife on and off campus, and a world-class music festival on your doorstep. The School has its own Student Community on Facebook.

The University is committed to ensure that your time with us will be as enjoyable socially as it will be rewarding professionally.

‘The university is exceptional and it has a good study environment and facilities.’
Herbert Aungon, 2013

Online courses

If you would like to have a taste of our teaching style, look at our free open online course at www.reading.ac.uk/moocs
Artificial Intelligence programme structure

Year 1
Compulsory modules
- Programming
- Software Engineering
- Computer Applications
- Cybernetics and Circuits
- Fundamentals of Computing

Students with A-level Maths grade B or above (or equivalent) must take: Engineering Mathematics

Otherwise students must take: Mathematics for Computer Science

Year 2
Compulsory modules
- System Design and Project Management
- Signal Processing
- Embedded Microprocessors and Digital Systems
- Databases
- Neuroscience
- Neural Networks
- Machine Intelligence

Optional modules
- Essential Algorithms
- Java
- Robotic Systems
- Institution Wide Language Programme

Year 3
Compulsory modules
- Individual Project (BSc/BEng)
- Group Project (MEng)
- Social, Legal and Ethical Aspects of Science and Engineering
- Computer Networking
- Modern Neurosciences
- Evolutionary Computation

Optional modules
- Medical image and signal processing
- Visual intelligence
- Signal Processing
- Practice of entrepreneurship

Year 4 (MEng only)
Compulsory modules
- Swarm intelligence and artificial life
- Mind as motion
- Advanced neural networks
- Industrial project or both a research project and research studies

Optional modules
- Robotic Systems

Electronic Engineering programme structure

Year 1
Compulsory modules
- Programming
- Software Engineering
- Computer Applications
- Engineering Mathematics
- Cybernetics and Circuits
- Fundamentals of Computing
- Telecommunications

Optional modules
- Essential Algorithms
- Java
- Robotic Systems
- Institution Wide Language Programme

Year 2
Compulsory modules
- System Design and Project Management
- Signal Processing
- Embedded Microprocessors and Digital Systems
- Control Systems
- Neurosciences
- Robots and Mechanics
- Robotic Systems

Optional modules
- Essential Algorithms
- Sensors and Devices
- Institution Wide Language Programme

Year 3
Compulsory modules
- Individual Project (BSc/BEng)
- Group Project (MEng)
- Social, Legal and Ethical Aspects of Science and Engineering
- Computer Architecture
- Digital Systems
- Measurement Systems
- Analogue Electronics

Optional modules
- Law and Management
- System Identification and Control
- State Space and Frequency Response
- Image Analysis
- Sustainable Electrical Energy
- Measurement Systems

Year 4 (MEng only)
Compulsory modules
- Wireless and cellular networking
- Industrial project or both a research project and research studies

Optional modules
- Advanced neural networks
- Nonlinear and Optimal Control
- Digital Signal Processing
- Advanced Digital Signal Processing
- Wireless communications for the real world
- Visual intelligence
- Practice of entrepreneurship
- Terahertz Technology
- Digital Communications
- Personal and Mobile Communications

Cybernetics programme structure

Year 1
Compulsory modules
- Programming
- Software Engineering
- Computer Applications
- Cybernetics and Circuits
- Fundamentals of Computing
- Institution Wide Language Programme

Year 2
Compulsory modules
- System Design and Project Management
- Signal Processing
- Embedded Microprocessors and Digital Systems
- Control Systems
- Neuroscience
- Sensors and Devices
- Neural Networks
- Robot and Mechanis
- Robotic Systems
- Telecommunications
- Machine Intelligence

Optional modules
- Essential Algorithms
- Java
- Robotic Systems
- Institution Wide Language Programme

Year 3
Compulsory modules
- Individual Project (BSc/BEng)
- Group Project (MEng)
- Social, Legal and Ethical Aspects of Science and Engineering
- Computer Architectures
- Mechatronics
- Machines in Motion
- Image Analysis
- Sustainable Electrical Energy
- Measurement Systems

Optional modules
- Advanced Digital
- Interactive Technologies
- Digital Signal Processing
- Advanced Digital Signal Processing
- Wireless communications for the real world
- Visual intelligence
- Practice of entrepreneurship
- Terahertz Technology
- Digital Communications
- Personal and Mobile Communications

