Government PG College, Ambala Cantt

Course File: 2023-24 odd semester

Name of Professor: Ajay Chauhan

Class: M.Sc. Geography_1st Semester

Subject code and Name: Geog 101_ Climatology

SYLLABUS

Maximum Marks: 100 **External: 80**

Minimum Pass Marks: External 32 and Internal 8 **Internal: 20**

Note: - There will be nine questions in all. Question No. 1 is compulsory and consists of 10 short notes (required to be answered in not more than 25 words each). Short notes shall cover entire syllabus. There will be 8 long questions, two from each unit. The candidate shall attempt FOUR long questions, one from each unit. Question 1 carries 20 marks while remaining four questions carry 15 marks each.

UNIT-I

1. Definition of weather and climate; Climatology and Meteorology.
2. Origin, composition, and structure of atmosphere.
3. Solar radiation, heat budget and temperature distribution.

UNIT-II

4. Atmospheric pressure and its distribution pattern.
5. General circulation and planetary winds, Walker circulation- ENSO and La Nina, origin of monsoons and jet streams.
6. Atmospheric Moisture: humidity, evaporation, condensation.

UNIT-III

7. Precipitation: Dynamics and types of precipitation.
8. Stability and instability of atmosphere, air masses and fronts.
9. Weather systems: Extra tropical and tropical cyclones.

UNIT-IV

10. Climatic classification: Bases of climatic classification by Koeppen, Trewartha and Thornthwaite.
11. Climatic change- Evidences and explanations.
12. Global warming and its impacts.

Suggested Readings:

1. Trewartha G. T., An Introduction to Climate, McGraw Hill Company, New York, 1980.
2. Chritehfield, H J, General Climatology, Printice Hall of India, New Delhi, 1987.
3. Barry R. G. and Chorley, R. J, Atmosphere, Weather and Climate, Marthren , 1968.

4. Lal, DS, Climatology, Chetanya Publishing House, Allahabad, 1966
5. Das, PK, The Monsoons, National Book Trust, New Delhi, 1984.
6. Ramasastry, AA, Weather and Weather Forecasting, Publication Division, New Delhi.

COURSE OBJECTIVES

The course objectives outlined are as follows:

Unit I: Introduction to Weather and Climate

1. Define and differentiate between weather and climate.
2. Understand the scope and relationship between Climatology and Meteorology.
3. Describe the origin, composition, and structure of the Earth's atmosphere.
4. Analyze the processes of solar radiation, heat budget, and temperature distribution within the atmosphere.

Unit II: Atmospheric Dynamics

5. Explain atmospheric pressure and its spatial distribution patterns.
6. Analyze the principles behind general circulation and planetary winds, including phenomena such as Walker circulation, ENSO, La Nina, monsoons, and jet streams.
7. Evaluate the factors influencing atmospheric moisture, including humidity, evaporation, and condensation.

Unit III: Precipitation and Atmospheric Stability

8. Investigate the dynamics and various types of precipitation.
9. Assess the stability and instability of the atmosphere, including the concept of air masses and fronts.
10. Analyze different weather systems, including extratropical and tropical cyclones.

Unit IV: Climatic Classification and Change

11. Compare and contrast the climatic classification systems proposed by Köppen, Trewartha, and Thornthwaite.
12. Examine the evidence and explanations for climatic changes over time.
13. Assess the impacts of global warming on climate systems and ecosystems.

These objectives aim to provide students with a comprehensive understanding of the fundamental concepts and processes in Climatology, from atmospheric dynamics to climatic classification and change, preparing them for advanced research and professional practice in the field.

Course Outcomes (COs)

1: Enhancement of knowledge about atmospheric constituents and structure.
2: Development of scientific understanding about climatic elements and their characteristics.
3: Sharpens the understanding about atmospheric moisture, stability, instability, and weather systems.
4: Enrichment of knowledge about climatic classification, climate change and global warming.

Lesson Plan

Sr. No	Topics	No. of Days	To be Completed up to	Activities
	UNIT-I			
1	1. Definition of weather and climate; Climatology and Meteorology.	10	11 September	Class Test 1
2	2. Origin, composition, and structure of atmosphere.			
3	3. Solar radiation, heat budget and temperature distribution			
	UNIT-II			
4	4. Atmospheric pressure and its distribution pattern. .	13	04 October	Assignment 1
5	5. General circulation and planetary winds, Walker circulation- ENSO and La Nina, origin of monsoons and jet streams.			Student's power point presentation
6	6. Atmospheric Moisture: humidity, evaporation, condensation			
	UNIT-III			
7	7. Precipitation: Dynamics and types of precipitation.	14	07 November	Student's power point presentation
8	8. Stability and instability of atmosphere, air masses and fronts.			Assignment 2
9	9. Weather systems: Extra tropical and tropical cyclones.			
	UNIT-IV			
10	10. Climatic classification: Bases of climatic classification by Koeppen, Trewartha and Thornthwaite.	12	30 November	Class Test 2
11	11. Climatic change- Evidences and explanations.			
12	12. Global warming and its impacts.			
	Revision	4	07 Dec. Up to exams	