

Neuroscience

Essentials

What neuroscience degrees are there?

Medical Neuroscience
Neuroscience
Neuroscience with Cognitive Science

What degrees can I take with neuroscience as a minor?

Psychology with Neuroscience (p117)

See also

Biochemistry (p35), Biology (p37), Biomedical sciences (p39), Cognitive science (p46), Medicine (p98)

What A levels/IB scores do I need?

(For other qualifications information, refer to pages 125-129)

Typical A level offer range: AAB-ABB

For Medical Neuroscience, A levels (or equivalent) must include at least two science A levels (which can include Psychology but not Geography). Alternatively, you must have one science A level (or equivalent) combined with AS level Chemistry at grade B

For Neuroscience or Neuroscience with Cognitive Science, A levels (or equivalent) must include one science A level (which can include Psychology but not Geography)

Typical IB diploma offer range: 34-36

For Medical Neuroscience, 34-36 points including two Higher Level science subjects

For Neuroscience or Neuroscience with Cognitive Science, 34-36 points including at least one Higher Level science subject

What else do I need?

GCSE (or equivalent) Chemistry or Physics (or Double Science) at grade B; and Mathematics, grade C

Fees

Refer to pages 137-138 for information on fees

English language requirements

IELTS 6.5 overall and not less than 6.0 in both the Listening and Writing sections. Internet-based TOEFL with 90 overall, including at least 24 in Speaking and 25 in Writing. For alternative language requirements, refer to page 130

Foundation year for UK and EU students

Refer to Biosciences (with a Foundation Year) on page 36

Foundation year for non-EU students

If your qualifications (including English language) do not yet meet our entry requirements for admission direct to the first year of these degree programmes, we offer an international foundation year entry route. Refer to pages 26 and 131 for details

How do I find out more?

For more information, contact:

E lifesci@sussex.ac.uk

T +44 (0)1273 678057

Admissions Tutor, Neuroscience, School of Life Sciences, University of Sussex, Falmer, Brighton BN1 9QG, UK

www.sussex.ac.uk/neuroscience

When can I visit?

Our Open Day dates for 2011 are 11 June and 8 October. We also run regular campus tours.

Please book online at **www.sussex.ac.uk/visitors** or call 01273 876787

Why neuroscience?

Neuroscience is the study of the brain – or the biology of the mind. Our brains contain many billions of interconnected neurons. Neuroscientists are interested in how the activity of these cells underlies thought and action, and we also study molecular mechanisms of drug action. We examine the systems that control our movement, allow us to see, underlie our emotional responses, or are affected by addictive drugs.

Medical neuroscience addresses our understanding of brain disease and dysfunction – and highlights the enormous scope for progress. How can discoveries in molecular genetics and neuropharmacology, and advances in techniques such as brain imaging and nanotechnology, lead to new treatments?

Neuroscience and artificial intelligence have much to learn from one another. They tackle related problems, such as understanding how – if at all – the human brain differs fundamentally from that of other animals, attempting to construct a conscious computer, or building a flying robot.

Why neuroscience at Sussex?

- Rated 8th in the UK for 'Pre-clinical and Human Biological Sciences' research in the 2008 Research Assessment Exercise (RAE). 85 per cent of our research was rated as recognised internationally or higher, and over half rated as internationally excellent or higher.

- Our degrees integrate basic biology with cognitive psychology. They offer a comprehensive grounding in neuroscience and you get the chance to do substantial practical work, with the final-year research project offering the opportunity to work in a leading research laboratory.

- Our status as a leading centre for neuroscience is reflected in the wide range of options we offer. There are specialised courses in areas such as intelligence, genetic and molecular processes of neural development, learning and memory.

- Teaching is informed by our cutting-edge research. Our recent discoveries have included understanding the basic mechanisms of hearing and how genetic defects of the ear lead to deafness; revealing the genetic controls whose malfunction leads to the development of brain tumours; and applying information from genomics to unravel the neuronal signaling in the brain.

- Our academic environment emphasises small-group teaching and close interactions between students, their teachers and other scientists.

