

CLIMATE CHANGE IMPACT ON ECOSYSTEMS (SYLLABUS)

Course Code	23CE2502	Year	III	Semester	II
Course Category	Open Elective-I	Branch	CIVIL	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	
Continuous Internal Evaluation	30	Semester End Evaluation	70	Total Marks:	100

Course Objectives:

The objective of this course is to:

- To understand the structure of the atmosphere and the thermal dynamics influencing Earth's climate.
- To study the hydrologic cycle and basic water balance on Earth.
- To examine climate variables that influence precipitation and water movement.
- To analyze the causes and impacts of climate variability and extremes.
- To introduce climate change science, modeling techniques, and global climate projections.

Course Outcomes:

Course will enable the student to:

CO	Statement				
CO 1	Understand the atmospheric structure and temperature variations related to climate	L2			
CO 2	Explain the components and balance of the hydrologic cycle	L2			
CO 3	Identify climate factors affecting precipitation, evaporation, and surface flow	L3			
CO 4	Recognize the indicators and impacts of floods, droughts, and other climate extremes	L4			
CO 5	Understand the causes of climate change and basics of climate modeling and scenarios	L4			

Course Articulation Matrix:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	2	1	2	3	-	-	-	-	2	2	2
CO2	3	2	2	2	1	2	2	-	-	_	-	2	3	2
CO3	3	2	3	2	2	2	3	-	-	-	-	2	3	3
CO4	3	2	2	2	1	3	3	-	-	-	-	2	2	2
CO5	3	2	3	2	3	2	3	-	-	-	-	3	3	3



Syllabus

Unit	Content					
No	Content					
	Climate System; Climate, weather and Climate Change; Overview of Earth's					
	Atmosphere; Vertical Structure of Atmosphere; Radiation and Temperature;					
Unit I	Laws of Radiation; Heat-Balance of Earth Atmosphere System; Random					
Uniti	Temperature Variation; Modelling Vertical Variation in Air Temperature;					
	Temporal Variation of Air temperature; Temperature Change in Soil; Thermal					
	Time and Temperature Extremes.					
Unit II	Hydrologic Cycle: Introduction; Global water balance; Cycling of water on					
Omt II	land, a simple water balance model					
	Climate Variables affecting Precipitation: Precipitation and Weather,					
	Humidity, Vapor Pressure, Forms of Precipitation, Types of Precipitation;					
Unit III	Cloud; Atmospheric Stability; Monsoon; Wind Pattern in India; Global Wind					
	Circulation; Evaporation and Transpiration, Processes of Vadose Zone,					
	Surface Runoff, Stream flow					
Unit IV	Climate Variability: Floods, Droughts, Drought Indicators, Heat waves,					
	Climate Extremes.	CO4				
Unit V	Climate Change: Introduction; Causes of Climate Change; Modeling of					
	Climate Change, Global Climate Models, General Circulation Models,					
	Downscaling; IPCC Scenarios	CO5				

Learning Resource(s)

Text Book(s)

- 1. B. Padmanabha Murty, "Environmental Meteorology", I K International Publishing House Pvt. Ltd, Company, 2013.
- 2 S. K. Sandge "Climate Change and Biodiversity", ARB PUBLICATIONS, 2024.
- 3. John T. Hardy, "Climate Change: causes, Effects and Solutions", Willy Publication, USA.

Reference Book(s)

- 1. C. Donald Ahrens, Robert Henson, "Meteorology Today: An Introduction to Weather, Climate and the Environment", 12th Edition, Brooks/Cole Publishing Company, 2018.
- 2. Roger Barry, Richard Chorley, "Atmosphere, Weather and Climate", 8th Edition, Routledge, 2003.

Web Materials: