Bachelor of Science in
Geography and Geosystems

FOURTH YEAR

Academic Year 2025/2026

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All students are cordially invited to address any issues, and questions, they may have about the program or modules with your program coordinators. Make an appointment or drop into our office hours.

Year Four of the Programme

In Year Four of the Programme, a large portion of the student's efforts will be dedicated to an independent research project supervised by staff members in Geography. In parallel, students will further develop their GIS skills and advance their understanding in the pathways of their choices to deepen their knowledge and understanding in these areas.

Learning Outcomes for Year Four [Core]:

- Be able to compare and differentiate among methods for *measuring*, *estimating,* and *calculating* hydrological data sets.
- Assess past hydrological events and future (predicted) events and contextualize these into return intervals.
- Formulate a novel research question and perform field-based research to answer this question.
- Design and execute a research project.
- Apply GIS skills in an independent research project within the field of Geography.
- Demonstrate a comprehensive knowledge and application of the theoretical background that underpins research communication with different audiences.
- Demonstrate ability to apply appropriate communication methods relative to different audiences.
- Appraise the merit and value of science and research communication activities to help improve communication practices.

PW 1: Coastal and Marine Sciences

- Demonstrate an understanding of using the systems approach to coastal environments.
- Demonstrate an understanding of contemporary coastal processes and landforms.
- Identify complex constraints on, and opportunities for, human exploitation of coastal resources.

- Describe and characterise environments (terrestrial, freshwater, marine) suitable for algal growth, with particular detail on growth requirements and controlling factors regarding seaweeds and phytoplankton.
- Describe the basic forces that drive ocean circulation.
- Critically evaluate the different field and laboratory methods used in analysing and interpreting the short- and long-term behaviour of coastal environments.
- Communicate and interpret human impacts on coastal and marine environments and conceptualize the problems of managing coastal and marine natural systems

PW 2: Ecosystem Sciences

- Assess critically the importance of links between plant and crop communities and their prevailing environment, including climate, soil type, and the availability of water and nutrients.
- Relate the characters of plant communities to variability in nutrient status, soil, and salinity.
- Produce and interpret soil profiles and texture triangles.
- Relate different soils to their possible agricultural uses and consider the possible environmental impacts of these.
- Identify and compare global terrestrial biomes and ecosystems, and their distributions.
- Describe and identify features of seaweeds on rocky shore ecology and zonation patterns and factors driving temporal and spatial variability.
- Identify and interpret the ecological requirements of important local Irish and global habitats.
- Explain the evolution and different types of plants.
- Appraise the economic and human relationships of various ecosystems.
- Describe how plants interact with pollinators, and how this has driven floral evolution.
- Describe the types of interactions that exist between plants and microorganisms.

PW 3: Environmental Planning and Policy

- Demonstrate an understanding of the variety of different theoretical perspectives by which issues central to politics at sea, such as fishing and marine energy disputes, can be understood from a broad social and political science tradition.
- Distinguish major habitat types in Ireland.
- Describe current conservation management practices for the major habitats in Ireland.
- Recognise the conservation value of habitats.
- Explain the complexities inherent in making conservation management decisions.

PW 4: Paleosciences

- Demonstrate a comprehensive understanding of long-term environmental change as it pertains to modern environmental systems.
- Discuss causes and impacts of modern climate change in the context of paleoclimate data.
- Critique the array of methodologies used to reconstruct past environments and climates.
- Assess long-term human-environment interactions through time.
- Apply theoretical concepts in a real-world context through hands-on field-based instruction.
- Discuss the role humans have played in shaping the landscape.
- Describe and appraise the key building blocks for a habitable planet.

Timetables and Module Outlines for Semester 1

Please note that times and venues are subject to changes. Please track information on Canvas to stay on top of times and venues for each module

Year 4 - Semester 1 PW1*				
CORE	Code	Title	ECTS	Sem.
	TI3129	*Dissertation*	*10*	*1*
	EOS402	Global Change (Week 7-12)	***5***	***1***
	EOS305	*Applied Field Hydrology (Week 1-6)*	*5*	*1*
PW1	*TI303*	*Coastal Dynamics*	*5*	*1*
PW3	*PI3103*	*Environmental Ethics OR*	*5*	*1*
	EC338	*Environmental and Natural Resource Economics*	*5*	*1*
PW4	*EOS3103*	Paleontology and Evolution (Week 1-6)	*5*	***1***