Rosa's perspective

'The Neuroscience programme is challenging, cutting edge and eye opening. There's a large range of options, allowing you the freedom to get your teeth into whatever fascinates you most. 'Sussex has a particularly strong interdisciplinary approach, so not only do you get to practise the methodology associated with different disciplines, but you also have the opportunity to integrate information in unique and exciting ways. 'Lecturers, lab technicians and other staff members are all extremely helpful and supportive. 'Neuroscience at Sussex is thoroughly enjoyable and I'd recommend it to anyone with a real passion for the subject.'

Rosa Hardt
Neuroscience graduate



Prital's career perspective

'What made Neuroscience at Sussex so appealing to me was the multidisciplinary courses – there's something for everyone. Even more tempting was the opportunity to go abroad in the second year on a biology field trip. It's a brilliant way of learning essential field skills! 'The teaching staff at Sussex will inspire you, and they are always happy to provide help and support. 'There's only one problem – by the end of the third year, this degree programme will leave you intrigued and wanting more! So much so that since graduating I've started working at a drug rehabilitation centre, where I'm able to apply my knowledge to real situations. I realise how many transferable skills I now have, and how my time at Sussex gave me the opportunity to develop my passion for understanding mental health and addictions. Sussex has given me the vital foundations I need to pursue my career aspiration of one day becoming a mental health professional within a clinical setting.'

Prital Patel
Day Services Worker,
St Thomas Fund,
CRI





By studying the remarkable ability of ants to learn food locations, we can understand how the brain uses visual spatial memory for navigation. Individually colour-coded ants that have succeeded in finding food are shown feeding on a sugar solution

What sort of career could I have?

- further study for a research degree or professional training
- pharmaceutical industry
- advanced information technology (especially robotics and artificial intelligence) and software consultancy
- graduate-entry medicine and related clinical work
- teaching and Higher Education
- biotechnology
- forensic science
- research careers in neuropharmacology and neuropsychology.

Looking at a brain in magnetic resonance imaging (MRI)



How will I learn?

Each course lasts a term, and usually includes two or three lectures a week, practical classes and tutorials. Tutorial classes have four to six students. They are informal and usually based around reading a research paper or review. You also present your own work and discuss ideas and questions. You are taught by lecturers who are involved in cutting-edge research.

Alongside lectures, your tutorial, practical and seminar learning are essential elements of our programmes that enable you to work independently and in groups.

Assessment is by coursework and unseen exams. The intellectual concepts and experimental methods that underlie neuroscience are as important as specific items of information. We encourage you to develop your interests by reading scientific literature, and by writing essays. Communication skills are essential: we teach you to write essays and practical reports in the clear style required in science, while you learn in seminars to communicate directly with an audience.

What will I achieve?

- You will develop the skills and knowledge to exploit career opportunities fully. Neuroscience is a key part of modern biomedical science, and our degrees open routes into careers in basic and clinical research, and to clinical and industrial careers.
- You will learn about the techniques of modern biomedical science, and the insights that it can bring to understanding the mind and its limitations. You will be able to assimilate data and ideas from technical literature, and summarise and communicate this material in clear prose.
- Alongside lectures your tutorial, practical and seminar learning are essential elements of our programme that will enable you to work independently and in groups.
- We encourage clear thought and expression, and stimulate inquiry and originality.
- The ability to convey complex ideas verbally and in writing; to understand scientific research and its literature; and to design and conduct experimental studies.
- In laboratory and project work you learn to devise, conduct and analyse experiments, and show how these advance our knowledge or test current theories.



Degrees

Medical Neuroscience

BSc (Hons), 3 years UCAS Code B142

The degree programme gives a foundation in the basic science, explains its medical implications, and shows you how research is done in laboratory and clinical settings. We introduce topics in medical neuroscience, neurological problems, their treatments and the (many) outstanding challenges in neurology and psychiatry.

In the second year, you learn about neuroscience and its clinical application in greater depth. You study developmental biology, which underpins understanding of many congenital diseases. As in the first year, teaching includes a mix of lectures and seminars, but there is an emphasis on practical work, and you encounter and use techniques that are usually only available in research laboratories. There is an option to study abroad for a term.