Robotics programme structure

Year 1
Compulsory modules
- Programming
- Software Engineering
- Computer Applications
- Engineering Mathematics
- Cybernetics and Circuits
- Fundamentals of Computing
- Telecommunications

Optional modules
- Essential Algorithms
- Java
- Robotic Systems
- Institution Wide Language Programme

Year 2
Compulsory modules
- System Design and Project Management
- Signal Processing
- Embedded Microprocessors and Digital Systems
- Control Systems
- Neuroscience
- Robots and Mechanics
- Robotic Systems

Optional modules
- Essential Algorithms
- Sensors and Devices
- Institution Wide Language Programme

Year 3
Compulsory modules
- Individual Project (BSc/BEng)
- Group Project (MEng)
- Social, Legal and Ethical Aspects of Science and Engineering
- Mechatronics
- Machines in Motion
- Image Analysis
- Sustainable Electrical Energy
- Measurement Systems

Optional modules
- Advanced Digital
- Interactive Technologies
- Digital Signal Processing
- Advanced Digital Signal Processing
- Wireless communications for the real world
- Visual intelligence
- Practice of entrepreneurship
- Terahertz Technology
- Digital Communications
- Personal and Mobile Communications

Year 4 (MEng only)
Compulsory modules
- Swarm intelligence and artificial life
- Manipulator dynamics and haptics
- Biomechanics
- Industrial project or both a research project and research studies

Optional modules
- Mind as motion
- Advanced neural networks
- Nonlinear and Optimal Control
- Medical Image and Signal Processing
- Visual intelligence
- Practice of entrepreneurship
- Terahertz Technology
Projects

The final year project will usually be related to current research and industrial activities in the School. Students will plan their project, carry it out, present it orally in a formal setting, and give a practical demonstration to a panel of academics. Students will also submit a CD archive of the project. Arrangements for supervision will normally take the form of a weekly meeting with a supervisor and, as part of the formal progress monitoring process, weekly log-book sign off.

Many Robotics, Electronic Engineering and Cybernetics projects require extensive hardware and software design thus forming a self-contained embedded system. They are designed to consolidate the theoretical material and the skills gained through lectures and laboratory work. Students have full access to state-of-the-art circuit design and simulation software, a well-equipped workshop including a 3D printer, well equipped PCB fabrication facilities and including a Surface Mount oven, in addition to extensive microprocessor software development and debugging tools.

Examples of 2012–13 final year projects

**Micro Heart Rate Monitor for Fitness Applications**
Scott Jenkins, BEng in Electronic Engineering and Cybernetics
This fitness heart rate monitor provides a practical and useful method for measuring heart rate and tracking fitness levels. The use of a colour display allows the user to see what target zone they are in with a quick glance and without having to stop to see the display.

**Musical Instruments for Stroke Rehabilitation**
Michael Slade, BSc Artificial Intelligence and Cybernetics
The aim of this project was to design and implement a piece of software to assist stroke patients with their rehabilitation exercises. Software was designed to engage patients by implementing a game that incorporates the movements of post-stroke rehabilitation exercises into the game-play, via a touch-screen.

**Enter the Cave**
Christopher Relf, BSc Artificial Intelligence and Cybernetics
A 3D video was created, using the 3D projectors within the department, in order to demonstrate the CAVE (University of Reading’s Immersive Virtual Environment room) to external companies and on Open Days.

**Alien Life Form**
Anthony Jenkins, BSc Robotics
Presently, if humans sent a spaceship to a distant planet the first ‘life’ form to step on that planet would have to be either a robot, or at best some biological/technological hybrid. As a potential alien life form, a robot was created to autonomously navigate around an area while avoiding objects in its path.

**3D Facial Recognition Using Kinect**
Dominic di Furia, MEng Robotics
The aim of this project was to implement 3D facial recognition using Microsoft’s Kinect sensor. Microsoft’s SDK was used to determine whether or not an object in sight of Kinect was a face and successful recognition was achieved using 3D geometric data and 3D appearance data using Microsoft’s Kinect sensor.
Employability

Choosing to study at Reading is investing in your future; we can help you on your way to a rewarding career.

