DEPARTMENT OF ENERGY SCIENCE AND TECHNOLOGIES
COURSE SYLLABUS

Course Details				
Code	**Academic Year**			**Semester**
EBT325	3			6
Title	**T**	**A**	**L**	**ECTS**
Introduction to the Climate System	3	3	0	6

Language	German					
Level	**Undergraduate**		**Graduate**		**Postgraduate**	
Department / Program	Energy science and –technology / Material science and –technology / Molecular Biotechnology					
Forms of Teaching and Learning	hybrid					
Course Type	**Compulsory**		**Elective**	x		
Objectives	Students gain scientific knowledge of the climate system and the combined roles of the atmosphere and ocean therein. They can assess the risks and uncertainties of climate impacts to specific engineering challenges.					
Content	This class focuses on the physical understanding of the climate system. The various components of the climate system and their interactions are described and the different internal and external forcings, internal feedbacks, and their influences (e.g. sensitivities) are discussed.					
Prerequisites	Basic knowledge of physics and mathematics					
Coordinator	Assoc. Prof. Dr. Merja Helena Tölle					
Lecturer(s)	Assoc. Prof. Dr. Merja Helena Tölle					
Assistant(s)	Res. Ass. Berat Berkan Ünal					
Work Placement	None					

Recommended or Required Reading	
Books / Lecture Notes	Yes, IPCC
Other Sources	Yes

Additional Course Material	
Documents	Videos
Assignments	
Exams	Yes

Course Composition		
Mathematics und Basic Sciences	15	%
Engineering	10	%
Engineering Design		%

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Social Sciences	5	%
Educational Sciences		%
Natural Sciences	70	%
Health Sciences		%
Expert Knowledge		%

Assessment

Activity	Count	Percentage (%)
Midterm Exam	1	40
Quiz		
Assignments		
Attendance		
Recitations		
Projects		
Final Exam	1	60
	Total	**100**

ECTS Points and Work Load

Activity	Count	Duration	Work Load (Hours)
Lectures	15	3	45
Self-Study	15	5	75
Assignments			
Presentation / Seminar Preparation			
Midterm Exam	1	1	1
Recitations	15	3	45
Laboratory			
Projects			
Final Exam	1	2	2
		Total Work Load	**168**
		ECTS Points (Total Work Load / Hours)	**6**

Learning Outcomes

1	Students gain scientific knowledge of the climate system and the combined roles of the atmosphere and ocean therein.
2	Students are able to apply the concepts and knowledge to specific topics in Climatology.
3	Name important climate zones and associated weather, clouds and vegetation patterns.
4	Explain the origin of large-scale phenomena in the atmosphere, including frontal systems, Hadley and Walker circulation, and ENSO
5	Explain the influence of atmospheric processes on the thermodynamic structure of the atmosphere and the patterns of horizontal wind

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6	Apply the equation of state and Clausius Clapeyron to calculate thermodynamic variables; and hydrostatic balance, angular momentum conservation and equation of motion on a rotating sphere to calculate winds
7	Understand impact of engineering choices on climate change (e.g., the Carbon Cycle)
8	Overview climate scenarios and understand how climate models work
Weekly Content	
1	Climate system and components
2	Earth-Sun geometry
3	Radiation
4	Earth's energy budget (global average)
5	Global circulation
6	Pressure
7	Humidity in the atmosphere
8	Coriolis force
9	Air masses and climate zones (climate classification)
10	Midterm week
11	Monsoon
12	ENSO
13	Climate change
14	Climate scenarios
15	Climate models
16	Final Exam

Contribution of Learning Outcomes to Program Objectives (1-5)

	P1	P2	P3	P4	P5	P6	P7	P8	P9
1	3	5	5	5	2	5	2	5	5
2	2	4	2	4	1	3	2	5	5
3	2	2	2	4	1	5	2	5	5
4	2	3	2	4	2	4	2	5	5
5	2	2	1	4	1	4	2	5	5
6	2	2	1	4	1	4	2	5	5
7	2	2	1	4	1	4	2	5	5
8	2	4	4	5	2	5	2	5	5

Contribution Level	1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High
https://obs.tau.edu.tr/oibs/bologna/progLearnOutcomes.aspx?lang=en&curSunit=5706	
Compiled by:	Assoc. Prof. Dr. Merja Helena Tölle
Date of Compilation:	09.12.2024