

## Semester V

### Paper No- 14: Earth and Climate

#### TOPICS

Components of the climate system. Climate forcing, Climate controlling factors. Climate system response, response rates and interactions within the climate system, feedbacks in climate system. (7 lectures)

Incoming solar radiation, receipt and storage of heat, heat transformation, earth's heat budget. Interactions amongst various sources of earth's heat. (4 lectures)

Layering of Atmosphere. Atmospheric circulation. Atmosphere and Ocean interaction and its effect on climate. (5 lectures)

Heat transfer in ocean. Global Oceanic conveyor belt and related control on earth's climate. Surface and deep circulation. Sea ice, Glacial ice. (5 lectures)

Response of biosphere to earth's climate. Climate Change: natural vs Anthropogenic effects. Humans and climate change. Future perspectives. (5 lectures)

Brief introduction to archives of climate change. Archive based climate change data from the Indian continent. (6 lectures)

Milankovitch cycles and variability in the climate (6 lectures)

Glacial interglacial stages. The Last Glacial maximum (LGM), Younger Dryas. Pleistocene Glacial-Interglacial cycles; Marine isotope stages. (6 lectures)

Mechanism of monsoon, Monsoonal variation through time. Factors associated with monsoonal intensity. Effect of monsoon (4 lectures)

**12 rounds of student presentations will be arranged in Groups on different topics covered under Theory**

#### Practicals:

1. Study of distribution of major climatic regimes of India on map
2. Distribution of major wind patterns on World map
3. Preparation of paleogeographic maps (distribution of land and sea) of India during specific geological time intervals
4. Numerical exercises on interpretation of proxy records for paleoclimate

#### List of Student project work (Extendable):

1. Study on Paleo-monsoonal condition
  2. Milankovitch cycle
- Linkages between atmosphere and Ocean  
Climatic forcing and their effect on climate

**Suggested Readings:**

1. Ruddiman, W.F., 2001. Earth's climate: past and future. Edition 2, Freeman Publisher.
2. Rohli, R.V., and Vega, A.J., 2007. Climatology. Jones and Barlatt
3. Lutgens, F., Tarbuck, E., and Tasa, D., 2009. The Atmosphere: An Introduction to Meteorology. Pearson Publisher
4. Aguado, E., and Burt, J., 2009. Understanding weather