

MANGALORE UNIVERSITY
MSc Geography

HARD CORE COURSE: GYH 402 Advanced Climatology

Course Learning Outcome:

- CO1. Understand the fundamentals climatology and climate change.
- CO2. Evaluate climate change scenarios and their impacts
- CO3. Analyses observed and projected trends and impacts of climate change.
- CO4. Evaluate the whole framework of international negotiations on climate change with reference to India's position
- CO5. Demonstrate local specific adaptation and mitigation strategies to curb climate change risk

Course Content:

Unit 1: Definitions, nature, scope and content of climatology. Elements of weather and climate. Origin, composition and structure of atmosphere. Temperature: Solar radiation principles, solar budget, greenhouse effects, horizontal and vertical distribution of temperature & inversion of temperature. Global warming and global cooling.

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Unit 2: Atmospheric pressure: Pressure gradient, Coriolis Effect, horizontal and vertical distribution of air pressure and pressure belts. Winds: planetary, monsoons, local winds, jet streams. Mechanism of monsoon. Humidity and precipitation. El-Nino and la Nina phenomena, el-nino-southern oscillation (ENSO).

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Unit 3: Air masses: Definition, nature, source region, classification of air masses. Fronts - frontogenesis and frontolysis, classification of fronts, frontal zones. Cyclones: types, tropical cyclones-Origin, types and structure of tropical cyclone. Distribution of tropical and temperate cyclones, features of temperate cyclone, source region, and origin of temperate cyclone. Polar front, study of weather disturbances through satellites.

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Unit 4: Classification of world climates: Koppen's & Thornthwaite classification. Changes in world climate: Global warming, depletion of ozone layer & greenhouse effect. Weather forecasting, problems and prospects of weather forecasting in India.

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Essential Readings

1. Adger, W. N. 2006. Vulnerability, Global Environmental Change, 16 (3), 268-281
2. Barros, Vicente R. (eds.), 2014. Climate Change 2014. Impacts, Adaptation and Vulnerability: Global and Sectoral Aspects. Fifth Assessment Report of the Intergovernmental Panel on Climate Change (Part B; Regional Aspect), Cambridge University Press, New York.
3. Barry, R.G. and Chorley, R.J. 2003. Atmosphere, Weather and Climate, Routledge, London
4. Brewster, E. N. 2010. Climate Change Adaptation: Steps for a Vulnerable Planet, New York, Nova Science
5. Critchfield, H. J. 1983. General Climatology. Prentice Hall India Ltd (2010 Reprint)
6. IPCC, 2013. Climate Change 2013: The Physical Science Basis, the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA,
7. John E Hobbs, 2016. Applied climatology: A study of Atmospheric Resources, Elsevier, London

8. Lal, D. S. 2003. Climatology, Allahabad: Sharda Pustak Bhawa
9. Oliver, J.E. 1993. Climatology: An Atmospheric Science, Pearson Education India, New Delhi
10. Trewartha G. T., 1980. An Introduction to Climate, McGraw Hill Company, New York.

