APPROVED

ENVR S8Z01: Emerging Issues of Environmental Concern

Module Details

Module Code:	ENVR S8Z01
Full Title:	Emerging Issues of Environmental Concern APPROVED
Valid From::	Semester 1 - 2018/19 (September 2018)
Language of Instruction:	English
Duration:	1 Semester
Credits::	7.5
Module Owner::	Valerie McCarthy
Departments:	Unknown
Module Description:	This module aims to introduce the student to the multidisciplinary world of environmental science by introducing them to some of the emerging issues of environmental concern and the cutting edge technologies, techniques and innovations which are being used to address them. A conscious understanding of ecological and environmental physical and chemical principles and how they apply to the major environmental problems of our times, such as water use, waste management, global warming, conservation and the preservation of biodiversity will be developed. The role of civil society in the management of these issues will be explored through an introduction to the United Nations Sustainable Development Goals (SDGs).

Module Learning Outcome	
On successful completion of this module the learner will be able to:	
#	**Module Learning Outcome Description**
MLO1	Appraise the mechanisms of climate change and analyse effects at an ecosystem level.
MLO2	Analyse the lifecycle of plastic from source to pollution and evaluate plastic alternatives and technologies for plastic waste reduction.
MLO3	Evaluate the current topics relating to issues of public health in terms of zoonotic disease transmission and the link between variations in the environment, both natural and human activity-related and emerging zoonotic disease.
MLO4	Critically engage with concepts and theory in biodiversity science and management from interdisciplinary perspectives and gain an insight into new technologies for the future of biodiversity science and management.
MLO5	Evaluate how all 17 SDGs interconnect and underpin these critical environmental issues - essentially meaning that success in one SDG affects success for others - and ultimately has implications for future environmental stability, e.g. how dealing with the threat of climate change can impact on how we manage our fragile natural resources, or how achieving better health through improved water quality can help eradicate poverty or examining the relationship between agriculture, food security and climate change.

Pre-requisite learning
Module Recommendations *This is prior learning (or a practical skill) that is strongly recommended before enrolment in this module. You may enrol in this module if you have not acquired the recommended learning but you will have considerable difficulty in passing (i.e. achieving the learning outcomes of) the module. While the prior learning is expressed as named DkIT module(s) it also allows for learning (in another module or modules) which is equivalent to the learning specified in the named module(s).*
No recommendations listed

Module Indicative Content
Climate Change Mechanisms and processes of directional climate change; measured effects on global and local climate, and projected future changes; effects on ocean acidification; effects on global freshwater water availability and water security; effects on ecosystems and the services they provide in an Irish context.
Biodiversity Introduction to the concept of biodiversity; measuring biodiversity; identification of threats; the ecological consequences of biodiversity loss; Ecosystem services and marketing biodiversity; prioritising choices in conservation.
Plastic Waste Sources of plastics; Biodegradability of plastics; Microbeads and wider microplastic pollution; Impacts on the environment including marine and terrestrial ecosystems; Plastic waste prevention and solutions including water and waste treatment and alternatives to plastics; EU waste hierarchy; Legislation associated with plastics.
Zoonoses Zoonotic disease; Emerging zoonotic disease; Epidemic zoonoses; Impacts of zoonoses; Pathogen flow; Risk factors; Managing zoonoses for human, animal and ecosystem integrity; overview on antimicrobial use in healthcare, veterinary and farming (use as therapeutic agents, prophylactics, metaphylactics and growth promoters); Emergence and spread of resistance; Mechanisms of antimicrobial resistance in bacteria; Environmental and global impact of antibiotic resistant bacteria.
SDGs and the Environment Introduction and overview of the United Nations Sustainable Development Goals (SDGs); Interconnectedness of the environmental, political, social and economic challenges facing our world; Local, national and global relevancy of the SDGs and the role of citizens and their governments; National SDG implementation plan.
Practicals Practicals will be delivered under each of the five major themes as follows - Climate Change: 1. Effect of warming on decomposition (simple incubation at different temperatures using measurement of gas evolved). 2. Simulation of effects of ocean acidification using effect of change in pH on eggshells, Computer based practicals- 1. accessing the latest climate change data 2. simple computer modelling scenario to asses effects of future warming in lakes; Plastic Waste: 1. Assessment of biodegradability of plastics 2. Analysis of microplastics in marine sediments; Zoonoses: 1. Identification of common zoonotic parasites 2. Analysis of dog faeces for toxocara contamination. Biodiversity:1. Biodiversity assessment and bumblebee collection; Use of molecular tools in ecological studies, Cryptic species diversity is thought to be common within the class Insecta, posing problems for basic ecological and population genetic studies and conservation management, students will extract total genomic DNA from a hind leg of sampled bumblebee using the chelex protocol. Cryptic species will be identified from the samples using mtDNA COI restriction fragment length polymorphism (RFLP) analysis developed by Murray et al. (2008). Suggested Field Trips: Zoo visit with conservation talk; Biodiversity Data Centre

Module Assessment

Assessment Breakdown	%
Course Work	30.00%
Project	40.00%
Practical	30.00%

Module Special Regulation

Assessments

Full Time On Campus

Course Work

Assessment Type	Continuous Assessment	**% of Total Mark**	15
Marks Out Of	100	**Pass Mark**	40
Timing	S1 Week 8	**Learning Outcome**	1
Duration in minutes	0		

Assessment Description
The students will carry out computer based practical exercises linked to modelling climate change scenarios.