Our degrees aren’t just about teaching you interesting subjects – they are designed to prepare you for a rewarding and challenging career in the areas and technologies of your choice.

We offer industrial placements, with many students securing posts among the world’s foremost companies, such as Microsoft, Shadow Robotics, and Fujitsu.

We have a dedicated Placement Team in the School to help you find a job.

We have a Careers, Placement and Experience Centre which helps students find summer placements through the Reading Internship Scheme. We also have the UK’s most successful Knowledge Transfer Centre.

After graduation, Knowledge Transfer Partnerships can help you find a job, fast-tracking your career through extensive training and management opportunities.

We run regular workshops and mock interviews in collaboration with companies such as IBM and Ernst & Young, who put you through their actual assessment centres to help refine your interview skills and give you experience of their recruitment methods.

With much of the UK’s technology industry on our doorstep, we have the best possible choice of companies for you to select.

We have employed University of Reading graduates for many years, and their careers often progress to high positions within the company. The School of Systems Engineering provides students with the skills needed for a career in a company such as Thales.’

Professor Edward Stansfield, Thales Research Technology Ltd

85% of our students over the last 2 years have found full-time employment within 6 months of graduating, with an average salary of £25,000

Placements

During your degree, you can gain work experience with leading companies in the Reading area as part of a Year in Industry. We have a dedicated Placements team to help you find the right position for you.

Our active links with many computing, electronics, robotics and research organisations enable us to offer a year of paid professional training and experience after the second year of our bachelor degree programmes.

Placement companies include:

| Goldman Sachs | PepsiCo | Deloitte | M&S |
| GlaxoSmithKline | BT | O2 | Oracle |
| Sony | KPMG | intel | John Lewis |
| Ernst & Young | IBM | Microsoft | Accenture |
| BBC | HSBC | PwC | 3M |

Sajeel Ahmed carried out his placement with Aero Engine Controls who are part of the Rolls-Royce Group. The company produces engine control software, electronic engine controls, fuel metering units, fuel pumps and engine actuators for a large number of common commercial and military aircraft. He got involved with writing the software that controls the engines for a whole range of systems used in the aircraft. He also tested the software through simulations and rigs and designed the control systems.

Tim Sudlow carried out a placement with Ansys, a global leader in engineering simulation software. The team at Milton Park focuses on developing and testing software that can simulate Fluid Dynamics problems. He was able to develop tools using Python, C++ and JavaScript; expand his knowledge to multiple platforms, manage a large web based database and understand how systems work in industry.

100% of our graduates from 2012-13 in full-time work are in professional/managerial roles
**Career Opportunities**

### Cybernetics

Our graduates go on to careers in software engineering, programming, consultancy, systems analysis, control engineering, game development, robotics, and even prosthetics design. A Cybernetics degree at the University of Reading gives you the skills you need for a highly rewarding professional career in a diverse range of fields. Recent graduates from the course have gone to work in the following roles within the first year of graduation:

- Graduate Engineer, Ultra Electronics
- Graduate Programmer Analyst, Woodward Associates
- Graduate Software Design Engineer, Imagination Technologies
- Junior Projects Engineer, Pharos communications division of Evertz
- Systems Engineer, Thales Research and Technology UK Ltd
- Control Systems & Software Engineer, Oxford Technologies
- Electronic Design Engineer, Transico Ltd

### Electronic Engineering

As a graduate Electronic Engineer, there is the option of a career in embedded software engineering, programming, consultancy, systems engineering, and electronics design. An Electronic Engineering degree at the University of Reading gives you the skills you need for a highly rewarding professional career in a diverse range of fields. Recent graduates have gone to work in the following roles within the first year of graduation:

- Software Test Engineer, Cisco Systems UK
- Calibration Technician, Agilent Technologies
- Design Engineer, Thales Research & Technology UK Ltd
- Development Engineer, Sonardyne Ltd
- Graduate Nuclear Engineer, Babcock
- Electrical Engineer, UK Power Networks

### Robotics

Graduates in Robotics have the option of a career in software engineering, programming, consultancy, systems analysis, control engineering, game development, robotics, and even prosthetics design. A Robotics degree at the University of Reading gives you the skills you need for a highly rewarding professional career in diverse fields. Recent graduates have gone to work in the following roles within the first year of graduation:

- Project Engineer, Feed4ward Control Ltd
- Software Engineer, General Dynamics Broadband
- Developer, Import.io
- Systems Engineer, Ultra Global PRT
- Oil & Gas Field Engineer, Schulumberger
- Network Engineer, Acturis
- Junior Engineer, Guralp Systems

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**Student Profile: Harry Eberle**

I had a really difficult time at school (the reasons for which could fill a book). I always loved learning, and I was good at it, but it wasn't really enough to pull me through, so making the grade for Reading University took a fair amount of effort. It was definitely worth it though - artificial intelligence is my dream subject and I've really enjoyed myself (particularly in the debate society!).

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Why did you choose to study at the University of Reading?

I heard about the University from a career advisor at college, who recommended that he thought it would be a very good fit for me. When I looked into Reading during my week out, I found that the cybernetics courses it offered were an almost perfect match to what I wanted to study and from that point I didn't really look back.

Why did you choose your particular course and what inspires you about your chosen subject of study?

Artificial intelligence has always fascinated me as a concept, but what attracted me to this course over other, similar ones was that the cybernetics component incorporates topics I simply would not have learnt about otherwise. Pure computer science degrees tend to keep physical reality at arm's length, while Reading's cybernetics courses include elements of electrical engineering and control, giving a broader knowledge base.

I find the study of artificial intelligence stimulating because it is still a very open question. There are scores of techniques and as many ideological camps over how intelligent behaviour can or should be produced and it still feels like anything could happen.

What is the best bit about living and studying in Reading?

I'm going to be boring here and say that my favourite part of Reading is probably the campus. It's one of the most attractive I've seen and I just like having the space to wander about and go for walks.

Please tell us about your current research placement?

In my current placement, which is run through Reading's UROP (Undergraduate Research Opportunities Programme), I am working to create an accurate model of how a human joint responds to being moved. The aim is to reliably separate the passive, physical stiffness of a joint from the active reflexive resistance of the muscles. This has applications in determining how strong a person's nervous response is, such as during recovery from a stroke.

How is your degree helping in your chosen career path?

I would ideally like to go into research, so the simplest way my degree helps me is by teaching me new things and expanding my knowledge. However, I've found that some of the most useful skills I have learnt are those I learned or taught myself in order to complete coursework and major projects. This includes skills like working in a team, but also the technical skills involved in making something actually work that can't really be learned from a piece of paper.

Any advice for students coming to Reading?

Make sure you get to know the entire university. Reading is big enough that it's possible to go years without knowing that a particular building or service exists and a lot of them are very useful. It also helps to know your way about when your lecture is moved to some obscure room you've never heard of (which will happen at least once).
A Career in Research

You may decide that a career in research is the career for you. Students on these degrees will be well prepared to contribute to the School’s Research in areas such as:
- Intelligent Systems
- Neuroscience
- Energy and Control Engineering
- Wireless Communications (and embedded systems)
- Big Data Analytics (and computational science)
- Computer Vision
- Socio-technical systems (including business information systems)
- Haptics and Human Computer Interaction
- Terahertz Technology
- Infrared optical filters and coatings for astronomy, space-flight and atmospheric sensing instrumentation

Please visit our website to find out more about the innovative research that is being carried out:
www.reading.ac.uk/urop

Opportunities to get involved with research

Successful candidates receive a bursary to work on research based placements that last six weeks over the summer, or can be part-time into the autumn term. They make a significant contribution to your transferable skills, employability and understanding of the research environment.

Example projects:

- The nature of strong anticipation
  Low Power Body Area Network devices in Residential Healthcare

- Developing accessible technology for people with learning disabilities
  Brain-computer interface control via detection of pre-movement activations in the brain

- Haptic Navigation System for People with Vision Impairment

- Accessible pulse oximeter for users with vision impairment.

Student Profile: Maitreyee Wairagkar

I am currently in the last year of an MEng in Artificial Intelligence and Cybernetics. I am an international student from India. I am an aspiring researcher with aptitude and skills in computer programming and problem solving. I have specific research interests in Brain Computer Interfaces (BCI) and studying their different paradigms along with Bionics and human applications of Artificial Intelligence and machine learning principles. I am a recipient of various awards like the University of Reading Chancellor’s Awards in 2011 and 2012, the Institute of Measurement and Control award, the Cybernetics Challenge award for outstanding academic achievement as well as the EPSRC award for extracurricular development.

