

**Guide to Module Choices for Incoming Exchange Students 2021/22**

School of Geography, Earth and Environmental Sciences

This booklet contains module information for the Academic Year 2021/22 and contains modules that are available to incoming International students from the School of Geography, Earth and Environmental Sciences (GEES). The information contained in this document provides general guidance only. While every care has been taken to provide correct information at the date of authoring, information may be subject to revision from time to time.

**Credits**

If a student is here for one semester they should take 60 credits. If a student is here for a full year they should take 120 credits. Students who are here for both semester 1 and 2 should ideally take 60 credits in each semester.

**Selecting Appropriate Modules**

Incoming students may take modules that are aimed at first year students, second year students and third year students.

Please note: Year 1 = Level C; Year 2 = Level I; Year 3 = Level H.

Students must check that their Home University is happy with their module selections. The responsibility is with the student.

Additional modules are available at level M (Masters). However, it should be noted that Masters level modules have different assessment Regulations to Undergraduate. Please contact the School direct.

There may be timetabling constraints with some module combinations where students have selected across different levels. Should this be the case, students will be asked to choose alternative module(s).

**Non-GEES Modules**

Students may take modules from other schools if their home university permits this and if it is compatible with the student’s timetable. However, it is the student’s responsibility to find out whether the timetables are compatible, and to get in touch with different tutors in each school to make such arrangements possible. Students must check that their Home University is happy with their module selections. The responsibility is with the student.

**Year 1 Modules (Certificate Level) – All Programmes**

| Banner Code | Module Title | Credits | Semester |
| --- | --- | --- | --- |
| **Earth Sciences Modules** |  |  |  |
| 29992 | Earth Systems | 20 | 1 |
| 33739 | Atoms to Volcanoes | 10 | 1 |
| 29202 | Earth History and Life | 20 | 2 |
| 29210 | Structural Geology | 20 | 2 |
| 36184 | Earth Materials | 20 | 1 |
| 33740 | Earth Structures and Tectonics | 20 | 2 |
| **Geography and Environmental Sciences Modules** |  |  |  |
| 33575 | Contemporary Human Geography A | 10 | 1 |
| 33562 | Contemporary Human Geography B | 10 | 2 |
| 33629 | Global Environmental Issues A | 10 | 1 |
| 33630 | Global Environmental Issues B | 10 | 2 |
| 30019 | From Molecules to Materials: deconstructing the environment | 20 | 1 |
| **Planning Modules** |  |  |  |
| 36283 | Planning for the Built Environment | 20 | 1 |
| 36282 | Cities in Transition | 20 | 2 |
| 27805 | Planning in Action | 10 | 2 |

**Year 2 Modules (Intermediate Level) – All Programmes**

| Banner Code | Module Title | Credits | Semester |
| --- | --- | --- | --- |
| **Earth Sciences Modules** |  |  |  |
| 24064 | Sedimentology | 20 | 1 |
| 33860 | Geological Natural Hazards | 20 | 1 |
| 36203 | Palaeoecology | 20 | 1 |
| 36213 | Rock Mechanics, Geophysics and Hydrogeology | 20 | 2 |
| 33756 | Resource Geology | 10 | 2 |
| **Geography and Environmental Science Modules** |  |  |  |
| 18180 | Hydroclimatology: climate and water | 20 | 1 |
| 36296 | Environmental Pollution and Management | 20 | 1 |
| 34034 | Cultural Geographies | 20 | 1 |
| 34027 | Social Geographies  | 20 | 1 |
| 34031 | Political Geographies | 20 | 1 |
| 37140 | Hydrology and Geomorphology | 20 | 2 |
| 18182 | Ecological Systems | 20 | 1 |
| 35199 | Environmental Human Geography | 20 | 2 |
| **Planning Modules** |  |  |  |
| 34071 | Urban Policy Design and Planning Analysis | 20 | 2 |

**Year 3 Modules (Honours Level) – All Programmes**

| Banner Code | Module Title | Credits | Semester |
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| **Earth Sciences Modules** |  |  |  |
| 36415 | Exploring the Energy Transition | 20 | 1 |
| 10820 | Evolution of Vertebrates  | 20 | 2 |
| 36380 | Engineering Geology and Pollution Hydrogeology  | 20 | 1 |
| 36413 | Tectonic and Volcanic Processes | 20 | 2 |
| 29996 | Palaeoclimates | 20 | 2 |
| **Geography and Environmental Science Modules** |  |  |  |
| 36268 | Geographies of Russia in a Regional and Global Context | 20 | 1 |
| 36269 | Geographies of the Global South | 20 | 1 |
| 36273 | Resource Governance | 20 | 1 |
| 36267 | Geographies of Childhood and Education | 20 | 1 |
| 36263 | Catchment Processes, Environmental Change and Restoration | 20 | 1 |
| 36266 | Environmental Research in High Latitudes | 20 | 1 |
| 36265 | Embodiment and the Carceral | 20 | 2 |
| 36275 | Work, migration and alternative economies | 20 | 2 |
| 36271 | Politics of Environment | 20 | 2 |
| 36270 | Geopolitics and Global Challenges.Middle East | Russia | Cities  | 20 | 2 |
| 36264 | Conservation: theory into practice | 20 | 2 |
| 36220 | Pollution impacts and Environmental Management | 20 | 2 |

**Year 4 Modules (Masters Level) – All Programmes**

***Please note that the pass mark for all 4th year modules is 50%***

| Banner Code | Module Title | Credits | Semester |
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| **Earth Sciences Modules** |  |  |  |
| 33794 | Inorganic Chemistry and Groundwater and Borehole Design Construction and Maintenance | 20 | 1 |
| 24881 | Groundwater Organic Contamination and Pollution Remediation  | 20 | 2 |

Additional modules are available at Level M (Masters). However, it should be noted that Masters level modules have different assessment regulations to undergraduate. Please contact the school direct at gees-ugadmin-yrs3-4@contacts.bham.ac.uk

**Year 1 Modules (Certificate Level) – All Programmes**

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| **29992**  | **Earth Systems**  | **20 credits** |
| **Level: C** | **Semester: 1** | **Module Leader: Sarah Green** |
| **Description:** | This module explores the Earth as a system of interconnected geological processes. Focus is placed on fundamental aspects of Earth Sciences and how knowledge of these underpins understanding of the overall Earth system. Major themes are 1. Earth in Context, 2. Earth’s Mineral Wealth, 3. Geochemistry, 4. Sedimentary Processes & Rocks, 5. Geomorphology and 6. Climates of the Past. Within each of these broad themes important research questions are addressed and unpacked by working from first principles, thus instigating the transition of students into researchers. Both the specific themed content within this module and the overall systems approach provide a foundation for later LI and LH/M modules.  |
| **Learning Outcomes:** | By the end of the module the student will be able to: * Understand that the Earth represents a system of interconnected geological processes
* Distinguish processes involved in the formation of igneous, metamorphic and sedimentary rocks
* Interpret geological and geomorphological processes using evidence from samples and geological data
* Use evidence from the geological record to assess past climates and climatic change
* Recognise key research questions across the Earth science discipline.
* Critically analyse geological research theories and conceptualisations.
* Balance chemical equations and use stoichiometry, the periodic table, and the concept of moles to perform basic calculations.
* Understand key concepts such as the pH scale and equilibrium reactions
* Appreciate the effects of thermodynamics and kinetics on chemical reactions
* Understand key controls on mineral solubility, precipitation, dissolution
* Trace the biogeochemical cycling of carbon through the Earth system
* Understand basic redox chemistry and the role of microbes in biogeochemical systems
* Calculate residence times and understand their importance in natural systems
* Show a basic understanding of stable isotopes and how they can be used as tracers of process
* Perform calculations related to fluid mixing
* Trace the biogeochemical cycling of carbon and other critical rock-forming elements through the Earth system
 |
| **Assessment:** | Assessment: A series of multiple choice/short answer quizzes or problem sets (50%)Group presentation (poster/podcast/videocast) (50%) |

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| **33739** | **Atoms to Volcanoes**  | **10 credits** |
| **Level: C** | **Semester: 1** | **Module Leader: Tom Dunkley-Jones** |
| **Description:** | The module begins with an investigation into the physical and chemical makeup of the primitive solar nebula the solar system, asteroids/meteorites and planets – with emphasis on Earth. Focus then moves onto building planetary bodies from scratch. The discussion begins with the atoms, crystals and minerals that represent the “basic building blocks of rocks”. Time is spent learning about basic theory about crystallography and mineralogy. The properties of all classes of minerals (including structure and composition) are discussed so that mineral identification can be accomplished in hand specimen. However, particular reference is given to the main rock-forming mineral groups. The module then moves on to the introduction of the petrological microscope whereby the principles of basic petrography are undertaken. This enables the rock-forming minerals to be studied in thin section. After the principles of petrography have been introduced the skill is developed throughout the rest of the module alongside the discussion of basic rock analytical techniques and igneous rock classification. This leads on to magmatic processes with an emphasis on the larger impacts of volcanological hazards. |
| **Learning Outcomes:** | By the end of the module students should be able to:* Understand the solar system and interstellar objects.
* Understand basic transmitted light microscopy.
* Understand basic mineralogy and crystallography.
* Understand and identify the main mineral groups and igneous rock types.
* Understand the fundamentals of igneous and metamorphic petrology.
* Understand the fundamentals of magmatic evolution using geochemical data.
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| **Assessment:** | One, 1 hour, multiple choice question examination (January) (50% of the module); and 2 assessed summative practicals to be done in class (50% of the module). |

