2019/0 - ENV-4001A GLOBAL ENVIRONMENTAL CHALLENGES

Autumn Semester, Level 4 module
(Maximum 185 Students)
UCU: 20 Organiser: Dr Mark Chapman
MODULE - 40% PASS ON AGGREGATE
Module Type: Coursework
Timetable Slot:D3/, D1/, F2-A2\, E1-H3\

What are the most pressing environmental challenges facing the world today? How do we understand these problems through cutting-edge environmental science research? What are the possibilities for building sustainable solutions to address them in policy and society? In this module, you will tackle these questions by taking an interdisciplinary approach to consider challenges relating to climate change, biodiversity, water resources, natural hazards, and technological risks. In doing so you will gain an insight into environmental science research 'in action' and develop essential academic study skills needed to explore these issues.

2019/0 - ENV-4005A UNDERSTANDING THE DYNAMIC PLANET

Autumn Semester, Level 4 module
(Maximum 180 Students)
UCU: 20 Organiser: Dr Richard Herd
MODULE - 40% PASS ON AGGREGATE
Module Type: Examination with Coursework or Project
Timetable Slot:A3, F1/, F2-A2\, E1-H3\

Understanding of natural systems is underpinned by physical laws and processes. You will explore the energy, mechanics, and physical properties of Earth materials and their relevance to environmental science using examples from across the Earth's differing systems. The formation, subsequent evolution and current state of our planet are considered through its structure and behaviour - from the planetary interior to the dynamic surface and into the atmosphere. You will study Plate Tectonics to explain Earth's physiographic features - such as mountain belts and volcanoes - and how the processes of erosion and deposition modify them. The distribution of land masses is tied to global patterns of rock, ice and soil distribution and to atmospheric and ocean circulation. You will also explore geological time - the 4.6 billion year record of changing conditions on the planet - and how geological maps can be used to understand Earth history. This course provides you with an introduction to geological materials - rocks, minerals and sediments - and to geological resources and natural hazards.

2019/0 - ENV-5001A AQUATIC ECOLOGY

Autumn Semester, Level 5 module
(Maximum 60 Students)
UCU: 20 Organiser: Dr Ros Boar

MODULE - 40% PASS ON AGGREGATE
Module Type: Examination with Coursework or Project
Timetable Slot:I1\, H3/, G2/, H3/-C1-B3
Exam Paper(hrs):2 Exam Period:SPR-02

Explore how chemical, physical and biological influences shape the biological communities of rivers, lakes and estuaries in temperate and tropical regions. You will take part in three field visits and laboratory work, usually using microscopes and sometimes analysing water quality, which provides an important practical component to this module. A good complement to other ecology modules, final-year Catchment Water Resources and modules in development studies or geography, you can also take this alongside Aquatic Biogeochemistry or other geochemical and hydrology modules. In selecting this module, you must have a background in basic statistical analysis of data.

2019/0 - ENV-5003A CLIMATE CHANGE: SCIENCE AND POLICY

Autumn Semester, Level 5 module
(Maximum 110 Students)
UCU: 20 Organiser: Professor Rachel Warren
MODULE - 40% PASS ON AGGREGATE
Module Type: Coursework
Timetable Slot:B1/-D1, A2\, D3/

You will develop your skills and understanding in the integrated analysis of global climate change, using perspectives from both the natural sciences and the social sciences. You will gain a grounding in the basics of climate change science, impacts, adaptation, mitigation and their influence on and by policy decisions. This module also offers you a historical perspective on how climate policy has developed, culminating in the December 2015 Paris Agreement. Finally, it considers what will be required to meet the goal of the Paris Agreement to limit global warming to well below 2 °C above pre-industrial levels.

