



## CLIMATE CHANGE IMPACT ON ECOSYSTEMS (SYLLABUS)

<b>Course Code</b>	<b>23CE2502</b>	<b>Year</b>	III	<b>Semester</b>	II
<b>Course Category</b>	Open Elective-I	<b>Branch</b>	CIVIL	<b>Course Type</b>	Theory
<b>Credits</b>	3	<b>L-T-P</b>	3-0-0	<b>Prerequisites</b>	
<b>Continuous Internal Evaluation</b>	30	<b>Semester End Evaluation</b>	70	<b>Total Marks:</b>	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	Blooms level
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	PSO1	PSO2
CO1	3	2	2	2	1	3	-	-	-	-	2	2	2
CO2	3	2	2	2	1	2	-	-	-	-	2	3	2
CO3	3	2	3	2	2	3	-	-	-	-	2	3	3
CO4	3	2	2	2	1	3	-	-	-	-	2	2	2
CO5	3	2	3	2	3	2	-	-	-	-	3	3	3



## Syllabus

Unit No	Content	Mapped COs
I	Climate System; Climate, weather and Climate Change; Overview of Earth's Atmosphere; Vertical Structure of Atmosphere; Radiation and Temperature; Laws of Radiation; Heat-Balance of Earth Atmosphere System; Random Temperature Variation; Modelling Vertical Variation in Air Temperature; Temporal Variation of Air temperature; Temperature Change in Soil; Thermal Time and Temperature Extremes.	CO1
II	Hydrologic Cycle: Introduction; Global water balance; Cycling of water on land, a simple water balance model	CO2
III	Climate Variables affecting Precipitation: Precipitation and Weather, Humidity, Vapor Pressure, Forms of Precipitation, Types of Precipitation; Cloud; Atmospheric Stability; Monsoon; Wind Pattern in India; Global Wind Circulation; Evaporation and Transpiration, Processes of Vadose Zone, Surface Runoff, Stream flow	CO3
IV	Climate Variability: Floods, Droughts, Drought Indicators, Heat waves, Climate Extremes.	CO4
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)
<b>Text Book(s)</b>
<ol style="list-style-type: none"><li>1. B. Padmanabha Murty, "Environmental Meteorology", I K International Publishing House Pvt. Ltd, Company, 2013.</li><li>2. S. K. Sandge "Climate Change and Biodiversity", ARB PUBLICATIONS, 2024.</li><li>3. John T. Hardy, "Climate Change: causes, Effects and Solutions", Willy Publication, USA.</li></ol>
<b>Reference Book(s)</b>
<ol style="list-style-type: none"><li>1. C. Donald Ahrens, Robert Henson, "Meteorology Today: An Introduction to Weather, Climate and the Environment", 12th Edition, Brooks/Cole Publishing Company, 2018.</li><li>2. Roger Barry, Richard Chorley, "Atmosphere, Weather and Climate", 8th Edition, Routledge, 2003.</li></ol>
<b>Web Materials:</b>
NPTEL