**** NOTE: If you chose PW2 in Year 2 please skip to the next timetable***

Semester 1 (PW1)	Monday	Tuesday		Wednesday	Thursday	Friday	
09:00						EOS305 *MRI 201*	
10:00	TI303 *AC 217*				EOS305 *IT 202*		
11:00	EOS305 *AC204*	PI3103 AC201	*EOS3103*		*EOS3103*	*EOS3103*	
12:00		PI3103 *AC201*	EC338 *LCI-G018*	TI3129 *AC 217*			
13:00		EOS305 *SC005*	EC338 *LCI-G018*	*EOS402*		EOS 305 P *QUAD*	EOS 402 *QUAD*
14:00	TI303 *AC 216*						
15:00							
16:00	*EOS3103 P*						
17:00					EOS3103		

Note: EOS305 is offered during weeks 1-6 and EOS402 in weeks 7-12

Year 4 - Semester 1 PW2* and PW4

	Code	Title	ECTS	Sem.
CORE	*TI3129*	*Dissertation*	*10*	*1*
	EOS402	Global Change (Week 7-12)	***5***	***1***
	EOS305	*Applied Field Hydrology (Week 1-6)*	*5*	*1*
PW2	*BPS3102*	*Plant Resources & Ecosystems (Week 1-6)*	*5*	*1*
PW4	*EOS3103*	Palaeontology and Evolution (Week 1-6)	*5*	*1*

**** NOTE: If you chose PW1 in Year 2 please consult the timetable above.***

Semester 1 (PW2)	Monday	Tuesday	Wednesday	Thursday	Friday
09:00			BPS3102		EOS305 *MRI 201*
10:00	BPS3102			EOS305 *IT 202*	
11:00	EOS305 *AC 204*	EOS 3103 / BPS 3102		*EOS3103*	*EOS3103*
12:00			TI3129 AC217		BPS3102 W1-6
13:00		EOS305 *SC 005*	EOS402		EOS 305 P *QUAD* / EOS 402 *QUAD*
14:00	*EOS3101 P**			BPS3102 P*	
15:00					
16:00	*EOS3103 P**				
17:00				EOS3103	

Note For students that chose **PW2 and PW4** there is a clash in the timetable on Tuesdays at 11am between EOS3103 and BPS3102. We are proposing two options:

(1) Replace BPS3102 (*Plant Resources & Ecosystems)* with TI303 (Coastal Dynamics)
(2) Replace either BPS3102 or EOS3103 with TI2110 Perspectives of Climate Change.

CORE: TI3129 Final Year Dissertation (Semester 1 & 2)

Lectures	**Wed 12:00; Venue AC217**
Coordinator:	Dr Terry Morley
E-mail	Terry.morley@universityofgalway.ie

Course Overview:
This course guides students through an extended period of research and toward the writing of a major, final-year project. As such, it is an integral part of a student's university education in that it teaches organisational and research skills, as well as skills critical for any career path. This research seminar is specifically for students who would like to undertake independent research in a specific field of Geography and Geosystems

Learning Outcomes:

- Formulate an original research question and perform a comprehensive literature review and identify appropriate conceptual and theoretical frameworks.
- Gather evidence from primary sources using appropriate research methodologies.
- Identify and access relevant sources of secondary data.
- Interpret and analyze research findings and discuss them in a critical manner.
- Communicate research findings appropriately and coherently in written form, using the 10,000-word thesis structure, complete with appendices of evidence and full and proper referencing, and complete an oral presentation on the topic.

For more information on your Final Year Dissertation please consult the ***Final Year Dissertation Handbook*** which will provide clear guidelines and information on this module.

CORE: EOS305 Introduction to Applied Field Hydrology Weeks 1-6

Lectures	**Mon 11:00-12:00, Venue: AC204** **Tue 13:00-14:00, Venue SC005** **Thu 10:00-11:00, Venue It202** **Fri 09:00-10:00, MRI201**
Practical	**Fri 13:00-15:00**
Coordinator:	Dr Tiernan Henry
E-mail	Tiernan.henry@universityofgalway.ie

Course Overview:
Hydrology is the term that broadly describes the study of water on, in and above the Earth's surface. This module is designed to introduce the students to the theories and concepts underpinning the discipline and to allow them to learn how to measure, estimate and calculate river and groundwater flows in the field and in the lab.