2019/0 - ENV-5008A METEOROLOGY I

Autumn Semester, Level 5 module
(Maximum 75 Students)
UCU: 20 Organiser: Mr Christopher Bell
MODULE - 40% PASS ON AGGREGATE
Module Type: Examination with Coursework or Project
Timetable Slot:D3\, A2/, G1/-H2
Exam Paper(hrs):2 Exam Period:SPR-02

The weather affects everyone and influences decisions that are made on a daily basis around the world. From whether to hang your washing out on a sunny afternoon, to which route a commercial aircraft takes as it travels across the ocean, weather plays a vital role. With that in mind, what actually causes the weather we experience? In this module you'll learn the

fundamentals of the science of meteorology. You'll concentrate on the physical process that allow moisture and radiation to transfer through the atmosphere and how they ultimately influence our weather. The module contains both descriptive and mathematical treatments of radiation balance, thermodynamics, dynamics, boundary layers, weather systems and the water cycle. The module is assessed through a combination of one piece of coursework and an exam, and is designed in a way that allows those with either mathematical or descriptive abilities to do well, although a reasonable mathematical competence is essential, including basic understanding of differentiation and integration.

2019/0 - ENV-5012A SOIL PROCESSES AND ENVIRONMENTAL ISSUES

Autumn Semester, Level 5 module
(Maximum 40 Students)
UCU: 20 Organiser: Dr Brian Reid
MODULE - 40% PASS ON AGGREGATE
Module Type: Examination with Coursework or Project
Timetable Slot:D3\, A2/, G1-H2
Exam Paper(hrs):2 Exam Period:SPR-02

This module will combine lectures, practicals, seminars and fieldwork to provide students with an appreciation of the soil environment and the processes that occurs within it. The module will progress through: basic soil components/properties; soil identification and classification; soil as a habitat; soil organisms; soil functions; the agricultural environment; soil-organism-agrochemical interaction; soil contamination; soil and climate change; soil ecosystem services and soil quality.

2019/0 - ENV-5014A POPULATION ECOLOGY AND MANAGEMENT

Autumn Semester, Level 5 module
(Maximum 60 Students)
UCU: 20 Organiser: Dr Aldina Franco
MODULE - 40% PASS ON AGGREGATE
Module Type: Examination with Coursework or Project
Timetable Slot:D3/, A2\, B1/-D1
Exam Paper(hrs):2 Exam Period:SPR-02

We live in a human dominated era recently designated "the Anthropocene". Humans harvest more than half of the primary productivity of the planet, many resources are over-exploited or depleted (e.g. fisheries) never before has it been so important to correctly manage natural resources for an exponentially growing human population. It is, thus, fundamental to predict where other species occur and the sizes of their populations (abundance). Population Ecology is an area dedicated to the dynamics of population development. In this module you will look closely at how populations are regulated, from within through density dependent factors and from external density independent factors. We start the module with a global environmental change perspective to the management of populations and the factors that affect the population size. We then extend these ideas to help us understand population properties and processes both intra-specifically and inter-specifically. Finally we examine several

management applications where we show that a good understanding of the population modelling is essential to correctly manage natural resources on the planet. Practicals include learning to survey butterflies and birds using citizen science monitoring projects and will be focused on delivering statistical analyses of “Big data” using the programme R-studio. The projects will provide a strong training in both subject specific and transferable skills.

2019/0 - ENV-5015A ATMOSPHERIC CHEMISTRY AND GLOBAL CHANGE

Autumn Semester, Level 5 module
(Maximum 50 Students)
UCU: 20 Organiser: Professor Jan Kaiser
MODULE - 40% PASS ON AGGREGATE
Module Type: Coursework
Timetable Slot:I3\, E1-H3\, F1/
Exam Period:SPR-02

Atmospheric chemistry and global change are in the news. Stratospheric ozone depletion, acid rain, greenhouse gases, and global scale air pollution are among the most significant environmental problems of our age. Chemical composition and transformations underlie these issues, and drive many important atmospheric processes. In taking this module, you'll cover the fundamental chemical principles and processes in the atmosphere, from the Earth's surface to the stratosphere, and consider current issues of atmospheric chemical change through a series of lectures, problem-solving classes, seminars, experimental and computing labs, as well as a field trip to UEA’s own atmospheric observatory in Weybourne/North Norfolk.

