

CURRICULUM INFORMATION

Structured Masters Ocean, Atmosphere and Climate

Curriculum information relates to the current academic year. Course and module offerings and details may be subject to change.

Required modules that you must study if you choose this course

- **BPS5114 Primary Productivity and Global Change - Dr. Dagmar Stengel**

This module will explore impacts of global change on terrestrial and marine plant (and algal) communities on a range of temporal and spatial scales. It will include a detailed overview of global change impacts on marine ecosystems and feedback mechanisms; such as ocean acidification, rising seawater temperatures, solar radiation, eutrophication, and the role of algae in global cycles. It will also investigate how global change has altered terrestrial plant communities in the past, and discuss current and future changes to plant communities (e.g. invasive species, climate change).

- **EOS5101 Advanced Topics in Earth and Ocean Sciences - Peter Croot**

This module aims to give postgraduate students the opportunity to take advanced level courses for the ongoing and further development of critical research skills in topics related to Earth and Ocean Sciences (EOS). In particular this course will allow NUIG students and staff to gain credit for participating in EOS relevant courses offered by the Irish Geoscience Graduate Programme (IGGP) and the Strategic Marine Alliance for Research and Teaching (SMART) accredited postgraduate courses. Courses may also be run by experts in particular fields of research who come to NUIG for the specific purposes of teaching a specialized course. Topics covered may include, but is not limited to; computer programming, statistical analysis, modelling, advanced GIS, remote sensing, hydrogeology, geochemistry, physical oceanography and marine biogeochemistry. The course will be taught through a series of lectures built around a specific topic or theme and where possible include hands on training in either a computer suite or laboratory setting. Courses may also be taught at any time of the year.

- **PH5117 Atmospheric Physics and Climate - Dr. Jurgita Ovadnevaite**

This module explores Earth's Climate System and the main factors shaping it, including Aerosol-Cloud-Climate interactions, and focuses on the interconnections between aerosols, derived from marine ecosystems, and clouds, with the overall goal to understand the related climate uncertainties. This module also explores aerosol sources, the relation of aerosol physicochemical properties to marine ecosystems as well as cloud formation potential, global dimming, and how this varies with changing Oceans caused by climate change. It presents physical principles behind direct and indirect climate effects and puts aerosol physics concepts in light of current realities (extreme weather phenomenon or global pandemic). The module introduces to state of the art observational and modelling techniques, related to aerosol and climate physics with hands on in a laboratory/ambient observational setting.

- **PH5118 Ocean-Atmosphere-Climate Interactions and Feedbacks - Jessica Gier & international experts in particular fields of research who will teach as guest lecturers**

This module will provide postgraduate with a deeper understanding of the interactions between the ocean and the atmosphere and link to the interdisciplinary themes of the Surface Ocean - Lower Atmosphere Study (SOLAS, <https://www.solas-int.org/science/science-plan.html>). Topics will include, but are not limited to greenhouse gases and the oceans, air-sea interface fluxes, atmospheric deposition, ocean biogeochemistry, upwelling systems, polar oceans, or impacts of climate intervention. In addition to natural science themes, the module will explore ocean sustainability, environmental policy aspects, and relevant connections to society. Lectures will be run by international experts in particular fields of research who will come as guest lecturers to NUI Galway.

- **PH5119: Master Research Project on Ocean, Atmosphere and Climate**

Each student will conduct an individual research project within the area of ocean, atmosphere and climate at a host institution. This can be either in Ireland or internationally. This involves preparing a literature review, identifying knowledge gaps, research questions, hypotheses, and writing a thesis of research findings. This provides the opportunity for the students to apply learnings from the course content to conduct independent research and communicate it. This module involves a series of discussions with supervisors, stakeholder, and progress reporting.

Optional modules that you may choose

- AN445: Scientific Writing
- BES519: Scientific Writing
- BSS2103: Introduction to Sustainability 1
- CT5165: Principles of Machine Learning
- CT5170: Principles of Machine Learning - Online
- EOS610: Introduction to Data Analysis Tools for Earth and Ocean studies
- EOS6101: Global Change
- MI4104: Scientific Communication
- MR414: Field Skills in Marine Science
- PAB5131: Sustainability Research Skills
- PH428: Atmospheric Physics and Climate Change
- PS6163: Data Analysis Through R
- SI4102: Science Communication Skills
- SPA459: Research Ethics
- SP3116: Ocean and Marine Politics
- ST237: Introduction to Statistical Data and Probability