Cranfield
Environment
and Agrifood

Continuing
Professional
Development

Environment

2019/20

Contents

Welcome

Professor Leon Terry
Director of Environment and Agrifood

Continuing professional development is a fundamental part of any professional career. At Cranfield University, we offer a range of options to enable you to develop professional skills throughout your career. These include our large selection of technical short courses, part-time postgraduate study, as well as our innovative level 7 apprenticeships and research degrees.

Choosing Cranfield University for your professional development gives you access to our knowledge and expertise across the environment sector. With an international community and a truly global reputation, our passion for the areas we operate in and our long-standing relationships with some of the most prestigious companies in industry mean that studying at Cranfield University will open doors for you.

Almost half of our students study while in employment and organisations, in turn, can rest assured that their employees will return to the workplace with enhanced skills. We can also work with your organisation on a bespoke basis, to help you solve pertinent business issues and identify new ways of growing and future-proofing your business.

We have mutually beneficial relationships with nearly 1,500 organisations around the world; from the smallest owner-managed SMEs to the largest multinational conglomerates; British and international universities, non-government organisations and governments.

At Cranfield, everything we do is concentrated on technology and management and our insight is rooted in our powerful industry links, world-class research and what really works in practice.

I look forward to welcoming you to Cranfield soon.

Progression routes

Many of the short courses in this brochure are modules from our popular MSc programmes, as such these modules can be taken for credit. Participants can accumulate credits towards a postgraduate qualification. Typically a one-week course is worth 10 credits.

In order to receive Cranfield credits, delegates must register as an associate student and successfully pass the assessment associated with the course, this is usually an assignment or examination.

Your progression route to a postgraduate qualification (PgDip, PgCert, MSc, MDes) will depend on your chosen postgraduate course of study, students wishing to take this route will need to check with us which short courses can be considered.

Postgraduate Certificate

60 credits

Comprises a subset of the syllabus for the taught element of the associated MSc/PgDip course.

Postgraduate Diploma

120 credits

Typically the PgDip represents the taught element of the associated MSc, although occasionally the curriculum requires a group project or integrated assessment.

Master of Science

200 credits

Typically requires an individual thesis project on top of the taught elements.

Environmental Engineering short courses

- Catchment Management,
- Clean Technologies in Water and Food Nexus,
- Environmental Risks: Hazard, Assessment and Management,
- Land Engineering Principles and Practices,
- Modelling Environmental Processes,
- Pollution Prevention and Remediation Technologies,
- Process Emissions and Control,
- Waste Management in a Circular Economy: Recycle, Recover and Dispose,

Catchment Management

The aim of this course is to improve your understanding of the drivers of catchment hydrological processes with regard to water quantity and quality, and how these can be managed through engineering practices including drainage, irrigation and soil erosion control.

On successful completion of this course you will be able to:

- Explain the processes and consequences of soil erosion, and of sediment transport and deposition,
- Select appropriate input parameter values to apply erosion models to predict current erosion status and evaluate different conservation measures,
- Design drainage systems, channels/waterways and simple hydraulic structures, including the calculation of peak runoff and total yield for a catchment.

Five days	+10 credits This course is an MSc module.	**www.cranfield.ac.uk/cm**

Clean Technologies in Water and Food Nexus

This course is premised on the understanding that environmental resources are inextricably intertwined and therefore there is a need of advancing a nexus approach to enable integrated and sustainable management of water, energy and food systems.

You will learn and evaluate a range of innovative technologies that provide significant gains in terms of provision and management of energy, water, food and resources.

On successful completion of this course you will be able to:

- Critically appraise the key issues related to water-energy-food nexus challenges,
- Critically evaluate the opportunities in the development and management of the water-energy-resource nexus, tailored to specific sectoral needs,
- Appraise the key indicators for clean technologies.

Five days	+10 credits This course is an MSc module.	**www.cranfield.ac.uk/ctwfn**

Environmental Risks: Hazard, Assessment and Management

This course aims to provide an understanding of the theory and practice of effective management of all phases of environmental hazards. The course covers key topics including conceptual model development, probability, risk characterisation, and informatics.

On successful completion of this course you will be able to:

- Identify, analyse and evaluate the wide range of environmental risks within the UK (e.g. animal disease, chemical spills, high winds, flooding) and be able to identify and apply appropriate methods of assessing these risks,
- Critically evaluate the decision process underpinning the management of such risks and provide justification for the prioritisation and application of different risk management actions,
- Examine and interpret the relationship between risk, social, economic, political and technological trends and be able to provide appropriate suggestions for communication of assessment and management of environmental risks related to the influencing factors.