2019/0 - ENV-5016A OCEAN CIRCULATION

Autumn Semester, Level 5 module
(Maximum 40 Students)
UCU: 20 Organiser: Dr Xiaoming Zhai
MODULE - 40% PASS ON AGGREGATE
Module Type: Examination with Coursework or Project
Timetable Slot:H3/, C1/-B3, G2/
Exam Paper(hrs):2 Exam Period:SPR-02

This module gives you an understanding of the physical processes occurring in the basin-scale ocean environment. We will introduce and discuss large scale global ocean circulation, including gyres, boundary currents and the overturning circulation. Major themes include the interaction between ocean and atmosphere, and the forces which drive ocean circulation. You should be familiar with partial differentiation, integration, handling equations and using calculators. Shelf Sea Dynamics is a natural follow-on module and builds on some of the concepts introduced here. We strongly recommend that you also gain oceanographic fieldwork experience by taking the 20-credit biennial Marine Sciences field course.

2019/0 - ENV-5018A GLOBAL TECTONICS

Autumn Semester, Level 5 module
(Maximum 50 Students)
UCU: 20 Organiser: Dr Martin Mangler
MODULE - 40% PASS ON AGGREGATE
Module Type: Coursework
Timetable Slot:D3/, B1/-D1, F2/
Exam Period:SPR-02

BEFORE TAKING THIS MODULE YOU MUST TAKE ENV-4005A

Processes in the Earth's interior exert a profound influence on all aspects of the Earth's system, and have done so throughout geological time. On this module, you'll explore all aspects of those processes from the creation and destruction of tectonic plates to the structure of the Earth's interior and the distribution and dissipation of energy within it. This will include: the theory and mechanisms of plate tectonics, the generation of magma and volcanism; the mechanisms behind earthquakes. We will also discuss the geological record of this activity, its evolution and impacts on the Earth.

2019/0 - ENV-5021A HYDROLOGY AND HYDROGEOLOGY

Autumn Semester, Level 5 module
(Maximum 40 Students)
UCU: 20 Organiser: Dr Helen He
MODULE - 40% PASS ON AGGREGATE
Module Type: Examination with Coursework or Project
Timetable Slot:E2+-C3, B2, F1\
Exam Paper(hrs):1 Exam Period:SPR-02

Hydrology and hydrogeology are Earth Science subjects concerned with the assessment of the natural distribution of water in time and space and the evaluation of human impacts on the water. You will be introduced to geological controls on groundwater occurrence, aquifer characteristics, basic principles of groundwater flow, basic hydrochemistry, to catchment hydrology, hydrological data collection and analysis, runoff generation processes and the principles of rainfall-runoff modelling. Practical classes will develop your analytical skills in solving problems as well as field skills in pumping test analysis and stream gauging. A field excursion in Norfolk is also offered in this module.

2019/0 - ENV-5034A GEOMORPHOLOGY

Autumn Semester, Level 5 module
(Maximum 60 Students)
UCU: 20 Organiser: Dr Trevor Tolhurst
MODULE - 40% PASS ON AGGREGATE
Module Type: Coursework
Timetable Slot:H3/-C1-B3, G2/

Geomorphology is the scientific study of landforms and the processes that shape them, it underpins numerous subjects including: sedimentology, palaeoclimatology, biodiversity, ecosystem services, natural hazards and natural resources. In this module you will be introduced to different landforms and gain an understanding of the earth surface processes that create these landforms. Our approach will be both descriptive and quantitative, based on understanding erosional and depositional concepts, weathering and sediment transport and the evolution of landscapes. Drawing from our own research, the emphasis will be on local East Anglian field sites as case studies (with half and full day field trips) with key international examples, to illustrate and improve your understanding of glacial geomorphology, coastal geomorphology, ecogeomorphology and mountain/river/slope geomorphology with some arid geomorphology. You will learn about and apply the methods and different types of data and evidence used by geomorphologists (e.g., maps, imagery and field observations/measurements) to understand landform creation and evolution, gaining numerous transferrable skills.

