

Science, technology and innovation

Essentials

Taught programmes

MSc degrees

Innovation and Sustainability for International Development
Science and Technology Policy

Research programmes

MPhil, PhD Science and Technology Policy Studies

Related programmes

MA in Globalisation and Development (p72)
MSc in Climate Change and Policy (p60)
MSc in Development Economics (p78)
MSc in Energy Policy for Sustainability (p60)
MSc in Sustainable Energy Technology (p88)

Admissions requirements

For information on overseas qualifications that meet the admissions requirements, refer to pages 156-157

MSc in Innovation and Sustainability for International Development

A first- or upper second-class undergraduate honours degree in either social or natural sciences. Applicants with relevant professional experience will also be considered

MSc in Science and Technology Policy

A first- or upper second-class undergraduate honours degree in the social and natural sciences or engineering. Candidates with a lower second-class undergraduate honours degree will be considered

MPhil and PhD

Normally a Masters degree in a field related to science and technology policy, or several years of equivalent professional experience

English language requirements

IELTS 7.0, with not less than 6.5 in each section. Internet TOEFL with 100 overall, with at least 21 in Listening, 22 in Reading and 27 in both Speaking and Writing. For more information and alternative English language requirements, refer to page 156

Fees

Refer to pages 158-159 for information on fees

Admissions and further information

School of Business, Management and Economics, Postgraduate Office, Mantell 2b3b,
University of Sussex, Falmer, Brighton BN1 9RF, UK
T +44 (0)1273 872717
E pgbmec@sussex.ac.uk
www.sussex.ac.uk/spru

SPRU offers a stimulating intellectual, social and physical environment for students and faculty

- SPRU – Science and Technology Policy Research has a student community of more than 90 doctoral and 60 Masters students, supported by about 50 research and teaching faculty. (Visit www.sussex.ac.uk/spru for further information.)
- Students come to SPRU with strong first degrees in sciences and engineering, as well as in social sciences. We provide systematic education and training for students interested in analysing and guiding policy, assessing the impact of policy, and managing scientific change and technological innovation within public-sector organisations, non-governmental organisations (NGOs) and companies.
- SPRU is recognised internationally as being at the forefront of research in the field of science and technology policy and innovation management.
- SPRU's multidisciplinary and international orientation provides a unique perspective on policy and management issues in the UK and elsewhere in Europe, in North America and Japan, and also in the industrialising countries of Latin America, Asia and Africa.
- The MSc and research degree programmes have extensive links with business and policy-making organisations, and emphasis is given to strengthening students' skills and competencies for employment.



Taught programmes

MSc in Innovation and Sustainability for International Development

1 year full time/2 years part time

Technological innovation lies at the heart of strategies to achieve sustainable well-being for those living in less-developed countries. However, the impact of new technologies on individuals and their environment is highly dependent on the choices made by policy makers, scientists and companies at different levels.

This MSc provides you with a broad theoretical grounding in how the institutions of science, technology and innovation can impact economic growth and positively influence ecosystem management and communities in less-developed countries. Relying on an interdisciplinary approach to teaching, our courses provide you with a rigorous academic training and discussion on impacts of scientific and technological development. You will also receive hands-on training that will develop your capabilities to communicate, negotiate and co-operate with diverse stakeholder groups to address key development challenges in areas such as poverty alleviation, and energy, food and water security.

In the autumn term, you will receive a grounding in the more general theories and debates in science and technology policy and sustainable development. This includes how policy choices impact on industry development, alternative development priorities and an introduction to debates on technology.

In the spring term, you can specialise in a sustainability pathway with a combination of core courses and options, or you can focus on courses that discuss technology policy and institutions for economic growth as applied to developing countries. This includes studies of systems of innovation, analysis of key industries and the development of clusters as a strategy for inclusion and growth.

This programme will integrate ideas from economics, innovation studies, policy studies, environment and development but it assumes no previous training in these areas.

Career opportunities

This MSc will equip you for careers in a range of areas including government ministries, industry and technology policy ministries, international organisations such as the UN, non-governmental organisations (NGOs), multinational corporations (MNCs), non-profit firms, and third-sector firms. The programme may also lead you to pursue doctoral studies and academic research in the areas covered.

Programme structure

Autumn term: Introduction to Sustainability
• Science and Technology Policy for Development.

Spring term: Growth, Institutions and Technical Change • Innovation and Sustainability for Development • Innovation Systems and Industry Analysis • Perspective, Methods and Skills. You may also choose from a range of options in SPRU including Technology and Human Development.

Summer term: you undertake supervised work on a dissertation.

Assessment

Courses are assessed by a combination of analysis assignments, project presentations, extended essays and a dissertation.

This programme is under development and subject to validation.