Learning Outcomes:

- Have an appreciation of the nature of the relationships between water and the land.
- Be able to complete water balances at local and regional scales.
- Know where and how to source data and information to prepare and produce water balances and water audits at various scales.
- Be able to compare and differentiate between methods for measuring, estimating and calculating hydrological data sets.
- Be able to assess past hydrological events and future (predicted) events and contextualise these into return intervals.
- Be able to incorporate field data, published data and interpreted data to make reasonable inferences about water and the land.

CORE: EOS402 Global Change Weeks 7-12

Lectures	**Wed 13:00-14:00** **Fri 13:00-15:00**
Coordinator:	Dr Peter Croot
E-mail	peter.croot@universityofgalway.ie

Course Overview:
This module introduces students to multi-disciplinary studies of the physical forcings and earth/ocean system responses that induce and drive environmental change on different temporal and spatial scales. Emphasis is placed on understanding and communicating the basic science behind natural climate cycling (e.g. Milankovitch/ENSO) and more recent anthropogenic forcings (e.g. fossil fuel burning, agricultural practices)

Learning Outcomes:

- Critically discuss the basic science behind the natural processes that impact global climate. Explain the role of the IPCC and how it works.
- Recognize and interpret geological and chemical indicators of present and past global change in the environment (atmosphere, water, sediment/mineral).
- Evaluate and appraise how human activities can be drivers of global change.
- Develop knowledge of current climate change adaptation strategies.
- Compile scientific information from multiple sources and prepare a briefing document for a general audience.
- Present scientific perspectives on global change to both a specific scientific audience and to the general public.

PW1: TI303 Coastal Dynamics (or option for PW2/PW4 clash)

Lectures	**Mon 14:00 – 15:00, Venue: CSB-G005** **Wed 13:00-14:00, Venue: AC215**
Coordinator:	Dr Kevin Lynch
E-mail	kevin.lynch@universityofgalway.ie

Course Overview:
The coastal zone exists at the interface of land, sea and atmosphere, making it a highly complex environment. Only through improved understanding of the processes operating in this zone can we hope to understand and manage this valuable resource in a sustainable manner. This course introduces the basic concepts of coastal science. The role of waves, wind and sea-level in shaping the coast are explored. Conversely, the shape of coastal landforms affects these processes; this interaction between process and form is considered within a morphodynamic framework. Topics include: Coastal systems, Wave processes, Sediments, Shoreface, Nearshore-Zone, Aeolian processes, Beaches, Coastal Dunes, Tidal processes, Beach dune ecology and Beach dune management.

Learning Outcomes:

- Demonstrate an understanding of using the systems approach to coastal environments.
- Demonstrate an understanding of contemporary coastal processes and landforms.
- Through fieldwork appreciate and develop skills that are used in the investigation of coastal environments.
- Be able to identify complex constraints on, and opportunities for, human exploitation of coastal resources.
- Comprehend and evaluate the patterns and processes controlling long-term coastal evolution and relative sea-level change.

PW2: BPS3102: Plant Resources & Ecosystems

Lectures	**Mon 10:00-11:00** **Tue 11:00-12:00** **Wed 09:00-10:00**

	Fri 12:00-13:00
Practical	**Thu 14:00-16:00**
Coordinator:	Dr Dagmar Stengel
E-mail	dagmar.stengel@universityofgalway.ie

Course Overview:
As primary producers, plants (and algae) are essential components of all global ecosystems. Throughout the world, there is a wide range ecosystems, providing the habitats for plant life on earth and the associated ecosystem services they provide. In this module, we will provide and introduction to the different global biomes, and what drives their distribution. We will also focus on the main habitat types in Ireland and discuss their status and ecology. This module explores the key features of global biomes in marine, aquatic and terrestrial systems, and the ecology of the plant communities (and resources) within these. Specifically, it addresses key components of rocky shore ecology, distribution, mapping and sustainable utilisation of seaweed bioresources. It further covers important global ecosystems, and in particular the ecology of Irish natural habitats such as grassland, woodlands, bogs, hedgerows etc.

