

GUJARAT TECHNOLOGICAL UNIVERSITY

Environmental Engineering (17)

CLIMATE CHANGE
SUBJECT CODE: 2721715
M.E. 2nd SEMESTER

Type of course: Environmental Planning & Management

Prerequisite: Basic knowledge of global warming, greenhouse emissions

Rationale: To curb existing and expected climate impacts

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
L	T/P	P		Theory Marks		Tutorial/ Practical Marks				
			ESE (E)	PA (M)	ESE (V)		PA (I)			
					ESE	OEP	PA	RP		
3	2	2	5	70	30	20	10	10	10	150

L- Lectures; T- Tutorial/Teacher Guided Student Activity; P- Practical; C- Credit; ESE- End Semester Examination; PA- Progressive Assessment; OEP-Open Ended problem; AL-Active learning;

Learning Objectives:

- To understand the earth's climate system and the concept of global warming, the impact of climate change on society and its imitative measures

Content:

Sr. No.	Content	Total Hrs	% Weightage
1	Basics of climate change: Science of climate change, Natural climatic variability Global warming, Natural and enhanced greenhouse effect, Greenhouse gases & Carbon emissions, Climate modelling	8	20
2	Green House Gases: Carbon dioxide & climate change, Methane & climate change, Nitrous oxide & climate change, CFCs & climate change.	8	20
3	Policies and legislation: International and national legislative frameworks- UNFCCC, IPCC and Kyoto protocol: Scientific and implementation bodies of Kyoto, Kyoto mechanisms- CDM, Joint implementation and Emission Trading, Decisions of Conference of Parties (COP) and Meeting of Parties (MOP), Carbon markets- CERs, Environmental Economics- Issues include the costs and benefits of alternative environmental policies to deal with air pollution, water quality, toxic substances, solid waste, and global warming.	10	20
4	Impacts and adaptation:	8	20

	Causes and severity of impacts, Vulnerability of various sectors like water resources, agriculture, forest, energy sector, coastal zones, human health, Adaptation strategies & options		
5	Climate change mitigation: GHG emission trends, Climate change mitigation policies, Mitigation technologies for transport, infrastructure, industry, waste, energy sector , Renewable and alternative energy, Green building	8	20

Reference Books:

1. IPCC Fourth Assessment Report, Cambridge University Press, Cambridge, UK.
2. Climate Change: Science, strategies & solutions by Eileen Clausen, Vicki Arryo Cochran.
3. Climate change: a multidisciplinary approach by William Kininmouth
4. Climate change: Critical Concepts in the environment by Frank Chambers, Michael Ogle.

Course Outcome: After successful completion of the course the students shall be able to

- Investigate the impacts and explore solutions climate change has on global and local human populations and wildlife ecosystems, including threatened and endangered species.
- evaluate the various factor that shape the climate
- learn how climate change is different from past climate cycles and how satellites and other technologies are revealing the global signals of changing climate

List of Experiments:

Term work will comprise of assignments and exercises based on policies and legislations, Climate change, protocols, CDM

Design based Problems (DP)/Open Ended Problem: --

Practically demonstrate -Human causes of climate change including sources of green house gases and quantify the impact of climate change on human well being and discuss how these can be reduced

List of Open Source Software/learning website:

- <http://elearning.vtu.ac.in/>
- www.nptel.iitm.ac.in/courses/