Semester: I/II			
Course Title	Global Climate Change	**CIE Marks**	50
Course Code	BCVETC105/205A	**SEE Marks**	50
Course Type	Theory	**Total Marks**	100
Course Category	ETC	**SEE Duration**	03 hrs
Hours Per Week	3L: 0T: 0P	**SEE Type**	Written
Total Hours	40 hrs	**Credits**	03

Course Learning Objectives
This course will enable the students to
• Gain knowledge on global climate crisis, factors influencing global warming and climate change, mitigation strategies and conventions.
Pre-Requisites
• Fundamentals of Basic Science.

Module-1: Earth's Climate System	**(8 hrs)**
Introduction to Earth system: Earth's climate, Structure of earth, Hydrosphere, Lithosphere, Cryosphere, Atmosphere and Biosphere, Ozone layer depletion and its control, Structure and composition of atmosphere, Meteorological parameters of atmosphere.	
Module-2: Greenhouse Gases	**(8 hrs)**
Climate Change Forcing Mechanism: Greenhouse effects, Radiative effects of greenhouse gases- Hydrological cycle, Nutrient cycles, Global warming potential, Weather & climate - Climate variables, Climate change and climate variability, Atmospheric stability, Temperature profile of atmosphere.	
Module-3: Causes and Impacts of Climate Change	**(8 hrs)**
Causes of Climate Change: Natural and anthropogenic causes of Climate change, change of temperature in environment, Melting of ice pole-Sea level rise, Urbanization, Deforestation, Agriculture, Livestock management, Coastal erosion and Landslides. **Impacts of Climate Change on Various Sectors:** Environmental impacts (Sea level rise and extreme weather events), Economic Impacts, Social and Health Impacts, Impacts on Agriculture, Energy systems, Coastal flooding, EL-NINO and LA-NINA effects.	
Module-4: Global Climate Change: Past and Future Climate	**(8 hrs)**
Account of Past Climate: Paleoclimate, Sources of paleoclimate data (Historical, Archaeological and Geological data), Extreme weather events- Drought, Extreme heat, Extreme precipitation. **Predicting Future Climate:** Climate models, Types of climate models- Energy balance models, Zero-dimensional models, One dimensional model, Radioactive convective models, General circulation models, Time dependent models.	
Module-5: Climate Change and Mitigation Measures	**(8 hrs)**
Clean Development Mechanism: Carbon rating, Carbon trading: -Future clean technology-Biodiesel, Natural compost, Eco friendly plastic, Alternate Energy- Hydrogen, Bio fuels, Solar energy, Wind, Hydroelectric power, Microbial fuel cell. **Mitigation Efforts in India and Adaptation:** Key mitigation technologies and practices, Carbon sequestration- carbon capture and storage (CCS), Waste management (municipal solid waste, bio-medical waste, industrial waste hazardous waste)	

Text Books/ Reference Books/ e-Resources:	
1.	"Introduction to Modern Climate Change" by Andrew E. Dessler, 3rd edition, Cambridge University Press.
2.	https://egyankosh.ac.in/handle/123456789/53875 ("Challenges to Sustainable Development", IGNOU Study Material)
3.	https://open.oregonstate.education/climatechange ("Introduction to Climate Science", by Andreas Schmittner, Oregon State University)
4.	https://www.ipcc.ch (IPCC – Intergovernmental Panel on Climate Change)
5.	https://unfccc.int (UNFCC – United nations framework convention on climate change)
6.	https://egyankosh.ac.in/handle/123456789/53875 ("Challenges to Sustainable Development", IGNOU Study Material)

Course Outcome Statements: After the successful completion of the course, the student will be able to	
CO1	Describe atmosphere, climate and climate forcing mechanism.
CO2	Explain the causes and impacts of climate change.
CO3	Describe the sources of paleoclimate information and classify the climate models.
CO4	Explain the concepts of mitigation measures against global climate change.
CO5	Prepare a report on global climate change impacts and action plans

Course Articulation Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	-	1	-	2	3	-	-	-	-	1
CO2	2	2	-	1	-	2	3	-	-	-	-	1
CO3	2	-	-	1	-	2	3	-	-	-	-	1
CO4	2	2	-	1	-	2	3	-	-	-	-	1
CO5	2	-	-	1	-	2	3	2	2	2	-	1
Avg.	**2**	**2**	-	**1**	-	**2**	**3**	**2**	**2**	**2**	-	**1**

3: High, 2: Medium, 1: Low

Suggested Activity Based Assessment (ABA) Methods

- Impact of climate change and human activities on bio-geochemical cycles.
- Impact of Indian industries on global climate change.
- Measures taken by Government of India to combat / mitigate climate change.
- Case studies on climate change.
- Preparation and presentation of IPCC reports.
- G-20 summit resolutions.
- Poster / Model making and dissemination of knowledge to school students.