Five days

+10 credits This course is an MSc module.

www.cranfield.ac.uk/erham

Land Engineering Principles and Practices

Soil protection or improvement and the reclamation of degraded land must be managed for a given environment from a base understanding of fundamental properties of soil and water, including basic hydrology, hydraulics and geotechnics.

On successful completion of this course you will be able to:

- Apply the concept of land capability to site assessment and carry out land capability classifications,
- Explain how to design earthworks and select appropriate land-forming machinery/equipment,
- Calculate the stability of slopes and design of simple support and stabilisation systems,
- Undertake an erosion survey and risk assessment,
- Devise strategies for the long-term management of top soil and subsoil in land engineering projects.

Five days

+10 credits This course is an MSc module.

www.cranfield.ac.uk/lepp

Modelling Environmental Processes

An introduction to the full suite of environmental models and modelling methods that are currently used to describe and predict environmental processes and outcomes.

The objective of this course is to give an overview of the different types of models currently being used to describe environmental processes and how they are being applied in practice.

On successful completion of this course you will be able to:

- Examine the major environmental models currently being applied in soil, water, ecosystems and atmosphere,
- Recognise the standard types of numerical models in use in environmental sciences,
- Formulate the generic process of model design, building, calibration and validation. Recognise some of the uncertainties introduced in this process.

Five days

+10 credits This course is an MSc module.

www.cranfield.ac.uk/mep

Pollution Prevention and Remediation Technologies

This short course introduces the extent and consequences of pollution in the environment. It identifies and evaluates technologies for prevention and remediation and evaluates decision support tools.

On successful completion of this course you will be able to:

- Understand the key issues related to environmental pollution prevention and remediation,
- Critically appraise the range of remediation technologies for soil and groundwater,
- Understand the key indicators for sustainable remediation approach,
- Select and evaluate accepted decision tools to assess remediation performance and end-points.

Five days

+10 credits This course is an MSc module.

www.cranfield.ac.uk/pprt

Process Emissions and Control

This course provides an understanding of the major air pollutants emitted by key industrial processes, the associated regulatory frameworks and monitoring and control techniques.

On successful completion of this course you will be able to:

- Appraise the extent, impact and implications of air pollution from industrial processes,
- Understand the practical requirements for air quality monitoring; including designing appropriate sampling strategies, selecting sample locations, applying sampling methods correctly, conducting standard tests and evaluating the results,
- Understand the most common traditional analytical techniques used in air monitoring,
- Demonstrate an understanding of the critical issues affecting these analytical techniques and be able to recognise the relative strengths and weaknesses of the techniques covered and how these relate to the quality of the data acquired.

Five days

+10 credits This course is an MSc module.

www.cranfield.ac.uk/pec

Waste Management in a Circular Economy: Recycle, Recover and Dispose

The aim of this course is to provide specialist understanding of the major processes used for municipal waste management and their role within an integrated circular waste management system.

In particular the course will focus on the bottom three points of the waste hierarchy: recycle, recover and dispose.

On successful completion of this course you will be able to:

- Appraise the role of waste treatment technologies under the circular management agenda - drivers, selection, pre-requisites requirements, waste types treated,
- Identify the properties (physical, chemical, and biological) commonly associated with Municipal Solid Waste (MSW) and integrate them into waste management calculations,
- Critically assess the performance of treatment processes including how wastes are analysed and data interpreted.

Five days

+10 credits This course is an MSC module.

www.cranfield.ac.uk/cwmr

Environmental Management for Business short courses

- **Economic Valuation and Appraisal,**
- **Environmental Innovation,**
- **Environmental Management in Practice,**
- **Environmental Policy and Risk Governance,**
- **Evaluating Environmental Sustainability,**
- **Leading Corporate Sustainability,**
- **Principles of Sustainability,**
- **Risk, Communication and Perception.**

Delivered in association with:

Cranfield School of Management

Economic Valuation and Appraisal

This course explores economic concepts and techniques that can be used for the valuation of the environment, how these support decisions regarding the optimal allocation of resources and the design of policy interventions.

On successful completion of this course you will be able to:

- Explain the purpose and methods of environmental accounting at business, sector and national levels,
- Explain the difference between financial and economic valuation and appraisal,
- Critically assess strengths and weaknesses of different environmental valuation methods and techniques,
- Critically evaluate different financial and economic appraisal metrics such as benefit/cost ratio, net present value, equivalent annual value, internal rate of return, and the choice of discount rate,
- Undertake a financial and an economic appraisal in a spreadsheet environment.