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| **29202** | **Earth History and Life** | **20 credits** |
| **Level: C** | **Semester: 2** | **Module Leader: Ivan Sansom** |
| **Description:** | The module focusses on how planet Earth has changed physically and biologically through geological time and introduces the principles of stratigraphy and palaeontology. The concepts of deep-time and the geological timescale are developed and provide a fundamental framework for studies in Geological and Earth Sciences. Through lectures, case studies are presented from the geological timescale that address key events in Earth history including the plate tectonic and palaeogeographic history of the planet, the development of global biogeochemical cycles, profound episodes of evolutionary diversification and extinction, as well as global patterns of climate and environment change through time. Integrating lecture and practical content the module will introduce invertebrate macrofossils and trace fossils, and their modes of preservation, and palaeontological topics dealt with include the classification, morphology and modes of life and geological importance of trilobites, brachiopods, molluscs, graptolites, echinoderms and corals. Trace fossils are dealt with in terms of their classification and evidence for organism:sediment interactions. Delivery methods are based on a combination of 25 lectures focussing on principles of stratigraphy, case studies though Earth History and introductory level palaeontology, and 20 hours of specimen based laboratory classes to provide both theoretical and practical experience of the subject.  |
| **Learning Outcomes:** | By the end of the module students should be able to:* Recount the major systems of the geological timescale and understand the principles of stratigraphy and deep-time.
* Demonstrate how the planet Earth has changed through geological time as a result of past geological processes.
* Explain the relationship between changing climates and geological processes at a global to local scale.
* Understand key events in Earth History and link these to likely causal mechanisms.
* Identify and classify the commoner types of invertebrate macrofossils and trace fossils.
* Describe, in basic terms, the modes of fossil and trace fossil preservation.
* Demonstrate how fossils can be used in biostratigraphy.
* Use fossils and trace fossils to aid inference of sedimentary environnment and in palaeogeographical reconstruction.
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| **Assessment:** | 1.5 hour written exam (1 seen question, 5 short answer questions) (50%)Practical assessments (50%) |

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| **29210** | **Structural Geology** | **20 credits** |
| **Level: C** | **Semester: 2** | **Module Leader: Marco Maffione**  |
| **Description:** | Structural geology is concerned with the geometry and distribution of rocks in the subsurface and is therefore absolutely crucial for any applied aspect of geology and geosciences. The field of structural geology includes analyzing how rocks deform, flow and are transported due to tectonics and other forces. Therefore several types of quantitative analyses are important to help to understand the strain and tectonic history of rocks and interpret their tectonic setting. This module provides an introductory level grounding in structural geology, deformation, rheology and tectonics at a university level. It covers geological structures and tectonics at a variety of scales and uses map interpretation and practical experiments as the main practical component. Topics include identifying and understanding geological structures, the basis and origins of plate tectonics theory, geological map interpretation, identifying various structures from maps, plotting structural data stereographically, stress and strain analysis and deformation processes and rheology. The module is delivered through a combination of lecture, practical and hands-on lab classes where analogue geological processes are tested and the relevant concepts explored. |
| **Learning Outcomes:** | By the end of the module students should be able to:* Identify and understand key geological structures.
* Understand the basis of plate tectonics.
* Interpret geological maps.
* Plot and read stereonets.
* Understand the relationship between stress and strain.
* Carry out basic strain analysis.
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| **Assessment:** | Theory class test (mainly short answer and MCQ) – 1.5 hours (50%)Examination 2.0 hours (50%) |

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| **36184** | **Earth Materials** | **20 credits** |
| **Level: C** | **Semester: 1** | **Module Leader: Tom Dunkley-Jones** |
| **Description:** | The module begins with an investigation into the physical and chemical makeup of the primitive solar nebula the solar system, asteroids/meteorites and planets - with emphasis on Earth. Focus then moves onto the planet Earth where the major planetary reservoirs are examined. The discussion begins with the crystals and minerals that represent the ‘basic building blocks of rocks’. Time is spent learning about basic theory about crystallography and mineralogy. The properties of all classes of minerals (including structure and composition) are discussed so that mineral identification can be accomplished in hand specimen. However, particular reference is given to the main rock-forming mineral groups. The module then moves on to the introduction of the petrological microscope whereby the principles of basic petrography are undertaken. This enables the rock-forming minerals to be studied in thin section. After the principles of petrography have been introduced the skill is developed throughout the rest of the module alongside the discussion of basic rock analytical techniques and igneous rock classification. This leads on to the introduction to metamorphism and magmatic processes with an emphasis on the larger impacts of volcanological hazards. The basic knowledge acquired in the first part of the module is now used to understand the mechanisms of magma production across global tectonic settings. Geothermal gradients, decompression, volatile release and high temperature processes are discussed for generating magmas and volcanic products. Basic information about magma ascent and processes operating in magma chambers is also given. Introduction to metamorphic rocks and development of metamorphic textures and metamorphic minerals follows on from knowledge of igneous processes.The course also provides an introduction to basic chemistry and the first principals of geochemistry, especially in its application to magmatic and metamorphic processes. |
| **Learning Outcomes:** | By the end of the module students should be able to:• Demonstrate a basic understanding of the overall chemical composition and structure of the solar system and the Earth and the major processes regulating distribution of the elements.• Identify and describe the common types of igneous and metamorphic rocks and rock-forming minerals.• Understand the origin and nature of igneous and metamorphic rocks from source region, to magma chambers to secondary deformational events.• Use the petrological microscope to identify common primary minerals in igneous and metamorphic rocks, as well as interpret mineral relationships and textures in thin section.• Understand the basic geochemistry. Including atoms, elements, isotopes, balancing equations, phases and reactions. |
| **Assessment:** | One, 1.5 hr, multiple choice question examination (January) (50% of the module) 3 assessed summative practicals to be done in class (50% of the module). |

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| **33740** | **Earth Structures and Tectonics** | **10 credits** |
| **Level: C** | **Semester: 2** | **Module Leader: Marco Maffione** |
| **Description:** | The evolution of the Earth’s crust and mantle over geological time involves a variety of tectonic processes that drive deformation and mountain building. This module provides essential level C introduction and grounding in tectonics and structural geology. Key skills include identifying and describing structures, tectonics and map interpretation.  |
| **Learning Outcomes:** | By the end of the module students should be able to:* Understand the relationship between stress and strain.
* Identify and interpret basic geological structures.
* Interpret basic geological maps.
* Measure and plot structural data stereographically.
* Understand the principles of plate tectonics.
 |
| **Assessment:** | Theory class test (MCQ) 1.5 hours (100%) |

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| **33575** | **Contemporary Human Geography A** | **10 credits** |
| **Level: C** | **Semester: 1** | **Module Leader: Peter Kraftl** |
| **Description:** | The course begins with an introduction to the big themes and academic nature of the discipline. Subsequent sections will consider the academic development, key concepts, current issues and debates central to sub-disciplines within Human Geography, drawn from the 9 key research areas in the school. |
| **Learning Outcomes:** | By the end of semester 1, students will: • have achieved a basic understanding of the nature of human geography at degree level.• Be able to identify some key themes and concepts within the human geographical sub-disciplines covered during the semester.• understand human geography as a discipline rooted in real-world issues.  |
| **Assessment:** | 2000 word essay (100%)  |

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| **33562** | **Contemporary Human Geography B** | **10 credits** |
| **Level: C** | **Semester: 2** | **Module Leader: Peter Kraftl** |
| **Description:** | The module draws upon those key sub-disciplines within Human Geography considering their academic development, along with key concepts and debates. The semester will finish with a conclusion to the course, revision meetings and a discussion of the type of exam to be expected. |
| **Learning Outcomes:** | By the end of semester 2, students will:• Have achieved a broader understanding of the scope and changing nature of human geography at degree level be able to identify key themes and concepts within human geography’s sub-disciplines, with particular reference those taught in the semester.• Build upon the theoretical understandings of Human Geography established in Contemporary Human Geography A• Be able to relate basic conceptual understandings within human geography to real world issues have established a solid foundation for progression to Level 2 human geography |
| **Assessment:** | 2000 Coursework (100%); |

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| **33629**  | **Global Environmental Issues A** | **10 credits** |
| **Level: C** | **Semester: 1** | **Module Leader: Chris Bradley** |
| **Description:** | This module examines the conflict between the use of natural resources, growing environmental degradation and increasing population. It assesses the difficulties in distinguishing human impacts from natural environmental changes, and examines a number of specific environmental issues grouped within broad inter-disciplinary themes spanning key areas of research excellence in GEES including a selection of: ‘Water’, ‘Environment and Society’, ‘Climate Change’, ‘Forests’, ‘Environmental Health’ ‘Urban Environments’ and ‘Global Challenges’ |
| **Learning Outcomes:** | By the end of the module you will be able to:* Understand the key drivers responsible for global environmental issues
* Recognise the nature of short-term and long-term human impacts on the environment
* Synthesise the literature to derive an objective assessment on the significance of selected environmental issues.
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| **Assessment:** | 2000 word essay (100%) |

