

SEMESTER VI

GEOG. 304 CLIMATOLOGY

Course Brief:

The course provides an overview of the physical processes responsible for determining global and regional climate. This course gives a general introduction to meteorology and climatology. Meteorology topics include energy balance, moisture and cloud development in the atmosphere, atmospheric dynamics, small- and large-scale circulations, storms and cyclones, and weather forecasting. Climatology topics include the interaction between the atmosphere and oceans over long time periods, climate classification, and the potential for climatic change. It brings together information from rural communities, indigenous peoples and research workers on how they use agro-biodiversity to cope with climate change.

Course Learning Objectives:

It stimulates communication between agro-biodiversity researchers, users and maintainers. It identifies tools and practices relevant to using agro biodiversity for coping with climate change and making these widely available. It also promotes awareness of the vital role of agro biodiversity in adapting to climate change among key audiences, including donors, development agents and the global biodiversity community.

Course Contents:

I. Introduction to Climatology

- i. Development of the science of Climatology
- ii. Definition, Scope and Study methods
- iii. Climatic Data Collection, Presentation and Analysis

II. Elements and factors of Climate

- i. Structure and Composition of Atmosphere
- ii. Insolation and Temperature
- iii. Air pressure and Winds
- iv. Air Masses and fronts
- v. Condensations and Precipitation
- vi. Cyclones and Weather Disturbances

III. Classification of Climates

- i. Critical study of the Koppen, Miller and Thornthwaite
- ii. Classification of major climates of the world,
- iii. Climatic Types; their characteristic features and geographical distribution

V. Climatic Changes and Variability

V. Principles of micro-climatology and its application in Pakistan

- i. Applied Climatology and its application in Pakistan
- ii. Intentional weather modification

VI. Introduction to Climate Modeling

- i. Climate Modeling and Parameterization
- ii. Atmospheric General Circulation modeling
- iii. sensitivity experiments and applications
- iv. Future prospects

VII. Climate and Climatic Regions of Pakistan

Books Recommended:

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

Assessment			
Sr. No.	Elements	Weightage	Details
1.	Midterm Assessment	35%	Written Assessment at the mid-point of the semester.
2.	Formative Assessment	25%	Continuous assessment includes Classroom participation, assignments, presentations, viva voce, attitude and behavior, hands-on-activities, short tests, projects, practical, reflections, readings, quizzes etc.
3.	Final Assessment	40%	Written Examination at the end of the semester. It is mostly in the form of a test, but owing to the nature of the course the teacher may assess their students based on term paper, research proposal development, field work and report writing etc.