I am a student member of the Brain Embodiment Laboratory in the School of Systems Engineering. I have participated in various research projects including a UROP placement on development of a BCI for cursor control. For my third year thesis, I worked on signal processing and classification of EEG signals for motor imagery based BCI for controlling mobile robots. Currently I am working on reliably predicting voluntary movement for the development of a robust BCI system for my MEng thesis. I have also completed UROP placement in developing software for analyzing and processing Terahertz images.

I am a teaching assistant for different modules like Programming and Fundamentals of Computing.

Why did you choose to study at the University of Reading?

The University of Reading is probably the only university in the world offering a degree in a unique combination of Cybernetics and Artificial Intelligence. As a final year student I feel my choice of this university was a perfect one. The academic staff members in the department make up the lead scientists in their fields undertaking research projects, of enormous potential and global impact. Research projects, especially summer placements are unique learning opportunities. Known for its student-friendly academic and research environment, the most beautiful campus, and peaceful cosmopolitan culture, Reading enriches the learning experience. The location of the University in the UK’s Silicon Valley with leading industries and IT companies nearby, offers good future opportunities.

Why did you choose your particular course and what inspires you about your chosen subject of study?

I always wished to pursue a unique course which would satisfy my creative urge, lead me on the research path and simultaneously enriching me to better serve humanity. Cybernetics and Artificial Intelligence being such a unique combination offered only at Reading was an obvious choice. This combination has the potential to revolutionise the global computer, biomedical and robotic technologies. My course gives me all the opportunities and tech-skill to help humanity, especially ability-challenged people by improving quality of life. Brain computer interface is one such area which has inspired me. I feel this course has the most to offer to fulfill my dreams. Humanity will be better able to face life’s challenges with development in AI and cybernetics.
What is the best bit about living and studying in Reading?
Reading, a small town away from the hassle and bustle of big cities is truly the best suited place to study. The positive ambience and the beautiful university campus are very welcoming. The national and international students coming from all over the world have formed a very healthy community and this gives me a chance to interact with people from different countries and learn about diverse cultures which has enriched me as a person. High standard university and accommodation facilities are provided for students that help us study better and at the same time caring staff make us feel at home. Welfare of the students is given special attention which enables us to have a good time at the most important phase of life that would decide our future.

Please tell us about your current research placement?
I have done a research placement in the Brain Embodiment Lab (BEL) for developing a Brain Computer Interface (BCI). BCI provides a new mode of communication and interaction for the disability challenged people by allowing them to interact with the external world by their thoughts. In my research project, I was working on development of Motor Imagery based BCI which allows the user to control a computer very intuitively just by imagining the movements of the right and left hand. I had done the BCI placement in BEL in the last summer and I have been working on a similar project throughout this year.

I have received an opportunity to do another placement in UROP for developing imaging software for viewing and processing images scanned using novel Terahertz technology. Terahertz technology was used to scan old paintings on the walls of churches and caves which were hidden behind layers of plaster and paint. This modern technique could be used to restore the ancient paintings digitally, thus preserving the heritage. Since the terahertz images are recorded in the form of long signals, the main task in this project was developing an efficient database system to store the large image data and retrieve it for processing in real time.

How is your degree helping in your chosen career path?
Since childhood, I was interested in research for enhancing human abilities with the help of modern and intelligent technology. My degree course is helping me in fulfilling my ambition. The course is based on the modern advancements in technology in today’s progressing world. I have been introduced to the various novel and innovative fields of research by the researchers in Systems Engineering working on ground breaking research projects. The emphasis on research in our course is helping me to understand the procedure and methods for conducting formal research and also the current advancements going on in the field of my interest. The UROP summer projects for two years have given me the opportunity to work on different innovative topics other than the set academic curriculum under the excellent guidance of supervisors, experts in their fields.

