SRUC

Sustainable Food Production and Land Use

www.sruc.ac.uk/study
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Leading the way in Agriculture and Rural Research, Education and Consulting
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Sustainable Food Production and Land Use*

Why Study Sustainable Food Production and Land Use at SRUC?

Agriculture and land use are significant sources of the greenhouse gas (GHG) emissions that cause climate change, and a major transition in our agricultural and food production systems is required if global warming is to be kept below 1.5°C and we are to curb the current rate of species extinction. BSc (Hons) Sustainable Food Production Land Use is an applied biology degree designed to provide students with knowledge, skills and understanding of sustainable and efficient agricultural systems that can provide the growing population with food, bioproducts and bioenergy, whilst helping to combat climate change, enhance biodiversity, and minimise pollution.

The curriculum reflects the recommendations of the UK Committee on Climate Change in their 2018 report '*Land Use: Reducing emissions and preparing for climate change*'. Students will investigate the latest approaches to improve the nutritional value and yields of crops, their resistance to pests and diseases, and their resilience to environmental stress. They will find out about alternative, more sustainable animal production systems, the integration of livestock into arable rotations and also food product innovations from insects or from the culture of animal cells or microbes.

Soils have the potential to lock large amounts of carbon out of the atmosphere, so students will learn how soils can be better managed to improve fertility and carbon sequestration, whilst reducing soil degradation and erosion. Studies also include the management of land to maintain biodiversity, including an introduction to agroforestry, forestry and woodland systems, and to the generation of land-based renewable energy and bioproducts to reduce the use of fossil fuels and petroleum based industrial raw materials.

This degree is designed to equip students for a wide range of careers, for example as agricultural and environmental consultants, researchers and lecturers, as farm/estate managers or agronomists and also in posts with government bodies and environmental organisations.

**This degree is subject to revalidation by the University of Glasgow in December 2019.*

Which Courses Where?

	Aberdeen	Ayr	Barony	Edinburgh	Elmwood	Oatridge
BSc/BSc (Hons) Sustainable Food Production and Land Use			✓			
HNC Bioscience		✓	✓			

Course Content

BSc Sustainable Food Production and Land Use Year 1

The first year will introduce you to a variety of biological subjects and how these relate to crops, livestock and the environment. It also provides a sound training in IT and in practical and laboratory techniques.

3 – 4 years of full time study for BSc/BSc (Hons)

Year 1 is also: HNC Bioscience

Course Content – Year 1:

Core modules:

- Cell Biology: Theory and Practice
- Biochemistry: Theory and Practice
- Microorganisms: Growth, Activity and Significance
- Genetics
- Biotechnology: An Introduction
- Quality and Health and Safety in Science Industries
- Bioscience Graded Unit (Project)
- Arable Crop Production
- Soils and Crop Establishment
- Plant Physiology
- Rural Land Use
- Environmental Awareness
- Ecology and Ecosystems
- Information Technology Applications Software 1

One elective from the following:

- Livestock Production Systems
- Biodiversity Conservation
- Business Management: An Introduction

Students who successfully complete year 1 can progress to year 2 or choose to graduate with HNC Bioscience.

Example of a first year module:

Microorganisms: Growth, Activity and Significance

With this module you will learn about the major groups of microbes, their activities and factors that affect their growth and survival. The main focus will be on microbes that benefit humans e.g. in food fermentation, nitrogen fixation and waste treatments, as well as microbes that may be harmful, as in food spoilage, soil denitrification and in animal and plant diseases. Teaching will largely take a practical, laboratory-based approach, during which you will develop practical skills in safely isolating and culturing microbes as well as identifying microbes using microscopy and chemical techniques.

Course Content

BSc Sustainable Food Production and Land Use Year 2

The biological principles developed in the first year are more specifically applied to sustainable land use in the second year, using case study site visits to gain an appreciation of the issues involved. You will explore how land can be used most efficiently to provide the population with their nutritional needs, alongside other land uses to maintain biodiversity, sequester carbon in the soil and provide renewable energy and timber to reduce the use of fossil fuels and energy demanding building materials. A range of selected crop, livestock and integrated food production systems, including agroforestry and permaculture systems will be explored, and their efficiency and environmental impact compared. You will further develop your skills in practical laboratory techniques, data management and statistical analysis, as well as skills in fieldwork, problem solving and communication.

3 – 4 years of full time study for BSc/BSc (Hons)

Course Content – Year 2:

Core modules:

- Food production systems
- Agroecosystems: energy and environment
- Crop physiology and reproduction
- Molecular techniques and research investigation
- Soil carbon and fertility
- Forestry and woodland systems
- Renewable energy systems
- Land surveying and GIS

Example of a second year module:

Agroecosystems: energy and environment

This compares a range of agricultural systems, with a particular focus on their efficiency at converting light energy to the energy of agricultural products, as well as their reliance on support energy inputs from fossil fuels and their environmental impacts such as greenhouse gas emissions, pollution and loss of biodiversity. With this understanding, students are able to suggest measures to improve the efficiency of agricultural systems as well as reduce their impact on the environment.

Course Content

BSc Sustainable Food Production and Land Use Year 3

The third year explores subjects in greater depth and detail and involves a greater amount of independent study. Research Skills and Data Analysis module prepares students for undertaking an Honours research project in their final fourth year.

