



**U.S. Pakistan Center For Advanced Studies In Energy
(USPCAS-E)**

National University of Sciences & Technology

Course Title: Energy and Climate Change

Course Code ESE- 832

Course Objectives: The objectives of this course are:

- To elaborate the fundamental concepts of climate change: Science history,
- To explain the Energy causes of Climate Change (natural and anthropogenic): Greenhouse Effect, Sources of Greenhouse Gases (transport, power generation, industry).
- To discuss in detail the Effects of Climate Change: agriculture, water, food security, ecology, human health
- To enlighten the Impacts of Climate Change: floods, droughts, extreme heat, cold waves, shifting weather patterns, hurricanes. and energy.
- To discuss the Pakistan's Policy Options and Strategy: Adaptation or Mitigation strategies. Role of renewable energy resources.
- To equip students with Pakistan's Stance in Global Negotiations

Detailed Contents:

Science of Climate Change

1. Introduction to Climate change: History, Scientific basis
2. Introduction to Earth Science: Structure, historical changes
3. Climate change Energy Causes , Effects, Scientific consequences

Impacts of Climate Change

4. Impacts of climate change on human, societies and on natural ecosystems (Agriculture, Water, Food security, Economics & energy).
5. Monitoring of global warming and changing environmental conditions
6. Vulnerability of Pakistan due to Climate Change

Addressing Climate Change (Mitigation and Adaptation)

7. Global, Regional and National Climate Change mitigation & Adaptation
8. Role of Renewable energy resources
9. Energy and transport for the future: energy efficiency; alternatives available for residential, industrial, or transportation sectors; or explorations of the decarbonization.

Climate Change Governance (Global Efforts)

- i. International dimensions of climate change (UNFCCC, IPCC)
- ii. Role of National and International Bodies
- iii. Pakistan National Climate Change Policy
- iv. Pakistan's Stance in Global Negotiations

Invited speaker Talk/Case study

Text/Ref Books:

- Comprehensive Guide to Climate Change, John Houghton -Text Book
- Energy and Climate Change: Creating a Sustainable Future, David Coley -Text Book
- Renewable Energy and Climate change 2nd addition Volker Quaschnig Ref Book
- Climate Change Profile of Pakistan Asian Development Bank Ref Book
- IPCC Assessment Reports IPCC Report