MSc in Science and Technology Policy 1 year full time/2 years part time

This programme offers you the opportunity to learn about the causes and consequences of change in science, technology and innovation. Central themes include:

- the social and economic motives for innovation
- the evolving features of globalised industrialisation
- problems and prospects for sustainable development
- the means by which innovation is stimulated and governed, with particular emphasis on public policy.

Tools for analysing the rate and direction of change, for dealing with complexity and uncertainty, and for taking decisions about the promotion and regulation of scientific and technological change are developed through coursework, which prepares you for your own dissertation research project.

There is a common set of core courses but you will follow one of two pathways when choosing your options. This can be done in two related but distinct areas:

- the analysis of science, technology and innovation policy, with emphasis on the impact of the adoption of innovations on the economy and wider society, or
- the analysis of science and technology in relation to sustainability. Both positive and negative aspects of scientific and technological development are analysed, with sectoral emphasis on energy and the environment, and food and agriculture.

These pathways are taught by world-leading researchers, and are international in focus, including the developing world. Within this framework, you deepen your knowledge and acquire relevant skills in specific areas of interest from the spring term onwards.

A 20,000-word dissertation demonstrates your capabilities for independent research and the ability to reach conclusions on complex questions and issues.

Career opportunities

Our graduates have gained employment in a wide range of public- and private-sector institutions all over the world. Many have gained employment and promotion in government departments such as science and technology, development, industry, trade, education, employment and environment ministries. Some have gained employment in non-ministerial public-sector bodies.

Employers of our graduates include the UK's Government Office for Science; the Department for Business, Innovation and Skills; the Environment Agency; the Department for Food and Rural Affairs; the European Commission; the European Environment Agency; the Royal Society of London; the Council of Canadian Academies; and the Chinese Academy of Engineering.

Many graduates have become teachers and professors in universities and research institutes in countries including the UK, Germany, the Netherlands, Austria, Italy, Spain, Argentina, Chile, Brazil, Japan, Australia, India and China. A significant proportion of our graduates has also gained employment in private-sector, third-sector and charitable organisations. Some are also employed in commercial research and consultancy organisations.



Programme structure

Autumn term: all students take Science, Technology and Innovations: Markets, Firms and Policies.

Additional courses are dependent on which pathway you are following:

On the *Science, Technology and Innovation Policy* pathway you also take Science, Institutions and Power.

On the *Science, Technology and Sustainability* pathway you also take Sustainability: Introduction and Economic Perspectives.

Spring term: all students take two courses from Energy Policy and Sustainability

• Entrepreneurship • Environmental Policy and Industrial Technology • Information and Communication Policy and Strategy • Innovation for Sustainability • Managing Knowledge • Science and Policy Processes • Science, Knowledge and Politics of Development • Science, Technology and Innovation Studies: Perspectives, Methods and Skills • The Political Economy of Science Policy. (Not all options may be offered in the year and additional options may be available.)

Students on the *Science, Technology and Sustainability* pathway take at least one option from Energy Policy and Sustainability

• Environmental Policy and Industrial Technology • Innovation for Sustainability.

In addition, in the spring term, all students take Introduction to Statistical Research Methods • Research Design, Planning and Management.

Summer term: all students carry out supervised work on a 20,000-word MSc dissertation relevant to their degree.

Assessment

Courses are assessed by a combination of coursework, multiple-choice questions, essays, analysis assignments, take-away papers and a dissertation.

Research programmes

SPRU offers research degrees (MPhil and PhD). The PhD may be achieved via two different routes:

- doctoral research linked to prior study and research training in one of SPRU's MSc programmes. This integrated programme may be taken by UK and other EU students as an ESRC-funded 1+3 programme. The expected duration of the combined programme is about four years
- as a stand-alone programme of doctoral research undertaken by students whose prior research training in a relevant field has been equivalent to that provided by a SPRU Masters programme. In this case the expected duration of the programme is three years.

SPRU's research focuses on the growth, sustainability and responsible governance of science, technologies and innovation systems. We emphasise interdisciplinary interactions that underpin our distinctive perspective. Current research projects fall under three main headings: Innovation in Firms and Industries; National and International Science and Technology Systems; and Governance and Sustainability. Within those themes, projects focus, for example, on strategy, structure and dynamics of innovating firms, research and technological change in high-tech industries, science and technology in developing countries, policy and regulation in energy and the environment, rethinking sustainable development, preventing the misuse of biological and chemical techniques, and the politics and economics of the 'information society'.

A major research theme concerns energy, climate change and sustainability, pursued via the Sussex Energy Group, and core membership of the Tyndall Centre for Climate Change Research and the UK Energy Research Centre. SPRU also co-hosts (with IDS) the ESRC-funded STEPS (Social Technological and Environmental Pathways to Sustainability) Centre.