Assessment Type	Other	**% of Total Mark**	15
Marks Out Of	100	**Pass Mark**	40
Timing	n/a	**Learning Outcome**	1,2,3,4,5
Duration in minutes	0		

Assessment Description
Students will be assessed on their contribution to in-class discussions, tutorials, debates or online discussion forums hosted through a VLE. In addition, students will be asked to engage in environmental activism by considering a campus based environmental initiative or public outreach relating to environmental issues.

Project

Assessment Type	Project	**% of Total Mark**	40
Marks Out Of	100	**Pass Mark**	40
Timing	End-of-Semester	**Learning Outcome**	1,2,3,4,5
Duration in minutes	0		

Assessment Description
Students will be asked to complete an e-Portfolio based assessment of a particular technique used to study or remediate against a specific environmental issue of concern referencing the UN SDGs. This assessment engages the students with technology enhanced learning through the development of an ePortfolio using the DkIT mahara system to provide a visual overview of the technique of choice and which allows the incorporation of video clips, images and webpages of relevance.

Practical

Assessment Type	Practical/Skills Evaluation	**% of Total Mark**	30
Marks Out Of	100	**Pass Mark**	40
Timing	Every Week	**Learning Outcome**	1,2,3,4
Duration in minutes	0		

Assessment Description
Laboratory experimentation, field and site
visits will be examined through a mixture of laboratory worksheets and report write-ups.

No Final Examination

Module Workload

Workload: Full Time On Campus

Workload Type	*Contact Type*	*Workload Description*	*Frequency*	*Average Weekly Learner Workload*	*Hours*
Lecture	Contact	Weekly lectures will be delivered in 1 x 2 hour block which will allow time for group discussion and student engagement. All lecture notes will be provided to the students through a Virtual Learning Environment (VLE). This VLE will also be used for access to helpful YouTube video clips, pod casts and peer reviewed publications of interest to the course.	Every Week	2.00	2
Lecturer-Supervised Learning (Contact)	Contact	Guest lectures with expertise in specific areas will be invited to give an overview of specific topics. This will include a range of individuals including those working in governmental organisations eg. EPA/Marine Institute and environmental scientists working in industry such as pharamacuticals. In addition, focus-group/discussion on case studies will be hosted by the lecturer and will encourage students to engage in open discussion on specific topics relating to emerging environmental issues.	Every Week	1.00	1
Practical	Contact	Practicals will be delivered under each of the five major themes Climate Change, Plastic Waste, Zoonoses, Biodiversity, Antiobiotic Resistance and Soil and Water Pollution /Toxin accumulation in crops as stipulated in the indicative content. These practicals will either involve site visits, field work or computer based sessions as appropriate.	Every Week	3.00	3
Independent Study	Non Contact	No Description	Every Week	3.00	3
Directed Reading	Non Contact	No Description	Every Week	3.00	3
				Total Weekly Learner Workload	12.00
				Total Weekly Contact Hours	6.00

This module has no Part Time On Campus workload.

Module Resources

Supplementary Book Resources

David Archer and Stefan Rahmstorf. (2009), The Climate Crisis, [ISBN: 978-0-521-732].

Gaston, Kevin J. & Spicer, John I.. (1998), Biodiversity : An introduction, Blackwell Science Oxford, Malden, MA, USA.

Macdonald, David W. & Service, Katrina. (2007), Key topics in conservation biology, Blackwell, Malden, MA, USA.

Blair Crawford, C. and Quinn, B.. (2016), Microplastics Pollutants, Elsevier, [ISBN: 9780128094068].

Stevens, E. (2002), Green Plastics: An introduction to the new science of biodegradable plastics., Princeton University Press, [ISBN: 9780691049670].

Andrady, A.. (2015), Plastics and Environmental Sustainability, Wiley, [ISBN: 978-1-119-009].

Recommended Article/Paper Resources

Murray, T.E., Fitzpatrick, Ú., Brown, M.J.F. et al.. (2008), genetics, Conservation Genetics, 9, p.653., https://doi.org/10.1007/s10592-007-9394- z

Other Resources

Website, NASA. A series of visualizations shows how some of Earth's key climate indicators are changing over time, https://climate.nasa.gov/interactives/cl imate-time-machine

Website, Calculating your carbon footprint, https://www.carbonfootprint.com/individu als.html

Website, IPCC. IPCC synthesis report, http://www.ipcc.ch/pdf/assessment-report /ar5/syr/SYR_AR5_FINAL_full_wcover.pdf

Website, NASA. Interactive virtual earth simulations, https://vesl.jpl.nasa.gov/

Website, EU Directive. EU Waste Directive, http://ec.europa.eu/environment/waste/in dex.htm