Learning Outcomes:
- Describe the main terrestrial habitat types in Ireland and discuss their current status
- Understand global terrestrial biomes and ecosystems, and their distribution
- Be familiar with features of seaweeds on rocky shore ecology and zonation patterns and factors driving temporal and spatial variability
- Give an overview of the ecology of important local Irish and global seaweed habitats
- Give an overview of important marine/coastal vascular plant communities (seagrasses, saltmarshes)
- Appreciate the processes and methods involved in the assessment of algal bioresources for sustainable utilisation

PW2 (clash option): TI 2110 Perspectives on Climate Change

Lectures	**Mon 13:00 – 14:00** **Wed 17:00 – 18:00; AUC-G002**
Coordinator:	Dr Gordon Bromley
E-mail	Gordon Bromley@universityofgalway.ie

Course Overview:
Perspectives on Climate provides students with (1) applied examples of the state of the art in climate science and (2) the skills to evaluate, implement, and communicate climate-pertinent data in a broad range of societal settings. The module explores the gathering of climatic knowledge that supports our modern understanding of climate variability, and assesses the human response - both individual and collective - to current climate pressures. Each week will focus on a fundamental element of the climate system (e.g., physics of greenhouse gases) from a variety of perspectives - scientific, societal, economic, ethical - to provide students with context, which they will then develop and apply via weekly group exercises.

Learning Outcomes:
- Critically evaluate climate-related media content

- Effectively communicate climate data and the environmental/societal implications of such data at a broad
- public-sector level
- Appraise current affairs in climate and the implementation of IPCC reports at local, national, and EU levels
- Analyse multiple types of climate data
- Explain risks associated with global warming for Ireland and Europe.
- Diagram and explain positive and negative feedbacks in climate systems
- Identify potential societal imbalances in the impact of future climate change
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PW3: PI3103 Environmental Ethics

Lectures	**Tue 11:00-13:00 Venue: AC201**
Coordinator:	Dr. Nora Ward
E-mail	nora.ward@universityofgalway.ie

Course Overview:
The course considers the ethical and social dimensions of environmental issues. The first part provides an overview of the field of environmental ethics. In particular, we explore the perception and valuation of nature in Western thought, and analyse the changing relationship between human and non-human nature. The second part considers the philosophical implications of major environmental issues and theories, such as climate change, indigenous rights, ecofeminism, environment justice and ecoterrorism.

Learning Outcomes:
- Develop critical and analytical skills associated with identifying and understanding philosophical concepts in environmental ethics.
- Show a good understanding of the history of environmental ethics and the central debates in the field.
- Be able to apply ethical concepts to contemporary environmental issues.
- Be able to explain and analyse selected philosophical concepts of nature, human and property.
- Develop critical skills associated with evaluating claims, issues and arguments, and identifying mistakes in reasoning.

PW3: EC388 Environmental and Natural Resource Economics (NOTE CLASH timetables might change)

Lectures	**Tuesday 12:00-13:50; Venue TBC**
Coordinator:	Dr Thomas Van Rensburg
E-mail	thomas.vanrensburg@universityofgalway.ie

Course Overview:
This course introduces students to the use of economic tools in analysing natural resource issues. The course discusses issues surrounding environmental sustainability in the context of economic growth. The theory of externalities and public goods are discussed and this addresses environmental external effects with respect to depletion and pollution. Causes of environmental externalities are also included in the context of missing markets and property rights. The components of value which, make up total economic value of environmental goods is considered. These include direct, indirect, option

value and existence value. Willingness to pay and willingness to accept approaches are discussed. Revealed and stated preferences valuation techniques are included. Consideration is also given to the analysis of environmental policy instruments, with an emphasis on pollution control. Issues surrounding international environmental problems including climate change are also discussed.

Learning Outcomes:

- Demonstrate an understanding of weak and strong sustainability conditions.
- Explain the relevance of the first and second law of thermodynamics for economic sustainability.
- Explain the theory of externalities, Coase Theorem, missing markets, public goods and Nash-Cournot equilibria.
- Critically evaluate the optimal extraction of renewable and non-renewable resources.
- Critically evaluate revealed preference and stated preference valuation methods.
- Critically assess pollution control instruments including standards, emission permits and Pigouvian taxes and evaluate how these instruments work in practice.
- Convey an understanding of key international environmental problems including climate change, biodiversity loss, trade in wildlife products and acid rain.

