

MODULE INFORMATION SHEET

Name of Module Unit	Global Climate Change
Name in polish language	Globalne zmiany klimatu
Module type	compulsory / elective
Form of studying	full-time day courses
Level of study	graduate course (M.Sc. level)
Type of study (for extra-mural courses)	-
Programme	Environmental Engineering
Speciality	Environment Protection Engineering
Responsible department	Chair of Environmental Protection and Management
Responsible person	Dr inż. Magdalena Reizer

Semester	Lectures(E)	Tutorials	Laboratory	Computer Exercises	Projects	ECTS
3	30			15		3

Learning outcomes (knowledge, skills, competences)

Learning outcomes – skills and competencies: understanding and attributing global climate change; its driving forces, processes and phenomena, impacts and mitigation options. Knowledge about human activities and natural processes as drivers of climate change; climate responses and feedback processes. Knowledge about the possible future impacts of climate change on the natural and human environment and for the adaptation options. Skill and competences to determine policies, measures and instruments to mitigate climate change.

Prerequisites

Air Pollution Control, Environmental Physics and Applied Climatology

Rules for integrated grade setting

Integrated grade is a weighted mean of the grades from lectures (60%) and projects (40%).

Recommended readings

1. IPCC, 2013: Fifth Assessment Report: Climate Change 2013 (AR5), selected materials.
2. IPCC, 2007: Fourth Assessment Report: Climate Change 2007 (AR4), selected materials.
3. IPCC, 2018: Special Report - Global warming of 1.5°C.
4. Seinfeld J.H., Pandis S.N., 2016: Atmospheric Chemistry and Physics: from air pollution to climate change, 3rd edition, Wiley & Sons, Hoboken.
5. Soyez K., Grassl H., 2008: Climate Change and Technological Options, Springer, Wien New York.
6. EEA, 2019: The European Environment – State and Outlook 2020 (SOER 2020). European Environment Agency, Luxembourg.

Contents of lectures (syllabus)

	Topics	Time (hrs.)	Scope (S / Ex)
1	Introduction. Historical overview of climate change science. Global climate change assessment – IPCC reports.	2	
2	Components of climate change process; natural and human drivers of climate change. Changes in human and natural drivers of climate.	2	
3	Radiative forcing: concept and changes; principal components.	2	
4	Global/regional emission and distribution of GHG. The global carbon cycle and budget. Sources, sinks and attributes of key GHG.	4	
5	Geophysical and biochemical climate feedbacks.	2	
6	Observations of changes in climate in XIX-XXI century; spatial distribution, consistency. Extreme weather events.	4	
7	Modelling the climate change; global and regional climate models; SRES and RCP scenarios.	4	
8	Global and regional future climate projections. The most vulnerable sectors and regions. Projected magnitude and timing of impacts.	4	
9	Adaptation practices, options, constraints and capacity. Policies, measures and instruments to mitigate climate change. International agreements: UNFCCC/Kyoto Protocol, Paris agreement, EU Climate and Energy Package. Co-benefits/side-effects of climate mitigation.	4	
10	Final test	2	
Total		30	hours

S – topics listed in the legal study programme standards from 12.07.2007

Ex – extended topics

Lecturers

Dr inż. Magdalena Reizer

Assessment method

Final test from lectures (open questions). Min. 51% of points are required to pass.

Contents of computer exercises

	Topics	Time (hrs.)	Scope (S / Ex)
1	Introduction to the computer exercises.	1	
2	Analysis of greenhouse gases emissions in relation to economic and demographic factors.	4	
3	Analysis of long-term trends of selected climate parameters (according to various IPCC RCP scenarios) for selected regions.	4	
4	Analysis of the possibilities to achieve the 1.5°C and 2°C climatic goals with the use of C-ROADS modelling software.	4	
5	Final test	2	
Total		15	hours

S – topics listed in the legal study programme standards from 12.07.2007

Ex – extended topics

Persons responsible for computer exercises

Dr inż. Magdalena Reizer; dr inż. Katarzyna Maciejewska

Assessment method for computer exercises

Credit for projects – 1 test and defense of projects. Min. 51% of points are required to pass.