Five days

+10 credits This course is an MSc module.

www.cranfield.ac.uk/iev

Environmental Innovation

While technological change is seen as the root cause of many environmental problems, it is simultaneously viewed as the means of solving such problems. This course explores technological change as part of positive sum strategies put forward by ecological modernisers.

Theories of technological change are reviewed such as evolutionary, path dependent and long wave, and used to formulate technology policy to achieve environmental net gain or transition to a low carbon economy. These are then set in practical contexts such as innovation in manufacturing, ecological restoration or low-carbon living.

On successful completion of this course you will be able to:

- Explain the limitations of selected theories of technological change, e.g. linear, induced, path-dependent, and evolutionary,
- Critically summarise the key trade-offs that occur in achieving technological change and economic development alongside environmental protection,
- Discuss and present a summary of examples of technological change developed to achieve transition, e.g. to a low carbon economy.

Five days

+10 credits This course is an MSc module.

www.cranfield.ac.uk/eni

Environmental Management in Practice

The purpose of this course is to introduce you to the practical issues associated with implementing Environmental Management Systems (EMS) into organisations.

On successful completion of this course you will be able to:

- Understand and critique the ISO standards,
- Differentiate between voluntary requirements and legal or regulatory requirements of EMS,
- Evaluate the likely environmental aspects of an organisation, in terms of energy, waste, water and pollution, and the appropriate control mechanisms,
- Design and implement an audit strategy to check compliance of an EMS with the ISO 14001 standard.

Five days

+10 credits This course is an MSc module.

www.cranfield.ac.uk/emip

Environmental Policy and Risk Governance

A critical application of environmental risk management is in the development and appraisal of policy in central government.

On successful completion of this course you will be able to:

- Define the technical, organisational and human features of effective environmental risk governance,
- Explain the environmental policy cycle of implementation and the basics of policy development and appraisal,
- Critically analyse different types of policy instruments, including regulation, economic, voluntary and other measures,
- Identify the appropriate policy instruments to use in different contexts,
- Compare and contrast environmental risk management techniques, selecting tools appropriate to the character of the risk in question,
- Identify the requirements of risk management maturity and the pre-requisites of good corporate risk governance.

Five days

+10 credits This course is an MSc module.

www.cranfield.ac.uk/eprg

Evaluating Environmental Sustainability

This course provides specialist understanding of the frameworks and techniques available to evaluate process performance of an organisation or cohesive system in terms of sustainability.

On successful completion of this course you will be able to:

- Select and evaluate accepted frameworks to assess the performance of processes and/or systems in terms of sustainability,
- Identify and implement appropriate techniques to assess the environmental performance of an organisation, product or process,
- Critically evaluate the outcomes of environmental assessment techniques.

Five days

+10 credits This course is an MSc module.

www.cranfield.ac.uk/ees

Leading Corporate Sustainability

This course outlines the major sustainability challenges and explores the capabilities organisations require to respond positively to them.

On successful completion of this course you will be able to:

- Identify global environmental and social trends and relate how these present both challenges and opportunities to business,
- Explain why businesses need to respond to these challenges and opportunities and assess the capabilities they require to do so,
- Classify the potential stakeholder groups businesses can work with to develop and implement their sustainability strategies and compare collaboration approaches,
- Consider the role of personal leadership in an organisation's values, strategic direction and ability to execute its sustainability strategy,
- Critically assess the content and reporting of businesses' sustainability strategies,
- Design and recommend a sustainability-oriented innovation for a selected business.

Five days

+10 credits This course is an MSc module.

www.cranfield.ac.uk/lcs

Principles of Sustainability

This course introduces and critiques three approaches to improving sustainability: ecosystem services, the circular economy, and per capita energy use. It examines their application to resolve real-world problems and create commercial opportunities.

On successful completion of this course you will be able to:

- Critique terms liked “sustainability”, “ecosystem services”, and “circular economy”,
- Explain how an ecosystem service approach can help society to identify and make decisions regarding the use of ecological resources, with a focus on biodiversity, greenhouse gases, nutrient loss, and water use,
- Explain how we can enhance the stability, resistance and resilience of natural systems.

Five days

+10 credits — This course is an MSc module.

www.cranfield.ac.uk/pos

Risk, Communication and Perception

The aim of this course is to develop an appreciation of the importance of individual and group attitudes towards the perception of risk, and how this may influence views, conduct and actions in the face of a range of risks. This can include the development of communication methods to disseminate information about risk(s) to a range of audiences and how to determine its effectiveness.