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| **33630**  | **Global Environmental Issues B** | **10 credits** |
| **Level: C** | **Semester: 2** | **Module Leader: Chris Bradley** |
| **Description:** | This module examines the conflict between the use of natural resources, growing environmental degradation and increasing population. It assesses the difficulties in distinguishing human impacts from natural environmental changes, and examines a number of specific environmental issues grouped within broad inter-disciplinary themes spanning key areas of research excellence in GEES including a selection of: ‘Water’, ‘Environment and Society’, ‘Climate Change’, ‘Forests’, ‘Environmental Health’ ‘Urban Environments’ and ‘Global Challenges’ |
| **Learning Outcomes:** | By the end of the module you will be able to:* Understand the key drivers responsible for global environmental issues
* Recognise the nature of short-term and long-term human impacts on the environment
* Synthesise the literature to derive an objective assessment on the significance of selected environmental issues
 |
| **Assessment:** | 2000 word essay (100%) |

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| **30019**  | **From Molecules to Materials: deconstructing the environment** | **20 credits** |
| **Level: C** | **Semester: 1**  | **Module Leader: William Bloss** |
| **Description:** | The module provides an introduction to the fundamental building blocks of matter and how they interact to the provide a habitable and functioning environment. Focus will be on deconstructing the building blocks of the environment in order to understand how they fit together. Theoretical concepts will be introduced in lectures and through online resources, and their application demonstrated within an environmental context through laboratory practicals and in-class problem-solving exercises.Specific environmental and geological topics covered include :* The unique properties of water that enable life;
* The environmental behaviour of specific elements and classes of compounds;
* Biogeochemical cycles (e.g. nitrogen, phosphorus; mercury);
* Important classes of chemical reactions in the environment, such as acid-base and redox reactions;
* Radioactive decay and the application of stable and unstable isotopes in geochemistry and pollution monitoring;
* Chemistry of rocks, soils and sediments, and natural waters;
* Carbon chemistry including funtional groups, polymers, surfactants, pesticides;
* Colloids and nanoparticles;
* Further important examples of chemical reactions in the environment, such as redox reactions as applied in wastewater treatment
 |
| **Learning Outcomes:** | By the end of the module students should be able to:* Understand key concepts such as bonding, reactivity, states of matter, reaction kinetics.
* Write/balance chemical equations and use periodic table to calculate formulas, moles etc.
* Show an understanding of acid-base and redox reactions, pH, and their implications for environmental and geological processes.
* Appreciate the reactivity and structure of selected environmentally important elements & pollutants and understand how they are cycled within environmental compartments.
* Show an awareness of common isotopes, radioactive decay processes, and their application to environmental science.
* Show a basic understanding of the natural and anthropogenic processes affecting atmospheric, soil and aquatic composition.
* Perform prescribed laboratory experiments with a high degree of accuracy and understanding, including analysing and reporting data and the use of data to support a hypothesis.
 |
| **Assessment:** | Assessments:1 x laboratory notebook (50%) Online Assessment (50 %) |
| **36283**  | **Planning for the Built Environment** | **20 credits** |
| **Level: C** | **Semester: 1** | **Module Leader: David Adams** |
| **Description:** | Urban and regional planning plays a critical role in shaping the nature of the built environment in which we all live. Our towns and cities are constantly evolving and the need to manage this change in order to create much-improved urban environments is critical. The ongoing transformation of Birmingham City Centre is testament to the important role that planning can play.A key objective of this module is the understanding of how cities and planning should be understood today. It will examine the roots and the development of planning from its origins up to the present day.This module goes on to explore the contemporary operation of the UK planning system and examines the tools that urban planners have at their disposal to help shape the built (and natural) environment. Topics will cover the organisation and management of the planning system, public engagement, climate change, and other contemporary planning issues. |
| **Learning Outcomes:** | By the end of the module you should be able to:• Discuss the key influences and figures that led to the emergence of urban and regional planning as a form of policy intervention• Understand the contemporary structure, function and operation of the UK planning system• Outline the different ways that urban and regional planning impacts on the built (and natural) environment• Explain how urban and regional planning might positively respond to social, environmental and economic challenges and opportunities• Communicate effectively in written, oral and visual form by presenting findings distilled from different sources |
| **Assessment:** | Individual poster (including c. 1,000-words of accompanying text) (worth 25%)Individual essay (3,000-words) (worth 75%) |

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| **36282** | **Cities in Transition** | **20 credits** |
| **Level: C** | **Semester: 2** | **Module Leader: David Adams** |
| **Description:** | This module introduces students to some of the key processes of socio-economic change shaping the fortunes of cities in Britain, Europe and North America. In so doing, it highlights the role they play in shaping urban policy and planning priorities in cities. The module draws on relevant international case studies of socio-economic change in major cities, including Barcelona, Manchester, Toronto, Berlin and Detroit.Situating these changes in the context of globalisation, urban fragmentation and other recent intellectual developments in urban studies, this module exposes students to debates around how the physical fabric of contemporary cities is being remodelled and re-shaped by a range of different forces, processes and actors. And it explores how major processes of change influence different kinds of cities and the diverse groups within urban society. Here, then, is an early opportunity for students an early opportunity to consider how planners and other policy makers might respond to these new urban challenges. |
| **Learning Outcomes:** | By the end of the course students should be able to:* Demonstrate an understanding of key socio-economic and environmental processes relevant to the analysis of spatial change in contemporary cities
* Explain how these processes shape public policy formulation, particularly at the city scale
* Analyse the differential impact that these forces are exerting on the fortunes of cities
* Generate policy recommendations to guide future planning and development decisions
* Communicate effectively and professionally in written, oral and visual form
 |
| **Assessment:** | Individual 1,500-word report (worth 35%)Individual 3,000-word report (worth 65%) |

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| **27805**  | **Planning in Action** | **10 credits** |
| **Level: C** | **Semester: 2** | **Module Leader: Mike Beazley** |
| **Description:** | This weekly tutorial programme provides an opportunity to explore urban and regional planning issues covered in the URS modules in small group discussion sessions. The programme involves a combination of class discussion, presentations, local visits, and small-group project work. We will be exploring planning in action and using local sites to explore some key issues as part of our planning laboratory. |
| **Learning Outcomes:** | By the end of the module you are expected to:• Demonstrate an understanding of the planning issues facing the City of Birmingham and the surrounding region• Apply some of the basic skills required of a planner• Respond effectively to a project brief and present the findings to the wider group |
| **Assessment:** | Individual report of 2,000 words (70%)Group project presentation (30%) |

**Year 2 Modules (Intermediate Level) – All Programmes**

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| **24064**  | **Sedimentology** | **20 credits** |
| **Level: I** | **Semester: 1**  | **Module Leader: James Wheeley**  |
| **Description:** | This module covers the physical characteristics of the major environments of deposition of the main types of siliciclastic, carbonate and evaporitic sediments and the processes involved with their deposition. It takes account of the different types of sedimentary basin in which they accumulate and the large-scale controls. Links are made between modern sedimentary environments and those preserved in the stratigraphic record especially through the application of sedimentary facies analysis. Where appropriate emphasis is placed on the techniques employed for the study of sedimentary rocks in the field and laboratory. The module covers the processes and products of diagenesis of siliciclastic and carbonate sediments. |
| **Learning Outcomes:** | By the end of the module the student should be able to: * Describe in technical detail the physical characteristics of sedimentary rocks from microscope to field scale for a range of sedimentary systems and record these data in appropriate ways including graphically
* Infer 3-dimensional environments from available data
* Evaluate the role of base-level shifts as a control on the spatial and temporal

variations in depositional systems * Log, describe and interpret facies in core
* Describe quantitatively the mineral composition of sedimentary rocks in thin section
* Identify, describe and interpret diagenetic processes and products in thin section and their influence on the generation of porosity and permeability.
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| **Assessment:** | 1 hour examination (30%)Core logging exercise and write-up (1000 word equivalent; 20%)assessed thin section exercise and write-up (2500 word equivalent; 50%) |