3 – 4 years of full time study for BSc/BSc (Hons)

Course Content – Year 3:

Core modules:

- Crop metabolism, productivity & resilience
- Innovations in food production systems
- Advances in food safety, storage and supply
- Agronomy
- Management, innovation & entrepreneurship
- Agricultural policy analysis
- Research skills and data analysis

Two electives from the following:

- Bioresources for a low-carbon bio-economy
- Ecological principles and applications
- **GIS and remote sensing**

This could include one 'wildcard' elective, according to timetabling constraints e.g.:

- Land and Habitat Restoration
- Multi-purpose woodland management
- Integrated catchment management
- Management, innovation & entrepreneurship
- Livestock management systems

Example of a third year module:

Crop Metabolism, Productivity and Resilience

A sound understanding of how plants function is essential if crop yields are to be increased still further to feed the growing global population. This module explores the physiological basis of crop growth and yield production and considers the latest research into increasing crop productivity and manipulating plant chemical composition to improve quality for food, feed and industrial end uses. Students also learn how plants respond to and adapt to environmental stresses such as drought and heat stress, which are predicted to become more of a problem with global warming. They also discover the detection and defence systems plant use to defend themselves against disease infection and attack by pests. Beneficial relationships with endophytic microbes and soil microorganisms are also explored. Students are then able to critically examine the ways in which knowledge of plant-environment (both abiotic and biotic) interactions might be used to improve crop protection and production

Course Content

BSc (Hons) Sustainable Food Production Land Use Year 4

As an important part of your fourth year, you will undertake an extensive piece of individual research, investigating a subject of your own choice with the guidance of a supervisor. Conducting your 'Honours Project' will allow you to develop a wealth of skills, from research skills to time management and planning, as well as building specialist knowledge in your chosen subject of interest. The fourth year will also help you to integrate the knowledge you have gained throughout your degree with the module Agriculture, Environment and Society, in which students discuss topics of contemporary relevance. These topics will relate to the current and emerging applications of science in the agricultural sector, the impacts these have on the economy, environment and society as well as the main drivers for advances in the agricultural biosciences.

4 years of full time study for BSc (Hons)

Course Content – Year 4:

Core Modules:

- Honours research project (triple credit module)
- Agriculture, environment & society

Any 4 electives from the following,

- Advanced agronomy
- Crop Improvement: breeding, biotechnology and biologicals
- Biorefining technologies
- Food biotechnology
- Protected (vertical) cropping systems
- Soils and nutrient cycling

Electives could include 1 'wild card' elective any year 3 or 4 module at the South and West campus (subject to timetabling constraints) for example:

- Integrated catchment management
- Land and habitat restoration
- GIS and remote sensing
- Climate change and the global environment
- Action for biodiversity
- Wildlife and resource management conflicts
- Advances in livestock production technology
- Management, innovation & entrepreneurship

Contact Us

For more specific course information, please feel free to contact the Programme Leader:

SRUC Ayr Campus:		
Chris Leggate	e: chris.leggate@sruc.ac.uk	t: 01292 886172

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#SRUCStudents www.facebook.com/sruc.ac.uk

Entry Requirements

Minimum entry requirements for BSc/BSc (Hons) Sustainable Food Production and Land Use

4 Scottish Highers (BBCC) or 3 A-Levels (BCC) or equivalent, to include a science subject or geography.

English or Maths are required at Standard Grade/GCSE level or equivalent.

Applicants with NQ Bioscience or other Access qualifications are encouraged to apply. Mature entrants with an interest and desire in the subject are encouraged to discuss application.

Minimum entry requirements for HNC Bioscience:
Typically two Scottish Highers/Irish Leaving Certificate subjects at Higher level (CC) or one A-Level pass, preferably to include Chemistry or Biology.

Entry qualifications must include Biology or Chemistry. English or Maths are required at Standard Grade/GCSE level or equivalent. Applicants with NQ Bioscience or other Access qualifications are encouraged to apply. Mature entrants with an interest and desire in the subject are encouraged to discuss application.

Advanced entry into Year 3 may be possible with a highly relevant HND, Foundation Degree or similar qualification.

Progression from other SRUC courses:
Applications from students on other SRUC courses will be considered on an individual basis.

About Scotland's Rural College (SRUC)

2012 saw the merger of Scotland's four land-based institutions: Barony, Elmwood and Oatridge Colleges and the Scottish Agricultural College. They now form Scotland's Rural College (SRUC) – the largest institution of its kind in Europe.

SRUC is an unusual organisation. Like a University, we have expertise in the areas of Education and Research, but in addition we also offer unrivalled links with industry through our Consultancy division and business services. We don't just offer undergraduate and postgraduate degree courses but we offer a full range of programmes at all levels from access courses and vocational studies through to PhDs.

We try to offer opportunities to study at whatever level is appropriate for you to join us at, and hope that you will stay with us, seamlessly progressing through educational levels and qualifications, until you have reached or exceeded your educational goal. You will find we offer courses which all link to the ways in which we make use of the land and natural resources around us – from agriculture and food production, the science that supports those industries, the way we interact with and support the environment around us, the business and industry which relies on these resources, to how we use outdoor space and the countryside in our recreation and leisure time.



SRUC comprises 6 campuses in locations around Scotland:

SRUC Aberdeen	aberdeen@sruc.ac.uk	www.sruc.ac.uk/aberdeen
SRUC Ayr	ayr@sruc.ac.uk	www.sruc.ac.uk/ayr
SRUC Barony	barony@sruc.ac.uk	www.sruc.ac.uk/barony
SRUC Edinburgh	edinburgh@sruc.ac.uk	www.sruc.ac.uk/edinburgh
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SRUC Oatridge	oatridge@sruc.ac.uk	www.sruc.ac.uk/oatridge



Visit Us

Contact us to arrange a time!

▸ For more information about open days, visit our website:
www.sruc.ac.uk/opendays

If you are unable to attend one of the scheduled Open Days,
please contact us so that we can make alternative arrangements for you to visit.
Further information is available from the local campus Marketing and Student Recruitment Office.

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