In the final year, you have the opportunity to shape and define your interest in medical neuroscience by choosing from a wide range of options. These courses involve lectures, but the emphasis is on participation in seminars and individual study. The research project accounts for a quarter of the year's study and is normally done in a University laboratory. At the end you write a project report in the form of a scientific paper.

Neuroscience

BSc (Hons), 3 years UCAS Code: B140

The first year of the Neuroscience degree provides an introduction to university-level study and prepares students from a range of academic backgrounds for the programme. The second year provides a range of specialist neuroscience teaching, with a chance to take options from other subjects. This allows diversification or specialisation according to taste, and enables you to make the most of our flexible and interdisciplinary programme structure. The third year allows you to develop your own interests and ambitions by choosing a research project and selecting options. Most students do their project in a laboratory at Sussex over two terms, but some do their research during the summer vacation or may be allowed to write up research done elsewhere as a project.

Refer to the core courses list on the right for details of neuroscience courses.

Neuroscience with Cognitive Science

BSc (Hons), 3 years UCAS Code: B141

This degree aims to understand mechanisms of human thought, by asking how mental processes such as perception, memory, language and emotion are implemented within the brain. Only a few years ago the techniques for answering such questions were very limited. An explosion of new methods dependent on computers and brain imaging has led to enormous progress and allows an array of new problems to be tackled directly. Cognitive science is a multidisciplinary subject, which integrates neuroscience, psychology, linguistics, philosophy and artificial intelligence. The programme is taught by neuroscientists, cognitive scientists and experimental psychologists from across the University.

In Year 1, you take core courses in biology, neuroscience and cognitive psychology, and also courses introducing cognitive science, the philosophy of science and cognitive modelling.

In Year 2, you take neuroscience and psychology courses, as well as cognitive science options such as Cultural Evolution; Human-Computer Interaction; Language Acquisition; Philosophical Foundations of Cognitive Science; and Philosophy and Science of Consciousness.

Your research project will be in an aspect of cognitive neuroscience.

Refer to the core courses list on the right for details of neuroscience courses; refer to the cognitive science subject entry on page 46 for more information on these courses.

Core courses

Courses currently include:

Year 1

Medical Neuroscience

To give a solid grounding, you take courses in behaviour, cognitive psychology, human and animal physiology, molecular genetics and cellular biochemistry, neuroscience, and physics. A seminar focuses on the causes and prospects for treatment of deafness and blindness

Neuroscience; Neuroscience with Cognitive Science

You take Evolution and the Diversity of Life • Introduction to Cognitive Psychology • Molecular and Cell Biology • Neuroscience and Animal Behaviour. Options include Computer Modelling • Developmental Psychology • Human Physiology. Those who need to can take chemistry, mathematics, or scientific writing classes. You also study physics relevant to neuroscientists

Year 2

Medical Neuroscience

You study the biology of the nervous system in depth, and discover how disease and malfunction affect the mind and brain. The main course, Neuroscience, is shared with the Brighton and Sussex Medical School. This includes classes run by clinical practitioners as well as scientists. There are practical or seminar courses in each term, and you also study abnormal psychology, and developmental and functional neuroanatomy

Neuroscience; Neuroscience with Cognitive Science

This year allows you to specialise. There are courses in basic neurophysiology and synaptic communication, and how neural circuits control behaviour. You will benefit from different study modes in laboratory-based courses and seminars, and use equipment usually available only in research. You also take two or more psychology courses and you have a wide range of options (including an overseas field course). You have the opportunity to study abroad for a term

Year 3

You can specialise, choosing options in areas such as biological bases of mental disorders, cognitive neuropsychology, developmental genetics and neurobiology, endocrinology, gene regulation in the nervous system, immunology in health and disease, motivation and emotion, neuronal plasticity and gene regulation, neuronal transmission and transmission, psychobiology of addiction, psychobiology of ageing and dementia, sensory and motor function of the nervous system, sensory neuroscience, and synaesthesia