PW4: EOS3103 Palaeontology & Evolution (weeks 1-6)

Lectures	**Tue 11:00-12:00 Venue: TBC** **Thu 11:00-12:00** **Thu 17:00-18:00** **Fri 11:00-12:00**
Practical	**Mon 16:00-18:00**
Coordinator:	Dr. John Murray
E-mail	john.murray@universityofgalway.ie

Course Overview:

This module will introduce students to palaeontology (the study of fossils). All of the major animal groups, who have left their mark in the fossil record, will be examined, along with trace fossils. Emphasis will be placed firmly on understanding form and function in organisms and how it has related to their habitat over time. The module will finish with the topic of vertebrate evolution.

Students will be trained to think both logically and critically; they will be shown how to develop arguments and answer questions based on the data available to them (or indeed collected by them in class). The background theme of the entire module will be to provide students with an appreciation for the story of evolution of life on Earth over the past c.541 million years.

Learning Outcomes:

- Label and describe the basic body plans of a wide range of invertebrate and vertebrate (fossil and living) groups
- Explain some of the physical principles governing the body construction of organisms
- Recognise the link between form and function in organisms and to then apply that insight to understanding how various creatures interact with their physical living environments (both at present and also in the past)
- Identify trace fossils and interpret their palaeoecological significance
- Describe and appraise the history of life on planet earth
- Collect, record and appraise scientific data
- Apply biological data/information not just qualitatively, but also quantitatively

Timetables and Module Outlines for Semester 2

Year 4 - Semester 2 PW1*				
CORE	Code	Title	ECTS	Sem.
	TI3129	*Dissertation*	*10*	*2*
	TI311	*Advanced GIS*	*5*	*2*
	EV5105	*Communicating Research*	*5*	*2*
PW1	*EOS303*	*Ocean Dynamics (Week 1-6)*	*5*	*2*
PW3	*SP420*	*Sociology of the Environment (or)*	*5*	*2*
	SP721	*Ocean & Marine Politics*	*5*	*2*
PW4	*TI338*	*Paleoecology: Reconstructing Past Environments*	*5*	*2*

**** NOTE: If you chose PW2 in Year 2 please skip to the next timetable***

Semester 2 PW1	Monday	Tuesday	Wednesday	Thursday	Friday
09:00					
10:00					
11:00					
12:00		SP721 *IT125*	TI3129 *AC 217*		
13:00	EOS303 *(W1-6) IT125*		EOS303 *(W1-6) MRA201*	EOS303 *(W1-6) MRA201*	EOS303 * *(W1-6) MRA201*
14:00	TI338 *Larmour LT*		SP420* *ENG-G017*		TI338 *Larmour LT*
15:00					
16:00		TI311 *ENG3036*	EOS303 P * *(W1-6)* QUAD		
17:00					

**note if you pick SP240 then you need to arrange a late practical for EOS303*

NOTE: *For Students that chose PW1 and PW4, TI338 will be on Fridays at 14:00 during Weeks 1-6. From Weeks 7-12 it will replace EOS303 on Wednesdays at 13:00.*

Year 4 - Semester 2 PW2*				
CORE	Code	Title	ECTS	Sem.

	TI3129	*Dissertation*	*10*	*2*
	TI311	*Advanced GIS*	*5*	*2*
	EV5105	*Communicating Research*	*5*	*2*
PW2*	*BPS3107*	*Plants, atmosphere, & environment throughout Earth history OR*	*5*	*2*
	BPS203	*Plant Diversity; Physiology and Adaption (Week 7-12)*	*5*	*2*
PW3	*SP420*	*Sociology of the Environment (or)*	*5*	*2*
	SP721	*Ocean & Marine Politics*	*5*	*2*
PW4	*TI338*	*Paleoecology: Reconstructing Past Environm.*	*5*	*2*

**** NOTE: If you chose PW1 in Year 2 please consult the timetable above***

Semester 2 PW2	Monday	Tuesday	Wednesday	Thursday	Friday
09:00				BPS3107 L OR BPS203 L	
10:00	BPS3107 L OR BPS203 L	BPS203 L (W7-12)			
11:00		BPS3107 L *(W7-12) TBA*			
12:00		SP721 *IT125*	TI3129 *AC 217*		
13:00			TI338 *Larmour LT*		
14:00	TI338 *Larmour LT*	BPS3107 L *(W7-12) TBA*	SP420 *ENG-G017*	BPS3107 P *(W7-12) TBA*	
15:00					
16:00	BPS203 P (W7-12)	TI311 *ENG3036*		BPS3107 P *(W7-12) TBA*	
17:00					

***NOTE:** When considering either BPS 203 or BPS3107, for PW2 please know that BPS3107 is a very advanced and difficult class. We would recommend only very strong students to consider this class.