2019/0 - ENV-5038A CONSTRUCTING HUMAN GEOGRAPHIES

Autumn Semester, Level 5 module
(Maximum 30 Students)
UCU: 20 Organiser: Dr Helen Pallett
MODULE - 40% PASS ON AGGREGATE
Module Type: Coursework
Timetable Slot:E2+-C3, B2, F1\

BEFORE TAKING THIS MODULE YOU MUST TAKE ENV-4010Y OR TAKE ENV-4006B OR TAKE DEV-4007B

How can human geographers help us understand and address pressing environmental and social problems? This is the central question of the module which affirms the distinctive value and relevance of work in contemporary human geography. Throughout you will explore a wide range of approaches to environmental and social problems in contemporary human geography. You'll gain a firm grounding in social constructivism which is underlying philosophy of these approaches. You'll also learn how to communicate insights from human geography to policy-makers and practitioners, and how to critically evaluate examples of human geographers' engagements with policy. You'll begin with the basics of social constructivism, learn why this approach is used by human geographers, and consider the value of this perspective. You'll then delve deeper, exploring the social construction of a different object or problem each week. Topics covered will include: nature, hazards, alternative economies, and social difference. By looking at what these human geography perspectives mean for real-world environmental and social problems you'll practice applying what you've learnt to current policy problems, and learn about how human geographers are making a difference to these issues. You'll learn through a mixture of lectures, workshops and self-directed study and you'll be assessed through a written policy brief and reflective report (100%).

2019/0 - ENV-6004A MODELLING ENVIRONMENTAL PROCESSES

Autumn Semester, Level 6 module
(Maximum 30 Students)

UCU: 20 Organiser: Professor Ian Renfrew
MODULE - 40% PASS ON AGGREGATE
Module Type: Coursework and Project
Timetable Slot:E1-H3\, F1/-B1\, I3\

BEFORE TAKING THIS MODULE YOU MUST TAKE MTHB5006A AND TAKE MTHB5007B OR TAKE ENV-5006A AND TAKE ENV-5007B OR TAKE MTHA5002Y AND TAKE MTHA5004Y

Our aim is to show how environmental problems may be solved from the initial problem, to mathematical formulation and numerical solution. Problems will be described conceptually, then defined mathematically, then solved numerically via computer programming. The module consists of lectures on numerical methods and computing practicals; the practicals being designed to illustrate the solution of problems using the methods covered in lectures. We will guide you through the solution of a model of an environmental process of your own choosing. The skills developed in this module are highly valued by prospective employers.

2019/0 - ENV-6005A BIOLOGICAL OCEANOGRAPHY AND MARINE ECOLOGY

Autumn Semester, Level 6 module
(Maximum 30 Students)
UCU: 20 Organiser: Professor Carol Robinson
MODULE - 40% PASS ON AGGREGATE
Module Type: Coursework
Timetable Slot:B2, F1\, E2+-C3

Explore the evolution, biodiversity and ecology of bacteria, diatoms, coccolithophores and nitrogen fixers, and the physiology and distribution of zooplankton. You will study ecosystems such as the Antarctic, mid ocean gyres and Eastern Boundary Upwelling Systems in detail, and predict the impact of environmental change (increasing temperature, decreasing pH, decreasing oxygen, and changes in nutrient supply) on marine ecosystem dynamics. Biological oceanographic methods will be critically evaluated. The module will include a reading week in week 7 and a voluntary employability visit to the Centre for the Environment, Fisheries and Aquaculture Science (CEFAS). You will be expected to have some background in biology, e.g. have taken a biology, ecology or biogeochemistry based second year module in order to study this module.

