

Atmospheric Physics

Module Code	PHYS97007	FHEQ Level	Level 7
Pre-requisites	None	Co-requisites	None
Primary Department	Physics		
Module Leader	Dr Arnaud Czaja, Dr Paulo Ceppi & Dr Ed Gryspeerd		
Additional Teaching Departments	None		
Teaching Staff	Dr Arnaud Czaja, Dr Paulo Ceppi & Dr Ed Gryspeerd		
Programmes on which the Module is delivered			Core/Elective
All UG Physics programmes (F300, F303, F309, F325, F390, F3W3)			Elective
Learning Outcomes	<p>On completing the Atmospheric Physics course, students will:</p> <ul style="list-style-type: none"> • Be able to describe the basic structure of an atmosphere and the climate system. • Be able to use fundamental thermodynamics to derive expressions for the variation of temperature, pressure, and air density with height. • Understand the concept of potential temperature and how it relates to static stability of the atmosphere. • Know the components of the Earth's radiation balance. • Understand the concepts of optical depth and transmissivity. • Be able to write down Schwarzschild's equation of radiative transfer and to solve it for both solar and thermal radiation under representative atmospheric conditions. • Derive a simple model of the greenhouse effect. • Know the forces acting on a parcel of air and apply Newton's 2nd Law to deduce the equations of motion for a compressible gas on a rotating planet. • Know how to apply scale approximations to the equations of motion (e.g. hydrostatic and geostrophic approximations). • Be able to identify the main anthropogenic and natural constituents that influence the Earth's climate. • Be familiar with how fundamental atmospheric physics is represented in complex climate models, and how such models and observations are used for weather forecasting, climate simulation, and investigations of the causes and impacts of climate change. 		
Description of Content	To provide students an understanding of the physics behind the structure, the dynamics, and the energetics of planetary atmospheres, with the main emphasis being on the Earth's atmosphere and its changing climate.		
Assessment		Assessment Type	Weighting
Written Exam		Exam	100%
Learning & Teaching Hours	Independent Study Hours	Placement Hours	Total Hours

57	93	0	150
ECTS Credit	6	CATS Credit	12
Date of introduction	October 2017	Date of Last Revision	April 2020