CORE: TI311 Advanced GIS

Lectures	**Tue 16:00-16:50; Venue TBD**
Coordinator:	Dr. Oisin Callery
E-mail	Oisin.callery@universityofgalway.ie

Course Overview:

Based on the basic concepts and simple applications of GIS that were covered in the course "Introduction to GIS", this course focuses on the advanced topics and advanced functions of GIS, which are more practical and problem-solving. The concepts of advanced analysis functions of network analysis and spatial interpolation are explained, and the topics Google Earth and Big Data are discussed. Actual applications in geography are demonstrated and practical exercises are provided. The extensions of ArcGIS are selected as the software package for this course. Students will understand the latest development of the advanced GIS topics and perform advanced spatial data analyses.

Learning Outcomes:

- Demonstrate the practical skills of a GIS project design and completion.
- Make practical maps and perform advanced analyses through computer practical classes.

PW1: EOS303 Ocean Dynamics Week 1-6

Lectures	**Mon, Wed, Thu: 13:00-13:50, Wed15:00-18:00 (P)**
Coordinator:	Dr Martin White
E-mail	Martin.White@universityofgalway.ie

Course Overview:
This module will introduce students to the forces that control ocean and shelf dynamics. The module will introduce the different types of ocean currents and features such as wind driven flow, turbulence and mixing/diffusion. The fundamental links between these dynamics and basic biogeochemical cycling (nutrient and phytoplankton dynamics) will be explored.

Learning Outcomes:

- An appreciation of scales, dimensional analysis and problem solving.
- Understand the different balance of forces and flow character in shelf sea and deep ocean. and aspects of some associated biophysical interactions.
- Completed a case study through measurement and analysis of collected data.
- Developed skills appropriate for a career in marine geoscience.

PW2: BPS3107 Plants, atmosphere, & environment throughout Earth history (Week 7-12)

Lectures	**Week 1-6: Mon, Tue 10:00, Tue 14:00, Thu 09:00; Venue TBD**
Coordinator:	Dr Karen Bacon
E-mail	Karen.Bacon@universityofgalway.ie
Telephone:	TBC
Office Hours:	TBC

Course Overview:
Plants are of fundamental importance to life on land, providing the building blocks for terrestrial ecosystems and interacting with sediments and the atmosphere over millions of years. This module will track plant evolution and diversification as it is represented in the last 400 million years of the fossil record. We will examine the earliest evidence for plants and move through time considering the earliest leafless Devonian plants to the giants of the Carboniferous to the emergence of seeds and finally the modern dominance of the flowering plants. The interactions between plants and their environment will be examined as will the use of plants as environmental and atmospheric proxies in palaeobotany. Key developments in our understanding of how plants are preserved in the fossil record, how they respond to mass extinction events, and how they interact with their environment will be discussed.

Learning Outcomes:

- Describe the evolution of plants as it is represented in the fossil record
- Evaluate evidence for plant–environment and plant–atmosphere interactions throughout Earth history
- Describe how plants can be used as environmental indicators throughout Earth history
- Demonstrate basic palaeobotanical techniques

- Describe key events recorded in the plant fossil record
- Evaluate how the fossil record can influence our understanding of modern plant ecology
- Produce concise reports and evaluate data

PW2: BPS203 Plant Diversity; Physiology and Adaption (Week 7-12)

Lectures	**Mon 10:00-11:00** **Tue 10:00-11:00** **Thu 09:00-10:00 Venue TBD**
Practical	**Mon 16:00-18:00**
Coordinator:	Dr Zoe Popper
E-mail	zoe.popper@universityofgalway.ie

Course Overview:

Land plants evolved ~500 million years ago and have since diversified to inhabit every available niche. This module explores key adaptations and innovations which have allowed plants to adapt to specific environmental stresses including changes in life cycle, biochemical and anatomical modifications of photosynthesis, water uptake and the evolution of roots and a vascular system, as well as the evolution of seeds and flowers. Plant diversity will be discussed providing an introduction to each of the major groups of land plants and their identifying features; this will be supported by examination of live and prepared materials.