2019/0 - ENV-6006A BIODIVERSITY CONSERVATION AND HUMAN SOCIETY

Autumn Semester, Level 6 module
(Maximum 80 Students)
UCU: 20 Organiser: Dr James Gilroy
MODULE - 40% PASS ON AGGREGATE
Module Type: Project
Timetable Slot:G2\+, G1/-H2, D3\

IN TAKING THIS MODULE YOU CANNOT TAKE ENV-7041A

The global biodiversity crisis threatens mass species loss. What are the implications for society? How can communities solve this problem in a world that is facing other challenges of climate change, food security, environmental and social justice? In this inter-disciplinary module, (designed for students of Geography, Environmental Science, Ecology and International Development who have an interest in biodiversity and its conservation), you will focus on the interactions between biodiversity and human societies. The module adopts a rigorous evidence-based approach. You will first critically examine the human drivers of biodiversity loss and the importance of biodiversity to human society, to understand how underlying perspectives and motivations influence approaches to conservation. You will then examine conflicts between human society and conservation and how these potentially can be resolved, reviewing institutions and potential instruments for biodiversity conservation in both Europe and developing countries. Coursework is inter-disciplinary and will require you to evaluate and communicate the quality of evidence showing effectiveness of conservation interventions and approaches. IN TAKING THIS MODULE YOU CANNOT TAKE ENV-7041A

2019/0 - ENV-6008A THE CARBON CYCLE AND CLIMATE CHANGE

Autumn Semester, Level 6 module
(Maximum 90 Students)
UCU: 20 Organiser: Dr Andrew Manning
MODULE - 40% PASS ON AGGREGATE
Module Type: Examination with Coursework or Project
Timetable Slot:I4\, D3\, G1/-H2
Exam Paper(hrs):2

What do you know about the drivers of climate change? Carbon dioxide (CO2) is the greenhouse gas that has, by far, the greatest impact on climate change, but how carbon cycles through the Earth is complex and not fully understood. Predicting future climate or defining ‘dangerous’ climate change is therefore challenging. In this module you will learn about the atmosphere, ocean and land components of the carbon cycle. We cover urgent global issues such as ocean acidification and how to get off our fossil fuel ‘addiction’, as well as how to deal with climate denialists.

2019/0 - ENV-6009A FOSSIL FUELS

Autumn Semester, Level 6 module
(Maximum 60 Students)
UCU: 20 Organiser: Dr Nikolai Pedentchouk
MODULE - 40% PASS ON AGGREGATE
Module Type: Examination
Timetable Slot:H3/, C1/-B3, G2/

You will be introduced to geological, economic and political aspects of fossil fuels (oil, natural gas and coal). These are used to discuss environmental concerns arising from the use of fossil fuels, and the potentially profound implications of future fuel scarcity on society.

You'll be expected to have some knowledge of Earth science and basic Chemistry.

2019/0 - ENV-6029K GEOSCIENCES FIELD COURSE TO SPAIN

Autumn Semester, Level 6 module
(Maximum 2 Students)
UCU: 20 Organiser: Dr Jenni Turner
MODULE - 40% PASS ON AGGREGATE
Module Type: Coursework

BEFORE TAKING THIS MODULE YOU MUST TAKE ENV-5004B OR TAKE ENV-5005K OR TAKE ENV-5018A OR TAKE ENV-5035B OR TAKE ENV-5029B OR TAKE ENV-5030B

