Name of Programme: M. Sc. Applied Geology
Course Code: GEO-610
Title of the Course: Climate Geology
No of Credits: 02
Effective from AY: 2023-24

Prerequisites for the course	Students should have undergone M.Sc. Semester III.	
Objective	To understand the climatic variation at various scales. To understand the relationship between ocean and atmosphere and its effect on climate.	
Content	**Module 1** Introduction, scales in climate geology, subfields of climatology. Atmosphere: structure and circulation. Orbital cyclicity and climate: Milankovitch cycles and solar activity, Marine Isotopic Stages - glacial and interglacial stages, Last Glacial Maximum. Ocean dynamics: The ocean conveyor belt and its role in controlling world's climate, Coriolis force and Ekman Spiral, upwelling, El Niño, La Niña and major currents of the world's oceans. **Module 2** Monsoon: Mechanism of monsoon, monsoonal variation through time and factors associated with monsoonal intensity. Brief introduction to paleoclimate and paleoclimate reconstruction from ice cores, pollens and spores, biogeochemical proxies, corals, speleothems. Role of Antarctica and Arctic in present and past climate.	15 hours 15 hours
Pedagogy	Lectures, case studies, discussions and assignments.	
References/ Readings	1. Ahrens, C. D. (2003). *An introduction to weather, climate, and the environment.* Meteorology Today (7th ed.) Thomson/Brooks/Cole, 624pp. 2. Kump, L.R., Kasting, J.F. and Crane, R.G. (2004). *The Earth System*, 2nd ed, Prentice Hall. 3. Oerlemans, J. (2001). *Glaciers and climate change, Balkema.* Rotterdam, Netherlands. 4. Oliver, J. E. (2002). *Climatology: An Atmospheric Science, 2/e*. Pearson Education India.	
Course outcomes	1. Students will be able to discuss climate and climatic variations on various time scales. 2. Understand ocean dynamics and its role in controlling climate. 3. Understand aspects of monsoon. 4. Learn different proxies related to paleoclimate.	