

Geog. 303 Climatology Cr. Hours (03)
BS Geography (5th to 8th Semester) Programme, University of the Punjab, Lahore

- **Introduction to Climatology**
 - Development of the science of Climatology
 - Definition, Scope and Study methods
 - Climatic Data Collection, Presentation and Analysis

- **Elements and factors of Climate**
 - Structure and Composition of Atmosphere
 - Insolation and Temperature
 - Air pressure and Winds
 - Air Masses and fronts
 - Condensations and Precipitation
 - Cyclones and Weather Disturbances

- **Classification of Climates**

BS Geography w.e.f. Academic Session 2020-2024 and onward

- Critical study of the Koppen, Miller and Thornthwaite
- Classification of major climates,
- Climatic Types; their characteristic features and geographical distribution
- **Climatic Changes and Variability**
- **Principles of micro-climatology and its application in Pakistan**
 - Applied Climatology and its application in Pakistan
 - Intentional weather modification
- **Introduction to Climate Modeling**
 - Climate Modeling and Parameterization
 - Atmospheric General Circulation modeling
 - sensitivity experiments and applications
 - Future prospects
- **Climate and Climatic Regions of Pakistan**

Books Recommended:

1. Miller A.; 2001 Climatology, Methuen New York.
2. Murry; 2000 The Ocean, McGraw Hill New York.
3. Barry. R.; 1998 Atmosphere, Weather and Climate (7th ed.) London: Clays St. Davis.
4. Strahler, A. N; 1998 Elements of Physical Geography, John Wiley New York.
5. Thompson, R.; 1997 Applied Climatology, Principles and Practice Routledge Canada.
6. Johnson H.; 1996 An Introduction to Oceanography.
7. Graedel, T.; 1995 Atmosphere, Climate and Change, Scientific American Library, New York.
8. Whyte, I; 1995 Climatic Change and Human Society Arnold Division London.
9. Byers, H. R.; 1993 General Meteorology, McGraw Hill New York.
10. Lamb, H ;1992 Climate History and the Modern World Methun & Co. Ltd. London.
11. Trenberth, K.; 1992 Climate System Modeling, McGraw Hill New York.
12. Critchfield, H.J.; 1991 General Climatology, Prentice Hall New Delhi.
13. Macleeven J.F.; 1991 Fundamentals of Weather and Climate, Chapman & Hall London.
14. Stringer, E.T.; 1989 Foundation of Climatology, Surjeet Publishers New Delhi.
15. Shamshad, K.M.; 1988 The Meteorology of Pakistan, Royal Book Co. Karachi.
16. Sellers, A. & Henderson, A.; 1986 Contemporary Climatology, Longman London.
17. Oliver, J.; 1981 Climatology: Selected Applications: Edward Arnold USA.
18. Trewartha, G.T; 1965 An Introduction to Climate, McGraw Hill New York.
19. Kendrew, W.G.; 1959 Climatology, 3rd ed. University Press Oxford.
20. Shapley, H.; 1960 Climatic Change, Evidence, Causes & Effects, Harward University Press Cambridge.
21. Petterson, S.; 1951 Introduction to Meteorology, McGraw Hill New York.
22. Haurwitz, B & Austin, J. 1944 Climatology, McGraw Hill New York.