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| **33860**  | **Geological Natural Hazards** | **20 credits** |
| **Level: I** | **Semester: 1** | **Module Leader: Seb Watt** |
| **Description:** | This module examines the major geological natural hazards (earthquakes, volcanic eruptions, ground stability and landslide hazards, tsunamis, bolide impacts) in terms of driving geological processes and human impacts. The theoretical background behind each hazard is addressed, placing processes in a wider geological context, examining the key physical principles driving each process, and considering frequency and magnitude relationships.Concepts of risk and vulnerability are introduced via a range of case studies, examining factors that have led to natural disasters. Methods of hazard assessment and monitoring are investigated, with case-study examples, to consider the forecasting and mitigation of geological natural hazards. |
| **Learning Outcomes:** | By the end of the module students should be able to:* Understand the nature, principal causes and the effects of a range of geological hazards.
* Understand how geological and human factors determine hazards and risks associated with natural geological processes
* Understand monitoring and communication approaches for mitigating the impacts of a range of geological natural hazards, and how these vary between hazard types
* Evaluate mitigation strategies for geological natural hazards based on an understanding of potential impacts and vunerability.
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| **Assessment:** | Three assessed practical exercises (60% in total)End of module examination (1.5 hours) comprising both short-answer and longer-format questions (40%) |

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| **36203** | **Palaeoecology** | **20 credits** |
| **Level: I** | **Semester: 1** | **Module Leader: Kirsty Edgar** |
| **Description:** | This module introduces students to the theory and practice of palaeoecology - the study of the relationships between organisms and their environments in the past. The goal of which is to understand how ancient environments and ecosystems looked, operated and changed through time, and the controls on these. The primary focus of this module is the marine ecosystem, the largest ecosystem on Earth, where life began and which, today provides vital social, economic and biological services to humans including regulation of global climate. Complimentary insights are also provided into selected terrestrial ecosystems. This module will provide an overview of [i] (palaeo)ecological concepts and measures, [ii] key events and controls on the evolution of ecosystems (from micro- to macro- scopic life), [iii] the different means by which we can reconstruct past life, ecosystems and environments, and [iv] assess the lessons from the palaeontological record for understanding current anthropogenic changes, e.g., ocean acidification and global warming. This topic is highly interdisciplinary bringing together elements of palaeontology, sedimentology, oceanography, climatology, ecology, biology, and geochemistry. |
| **Learning Outcomes:** | By the end of the module students should be able to: • Understand and apply key (palaeo)ecological concepts and techniques• Understand taphonomy and evaluate preservational bias in the geological record• Describe and use different methods for reconstructing organisms? ecology• Demonstrate familiarity with biotic and geochemical methods of reconstructing past environments• Identify and describe key events in the evolution of marine ecosystems and the dominant controls• Assess the relevance and insights from the fossil record for understanding current anthropogenic changes |
| **Assessment:** | 50% 2 hr examination50% 2000 word data analysis and interpretation report |

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| **33756** | **Resource Geology** | **10 credits** |
| **Level: I** | **Semester: 2** | **Module Leader: Jason Hilton** |
| **Description:** | The broad, introductory module in resource geology aims to develop themes that underpin exploitation of the Earth’s physical resources, and that are central to many graduate careers in geoscience. These themes comprise: * Resources as bulk materials, aggregates: exploration and evaluation using Geographical Information Systems (GIS).
* Hydrocarbon systems and application of seismic reflection and well-logging methods for their exploration.
* Igneous ore deposits: formation, exploration using gravity, magnetics and remote sensing.
* Surface and hydrothermal ore deposits.
* Earth’s energy resources: formation and extraction of oil, gas, coal, ground source, nuclear resources.
* Resource management.

The module also included training in the production of concise, structured reports developed to professional standards as expected in industry and employment. Practical components are based on real-world scenarios and where possible link to fieldwork modules. |
| **Learning Outcomes:** | By the end of the module, students should be able to:* Demonstrate an understanding of the principles regulating the distribution of natural resources in a plate tectonic context, and to understand the methods of formation for different natural resources.
* Evaluate physical resources from geological maps, satellite and geophysical data and identify appropriate extraction and processing techniques for different resources.
* Understand and apply the techniques used in geographical information systems (GIS) and remote sensing
* Interpret and integrate geophysical data.
* Produce reports on to professional standards expected in industry.
 |
| **Assessment:** | Assessments: 3 pieces of coursework Geophysics exercise (~ 500 words + diagrams/tables/calculations; 40%)GIS practical exercise and report (30% ~ 500 words, 1 figure from software used, and data tables)Remote sensing practical exercise and report (30% ~ 500 words, 6 figures from software used) |

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| **36213** | **Rock Mechanics, Geophysics and Hydrogeology** | **20 credits** |
| **Level: I** | **Semester: 2** | **Module Leader: Carl Stevenson** |
| **Description:** | This module covers the key aspects of structural and applied geology in order to equip students to employ important geological theory and understand how this theory links to advanced and applied settings. Topics include structural geology concepts of stress and strain rooted in engineering principles and relevant to geological processes including kinematics. Geophysics and geophysical application that link subsurface structures to applied settings and the relevant techniques that are employed. Finally, essential principles of groundwater flow and chemistry complete the quantitative aspects of applied geoscience. |
| **Learning Outcomes:** | By the end of the module students should be able to:• Build on elementary structural geology to link fundamental theory to applied and practical settings• Analyse and interpret a range of key geophysical data sets and applications• Understand the principles governing groundwater flow and chemical composition and their applications in assessing groundwater resources |
| **Assessment:** | 1 hr exam (35%), Structural assignment 1500 words (30%), Geophys assessed exercise (35%) |

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| **18180**  | **Hydroclimatology: climate and water** | **20 credits** |
| **Level: I** | **Semester: 1** | **Module Leader: Martin Widmann** |
| **Description:** | The module introduces the Earth’s climate, weather and water system, represented by hydroclimatological variables such as precipitation, wind, atmosphericpressure, temperature, evaporation, snow and ice, (sub) surface water, and rivers. We will discuss how to measure these variables with in-situ and remote sensing methodsWe will study the spatial and temporal variability of these variables, covering local (for example Birmingham), regional (for example UK) and global scales and timescales from hours to centuries. We will investigate the meteorological and hydrological processes affecting these variables and the way they are linked through the water balance. This will include discussing the impact of human-induced climate change on hydroclimatic variables. |
| **Learning Outcomes:** | By the end of the module the student should be able to:* Understand fundamental concepts and methods in both the atmospheric and hydrological sciences on different scales (e.g. point scale, catchment scale, global scale);
* Describe the water balance, represented by interactions between: precipitation, evaporation, soil moisture, groundwater, snow and ice lakes and wetlands, and stream flow.
* Explain the spatial and temporal variation in hydroclimatological variables for the globe and the UK;
* Discuss the challenges in hydroclimatology resulting from increasing human impact upon natural processes, including anthropogenic climate change.
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| **Assessment:** | Assessments: 1.5 hour unseen examination (50%)Coursework: poster presentation (50%) |

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| **36296**  | **Environmental Pollution and Management** | **20 credits** |
| **Level: I** | **Semester: 1** | **Module Leader: Zongbo Shi** |
| **Description:** | Pollution in the environment is one of major threats facing society whether in the form of gases (e.g. air pollution, climate change), dissolved substances (e.g. mine drainage, agricultural run-off), liquids (e.g. surface and groundwater quality) or particles (e.g. microplastics and airborne particles). This module will introduce the main environmental pollutants, their causes and effects as well as consider how they are transferred within and between various media and how they interact with biota to constitute an environmental risk. We will use the source pathway receptor model to explore how the form and transport of pollutants contributes to their importance in an environmental context. We will also consider how the extent of pollution can be assessed within different environmental media. These key concepts will be considered in relation to current environmental issues including air, water, soil pollution and chemical use.Lectures will be supported by workshops and laboratory and computer practicals to allow students to put in practice theoretical concepts. |
| **Learning Outcomes:** | By the end of the module students should be able to:• Critically assess a range of sources, type and controls on air, land and water pollutants.• Understand the causes and effects of specific pollutants and their movement and behaviour in the environment.• Elucidate the linkages between land management and water quality at catchment scale• Have knowledge of how modelling can be used to characterise the aquatic environment and pollution risks• Conduct and interpret a range of relevant laboratory / field environmental monitoring techniques for characterising and assessing environmental quality |
| **Assessment:** | 3000 word lab report (50%)Group video (50%) |

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| **34034**  | **Cultural Geographies** | **20 credits** |
| **Level: I** | **Semester: 1** | **Module Leader: Lloyd Jenkins** |
| **Description:** | The module focus will be on cultural geographies, with particular emphasis on landscapes, embodiment and cities. Material covered will move from the birth of the modern city in the mid-nineteenth century through to the present day. The module will raise questions around how spaces are embodied and lived, alongside the creation of identities and landscapes. |
| **Learning Outcomes:** | By the end of the module students should be able to:* Understand the diversity of theoretical approaches to examining cities, bodies and landscapes.
* Critically deconstruct the explanatory power of different theoretical frames from cultural geography.
* Apply a range of theoretical concepts to analyse the world around us.
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| **Assessment:** | 2 x 2000 word essays (50% each) |