On successful completion of this course you will be able to:

- Describe the “non-science” influences in risk assessment and management using sociological and psychological theories relating to risk perception, attitudes and communication,
- Identify and describe drivers that may influence individual or group perceptions and attitudes towards risk in specific scenarios,
- Participate in the discourse on the roles in society of different stakeholders (e.g. the media, NGOs, academics, government) with respect to risk assessment issues and to be able to describe to others why they have the beliefs they hold.

Five days

+10 credits — This course is an MSc module.

www.cranfield.ac.uk/rcp

Geographical Information Management short courses

- **Advanced GIS Methods,**
- **Aerial Photography and Digital Photogrammetry,**
- **Applied Environmental Informatics,**
- **Environmental Resource Survey,**
- **GIS Fundamentals,**
- **Image Processing and Analysis,**
- **Landscape Ecology,**
- **Modelling Environmental Processes,**
- **Physical Principles of Remote Sensing,**
- **Spatial Data and the Internet,**
- **Spatial Data Management.**

Advanced GIS Methods

Develop the skills of critical evaluation which should be applied to all outputs from Geographic Information Systems (GIS) analysis and understand the concepts and practice of GIS customisation.

On successful completion of this course you will be able to:

- Assess the quality of geographic data,
- Select appropriate processing methods for various types of spatial data,
- Analyse the requirements of a proposed application and synthesise an appropriate solution,
- Develop scripts to efficiently run complex/time consuming processes.

Five days

+10 credits — This course is an MSc module.

www.cranfield.ac.uk/agis

Aerial Photography and Digital Photogrammetry

This course introduces techniques for the extraction of topographic information from remotely sensed data using softcopy photogrammetry techniques.

On successful completion of this course you will be able to:

- Summarise the geometry and spectral properties of vertical aerial photographs and evaluate their importance in the use of aerial photography for deriving mapping products,
- Apply the basic principles of softcopy photogrammetry to a range of remotely sensed datasets,
- Interpret aerial photographs in the context of the physical and human environments,
- Evaluate elevation data products derived from stereo image pairs and assess their use for a range of applications,
- Prepare orthophotography from standard frame aerial photography and assess the quality of the output.

Five days

+10 credits — This course is an MSc module.

www.cranfield.ac.uk/apdp

Applied Environmental Informatics

The objective of this course is to supply you with a toolbox of techniques for data mining and modelling (informatics) and develop the strategic ability to effectively apply this toolbox.

On successful completion of this course you will be able to:
- Assess the potential and possible pitfalls of 'big data',
- Assemble and organise data for prescribed analysis and modelling approaches,
- Appraise and apply data mining techniques, identify underlying data structures,
- Construct models that reproduce observed relationships; the application of inference engines,
- Create integrative designs of process models with data; applying model data fusion,
- Recognise uncertainty and error in data and model parameter estimations,
- Develop diagnostics measures of model performance.

Five days

+10 credits This course is an MSc module.

www.cranfield.ac.uk/aei

Environmental Resource Survey

This course will identify the objective of a survey of the environment and determine the appropriate survey method to undertake an assessment of environmental resources.

On successful completion of this course you will be able to:
- Identify the objective of a survey of the environment,
- Determine the appropriate survey method to undertake an assessment of environmental resources,
- Evaluate existing information and models which complement the survey method,
- Design and conduct field surveys for data collection and verification,
- Select and carry out appropriate modelling and statistical analyses,
- Assess the accuracy of results,
- Summarise and present results of a survey for users effectively.

Five days

+10 credits This course is an MSc module.

www.cranfield.ac.uk/ers

GIS Fundamentals

Geographic Information Systems (GIS) is an important technology for handling geographic data and has wide application for studies of the environment.

On successful completion of this course you will be able to:
- Describe the functional components of a GIS,
- Define system specifications including projections, data and process modelling,
- Organise, using appropriate data structures, geographic data within a GIS,
- Analyse data and prepare digital databases using GIS software,
- Summarise, using maps and tables, the results of GIS based analyses.

Five days

+10 credits This course is an MSc module.

www.cranfield.ac.uk/gisf

Image Processing and Analysis

Image processing and analysis is one of the fundamental tools of applied remote sensing. It is the means by which information can be extracted from raw digital data to produce and manipulate images from airborne and space sensors.

On successful completion of this course you will be able to:
- Identify a wide-range of image processing techniques,
- Explain the purpose of each process and the underlying mathematical principles,
- Select appropriate image processing sequences to achieve predetermined objectives,
- Operate and manage an image processing system,
- Integrate image processing techniques into applications of remote sensing.

Five days

+10 credits This course is an MSc module.

www.cranfield.ac.uk/ipa

Landscape Ecology

Landscape ecology provides a foundational framework for problem solving, decision making and planning in land restoration, ecological conservation and natural resources management. It covers topics related to structure, function and change and it provides the necessary tools to select the appropriate methods to test spatial hypothesis and solve problems at multiple scales.

This short course is delivered to introduce you to a variety of tools that measure and quantify landscape components at different scales and to understand them in the context of their field of expertise, priorities and regulations.

On successful completion of this course you will be able to:

- Explain the key elements of a landscape,
- Discuss the importance of scale in landscape ecology related questions,
- Design strategies to quantify spatial patterns, spatial structures, and species at the relevant scales.

Five days

+10 credits This course is an MSc module.

www.cranfield.ac.uk/le

Modelling Environmental Processes

An introduction to the full suite of environmental models and modelling methods that are currently used to describe and predict environmental processes and outcomes.

The objective of this course is to give an overview of the different types of models currently being used to describe environmental processes and how they are being applied in practice.

On successful completion of this course you will be able to:

- Examine the major environmental models currently being applied in soil, water, ecosystems and atmosphere,
- Recognise the standard types of numerical models in use in environmental sciences,
- Formulate the generic process of model design, building, calibration and validation. Recognise some of the uncertainties introduced in this process.

Five days

+10 credits This course is an MSc module.

www.cranfield.ac.uk/mep

Physical Principles of Remote Sensing

This subject introduces the basic radiometric concepts and physical relations required for remotely sensed data to be analysed quantitatively. The appropriate application of remote sensing to the monitoring of earth resources requires an understanding of basic physics and imaging technology.

On successful completion of this course you will be able to:

- List the primary physical quantities that are directly related to measured radiance,
- Define the basic radiation quantities,
- Explain the nature of surface and atmospheric interactions with electromagnetic radiation,
- List the major types of detectors and describe how satellite images are formed,
- Describe the complete remote sensing process from data reception to information extraction,
- Apply calibration and atmospheric correction methods to image data,
- Explain the physical relations underlying the retrieval of satellite measured reflectance, temperature and backscattering coefficients.

Five days

+10 credits This course is an MSc module.

www.cranfield.ac.uk/pprs

Spatial Data and the Internet

Geographical information is now becoming increasingly more present in our daily life. This poses new challenges to its efficient and timely delivery to potential end users who do not necessarily have the required skills to access or operate a GIS software package. The internet offers a powerful medium for real-time delivery of geographical information and location-based services.

On successful completion of this course you will have:

- Familiarity with current internet technologies and their applications relevant to geographical data dissemination,
- Basic level of proficiency in HTML and XML,
- Experience with JavaScript and use of Application Programming Interfaces (APIs).

Five days

+10 credits This course is an MSc module.

www.cranfield.ac.uk/sdi

Spatial Data Management

It has been estimated that some 80% of the data used for environmental, business and policy oriented decision making is geographical in nature. Such spatial data requires a structured approach in their management if the maximum benefit is to be derived from their analysis and dissemination.

This course provides a solid introduction to the issues concerning the management of spatial information.

On successful completion of this course you will be able to:

- Design and build appropriate database structures for GIS analysis using a Geodatabase,
- Manipulate data within and between a range of database management systems,
- Appreciate the application of systems analysis methodologies to spatial data.

Five days

+10 credits
This course is an MSc module.

www.cranfield.ac.uk/sdm

We are recognised worldwide by industry, government and academe for our research and teaching in plants, soil, water and air.

Land Reclamation and Restoration short courses

- Aerial Photography and Digital Photogrammetry,
- Ecological Restoration,
- GIS Fundamentals,
- Land Engineering and Water Management,
- Land Resource Planning,
- Landscape Ecology,
- Principles of Sustainability,
- Soil Engineering, Contaminant and Nutrient Management,
- Soil Erosion Control: Principles and Practices,
- Soil Systems.

Aerial Photography and Digital Photogrammetry

This course introduces techniques for the extraction of topographic information from remotely sensed data using softcopy photogrammetry techniques.

