

Semester I**Course: GGUT- 112: Principles of Climatology****No. of Credits: 04 No. of Periods: 60**

Topic No.	Topic	Sub topics	No. of Periods
1	Introduction to Climatology	i. Meteorology and Climatology	06
		ii. Nature and Scope of Climatology	
		iii. Development of Climatology	
		iv. Tropical Climatology	
2	Earth's Atmosphere	i. Evolution	08
		ii. Structure and composition of atmosphere	
		iii. The ozone layer depletion	
		iv. Aurora - types	
3	Insolation	i. Solar and terrestrial radiation	10
		ii. Electromagnetic spectrum	
		iii. Factors affecting insolation	
		iv. Latitudinal and seasonal variation	
		v. Effect of atmosphere	
		vi. Greenhouse effect	
		vii. Heat budget	
		viii. Mechanisms of heat transfer	
4	Temperature	i. Heat and temperature	06
		ii. Temperature measurements and controls	
		iii. Lapse rate	
		iv. Temperature inversion	
		v. Types of inversion	
5	Atmospheric Pressure and Winds	i. Pressure measurement and distribution	12
		ii. Factors affecting distribution of pressure	
		iii. Wind observation and measurement Factors affecting wind	
		iv. Geostrophic wind and Gradient wind Models of general circulation of the atmosphere Eddy	
		v. theory	
		vi. Local winds	
		vii. Jet stream	
		viii. Cyclones and Anticyclones	
		ix.	
		x.	

6	Atmospheric Moisture	<ul style="list-style-type: none"> i. Atmospheric moisture ii. Hydrologic cycle iii. Evaporation and condensation iv. Forms of condensation v. Precipitation vi. Types of precipitation vii. Measurement of humidity 	06
7	Atmospheric Stability	<ul style="list-style-type: none"> i. Lapse Rate: normal, environmental, dry adiabatic lapse rate and wet adiabatic lapse rate Stable and unstable air ii. Absolute stability iii. Absolute instability iv. Conditional instability v. 	06
8	Air Masses and Fronts	<ul style="list-style-type: none"> i. Introduction to air masses and fronts ii. Types of air masses iii. Types of fronts 	06

Reference Books:

- **Critchfield, H.J. (Rep. 2010):** General Climatology. Prentice Hall, New Delhi.
 - **Lal, D.S. (1998):** 'Climatology', Chaitanya Publishing House, Allahabad.
 - **Lutgens, Frederic K. & Tarbuck, Edward J. (2010):** 'The Atmosphere: An Introduction to Meteorology', Pearson Prentice Hall, New Jersey.
 - **Oliver, John E. & Hidore, John J. (2003):** Climatology: An Atmospheric Science, Pearson Education, Delhi
 - **Savindra Singh (2005):** Climatology, PrayagPustakBhawan, Allahabad.
 - Trewartha: Introduction to Weather and Climate.
 - **More, Pagar, Thorat (2014):** (Marathi), Elements of Climatology & Oceanography, Atharv Publication, Pune
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