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| **34027**  | **Social Geographies** | **20 credits** |
| **Level: I** | **Semester: 1** | **Module Leader: Natasha Cornea**  |
| **Description:** | This module uses a range of contemporary social geographical approaches to understand how, why and in what ways individuals and organizations act in an increasingly globalized world.The module will elaborate a critical geography approach with regard to current socio-economic developments at a range of scales including the global, national, local environments, cities, neighbourhoods, and individual bodies, paying particular attention to social differences and axes of power. A geographical critique of neoliberalism and its discontents will form the conceptual core of the module, utilising the wide body of scholarship in this field. Building on human geography concepts introduced in Year 1, the module will aim to take the students beyond a mere descriptive understanding the basic themes and issues in contemporary social geography, by giving them the skills - mainly through EBL methods - to actively question taken- for-granted assumptions regarding the relationship between society, economy, and the everyday. |
| **Learning Outcomes:** | By the end of the module the student will be able to: * Be able to recognise the social implications, elements and functioning of neoliberal policies at a global scale, and understand the core components of critical geographic thought with regard to contemporary social geography issues as these affect different social groups.
* Relate critical geography approaches to questions of social equity and justice, migration, citizenship, urban change, and contemporary socio-demographic change, connecting the global scale with everyday life.
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| **Assessment:** | 4,000 word essay  |

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| **34031**  | **Political Geographies**  | **20 credits** |
| **Level: I** | **Semester: 1** | **Module Leader: Adam Ramadan** |
| **Description:** | This module uses a range of contemporary key concepts and methods in political geography and geopolitics to understand how, why and in what ways current and emergent forms of sovereignty, statehood and territory are mobilised by states, cities, organizations and individuals in an increasingly globalized world. Specifically, drawing on historic and contemporary examples (including case studies of inter alia Lebanon, Russia, the European Union), the module examines (1) how sovereignty emerged and been sustained as one of the critical drivers of political geography by actors and organizations, and how is it manifested at a variety of spatial scales; and (2) how sovereignty is implicated in current and likely future patterns and processes of political contestation, (dis)integration and geopolitical developments locally, nationally and globally in the 21st century. |
| **Learning Outcomes:** | By the end of the module the student will be able to: * Be able to recognise the political implications, elements and functioning of sovereignty at a variety of scales, and understand the core components of critical geographic thought with regard to contemporary sovereigntyscapes
* Relate critical geography approaches to questions of sovereignty, states, borders, territories, equity and justice, migration, citizenship, urban change, and contemporary geopolitics.
* Understand some of the key concepts in contemporary political geographical and geopolitical thought and the key events and processes underpinning changing political geographies of sovereignty.
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| **Assessment:** | 2 hour examination  |

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| **37140** | **Hydrology and Geomorphology** | **20 credits** |
| **Level: I** | **Semester: 2** | **Module Leader: TBC** |
| **Description:** | The module provides in-depth coverage of physical hydrology and geomorphology with a focus on integrating catchment-scale hydrological and landscape processes and their controls as influenced by land use and climate change.The integrated hydrology and geomorphology components of the module will enable students to understand and critically evaluate the science behind catchment-scale water cycle problems under land use, flood, drought and climate change; and to equip students with critical analytical skills in devising sustainable water management plans. The hydrology component will cover a) the physical basis of water cycle at catchment scale including water input, storage and outputs, and b) contemporary global issues in catchment management affecting water resources including emerging tools for sustainable water management.The geomorphology teaching will review fundamental controls on landscape systems and processes, using new and classic research. These concepts are discussed in both simple qualitative frameworks, but also using quantitative modelling approaches where numerical expressions are introduced. These are applied to a wide range of geomorphic environments based on the current research interests of staff delivering the module. |
| **Learning Outcomes:** | By the end of the module students should be able to:• Critically evaluate fundamentals of catchment water cycling under land use and climate change and its implications for water quantity• Appreciate the key drivers of the hydrological cycle and their functioning in catchments across environmental and human modification gradients.• Apply geomorphological principles to understand how processes are linked to resultant landforms in different geomorphological systems.• Demonstrate an understanding of the appropriate application of quantitative and qualitative modelling techniques to geomorphological problems. |
| **Assessment:** | Poster presentation (50%)1.5-hour unseen examination (50%) |

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| **18182**  | **Ecological Systems** | **20 credits** |
| **Level: I** | **Semester: 1** | **Module Leader: Mark Ledger** |
| **Description:** | The module provides a thorough grounding in basic ecology at the species, population and community levels. We will explore how factors including dispersal, habitat and species interactions affect the distribution of species in marine, freshwater and terrestrial communities, study the demographics and regulation of populations, and investigate regulation of communities by competition, predation and physical disturbance. Major ecological concepts including succession and food web dynamics will be described. |
| **Learning Outcomes:** | By the end of this module students should be able to:* Demonstrate knowledge of key concepts of ecology with reference to species distribution populations, communities and ecosystems.
* Integrate and evaluate information acquired through lectures and directed reading to demonstrate understanding of specific ecological concepts or issues.
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| **Assessment:** | Multiple choice class tests (50%)1.5 hr Unseen Examination (50%) |

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| **35199**  | **Environmental Human Geography** | **20 credits** |
| **Level: I** | **Semester: 2** | **Module Leader: Steven Emery** |
| **Description:** | This module provides a foundation in environmental human geography. It encourages critical reflection on the relationship between humans and ‘nature’ as well as the tensions inherent in the various social relations and interests that underlie engagement with the environment.  This critical perspective is extended to problematize prominent principles (such as sustainable development, ecosystem services and resilience) and to examine them in relation to environmental policy and management practices from national and international case studies. In sum, the module demonstrates the value of a theoretically grounded social scientific approach for understanding and implementing contemporary approaches to managing human interaction with the environment. |
| **Learning Outcomes:** | By the end of the module students should be able to:* Articulate, problematize and critique key concepts framing environmental management.
* Apply different theoretical understandings of human-environment relations to analyse and interpret contemporary approaches to environmental governance.
* Identify key factors and concerns in the public understanding of environmental issues.
* Appreciate the relevance of social, cultural and political dimensions in evaluating approaches to environmental governance and engagement
 |
| **Assessment:** | 2,000 word essay (50%)1.5 hour exam (50%) |

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| **34071** | **Urban Policy Design and Planning Analysis** | **20 credits** |
| **Level: I** | **Semester: 2** | **Module Leader: David Adams** |
| **Description:** | This module offers a comparative perspective on urban policy design and planning analysis. Four key issues are explored: evaluating policy contexts, designing policy/planning processes, analysing and evaluating policy outcomes, and surveying different policy/planning instruments.The module will be assessed through one semester-end portfolio, equivalent to 5,000 words. This includes a reflective piece on planning theory and policy analysis exercise. Formative assessments will take place throughout the semester. At the end of the semester, students will gain a more comprehensive understanding of the political, social, and economic processes behind urban policies and plans, the different instruments and drivers of planning and implementation in local contexts, as well as the equity, sustainability, and inclusiveness implications of particular policy designs and planning interventions. |
| **Learning Outcomes:** | By the end of the module students should be able to:* Compare and contrast theories and models of poverty urban policy design, implementation, and evaluate how planners and other actors involved in the built and natural environment use these instruments.
* Explore the causes and consequences of urban poverty political, economic, and social foundations of policy and planning interventions in cities.
* Analyse the methodological strengths and weaknesses main models of institutional design, participatory decision-making, project/plan implementation, and monitoring and evaluation.
* Reflect on the extent to which different policy mechanisms might help address issues of equity, sustainability and inclusiveness.

• Develop report writing skills through the preparation of a professionally presented neighbourhood strategy replete with policy interventions |
| **Assessment:** | Briefing note (1,000 words) 30%Neighbourhood Strategy (3,000 words) 70% |

**Year 3 Modules (Honours Level) – All Programmes**

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| **36415** | **Exploring the Energy Transition** | **20 credits** |
| **Level: H** | **Semester: 1** | **Module Leader: Steve Jones**  |
| **Description:** | A transfer from hydrocarbon production to carbon sequestration is projected for the coming decade. The suite of techniques that were traditionally used to explore for oil and gas will still be needed for sequestering carbon. The same exploration techniques are used when planning academic expeditions to recover core for climate reconstruction studies.This module gives a practical introduction to how we use borehole and seismic data in combination to explore sedimentary basins for industrial or academic purposes, in the context of the Energy Transition and the Climate Emergency.Most of the course time is devoted to extended practical exercises that give students grounding in industry-standard analysis techniques and software. |
| **Learning Outcomes:** | By the end of this module, you should be able to:* Demonstrate understanding of how sedimentary basin exploration exacerbates and mitigates the Climate Emergency, and how industries are responding to the Energy Transition.
* Use palaeo-water depth reconstruction, burial and maturation analysis techniques in sedimentary basin exploration for industrial and academic purposes.
* Use seismic datasets, including within industry standard software, to explore a sedimentary basin for industrial and academic purposes.
* Correlate seismic and borehole data, including wireline logging data, and plan boreholes in industrial or academic contexts.
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| **Assessment:** | Portfolio of practical exercises (100%) |

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| **10820**  | **Evolution of Vertebrates** | **20 credits** |
| **Level: H** | **Semester: 2** | **Module Leader: Ivan Sansom** |
| **Description:** | The module will examine the evolution and palaeobiology of vertebrate groups with emphasis on the evolutionary origins of distinct types of skeletal architecture. The practicals will involve the examination and comparison of fossil and recent vertebrates and employ cladistic methods to analyse relationships. |
| **Learning Outcomes:** | By the end of the module you should be able to:* Describe, in detail, the evolutionary history and palaeobiology of extant and extinct vertebrate groups
* Evaluate the techniques used to analyse their phylogenetic relationships.
 |
| **Assessment:** | 1.5 hour written examination (50%)Assessment: multi-authored review article and presentations (50%) |

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| **36380**  | **Engineering Geology and Pollution Hydrogeology** | **20 credits** |
| **Level: H** | **Semester: 1** | **Module Leader: John Tellam** |
| **Description:**  | The module is concerned with engineering geology and pollution hydrogeology, focussing on developing skills that would be required in industry. These skills are largely quantitative and practicals will involve calculations based on equations developed or introduced in the lectures as well as qualitative arguments. Ultimately students will learn how geological theory can be used in solving practical problems.The module mainly focusses on: (1) the engineering properties behaviour of rocks and soils; (2) geological and environmental considerations involved in ground investigation; (3) the transportation of contaminants in groundwater.Practical sessions focus on two assessed exercises: (1) completion of a site investigation for an area of proposed construction; (2) investigation of a groundwater pollution problem using professional groundwater pollution transport software (latter available on University computers but also available free for installation on students’ own computers). |
| **Learning Outcomes:** | By the end of the module students should be able to:* Apply the essential theories covering rock strength and soil consolidation to geotechnical investigation of a site;
* Differentiate the processes of soil formation**;**
* Apply appropriate calculations to rock/soil engineering problems**;**
* Design and evaluate methods to predict the subsurface geology at a site**;**
* Apply the essential theories covering solute transport to groundwater pollution problems**;**
* Develop solutions to groundwater pollution issues using industry standard modelling techniques**;**
* Analyse results of groundwater pollution investigation through a technical report
 |
| **Assessment:**  | Site Investigation (35%)Pollution Hydrogeology study (15%)Examination (50%) |

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| **36413**  | **Tectonic and Volcanic Processes** | **20 credits** |
| **Level: H** | **Semester: 2** | **Module Leader: Tim Reston** |
| **Description:** | This course provides a theoretical and practical understanding, extensively informed by research being carried out in Birmingham, of the latest understanding of the processes of plate motion, continental extension and break-up, plate-boundary deformation, mantle melting, and magma transport, storage and eruption processes. These processes are illustrated with case studies from mid-ocean ridges, subduction zones, continental margins and sedimentary basins, providing students with hands on experience of active research methods. Emphasis is placed on the latest developments in joint interpretation of geophysical, geochemical and modelling datasets and in the understanding of the limitations of these data. Processes underpinning volcanism and controlling eruption styles are investigated through current methods based on physical and petrological interpretation of volcanic products |
| **Learning Outcomes:** | By the end of the module students should be able to:* Detail the key steps in the evolution of plate tectonic theory from continental drift through seafloor spreading, the recognition of the importance of transforms faults, the discovery of subduction zones, through to the rigorous current framework of rigid plates driven by internal forces
* Evaluate the latest research (including that at Birmingham) into the key tectonic and magmatic processes occurring at plate margins (incipient, divergent, convergent, transform), from rifting to breakup (rifted margin formation) to seafloor spreading to subduction initiation to fully-fledged subduction
* Apply appropriate research-level analyses of geological, petrological, geophysical and volcanological data to further understanding of tectonic, magmatic and volcanic processes
* Explain how tectonic, magmatic and volcanological processes are linked in the cohesive framework of plate tectonics to provide a unified view of the processes affecting our planet.
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| **Assessment:** | 60% Practical coursework and report40% 1.5 hr Written unseen examination |

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| **29996**  | **Paleoclimates** | **20 credits** |
| **Level: H** | **Semester: 2** | **Module Leader: James Bendle**  |
| **Description:** | There has never been a more critical time for students to understand the causes and potential consequences of Earth’s changing climate. The context for understanding the global warming of today lies in the records of the Earth’s past. This module will put key data and published case studies of past climate change at students’ fingertips, so you can experience the nature of paleoclimate reconstruction. Students will evaluate data, practice developing and testing hypotheses and infer the broader implications of the scientific results. ***How*** we know is as important as ***what*** we know about past climate. This module is ***inquiry based*** and departs from the traditional lecture based format. |
| **Learning Outcomes:** | By the end of this module, you should be able to:* Frame climate change appropriately within geological time-scales, with a focus on the Cenozoic.
* Synthesize palaeoclimate data, formulate hypotheses and articulate evidence based arguments.
* Apply quantitative and problem solving skills to palaeoclimate data.
* Recognise and deal with complexity and uncertainty in geological/environmental data-sets.
* Work in independently and in groups and communicate (written and oral) effectively with others.
* Be able to evaluate the magnitude, pattern and rates of climate change during time-periods of focus (e.g. the Cenozoic).
 |
| **Assessment:** | The module assessment is 100% by practical assessment. There is no exam. Assessment: Each week will have three sessions. The 1st session (2 hours) is typically designed to introduce a topic and gauge prior knowledge and give formative tasks (building on a Panopto or in-class lecture, where appropriate). Some formative exercises may be set as guided independent study. Both group / independent work and discussion is facilitated. The 2nd and 3rd sessions (2 hours each) are a more in-depth exploration of the topic, culminating in another practical task. Of these sessions, 4 will form the summative assessment (ca. every other week over 10 weeks). |

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| **36268** | **Geographies of Russia in a Regional and Global Context** | **20 credits** |
| **Level: H** | **Semester: 1** | **Module Leader: Paul Richardson** |
| **Description:** | This module introduces students to the political, economic, and social geography of Russia. It includes a focus on Russia's national identity, issues of migration, the impacts on society of economic transformation, the legacies of the Soviet past, marginalisation, and the exercise of political control over space.The module will consolidate and develop theoretical themes introduced in Years 1 and 2 concerning political and socio-economic geography. These will be related case-studies that are drawn from the lecturers’ own research on Russia.The programme aims to combine concepts with real-world examples. It seeks to overcome prevailing stereotypes on a country that is often misunderstood and misrepresented in the West. Students will also be encouraged to keep in mind the policy relevance of their learning. |
| **Learning Outcomes:** | By the end of the module the student will be able to:• Critically evaluate Russia's socio-economic and political transition• Apply theoretical concepts in social, political and economic geography to Russia• Articulate key debates and issues in contemporary Russian society and politics• Demonstrate knowledge of Russia's relationship with its neighbouring region and the wider world |
| **Assessment:** | 4000 word essay (100%) |

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| **36269** | **Geographies of the Global South** | **20 credits** |
| **Level: H** | **Semester: 1** | **Module Leader: Pat Noxolo** |
| **Description:** | Mid- to low-income countries in Africa, Asia and Latin America/the Caribbean make up two-thirds of the world's population. These are countries that are diverse, dynamic, and above all fascinating!No one geographical approach is enough to gain real insight into the rapidly changing geographies of the Global South. The three module convenors have come together to combine political, economic, environmental and cultural approaches, drawing in concepts from political economy, political ecology and cultural geography, and applying them to a range of urban and rural contexts. Our questions are many, but they include:* What are the socio-natural processes that are impacting lives and experiences in some of the world's fastest-growing cities?
* What understandings are geographers bringing to ongoing processes of rural change in the 21st century?
* And with what diverse forms of creative practice is the Global South shaping the world's highly unequal global culture?
 |
| **Learning Outcomes:** | By the end of the module the student will be able to:* Critically engage with a range of cultural, social, environmental and political theories and concepts.
* Apply and evaluate a range of relevant critical theories, including political economy, political ecology and postcolonial approaches.
* Analyse and evaluate a range of relevant secondary materials.
* Engage critically with and evaluate demanding readings drawn from diverse intellectual traditions.
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| **Assessment:** | 1 x 4000 word coursework essay |

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| **36273** | **Resource Governance** | **20 credits** |
| **Level: H** | **Semester: 1** | **Module Leader: Julian Clark** |
| **Description:** | This module examines the conceptualisation and management of resources through the lens of governance against a backdrop of intensified conflicts over their use globally. Governance is defined loosely as the formal and informal structures and processes that encourage and accommodate representation by societal groups in decision-making and decision-taking. The module considers different ways in which resource production and its distributional effects are represented, managed, legitimized and contested through complex relations between state, industry and society. Through a variety of case studies, it explores the resulting implications for accountability, transparency, social acceptability, representation and justice, and for power relations locally, nationally and globally. It also considers various obstacles and barriers as well as tools and procedures that might enable wider participation of actors in resource governance in future. Crucially, developing effective forms of resource governance is a process that cuts across multiple geographical scales and political-administrative boundaries, requiring targeted interventions to enable effective participation. |
| **Learning Outcomes:** | By the end of the module the student will be able to:* Demonstrate knowledge of resource management through relating theories of inter alia governance, justice, epistemology/knowledges, and science and technology studies to practical contemporary resource management issues
* Identify and critically assess shifting patterns and processes of resource governance based on case studies and the competing interests of different actors in relation to them
* Critically evaluate policies and interventions relating to resource governance in terms of governance relations, justice, and / or effectiveness of outcomes
* Demonstrate the value of an integrated and interdisciplinary approach to understanding resource management and conflicts
 |
| **Assessment:** | 1 x 4000 word assignment (100%) |