On successful completion of this course you will be able to:

- Summarise the geometry and spectral properties of vertical aerial photographs and evaluate their importance in the use of aerial photography for deriving mapping products,
- Apply the basic principles of softcopy photogrammetry to a range of remotely sensed datasets,
- Interpret aerial photographs in the context of the physical and human environments,
- Evaluate elevation data products derived from stereo image pairs and assess their use for a range of applications,
- Prepare orthophotography from standard frame aerial photography and assess the quality of the output.

Five days

+10 credits This course is an MSc module.

www.cranfield.ac.uk/apdp

Ecological Restoration

This course covers the breadth of considerations required for ecological restoration and gives the opportunity to undertake management planning at both site and landscape scales.

In addition, successful ecological restoration requires an understanding of appropriate remediation technologies. Consequently, this course also introduces a range of suitable technologies for the remediation of different types of contaminated land including clean-up methods for soils, sediments and water.

On successful completion of this course you will be able to:

- Understand the principles underlying restoration ecology and ecological restoration in local, national and global contexts,
- Identify the environmental and biological controls on plant community composition and ecosystem structure,
- Describe the mechanisms underlying natural successional patterns in vegetation communities, as well as human-induced changes in habitat-type.

Five days

+10 credits This course is an MSc module.

www.cranfield.ac.uk/er

GIS Fundamentals

Geographic Information Systems (GIS) is an important technology for handling geographic data and has wide application for studies of the environment.

On successful completion of this course you will be able to:

- Describe the functional components of a GIS,
- Define system specifications including projections, data and process modelling,
- Organise, using appropriate data structures, geographic data within a GIS,
- Analyse data and prepare digital databases using GIS software,
- Summarise, using maps and tables, the results of GIS based analyses.

Five days

+10 credits This course is an MSc module.

www.cranfield.ac.uk/gisf

Land Engineering and Water Management

Soil protection or improvement and the reclamation of degraded land must be managed for a given environment from a base understanding of fundamental properties of soil and water, including basic hydrology, hydraulics and geotechnics.

On successful completion of this course you will be able to:

- Estimate crop water requirements and soil water deficits in different environments,
- Calculate leaching requirements for saline and sodic soil conditions,
- Calculate run off and yield for catchment.

Five days

+10 credits This course is an MSc module.

www.cranfield.ac.uk/lewm

Land Resource Planning

Land planning and its "human dimension" are fundamental aspects of managing the physical and human environments.

On successful completion of this course you will be able to:

- Assess the planning context within which land planning will operate,
- Design surveys to address land planning issues,
- Practice techniques designed to provide data for land planning.

Five days

+10 credits This course is an MSc module.

www.cranfield.ac.uk/lrp

Landscape Ecology

Landscape ecology provides a foundational framework for problem solving, decision making and planning in land restoration, ecological conservation and natural resources management. It covers topics related to structure, function and change and it provides the necessary tools to select the appropriate methods to test spatial hypothesis and solve problems at multiple scales.

This short course is delivered to introduce you to a variety of tools that measure and quantify landscape components at different scales and to understand them in the context of their field of expertise priorities and regulations.

On successful completion of this course you will be able to:

- Explain the key elements of a landscape,
- Discuss the importance of scale in landscape ecology related questions,
- Design strategies to quantify spatial patterns, spatial structures, and species at the relevant scales.

Five days

+10 credits This course is an MSc module.

www.cranfield.ac.uk/le

Principles of Sustainability

This course introduces and critiques three approaches to improving sustainability: ecosystem services, the circular economy, and per capita energy use. It examines their application to resolve real-world problems and create commercial opportunities.

On successful completion of this course you will be able to:

- Critique terms liked “sustainability”, “ecosystem services” and “circular economy”,
- Explain how an ecosystem service approach can help society to identify and make decisions regarding the use of ecological resources, with a focus on biodiversity, greenhouse gases, nutrient loss and water use,
- Explain how we can enhance the stability, resistance and resilience of natural systems.

Five days

+10 credits This course is an MSc module.

www.cranfield.ac.uk/pos

Soil Engineering, Contaminant and Nutrient Management

Land restoration and reclamation practices in relation to improving soil structural conditions for optimal crop growth and prevention of soil resource losses must be grounded on an understanding of principles from soil science, bio-science and engineering.

On successful completion of this course you will be able to:

- Understand the principles of soil strength/failure and apply this to the physical management of soil,
- Understand issues of soil stability and plasticity,
- Quantify soil compaction and devise strategies to minimise compaction and/or rectify the problem.