Recent research programmes and projects have included the following:

Benchmarking the environmental performance of manufacturing firms

Development of renewable energy technology in developing countries

Developing practical ways for dealing with new risks and uncertainties

Improved indicators of scientific, technical and environmental performance

Innovation in energy networks to manage decentralised power

Innovative management in collaborative software development networks

Managing complex knowledge bases, skills and organisations

Managing the development of integrated systems and services

New perspectives on biomedical systems, especially genetics/genomics

The management of innovation in firms, industries and countries

The role of scientific evidence and expertise in public policy-making

Practitioners with knowledge and competencies in these and similar fields are increasingly sought after internationally, and students engaged in research-degree study at SPRU can expect excellent career opportunities in a range of roles in the academic, business or public-sector arenas.

Coursework

Although the MPhil and PhD research degrees are assessed by thesis, you are expected to take assessed research and statistical methods courses. You may also be asked to take other specific courses in the first two terms, to fill gaps in your knowledge.

Thesis research topics

SPRU attaches a high priority to integrating research students closely with its overall research activities. Thesis research topics may therefore cover a wide range of areas where this integration is possible. However, prospective applicants should consult the SPRU website to review in more detail the research interests of faculty and the current thesis topics of research students.

Career opportunities

We have extensive links with business and policy-making organisations, and emphasis is given to strengthening students' skills and competencies for employment.

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Faculty research interests

The research interests of selected SPRU faculty are briefly described below. For more detailed information, visit

www.sussex.ac.uk/spru/people

Allam Ahmed Economist with research interests in technology management, technology transfer, sustainable development, international business.

Frank Geels Socio-technical transitions and system innovations; decline of industries and technology; sustainable development; co-evolution of technology and society.

Rumy Hasan Economist focusing on international strategic alliances, transitional economies, east Asia.

Mike Hopkins Biologist with research interests in firm strategy and industrial competitiveness in biotechnology; genetic testing services in NHS/industry; DNA patenting.

Justine Johnstone Philosopher/social scientist. ICT and knowledge in developing countries; theory of knowledge; ethics and technology; critical realism and methodological pluralism.

Professor Gordon MacKerron Energy policy of carbon emission reductions and security of supply; nuclear power economics and policy; economic regulation in the energy industries.

Catriona McLeish Harvard Sussex Program on Chemical and Biological Warfare (CBW) Armament and Arms Limitation; international regimes against CBW; implementation of the BW regime.

Fiona Marshall Science and international development; food safety policy and livelihoods in the developing world; peri-urban environmental change.

Ben Martin Physicist/social scientist focusing on research and technology foresight; comparisons of national scientific performance; university-industry links, changing nature of the university.

Mari Martiskainen Consumer behaviour and energy demand; the governance of nuclear power and local stakeholder engagement.

Erik Millstone Physicist/philosopher. Public and environmental health protection policies; risk assessment and management by national and international regulatory bodies; obesity policy.

Jordi Molas-Gallart Economist focusing on defence industrial policy; dual-use technologies; evaluation and impact assessment of public policies in support of science and technology.

Piera Morlacchi Innovation of medical technologies; entrepreneurship and technology strategy in biomedical fields; interorganisational and social networks; co-evolution of technology and organisations.

Paul Nightingale Chemist, Complex Product Systems Innovation Centre; genetics technologies in the healthcare and pharmaceutical sectors; science and technology.

Pari Patel Economist with research interests in national systems of innovation and uneven development; technological strategies of the world's largest firms.

Ismael Rafols Emergence of hybrid scientific fields such as bionanotechnology and systems biology, using sociological approaches and dynamic systems concepts like diversity.



SPRU occupies an innovative building – the Freeman Centre. This has been built to accommodate both SPRU and a partner organisation – the Centre for Research in Innovation Management (CENTRIM) of the University of Brighton

Matias Ramirez Refer to the Business, management and finance subject entry on page 55.

Maria Savona Economics of innovation and technological change in low-tech sectors; technical change and income distribution; technical change in developing countries.

Adrian Smith Mechanical engineer with research interests in civil society and technology; environmental policy process.

Steve Sorrell Refer to the Climate change and energy subject entry on page 60.

Lee Stapleton Multi- and interdisciplinary work spanning economic, scientific, and mathematical modelling and social scientific application to ecological, environmental, agricultural and energy issues.

Professor Ed Steinmueller Economist focusing on economics of information, networks, and knowledge; science and technology policy; development and sustainability.

Andy Stirling Social scientist. Management of technological risk; science and precaution in the governance of innovation; tools for the handling of uncertainty and divergent values; technological diversity.

Puay Tang International relations; socio-economic analysis of electronic service innovations; ICTs; electronic commerce and regulatory issues; IP rights in a digital environment; e-government.

Professor Joe Tidd Physicist. Innovation strategy and firm organisation; measurement of innovation and market performance; process of new product and service development.

Jim Watson Engineer. Development and deployment of cleaner energy technologies; distributed energy systems technologies and policies; energy and environment in developing countries.