GEOG-603 INTRODUCTION TO CLIMATOLOGY

Course Description:

This course introduces the study of climate, covering the processes and factors that influence climate patterns and variability. Topics include atmospheric circulation, global climate systems, climate classification, climate change, and the human impact on climate.

Learning Objectives:

1.Understand the fundamental principles and concepts of climatology.
2.Analyze the processes and factors driving global and regional climate patterns.
3.Evaluate the evidence for climate change and its potential impacts.
4. Apply climatological knowledge to real-world issues and challenges.

BLOCK 1: INTRODUCTION TO CLIMATOLOGY

1. Definition and scope of climatology, Historical development of climatological studies, Basic concepts: weather vs. climate, climate variability, climate data sources,
2. Earth's Energy Budget, Solar radiation and its distribution, Energy balance and heat transfer processes, Greenhouse effect and its role in climate regulation
3. Atmospheric Circulation, Global circulation patterns: Hadley, Ferrell, and Polar cells, Jet streams and planetary-scale wind systems, Local and regional wind systems.

BLOCK 2: CLIMATE SYSTEMS AND PATTERNS

4. Koppen and Thornthwaite’s climate classification systems

5. Climate zones and their characteristics

6. Influences of latitude, altitude, and proximity to water bodies on climate

7. Climate Variability - El Niño-Southern Oscillation (ENSO), North Atlantic Oscillation (NAO)

BLOCK 3: CLIMATE CHANGE

8. Climate Change Evidence and Causes

9. Historical climate records and proxy data, Observed trends in temperature, precipitation, and extreme weather events

10. Natural and anthropogenic drivers of climate change

11. Impacts of Climate Change on ecosystems, agriculture, and water resources, Human health, Adaptation, and mitigation strategies

BLOCK 4: CLIMATE MODELS AND PROJECTIONS

12. Overview of climate modelling

13. Scenario-based projections of future climate change

14. Uncertainty and limitations in climate modelling

Texts/Resources:
- "Principles of Climatology" by John E. Oliver
-"Climate Change: A Very Short Introduction" by Mark Maslin