Five days

+10 credits This course is an MSc module.

www.cranfield.ac.uk/secnm

Soil Erosion Control: Principles and Practices

The control of water pollution and sedimentation needs to be based on the correct identification of source areas of sediment, a knowledge of the processes by which water and sediment are moved over the land surface, and an understanding of how these processes are affected by the physical environment and socio-economic factors.

On successful completion of this course you will be able to:

- Describe the processes of soil erosion, and of sediment transport and deposition,
- Define the environmental impacts of soil erosion, and the need for erosion control and soil conservation,
- Evaluate erosion risk at a field and catchment scale and identify potential sources and sinks of sediment.

Five days

+10 credits This course is an MSc module.

www.cranfield.ac.uk/secpp

Soil Systems

This course will focus on a fundamental understanding of the science of soil systems and how decisions in land management affect the soil functions related to food production and land restoration.

On successful completion of this course you will be able to:

- Describe the role of soil systems in the context of soil functions and ecosystem services,
- Explain the principal responses of plants to the climatic environment,
- Quantify key soil physical properties,
- Assess the role and contribution of soils in nutrient availability and cycling,
- Describe the functional role of soil biology in soil systems,
- Evaluate the impact of soil management and agricultural innovation in agricultural production,
- Create a soil assessment in the context of land restoration.

Five days

+10 credits This course is an MSc module.

www.cranfield.ac.uk/ssyst

Part-time postgraduate study

The following postgraduate programmes are available part-time over two-to-three years. They benefit from Cranfield's long-standing expertise for delivering high-quality master's programmes alongside being relevant to industry ensuring content meets the expectation of employers.

If you already have short course credit points from an associated programme why not develop your skills further?

Environmental Engineering

Suitable for engineering, science and geography graduates, the Environmental Engineering MSc will help you develop your career as an environmental engineer. Accredited by CIWEM, CIWM, and IAgrE, this course will equip you with the knowledge and skills required to solve a wide range of environmental engineering challenges, including municipal and toxic waste management and disposal, process emissions, contaminated land and water, waste disposal, and energy and resource recovery. Cranfield offers a unique, postgraduate-only environment, with a teaching team with extensive experience of solving real world environmental challenges.

Environmental Management for Business

This Environmental Management for Business MSc is designed to prepare you for a successful environmental management career working in business, the public sector or NGOs. Delivered in association with the globally renowned Cranfield School of Management, this course enables you to develop the advanced theoretical knowledge and practical skills required to critically evaluate complex environmental issues, develop effective strategies and lead their implementation.

Geographical Information Management

Sustainable use or conservation of the earth's resources requires the organisation, exploitation and integration of technologies such as database management, image processing and digital cartography, to ensure provision of high quality, reliable and up-to-date information. The Geographical Information Management MSc has been developed in direct collaboration with industry, in response to the increased global demand for multi-disciplinary managers, advisors and consultants in resource management. Taught by a dedicated faculty, this course is unique in providing balanced coverage of the key GIS technologies to prepare you for a successful career across the full range of global sectors using geographical information (GI) technologies.

Land Reclamation and Restoration

Land is a vital resource and the deterioration or loss of the productive capacity of soils is a major global challenge for the 21st century. This course has been designed to meet the increasing demands to manage and restore degraded land as close as possible to its original status. Accredited by IAgrE and the Landscape Institute this course will provide you with the knowledge and skills required to bridge the gap between damaged land and fully restored ecosystems.

www.cranfield.ac.uk/studyenvironment

In-company and customised training

How can you help your business and employees reach their full potential? Have you considered in-company training, tailored to your business needs?

Our insight is rooted in our powerful industry links, world-class research and what works in practice. As such, we can make a real difference to you and your organisation, whether you are a multi-national company, a growing SME or a small start-up. Benefit from having tailor-made courses specific to your business needs, at a time and place that suits you.

We can provide a range of programmes from half-day workshops, to intensive week-long training, informed by the latest research and delivered by leading experts in the field.

Talk to us about how we can develop your staff and enhance performance in your organisation.

E: **shortcourse@cranfield.ac.uk**

Masterships® Master's-level apprenticeships

Cranfield Masterships® are master's-level degrees which meet the requirements of the UK Government Level 7 Master's Degree Apprenticeship Standard. These enable you to use your Apprenticeship Levy to accelerate the development of your middle and senior managers, and employees in senior technical positions as they move into leadership positions.

