

Climate Change Adaptation & Mitigation

Course Code	Title of Course	Credit Hours
HND-216	Climate Change Adaptation and Mitigation	3(2-1)

Learning Outcomes:

Students will be able:

- To identify natural and anthropogenic drivers of climate change and interpret direct observations and scientific evidence of recent climatic variations.
- To explain the impacts of climate change on agriculture, forestry, ecosystems, water resources, society, and human health at global and regional levels.
- To evaluate adaptation and mitigation strategies to address climate change challenges, including sustainable resource management, carbon reduction, and policy interventions.

Course Contents:

Introduction, types and their climatic effects; Modeling of climate change, types of climate change models; Climate Change and Wetlands: Impacts, Adaptation and Mitigation; Basic understanding of the physical science of climate change; Climate change impacts and the human response to climate change; Adaptation to climate change; Natural and anthropogenic drivers and direct observations of recent climate change; Potential adaptation strategies in different sectors; Climate change impacts and adaptation practices for ecosystems; land use, water resources, society and human health; Climate change mitigation strategies; Carbon sequestration; Transition to carbon neutral energy sources; Geo-engineering as well as measures to increase energy efficiency; Climate change policy and social change; International climate change negotiations; Regulatory instruments; Voluntary agreements and social change; Climate change and food production; Climate change and its effects on Pakistan's agriculture, water resources, forests, etc.

Practical:

Climate Change Modeling; Impacts of Climate Change; Adaptation and Mitigation Strategies; Policy and Governance; Climate Change and Pakistan.

Suggested Readings:

Text Books

1. Pelling, M. (2010). *Adaptation to Climate Change*. Abingdon, Oxon, England; New York: Routledge. ISBN: 9780415477505.
2. Hardy, J. T. (2003). *Climate Change: Causes, Effects, and Solutions*. 1st Edition. John Wiley & Sons.
3. Houghton, J. T. (2004). *Global Warming: The Complete Briefing*. 3rd Edition. Cambridge University Press.

Reference Books

1. Parry, M. L., Carter, T. R., & Konijn, N. T. (Eds.). (2005). *Climate Impact and Adaptation Assessment: A Guide to the IPCC Approach*. Earthscan Publications Ltd., London.
2. Warrick, B., & Jäger, D. (Eds.). (1991). *The Greenhouse Effect, Climate Change and Ecosystems*. ECOPE 29. John Wiley & Sons, Chichester, UK.
3. Botkin, D., & Keller, E. (2000). *Environmental Science: Earth as a Living Planet*. 8th Edition. John Wiley & Sons.
4. Cunningham, W. P., & Saigo, B. W. (2001). *Environmental Science*. 6th Edition. McGraw-Hill.