

**DEREE COLLEGE SYLLABUS FOR:
ES 3232 RESPONSES TO CLIMATE CHANGE**

3/0/3

(New Fall 2022)

**UK LEVEL: 5
UK CREDITS: 15**

PREREQUISITES:

ES 1000 Environmental Science: Ecosystems and Biodiversity
ES 1010 Environmental Science: Energy Resources and Pollution

CATALOG DESCRIPTION:

An overview of the basic principles of climate, the greenhouse effect and the physical and chemical changes occurring as a result of human activity, leading to the phenomenon of human-induced climate change. The impacts of climate change, mitigation and adaptation options are also discussed.

RATIONALE:

The course focuses on the global issue of human-induced climate change. It is a course addressed to environmental studies majors and minors and aims to acquaint students with the mechanisms and concepts related to climate, the greenhouse effect and climate change, as well as with the climate change impacts on natural cycles, ecosystems, biodiversity and human societies. Furthermore, it extensively discusses scenarios, models and future projections, as well as the available options in matters of mitigation, adaptation and building resilience. Emphasis is on the relevant policy framework and on international responses to climate change.

LEARNING OUTCOMES:

As a result of taking this course, the student should be able to:

1. Demonstrate knowledge and understanding of the factors and processes contributing to climate and of the mechanisms of climate formation and natural climate change, as well the mechanisms of human-induced climate change.
2. Identify parameters, patterns, scenarios and models to map and predict future changes on climate, as well as elaborate on current and future impacts of human-induced climate change to natural cycles, natural phenomena, ecosystems, biodiversity, human societies and the economy.
3. Elaborate on and appraise the policy responses to human-induced climate change, mitigation, adaptation, building resilience.
4. Adapt an interdisciplinary approach that will allow them to critically evaluate current responses and formulate recommendations for the future as well to develop their analytical and communication skills.

METHOD OF TEACHING AND LEARNING:

In congruence with the teaching and learning strategy of the college, the following tools are used:

- Class lectures, interactive learning (class discussions, group work), video presentations, and practical exercises/problems.
- Exercises and primary source documents are assigned as homework and are reviewed in class.
- Student projects and presentations.
- Updating through use of scientific journals and reports of the field.
- Office hours: students are encouraged to make full use of the office hours of their instructor, where they can ask questions, see their exam paper, and/or go over lecture material.
- Use of a Blackboard site, where instructors post lecture notes, assignment instructions, timely announcements, discussion boards as well as additional resources.
- Use of online interactive tools for teaching and learning.

ASSESSMENT:	<p>Summative:</p> <table border="1"> <tr> <td>Student Project (2000 – 2500 words)</td> <td>40%</td> </tr> <tr> <td>Final Examination (2 hours)</td> <td>60%</td> </tr> </table> <p>Formative:</p> <table border="1"> <tr> <td>Critical Essays</td> <td>0</td> </tr> <tr> <td></td> <td></td> </tr> </table> <p>The formative tests aim to prepare students for the examinations. The “Student project” tests Learning Outcomes 3, 4 and 5. The “Final examination” tests Learning Outcomes 1, 2 and 3.</p>	Student Project (2000 – 2500 words)	40%	Final Examination (2 hours)	60%	Critical Essays	0		
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Final Examination (2 hours)	60%								
Critical Essays	0								
INDICATIVE READING:	<p>REQUIRED READING: Dessler A. E. 2021. <i>Introduction to Modern Climate Change</i>, 3rd edition, Cambridge University Press, ISBN: 9781108879125</p> <p>RECOMMENDED READING: 6th IPCC Report</p>								
INDICATIVE MATERIAL: (e.g. audiovisual, digital material, etc.)	<p>REQUIRED MATERIAL: N/A</p> <p>RECOMMENDED MATERIAL: Journal Nature Climate Change: https://www.nature.com/nclimate/ Journal Springer Climate Change: https://link.springer.com/journal/10584/volumes-and-issues/169-1</p>								
COMMUNICATION REQUIREMENTS:	<p>Verbal skills using academic/professional English</p>								
SOFTWARE REQUIREMENTS:	<p>Microsoft Word, Microsoft PowerPoint, Microsoft Excel, Blackboard, Platforms for online communication and learning.</p>								
WWW RESOURCES:	<ul style="list-style-type: none"> • United Nations Framework Convention on Climate Change: https://unfccc.int/ • The Intergovernmental Panel on Climate Change: https://www.ipcc.ch/ • European Commission Climate Action: https://ec.europa.eu/clima/index_en • European Environment Agency: https://climate-energy.eea.europa.eu/ • UN Environment Programme Climate Action: https://www.unep.org/explore-topics/climate-action • EU Copernicus Services (Databases): https://www.copernicus.eu/en • National Oceanic and Atmospheric Administration (U.S): https://www.noaa.gov/ • NASA Global climate change: https://climate.nasa.gov/ • National Observatory of Athens – Institute for environmental research and sustainable development: https://www.iersd.noa.gr/en/ • World Meteorological Organisation https://public.wmo.int/en 								
INDICATIVE CONTENT:	<ol style="list-style-type: none"> 1. Essentials of Climate and Meteorology <ol style="list-style-type: none"> a. Factors affecting Climate b. Weather phenomena 2. Radiation and energy balance 								

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| | <ol style="list-style-type: none">3. An introduction to the climate problem<ol style="list-style-type: none">a. Historical changes in climate – Past Climate Erasb. Background climate changec. Evidence of a changing climate4. Mechanism of climate change or Why the climate is changing?<ol style="list-style-type: none">a. The First Suspect: Plate Tectonicsb. The Sunc. The Earth's Orbitd. Unforced Variabilitye. Greenhouse Gasesf. Putting it together5. Predictions of future climate change<ol style="list-style-type: none">a. Using scenarios and climate modelsb. Analysing scenariosc. Predictions for the future6. Impacts of Climate change<ol style="list-style-type: none">a. Natural environment, cycles and processesb. Extreme weather eventsc. Ecosystems and Biodiversityd. Human societies and economy7. Mitigation options and policies8. Adaptation options and policies - Building resilience9. The politics and instruments to tackle Climate Change<ol style="list-style-type: none">a. International Conventions and Agreementsb. IPCCc. UNFCCCd. Climate Justice - Climate refugeese. The way forward |
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