Our current Masterships® include:

- Engineering Competence (Executive) PgDip – Postgraduate Engineer Standard
- Executive MBA – Senior Leader Standard
- Business and Strategic Leadership MSc - Senior Leader Standard
- Systems Engineering - Systems Engineering in Defence Standard

www.cranfield.ac.uk/masterships

Research degrees

DBA | EngD | MRes | MPhil | PhD

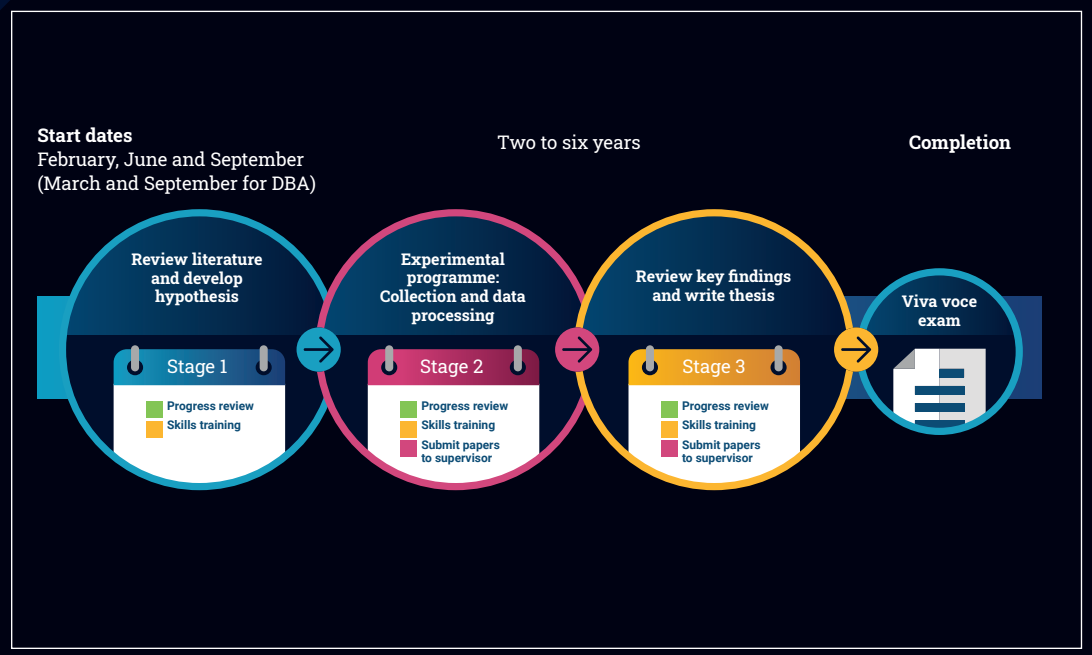
Our research degrees are also available to study part-time. As a part-time research student you will be in good company, over a third of all our students study part-time.

Cranfield's dynamic, research intensive and specialised position means our research students are able to study exciting projects that have an impact globally and make a practical difference to the world.

There are three ways to study a research degree at Cranfield:

- **Funded research opportunities** – we offer a range of fully funded research opportunities, often in collaboration with industry and research councils.
- **Individual research projects** – self funding allows you to explore an area of research that you are passionate in, you will first need to develop a research proposal with support from an academic supervisory team.
- **Employment related research projects** – if you and/or your employer have a concept for a research project linked to your area of work then we can help develop and support this.

For more information on our research degree opportunities, entry requirements or to make the first step in an individual research project visit: **www.cranfield.ac.uk/research**



Staff

One of the strengths of Cranfield is that we bring together a world-class group of experts to share their experiences.

Dr Monica Rivas Casado, Senior Lecturer in Integrated Environmental Monitoring

Professor Neil Harris, Professor in Atmospheric Informatics

Professor Paul Leinster, Professor in Environmental Assessment

Professor Andrew Thompson, Professor of Molecular Plant Science, Head of Cranfield Soil and Agrifood Institute

Professor Jane Rickson, Professor of Soil Erosion and Conservation

Dr Paul Burgess, Reader in Crop Ecology and Management

Past attendees

Across our range of courses, we have welcomed many high-profile organisations. These include, but are not limited to:

- Anglian Water,
- ADHB,
- Environment Agency,
- Mott MacDonald,
- National Trust,
- Natural England,
- Ordnance Survey,
- Ratheon UK,
- R&D Trials Agronomist,
- Tarmac,
- United Nations.

Location

How to find us

Cranfield University is located about halfway between London and Birmingham, and on the outskirts of Milton Keynes. Junctions 13 and 14 of the M1 are five minutes away and Milton Keynes railway station is 20 minutes away by taxi. London Luton, Stansted and Heathrow airports are 30, 90 and 90 minutes away espectively by car, offering superb connections.

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