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| **36267** | **Geographies of Childhood and Education** | **20 credits** |
| **Level: H** | **Semester: 1** | **Module Leader: Peter Kraftl** |
| **Description:** | This module addresses the theoretical and methodological underpinnings of the geographies of childhood and education. It examines children and young people's everyday lives and educational experiences in the context of urban, social, cultural and environmental change. Together, the related sub-disciplines of Children's Geographies and Geographies of Education have bought increased academic and policy attention to the importance of understanding children and young people's everyday lives. The module will draw on contemporary research projects, literature and academic and policy debates about the socio-spatial lives of children and the educational spaces in which they spend much of their lives. It will also assess the ways in which, in turn, geographical research on education relates with the teaching of geography and children's learning about spatial skills in the classroom. Importantly the module will address the diversity of childhood experiences, offering distinctions between and within majority and minority worlds. Thinking geographically about children and young people's use of environment, education, positionality, culture, participation, agency and citizenship is key to exploring the social constructions of childhood. |
| **Learning Outcomes:** | By the end of the module the student will be able to:• Discuss the significance of geography for understanding the everyday lives of children and young people, and their educational experiences• Evaluate and narrate how understandings and experiences of childhood differ across historical and geographical contexts• Demonstrate a critical appreciation of the diversity of environments in which children learn (including but beyond `school’)• Apply theoretical and methodological understandings of Children's Geographies and Geographies of Education in their analyses of space and place |
| **Assessment:** | 1x 2000 word reflective narrative (50%)1x 2000 word report (50%) |

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| **36263** | **Catchment Processes, Environmental Change and Restoration** | **20 credits** |
| **Level: H** | **Semester: 1** | **Module Leader: Greg Sambrook-Smith** |
| **Description:** | This module develops approaches to help understand the fundamental controls on catchment processes, channel change and ecological systems and how these can be both influenced by and managed appropriately through human actions. A greater understanding of natural and human-induced environment and catchment changes is crucial in order for informed management practices to be applied. In this respect the module adopts a broad consideration of temporal and spatial scales; covering palaeo approaches of landscape change over the last 20 thousand years through to natural process interactions between instantaneous turbulent flow and sediment grains within rivers. The module will explain the need for restoration in the context of past and present human impacts on catchment systems and the future need to mitigate impacts of climate change and how this can be informed by studies of past change. Practical restoration techniques and examples of catchment change through time will be illustrated with case studies. |
| **Learning Outcomes:** | By the end of the module the student will be able to:• Develop cogent, coherent and sustained arguments about significant issues related to natural and human-induced environment and landscape change for a range of habitats• To understand the purpose and potential of river restoration approaches to restore and/or rehabilitate river habitats• Demonstrate an in-depth familiarity with key concepts, models and datasets appropriate to the quantification and interpretation of river geomorphological and sedimentological dynamics, through a critical engagement with published analyses in the international scientific literature |
| **Assessment:** | 2000 word essay (50%)Open book take home exam paper (50%)  |

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| **36266** | **Environmental Research in High Latitudes** | **20 credits** |
| **Level: H** | **Semester: 1** | **Module Leader: Nick Barrand** |
| **Description:** | High latitude regions are experiencing some of the most rapidly changing environmental conditions on the planet, impacting global water resources and carbon stores. Within this module you will apply state of the art methods and approaches to examine the behaviour of these high latitude regions, with specific focus of glacial, permafrost and peatland environments. In addition to developing your theoretical background, you will learn specific technical skills through targeted practical sessions critically engage with the key debates in the science of high latitude environments. Practical sessions will be conducted to develop critical thinking and problem solving skills. You will applying emergent earth observation and geospatial technologies to problems in the cryospheric sciences in addition to data analysis and numerical modelling approaches to determine the hydrological response that control some of these critical high latitude ecosystems. This is a hands-on module, and a high proportion of your time will be devoted to practicals and working on data. The practicals provide the foundation of the module assessments (100% coursework) in which you will document the findings from the practical work and write a short research article linking this research to different processes within high latitude environments. |
| **Learning Outcomes:** | By the end of the module the student will be able to:• Demonstrate a good understanding of fundamental concepts and methods used within hydrological sciences and cryospheric sciences.• Apply selected remote sensing technologies to key questions in the cryospheric sciences.• Articulate how models represent the environment and be familiar with some of the limitations of model simulations.• Apply these concepts and methods to represent how high latitude environments are changing in response to changing environmental conditions. |
| **Assessment:** | Laboratory notebook (50%)2000 word research article (50%)  |

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| **36265** | **Embodiment and the Carceral** | **20 credits** |
| **Level: H** | **Semester: 2** | **Module Leader: Dominique Moran** |
| **Description:** | This module introduces notions around carcerality and migrant detention within the context of broader questions of embodiment. It is informed by and extends theoretical developments across a range of geographical debates.Carceral spaces can include institutional spaces of formal imprisonment and detention, such as prisons and immigration removal centres, and also spaces outside of such institutions, but which are also affected by carceral processes, such as family, community and urban spaces.Students will select from a range of theoretical frames within which to investigate these topics, including, for example, spatial theorisations of gender, embodiment and temporality, considered in `carceral’ contexts. |
| **Learning Outcomes:** | By the end of the module the student will be able to:• Demonstrate a critical understanding of the theoretical underpinnings of carceral geography, and its relationship to relevant theories within contemporary human geography.• Demonstrate a critical understanding of carceral practices both in relation to `mainstream’ imprisonment, immigration detention, and other circumstances of confinement.• Critically analyse and evaluate scholarship around embodiment, gender and temporality, drawing on appropriate literatures and case studies. |
| **Assessment:** | 1 x 4000-word (or equivalent) essay (100%) |

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| **36275** | **Work, Migration and Alternative Economies** | **20 credits** |
| **Level: H** | **Semester: 2** | **Module Leader: Jessica Pykett** |
| **Description:** | This specialist module builds on learning in social, political, economic and cultural geography modules to develop your understanding of three key aspects of social and spatial inequalities: work, migration and alternative economies. The course examines the relationship between the state, markets, informal economic activity, personal life and social relations. Topics which may be covered include labour geographies, regional unemployment, transformations of the welfare state, discrimination and marginalisation in work, welfare, migrant experience and social policy. The aim of the course is to demonstrate how geographers think about how dominant global economic processes shape unpaid and paid work, welfare, migration, formal and informal work spaces and alternative economies. Fairness, justice, rights, coping, resilience, responsibility are concepts which underpin the course. Central to these issues is a politics concerning whose life and work is valued. You will also consider how spatial inequalities are shaped by issues of political and media representation, collective organising and shifts in social policy. The course will be useful to students considering a career in policy-making, non-governmental/voluntary organisations, social enterprises and the public sector. |
| **Learning Outcomes:** | By the end of the module the student will be able to:* Critically analyse political and social debates around contemporary trends in and policies on work, migration, and informal or alternative economies and how these have changed over time
* Deliberate and evaluate the effects of discriminatory power and particular representational forms on contemporary experiences of social inequality using appropriate evidence
* Demonstrate a clear understanding of human geography and social science literature on work, migration and informal or alternative economies
* Demonstrate ability to make effective connections between research on everyday life and work, representations of different social groups and global economic processes, including how these inform the spatial dimensions of policy and practice
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| **Assessment:** | 2 x 2000 word essays |

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| **36271** | **Politics of Environment** | **20 credits** |
| **Level: H** | **Semester: 2** | **Module Leader: Julian Clark** |
| **Description:** | Drawing on a variety of disciplinary approaches, this module examines the political challenges surrounding environmental policy in contemporary developed and developing societies, alongside the theoretical and practical tools and skills used in their resolution. Using a range of case examples from the global north and south (including in rural areas), it examines state-of-the-art concepts and policy approaches to address these challenges. In doing so it advances the notion of science as a socially constructed endeavour in analysing the evidence base on conflicting policy issues. The module is structured around critical questions including: how do environmental politics/environmental policy challenges come about? What are the processes by which environmental politics emerge/are defined? Who is involved in making decisions, and how are values and knowledges mobilized to underpin them? How can we reconcile conflicts between different forms of rationality with the need to be environmentally accountable and responsible? And, ultimately, what are 'good' decisions and `good’ environmental governance and outcomes? |
| **Learning Outcomes:** | By the end of the module the student will be able to:• Acquire knowledge of origins and manifestation of different environmental challenges in the global north and global south;• Acquire knowledge of multidisciplinary and interdisciplinary approaches, concepts and theories for assessing and addressing environmental challenges in the global north and global south;• Understand the strengths and weaknesses of these different approaches and their fitness for purpose to deal with a range of different environmental challenges.• Be able to critically apply ideas introduced in the module to the evaluation and design of environmental policies and decision-making processes. |
| **Assessment:** | 1 x 4000 word assignment (100%) |