This module is designed to promote a deeper understanding and integration of geoscience subjects through the development of field observation, recording and interpretation skills in areas of classic field geology. This 10 day field course is to the Almeria province in southern Spain, a region to the north of the Mediterranean coast; accommodation is likely to be full board at the Urra field study centre near Sorbas. The focus of this field course is folded and metamorphic solid geology which form alpine belts which bound sedimentary fill of a basin. The sedimentary fill provides a World class example of basin analysis - sediments represent different stages of basin evolution and different depositional environments under varied climatic conditions, post-depositional uplift, and incision in a now-arid region. The regional setting is an active strike-slip fault system, with associated sub-marine Miocene volcanism. This module is designed to promote a deeper understanding and integration of geoscience subjects through the development of field observation, recording and interpretation skills in areas of classic field geology. This fieldcourse to the Almeria province in southern Spain, is a study of a range of rock types, from folded and metamorphic solid geology which form alpine belts to sedimentary fill of a basin with climatic and tectonic controls, the latter an active in a strike-slip tectonics withassociated sub-marine Miocene volcanism. This module is not running in 2017/8 During this field course you will develop a deeper understanding and integration of geoscience subjects through the development of field observation, recording and interpretation skills in areas of classic field geology. This fieldcourse is in the Almeria province of southern Spain where you will study a range of rock types sedimentary rocks to folded and metamorphic solid geology which form alpine belts. Your interpretive skills will include reading the rock record to unravel evidence for deep to shallow to marginal basin environments, with climatic and tectonic controls on the sedimentary fill of a basin. Also the evidence for strike-slip systems and associated sub-marine Miocene volcanism. During this field course you will develop a deeper understanding and integration of geoscience subjects through the development of field observation, recording and interpretation skills in areas of classic field geology. This fieldcourse to the Almeria province in southern Spain, where you will study of a range of rock types, from folded and metamorphic solid geology which form alpine belts to sedimentary fill of a basin with climatic and tectonic controls, the latter an active in a strike-slip tectonics with associated sub-marine Miocene volcanism. THIS FIELD COURSE WILL NOT RUN IN 2019-20 During this field course you will develop a deeper understanding and integration of geoscience subjects through the development of field observation, recording and interpretation skills in areas of classic field geology. This fieldcourse is in the Almeria province of southern Spain where you will study a range of rock types sedimentary rocks to folded and metamorphic solid geology which form alpine belts.

Your interpretive skills will include reading the rock record to unravel evidence for deep to shallow to marginal basin environments, with climatic and tectonic controls on the sedimentary fill of a basin. Also the evidence for strike-slip systems and associated sub-marine Miocene volcanism.

2019/0 - ENV-6032A NEW GEOGRAPHIES OF THE ANTHROPOCENE

Autumn Semester, Level 6 module
(Maximum 30 Students)
UCU: 20 Organiser: Dr Martin Mahony
MODULE - 40% PASS ON AGGREGATE
Module Type: Coursework
Timetable Slot:B1/-D1, D3/, A2\
Exam Period:SPR-02

BEFORE TAKING THIS MODULE YOU MUST TAKE ENV-5038A OR TAKE ENV-5002B

The onset of the Anthropocene, a geological epoch defined by the human shaping of Planet Earth, is seeing people starting to fundamentally rethink the human place in nature. What does this mean for the study of human geography? In this module you'll explore the debate over the onset of the Anthropocene, and the unique contribution that human geographers can make to it. You'll gain a firm grasp on how the idea of the Anthropocene is re-shaping geographical thought, and will encounter concepts and methods from across the field of human geography which can help us to think in new ways about the past, present and future of human-environment relationships. You'll also learn new skills in communicating geographical ideas and theories by written, oral and visual means. You'll begin with an introduction to the Anthropocene debate and to the different kinds of evidence that are drawn upon to define the character of this new age. You'll then range across the discipline, taking on-board ideas and insights from historical, political, social and cultural geography on the complex roots, meanings and politics of environmental change. Through a mixture of lectures, seminars, field classes and self-directed study, you'll explore what it means to be a geographer in a rapidly changing world. You'll develop a new appreciation of the processes shaping our environmental present, as well as the critical capacities needed to help shape our environmental future. Lectures cover topics such as Geopolitics as if the Earth Mattered, Cities in the Anthropocene, and Conservation at the end of Nature. As you study you'll put your new knowledge into practice, gaining experience in communicating your ideas in tutorials, group discussions, presentations and written work.