Course title: Science and Policy of Climate Change			
Course code: NRE 181	**No. of credits:** 3	**L-T-P:** 28-14-0	**Learning hours:** 42
Pre-requisite course code and title (if any):			
Department: Department of Natural Resources			
Course coordinator: Dr Kamna Sachdeva	**Course instructor:** Dr Kamna Sachdeva		
Contact details:			
Course type: Elective	**Course offered in:** Semester 3		

Course Description

Climate change and variability is a global concern across the boundaries. It has shaped societies and now it presents a further challenge to societies to adapt to it. The scope of the course is science and policy of climate change, with a focus on India. This course provides an introduction to the earth's climate system and its inter-relationship with various socio-economic systems. It also goes into aspects of vulnerability to and impacts of climate change and covers the response measures to combat climate change, namely adaptation and mitigation, both at policy as well as at implementation level to enable students to understand science and policy aspects of climate change in either applied or academic context.

Course objectives

1. An understanding of the earth's climate system and its inter-relationship with various socio-economic systems.
2. Understand various aspects of vulnerability to and impacts of climate change
3. Policy response measures to climate change adaptation and mitigation.

Course content

SNo	Topic	L	T	P
1.	**Scientific aspects of climate change** Introduction to Climate System- drivers of climate system, feedback mechanisms, climatic cycles, Natural variability vs. Anthropogenic forcing to climate system and concept of climate sensitivity Paleoclimatology- tree rings and ice core analysis Global warming, radiation, greenhouse gases: sources & sinks Introduction to Climate system modeling and simulations- General Circulation models and Regional circulation models	4 2 2 4	2	
2.	**Vulnerabilities to and Impacts of Climate Change** Concept of vulnerability, impacts and adaptation options, Sectoral vulnerabilities and impacts. Adaptation and sustainable development linkages.	4	4	
3.	**Policy aspects of climate change** International efforts and policy frameworks- IPCC, UNFCCC, Kyoto Protocol, their history, objectives, activities. Equity issues, Key issues in multilateral negotiations on climate change, India's national policy framework for climate change **Tutorials –** Review of select policies, mechanism, institution etc. and discussion	6	4	
4.	**Mitigation of Climate Change** CDM project cycle and modalities and procedures and global	6		

	carbon market, CO_2 sequestration, forests and other sinks in India-opportunities and concerns, Linking climate change mitigation and adaptation			
5.	**Case studies**		4	
	Total	**28**	**14**	

Evaluation criteria

- 2 Minors (15+15): 30%
- Assignments and Term paper: 30%
- 1 Major : 40%

Learning outcomes

1. An understanding of the earth's climate system and its inter-relationship with various socio-economic systems.
2. Understand various aspects of vulnerability to and impacts of climate change
3. Policy response measures to climate change adaptation and mitigation.

Pedagogical approach

Materials

Required text

1. Hard J. (2003) Climate Change: Causes, Effects and Solutions, John Wiley & Sons.

Suggested readings

1. A Climate Modeling Primer-Henderson Sellers, A & K McGuffie (1996), Chichester: Corley, (2nd Edition).
2. Climate Change: Perspectives Five Years after Kyoto–Grover V.(ed.) (2004), Hamilton, Ontario, Canada, ISBN 978-1-57808-326-8.
3. Cole B., 7th Ed. (2002) Meteorology Today: An Introduction to Weather, Climate, and the Environment–Ahrens, C D. http://www.worldclimate.com.
4. IPCC, Assessment Reports 4 (AR4), The scientific Basis Impacts, Adaptation and Vulnerability Mitigation
5. Pant G.B. and Kumar K.R. (1997) Climates of South Asia, John Wiley & Sons.

Case studies

Websites

Journals

1. Climate Change
2. Climate Dynamics
3. Earth Planet Science letters
4. Global Environmental Change, Elsevier Publication.
5. International Journal of Climatology
6. International Journal of Climate Change Strategies and Management, Emrald Publication
7. Nature
8. Science

Additional information (if any)

Student responsibilities

Attendance, feedback, discipline, guest faculty etc