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| **36270** | **Geopolitics and Global Challenges. Middle East | Russia | Cities** | **20 credits** |
| **Level: H** | **Semester: 2** | **Module Leader: Sara Fregonase** |
| **Description:** | This specialist module explores concepts and case studies related to the geopolitics of current global challenges. The module draws on political geography, critical geopolitics, and cognate areas, to explore some of the most important geopolitical processes of our time, focusing on the Middle East, Russia and Cities.The module adopts a deliberately wide notion of geopolitics encompassing a variety of scales and their interactions, from the regional and transnational through the national to the urban, the everyday and intimate.The module has three strands of lectures and seminars: on the Middle East, on Russia and on urban geopolitics. These will equip students with a broad knowledge of current global geopolitical challenges and concepts, applying them to relevant examples. The module blends lectures and seminars, where students will deepen their knowledge of and engage in learned debate about a range of specific cases and/or ideas. The module is subdivided in lecture blocs/strands:Strand 1. Imaginative Geographies and the Middle East: this first strand looks at the Middle East in the 21st Century, from the `war on terror’ through the Arab Spring to the war in Syria. In particular, we’ll be interested in how understandings and representations of the region have influenced policies and interventions led by western powers since the turn of the century. Specific points of focus will be the `war on terror’, the `Arab Spring’ and the Syria war.Strand 2. Geopolitics, Identity, and Russia: this strand examines how Russia is interpreted through the lens of geopolitics. It will introduce and critique both classical and critical geopolitics in order to explore Russia's fraught relationship with the West, its contested borders, relations with its neighbours, and the influence of Eurasianism in defining Russia's place in the world.Strand 3. Cities, global politics, and conflict: this strand explores why and how cities are geopolitically significant in contemporary global challenges. We will study how and why cities have become strategic terrains as well as targets of regular and irregular warfare, and with what legacies. |

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| **Learning Outcomes:** | By the end of the module the student will be able to:* Identify and critically evaluate the main and geopolitical challenges in a number of crucial settings (e.g. Russia, the Middle East and cities) in the 20th and 21st century.
* Master a conceptual and policy-relevant vocabulary to address and communicate aspects, concepts and dynamics of geopolitics and more widely political geography across a variety of scales.
* Demonstrate in-depth empirical and policy-relevant understanding of contemporary global geopolitical challenges.
* Develop analytical skills to understand complex issues and be able to write about, discuss, and communicate geopolitical issues for a range of target audiences
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| **Assessment:** | Take-home online exam |

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| **36264** | **Conservation: theory into practice** | **20 credits** |
| **Level: H** | **Semester: 2** | **Module Leader: Jon Sadler** |
| **Description:** | This module provides students with the opportunity to apply ecological theory to conservation practise. Using a combination of lectures, practical classes and fieldwork we will explore what is meant by evidence-based conservation and the importance of ecological measurements and surveys within this. It will be argued that human-nature relationships are key to understanding the complexities of conservation and one needs to utilise results from both the natural and social sciences. The module will use a variety of current issues and case studies to illustrate key ecological concepts within the context of conservation. Topics will include habitat management and restoration; metapopulations and gradient theory; species-based conservation, sampling, and rewilding. Students will be able to choose to focus on conservation management plan or an ecological (taxa-focused) project using either field or secondary data sources for their main assessment. |
| **Learning Outcomes:** | By the end of the module the student will be able to:• Demonstrate knowledge of key ecological theories and apply them to conservation practice• Identify key strategies used to design, protect, and manage habitats.• Demonstrate competence in ecological measurement techniques and be able to apply them to project design or management evaluation• Be able to identify and evaluate threats to biodiversity• Understand how policy and legislation are used within conservation• Be able to critically assess and choose appropriate management techniques for conservation of habitats and species• Understand how human-nature relationships are critical for conservation |
| **Assessment:** | Students choose either:a) 5000 word management plan (100%); orb) 5000 word ecological data project (100%) |

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| **36220** | **Pollution impact and Environmental Management** | **20 credits** |
| **Level: H** | **Semester: 2** | **Module Leader: Mohammad Abdallah** |
| **Description:** | This module will provide an overview of the impacts of pollution on the terrestrial and marine environment, as well as potential risk to human health and well-being. Current concerns over emerging classes of pollutants (e.g. microplastics, nanoparticles, pharmaceuticals and personal care products) will be explained. The module will focus on some key principles and approaches in environmental management of pollution, including the precautionary principle, ecosystems services and environmental impact assessment, as well as discussing key regulatory frameworks such as REACH, the Water Directive Framework (including the pesticide and wastewater directives) and the EU 2020 Biodiversity Strategy. Building on the theory of these frameworks, the module will discuss approaches to their application in practice, monitoring their effectiveness and assessing their impact on environmental quality. |
| **Learning Outcomes:** | By the end of the module the student will be able to:• Critically assess the current impacts of pollution on the environment and human.• Present and synthesize information on the fate and behaviour of emerging contaminants (e.g. microplastics, nanoparticles, pharmaceuticals and personal care products).• Explore the possible implications of climate change on the global levels and distribution of various contaminants.• Demonstrate a knowledge and understanding of key concepts in environmental management and the major EU environmental protection directives applicable to air, water, soil, plants, food/agriculture, energy and the built environment• Evaluate the relative strengths and weaknesses of the principal approaches available for environmental management and the key policies in place to achieve this• Show understanding of how key environmental protection concepts, principles and models are integrated into environmental protection strategies and legislation.• Demonstrate ability to apply the various management approaches to real case studies, and to reflect on the relative merits and limitations of the different environmental management tools |
| **Assessment:** | Coursework 1: Poster (A1 size) on the impact and/or a potential solution of emerging pollutants (e.g. microplastics, nanoparticles). (50%)Coursework 2: 2500 word Environmental management/impact assessment plan addressing key current environmental issues. (50%) |

**Year 4 Modules (Masters Level) – All Programmes**

***Please note that the pass mark for all 4th year modules is 50%***

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| **33794**  | **Inorganic Chemistry and Groundwater & Borehole Design, Construction and Maintenance** | **20 credits** |
| **Level: M** | **Semester: 1** | **Module Leader: John Tellam** |
| **Description:** | Quantitative aqueous inorganic chemistry theory, concentrating on aspects relevant to groundwater systems, including dissolution/precipitation, acid/base, oxidation/reduction, and sorption/desorption reactions, and an introduction to the application of thermodynamic calculations. Application of theory to problem solving in natural and polluted groundwater settings. Lectures, practical exercises on both invented and real datasets, and a computer session using a geochemical modelling code.An introduction to the theory and practice of the design, construction and maintenance of boreholes covering: methods of groundwater abstraction; drilling, logging, and sampling; borehole geophysics; pump technology and design; well design and construction; well maintenance and rehabilitation. |
| **Learning Outcomes:** | By the end of the module, students should be able to:* Apply aqueous inorganic chemistry principles to solving groundwater quality problems
* Design construction, completion, and maintenance of a range of borehole types
* Design and interpret results from borehole logging programmes
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| **Assessment:** | 3 hour examination (100%) |

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| **24881** | **Groundwater Organic Contamination and Pollution Remediation** | **20 credits** |
| **Level: M** | **Semester: 2** | **Module Leader: John Tellam** |
| **Description:** | Pollution of groundwater by organic contaminants remains a key driver of exceedingly expensive contaminated land and groundwater investigation and remediation efforts. This module seeks to provide the organic contaminant hydrogeological knowledge base that will underpin a student's potential future professional activity in this field. The module will cover contaminant source terms, contextual toxicology and environmental standards and legislation; organic contaminant phase partitioning to air, water, solids; conceptual models of contaminant migration; processes of sorption, chemical reaction, biodegradation; and, NAPL multi-phase flow. These will be illustrated by contaminant case studies throughout. Student learning will be underpinned by set calculation problem sheets. These theoretical aspects will underpin more industry applied / research-based subsequent learning on contaminated land / groundwater legislative frameworks, groundwater; groundwater risk assessment (industry-led ConSim workshop), site investigation and groundwater monitoring practice and groundwater remediation options. Remediation will predominantly focus on organic contaminants, but also include some discussion of related fields of metals - hydrochemistry, radiological and microbiological contamination. Remediation will cover a range of representative modern technologies as well as groundwater protection initiatives and relevant waste disposal practice. |
| **Learning Outcomes:** | By the end of the module, students should be able to:• Show advanced understanding of processes controlling organic contaminant fate and transport in groundwater systems - this understanding should be from both organic/physical chemistry and hydrogeology standpoints;• Demonstrate quantified understanding of topics and undertake appropriate hand calculations;• Demonstrate theoretical and applied understanding of groundwater - contaminated land remediation implementation including accompanying aspects of site investigation/monitoring, risk assessment and regulatory contexts;• Demonstrate research-level literature awareness of the specialised topics selected for the coursework projects. |
| **Assessment:** | 1.5 hour written examination (65%) and coursework project (35%) comprising applied (i) organic contaminant fate and (ii) site remediation implementation. |