Imperial College London

Module Specification (Curriculum Review)

Basic details

UID		Cohorts covered	Earliest cohort: 2023-24	Latest cohort:
Long title	Environmental Physics			
New code	PHYS50008	New short title	Environmental Physics	

Brief description of module *(approx. 600 chars.)*

This module introduces students to the application of core physical concepts to the Earth system, with special focus on: atmospheric radiation, greenhouse gases, pollution, climate change, and energy. The module will demonstrate how physics is fundamental to understanding natural and human influences on climate and atmospheric composition. The module will develop problem solving abilities and a critical, practical awareness of global environmental change.

459 characters

Available as a standalone module/ short course? N

Statutory details

	ECTS	CATS	Non-credit		
Credit value	5	10	N	HECOS codes	
FHEQ level	Level 5				

Allocation of study hours

	Hours	
Lectures	16	
Group teaching	0	*Incl. seminars, tutorials, problem classes.*
Lab/ practical	0	
Other scheduled	13	*Incl. project supervision, fieldwork, external visits.*
Independent study	96	*Incl. wider reading/ practice, follow-up work, completion of assessments, revisions.*
Placement	0	*Incl. work-based learning and study that occurs overseas.*
Total hours	125	
ECTS ratio	25.00	

Project/placement activity

Is placement activity allowed? No

Module delivery

Delivery mode	Taught/ Campus	Other	
Delivery term	Term 2	Other	Exam in Term 3

Ownership

Primary department	Physics
Additional teaching departments	May include guest lectures from other departments if deem
Delivery campus	South Kensington

Collaborative delivery

Collaborative delivery?	N
External institution	N/A
External department	N/A
External campus	N/A

Associated staff

Role	CID	Given name	Surname
Module Leader		Helen	Brindley

Learning and teaching

Module description

Learning outcomes	On completion of this module, you should be able to: 1) Explain the “greenhouse effect”, radiative forcing and feedback using simple energy-balance models and understand how these relate to global warming 2) Have an understanding of the carbon cycle and the controls on other key greenhouse gases 3) Discuss what controls the response time of the climate to anthropogenic activity and natural variability 4) Describe the strengths and weaknesses of our current climate-observing system 5) Describe how climate is modelled on different scales, ranging from the local environment to the global Earth system and explain how environmental monitoring and modelling influence legislation and policy 6) Explain the relation between energy production, energy consumption, and climate change 7) Demonstrate an awareness of climate-change mitigation and the physics behind renewable energy sources 8) Discuss the pros and cons of climate geo-engineering
Module content	The module contains three sub-topics: 1) Physics driving the Earth's climate 2) Climate observations, modelling and policy 3) Climate change mitigation

Learning and Teaching Approach	Students will be taught over a term using a combination of lectures, office hours and directed exercises.
Assessment Strategy	Final exam: 2 hours to probe understanding of learning outcomes.
Feedback	Problem sheets are provided for all the core material. Full solutions are published online. Office hours (two per week) will be available for students to discuss the lectures and/or problem sheets. General feedback on written examinationis provided in the form of written reports from the examiners for the students.
Reading list	The module is self-contained and no additional books are required to be purchased by the students. Further discussion of material covered by the module can be found in: General: •Environmental Physics Sustainable Energy and Climate Change, 3rd Edition, E. Boeker & R. van Grondelle •Climate Change 2021 – The Physical Science Basis. Summary for Policymakers, IPCC, available at: http://www.ipcc.ch/report/ar6/wg1/#SPM More specialised areas: •The Physics of Atmospheres, by John Houghton (mainly chapters 2-4 & 12) •Atmospheric Science, an introductory survey, J. Wallace and P. Hobbs (Chapters 2 and 6) •Air Pollution and Global Warming: History, Science, and Solutions, 2nd Edition, M. Jacobson

Quality assurance

Date of first approval	
Date of last revision	
Date of this approval	
Module leader	Helen Brindley

Office use only

QA Lead	
Department staff	
Date of collection	
Date exported	
Date imported	

Notes/ comments	

Template version 16/06/2017

Programme structure

Associated modules

UID	Legacy code	Module title	Requisite type

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Assessment details

Grading method	Numeric	Pass mark	40%

Assessments

Assessment type	Assessment description	Weighting	Pass mark	Must pass?
			40%	
Examination	Written Exam	100%	40%	N
		0%		