



GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Master of Engineering

Level: PG

Branch: Environmental Management

Subject Code: ME02018101

Subject Name: Climate Change and Sustainability

w.e.f. Academic Year:	2024-25
Semester:	2
Category of the Course:	Professional Elective Course

Prerequisite:	Introduction to Air Pollution and its effect, Basics of Sustainability and Finance
Rationale:	To develop better understanding about various aspects of weather and climate, climate Policies and Climate Finance

Course Outcome:

After Completion of the Course, Student will able to:

No.	Course Outcomes
01	Develop the understanding of concepts of Global Warming and Climate Change.
02	Translate the role of earth's ecosystem system in Climate Change.
03	Interpret the International and National Climate Policies.
04	Develop the understanding of concepts of ESG and Circular Economy.
05	Translate the fundamentals of climate finance.

Teaching and Examination Scheme:

Teaching Scheme(in Hours)			Total Credits L+T+(PR/2)	Assessment Pattern and Marks				Total Marks
L	T	PR		C	Theory		Tutorial/Practical	
			ESE (E)		PA/ CA (M)	PA/CA(I)	ESE (V)	
03	00	02	04	70	30	20	30	150

.Course Content:



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Unit No.	Content	No. of Hours	% of Weightage
1	Introduction to Global Warming and Climate Change History of Global Warming and Climate Change, Greenhouse Effect, Weather and Climate, Carbon Cycle, Greenhouse Gases and Climate Change, Impacts of Climate Change.	05	12%
2	Climate Science Role of Meteorological parameters, Feedback factors, Earth's Energy Budget, Climate Subsystems: Global Carbon Budget, Global Wind Circulation, Global Ocean Circulation.	09	21%
3	Climate Policy International Environmental Protocols, Role of IPCC and UNFCCC, Conference of Parties (COP), Paris Agreement, Nationally Determined Contribution, Sustainable Development Goals, Carbon Neutrality and Net Zero Pathways and Policies.	10	25%
4	Environmental Sustainability Principle of Environmental Sustainability, Introduction of ESG, Environmental, Social, and Governance Factors, Corporate Sustainability and Carbon Accounting, ESG Policies and Framework <ul style="list-style-type: none">• Introduction to Circular Economy: concept, principles, and goals of a circular economy.	09	21%
5	Climate Finance Businesses and Carbon Markets, Carbon Finance Instruments and Funds, Carbon Trading: Carbon pricing initiatives, EU Emission Trading System (EUETS) and Emerging Trends in India.	12	21%
	Total	45	100



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Suggested Specification Table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
20	30	30	20	-	-

Where R:Remember; U:Understanding; A:Application, N:Analyze and E:Evaluate C:Create(as per Revised Bloom's Taxonomy)

References/Suggested Learning Resources:

(a) Books:

1. Global Warming: the complete briefing by John Theodore Houghton (2019)
2. IPCC Reports, Assessment Reports (AR) 01 to AR 06 (1990, 1995, 2001, 2007, 2013, 2021)
3. Introduction to Climate Science, Open Textbook, Oregon State University, Roger Schmittner, 2022
4. Climatology-An Atmospheric Science (second edition), J. Oliver and J. Hidore (2001)
5. The Principles of Sustainability, Dresner S. (2002), Earthscan, London.
6. Sustainable Engineering - Principles and Practice, Cambridge University Press, Bhavik Bakshi (2019).
7. Global Warming and Climate Change by Soli Arceiwala
8. Global Warming and Climate Change by Dr S K Agrawal

(b) Open sources of software and website: UNFCC and IPCC

Suggested Course Practical List:

1. Case study on calculation of carbon footprints of educational institutes/commercial buildings/given infrastructure
2. Case study on National Climate Policies
3. Case study on Emission Accounting
4. Case study on Emission Trading

List of Laboratory/Learning Resources Required:

Suggested Activities for Students:

Prepare Presentation on given topics.
