

Subject Code: 01OE9005
Subject Name: Climate Change and Sustainable Development

Objectives: To gain the knowledge of climate change for achieving the goal of sustainable development.

Credits Earned: 3 Credits

Course Outcomes: At the end of the course student will able to:

1. Understand the connection between climate change and human activities and the physical basis of the natural greenhouse effect.
2. Discuss the policies and legislation of international and national legislative frameworks.
3. Apply sustainable development approach in industries.
4. Identify ways of achieving sustainable goals

Pre-requisite of course: To utilize knowledge of climate change for achieving the goal of sustainable development.

Teaching and Examination Scheme

Teaching Scheme (Hours)			Credits	Theory Marks			Tutorial/ Practical Marks		Total Marks
Theory	Tutorial	Practical		ESE (E)	IA (I)	CSE (C)	Viva (V)	Term work (TW)	
3	0	0	3	50	30	20	0	0	100

Contents:

Unit	Topics	Contact Hours
1	Basics of climate change Science of climate change, Global warming, Way and means, Global Carbon Cycle, Greenhouse gases & Carbon emissions, Natural and enhanced greenhouse effect, Methane & climate change, Nitrous oxide & climate change, CFCs & climate change, Comparison of various IPCC reports, important findings of IPCC AR5, Impacts of climate change – Global and India	8
2	Climate change mitigation, Carbon Capture and Sequestration (CCS) GHG emission trends, Climate change mitigation policies, Mitigation technologies for transport, infrastructure, industry, waste, energy sector, Renewable and alternative energy, Green building, Carbon Capture in Industries, Modalities and Procedures, Fossil Power Generation with CCS: Development for Technology and Deployment, CO ₂ Properties and Geological Storage, CO ₂ Storage through Enhanced Hydrocarbon recovery, Enhanced Oil Recovery (EOR), Enhanced Coal Bed Methane Recovery	14

3	Climate 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, Carbon markets- CERs, Environmental Economics	8
4	Sustainable Development Principles of Sustainable Development: Emergence of the concept of Sustainable Development, Definitions, Industrialization, Globalization and Environment; Sustainable Development Goals and International Contribution: Components of sustainability, Action plan for implementing sustainable development, Socio-economic Sustainable Development Systems, Role of developed countries in the sustainable development of developing countries, Demographic dynamics and sustainability	10
	Total	40

Reference Books:

1. Climate Change: Science, strategies & solutions by Eileen Clausen, Vicki Arryo Cochran and Debra P. Davis, 2001.
2. Climate change: a multidisciplinary approach by William James Burroughs, 2007.
3. Cites Carbon Capture: Sequestration and Storage (Issues in Environmental Science and Technology), by R E Hester and R M Harrison, 2009.
4. Introduction to Carbon Capture and Sequestration by Berend Smit, Jeffrey A Reimer, Curtis M Oldenburg and Ian C Bourg, 2014.

Suggested Theory distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery and evaluation					
Remember	Understand	Apply	Analyze	Evaluate	Create
30%	30%	20%	20%	-	-

Instructional Methods

- a. The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by white board, may also use any of tools such as collaborative learning, demonstration, role play, Quiz, brainstorming, MOOCs, Active Learning Assignments etc.
- b. The internal evaluation will be done on the basis of continuous evaluation of students in the laboratory and class-room.
- c. Viva examination will be conducted at the end of semester for evaluation of performance of students.