Any advice for students coming to Reading?
The University of Reading has been very supportive since my arrival to Reading. The lecturers are very supportive, helpful and willing to answer any questions from students either during the lecture, after the lecture or by email. All the lecturers are very approachable and I often seek appointments for meetings for discussing various topics for projects, coursework or a module in general. The personal tutor system is very helpful and your tutor knows you personally, especially when you are new and the lecturers do not know the students and you receive guidance and mentoring throughout the course. The supervision and guidance provided by the supervisors for the research project is excellent and the weekly supervisor meetings are very useful to decide the future path of the project. The administrative staff in the university including the students’ information centre and technical help (TNG) in systems engineering, have also been very helpful and cooperative.

Notes: All offers exclude Key Skills and General Studies. If you have BTEC qualification, please contact ugadmissions@reading.ac.uk

Entry requirements

<table>
<thead>
<tr>
<th>Course</th>
<th>UCAS Code</th>
<th>A Level Requirement</th>
<th>International Baccalaureate</th>
</tr>
</thead>
<tbody>
<tr>
<td>BSc Cybernetics</td>
<td>H651</td>
<td>BBB/ABC at A level including Mathematics and either Physics or Electronics</td>
<td>30 points including 5 points in both higher level Mathematics and Physics or Electronics</td>
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<tr>
<td>BEng Electronic Engineering</td>
<td>H601</td>
<td>ABB/AAC at A level including Mathematics and either Physics or Electronics</td>
<td>32 points including 5 points in both higher level Mathematics and Physics or Electronics</td>
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<tr>
<td>BSc Cybernetics with Industrial Year</td>
<td>H690</td>
<td>ABB/AAC at A level including Mathematics and either Physics or Electronics</td>
<td>35 points including 6 points in both higher level Mathematics and Physics or Electronics</td>
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<tr>
<td>BEng Electronic Engineering with Industrial Year</td>
<td>H605</td>
<td>ABB at A level including grade A in Mathematics and Physics or Electronics</td>
<td>35 points including 6 points in both higher level Mathematics and Physics or Electronics</td>
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<tr>
<td>MEng Cybernetics</td>
<td>H654</td>
<td>BBB/ABC at A level including Mathematics and a science subject</td>
<td>30 points including 5 points in both higher level Mathematics and a science subject</td>
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<tr>
<td>MEng Electronic Engineering</td>
<td>H603</td>
<td>ABB/AAC at A level including Mathematics and a science subject</td>
<td>32 points including 5 points in both higher level Mathematics and a science subject</td>
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<tr>
<td>BSc Artificial Intelligence</td>
<td>GH76</td>
<td>BBB/ABC at A level including Mathematics and a science subject</td>
<td>35 points including 6 points in both higher level Mathematics and a science subject</td>
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<tr>
<td>BSc Robotics</td>
<td>H671</td>
<td>ABB/AAC at A level including Mathematics and either Physics or Electronics</td>
<td>30 points including 5 points in both higher level Mathematics and Physics or Electronics</td>
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<tr>
<td>BSc Artificial Intelligence with Industrial Year</td>
<td>HG67</td>
<td>ABB/AAC at A level including Mathematics and either Physics or Electronics</td>
<td>35 points including 6 points in both higher level Mathematics and a science subject</td>
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<tr>
<td>BSc Robotics with Industrial Year</td>
<td>H670</td>
<td>ABB/AAC at A level including Mathematics and either Physics or Electronics</td>
<td>35 points including 6 points in both higher level Mathematics and a science subject</td>
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<td>MEng Robotics</td>
<td>H675</td>
<td>ABB at A level including grade A in Mathematics and a science subject</td>
<td>30 points including 5 points in both higher level Mathematics and a science subject</td>
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<tr>
<td>MEng Artificial Intelligence</td>
<td>GH7P</td>
<td>ABB at A level including grade A in Mathematics and a science subject</td>
<td>30 points including 5 points in both higher level Mathematics and a science subject</td>
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</tbody>
</table>
How to apply

All applications to our Undergraduate programmes should be made through the Universities and Colleges Admissions Service (UCAS).

Please see www.ucas.com for instructions on how to apply.

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Choosing to study at Reading is investing in your future; we can help you on your way to a rewarding career.

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You will also have the opportunity to visit the campus and student accommodation. For details of how to visit us, see www.reading.ac.uk/opendays