Learning Outcomes:

- Describe and understand the breadth of land plant diversity, and how it originated
- Explain the functional biology of plant taxa, and their ecological significance
- Compare the life-cycles and forms of reproduction found in extant land plants and explain their strengths and limitations;
- Identify the distinguishing characteristics of major groups of bryophytes, ferns, gymnosperms and flowering plants
- Discuss the major innovations and adaptations that have enabled plants to diversify and inhabit every available niche
- Discuss Ireland's flora and biogeography

NOTE: When considering either BPS203 or BPS3107, for PW2 please know that BPS3107 is a very advanced and difficult class. We would recommend only very strong students to consider this class.

PW3 SP721 Ocean & Marine Politics

Lectures	**Tue 12:00-13:50; Venue IT125**
Coordinator:	Dr Brendan Flynn
E-mail	Brendan.Flynn@universityofgalway.ie

Course Overview:

This course explores some of the politics that happens at sea. In particular we will focus on the politics of fishing and marine renewable energy, and to a lesser extent we will look at conflicts over marine natural resources, disputes on marine boundaries, and the role of the state as regards all matters of the sea. The course explores various theoretical perspectives, in particular an emerging literature that stresses the 'social construction' of the sea, and the concept of 'resilience'. We will also examine methodological questions, or how should we study a politics of the seas? Here the focus is on exploring

to what extent qualitative ethnographic methods can help shed understanding and context on complex marine based activities.

Learning Outcomes:

- Demonstrate an understanding of the variety of different theoretical perspectives by which issues central to politics at sea, such as fishing and marine energy disputes, can be understood from a broad social and political science tradition (historical, social constructionist, ethnographic, and feminist approaches, etc.).
- Understand key threshold concepts (resilience, securitization, maximum sustainable yield) within the literature and have a good understanding of important institutional regimes (such as the Law of the Sea regime, Common Fishery Policy regime).
- Analysis the need for critical and diverse understandings of the role of the state, and other actors, in managing marine natural resources, and how marine policy problems can be socially constructed in a variety of ways, suggesting a diversity of possibilities as regards polices and how we could understand them.

PW3 SP420 Sociology of the Environment

Lectures	**Wed 14:00-15:50; Venue ENG-G017**
Coordinator:	Dr Mike Hynes
E-mail	mike.hynes@universityofgalway.ie

Course Overview:

This module explores the relationship between social, political transformation, and environmental change, focusing on sustainability questions. It seeks to answer questions about whether, and to what extent, interactions between society and the environment in Ireland and elsewhere remain hidden and how political influences shape how they are perceived. The module also looks at urban planning, sustainable, and active transport options, and aims to assess the relationship between the urban and built environments and the crucial social life it sustains. The first two parts of the module give rise to questions about environmentalism as a form of social organisation and its contributions to contemporary debates on society-environment interactions and sustainability questions. The third part of the course examines social and political developments related to the rise of environmental movements in Ireland and worldwide. What are the basic tenets of environmentalism? And is there a 'sustainable way forward'? What are the choices facing us in the 21st century? Are there pathways to alternative futures that recognise the realities of the climate crisis?

PW4: TI338 Palaeoecology - Reconstructing Past Environments

Lectures	**Mon 14:00-14:50** **Wed 13:00-14:00 *OR** **Fri 14:00-14:50; Venue TBD**
Coordinator:	Dr Karen Molloy
E-mail	Karen.Molloy@universityofgalway.ie
Telephone:	TBC
Office Hours:	TBC

**NOTE: For Students that chose PW1 and PW4, TI338 will be on Fridays at 14:00 during Weeks 1-6. From Weeks 7-12 it will replace EOS303 on Wednesdays at 13:00.*

Course Overview:

The Irish landscape as we know it today is governed by what has happened in the past. Both climate change and anthropogenic factors have played significant roles in shaping the development of the landscape. The objectives of this module are to introduce the student to palaeoenvironmental methods, in particular pollen analysis, as a means of interpreting the past 15, 000 years of vegetation and environmental change in Ireland. The course will consist of a series of lectures, a field excursion and 3 laboratory sessions where students will use microscope techniques to identify and count fossil pollen grains.

Learning Outcomes:

- Evaluate the main methods both direct and indirect of reconstructing past environments.
- understand the main principles of pollen analysis.
- understand the key vegetation changes that have occurred in Ireland since the end of the Ice Age.
- have an appreciation of the role people have played in shaping the Irish landscape from the arrival of the first farmers in Neolithic times.
- have a greater understanding of the natural world.
- use a microscope and identify the pollen of the most common Irish trees.
- interpret and evaluate a pollen diagram.