MGS 454: METEOROLOGY AND CLIMATOLOGY

Skills, employability and entrepreneurship: These subjects are mainly the basis for the MSc/M.Tech in Meteorology, climatology. The main purpose of introducing these subjects are to bring to the notice of students about the weather/climate change, their extreme variability including the study of the past weather/climate. This provides the basis for predicting the future. Students with these skill can serve in different R and D labs. Research institutions and private organizations.

Meteorology

Unit 1	Elements of meteorology and their significance. Precipitation and its types, temperature, atmospheric pressure, winds and humidity. Earth's radiation balance and human interference: relationships between the Earth and the Sun. Latitudinal, altitudinal and seasonal variations in the temperature including lapse rate. Atmospheric boundary layer and turbulence. Coupled ocean-atmosphere system, El Nino Southern Oscillation (ENSO).	6 hrs
Unit 2	Descriptive meteorology: Winds- geostrophic, and distribution of global winds, regional and local winds, land-sea breezes. Atmospheric pressure and air masses of the globe. Introduction to the global monsoons, jet streams, tropical cyclones and other related phenomena. Monsoon meteorology. Rainfall, measurements and its distribution over the globe with special emphasis on India. Onset and withdrawal of monsoons. General weather systems of India.	6 hrs
Unit 3	Weather monitoring, meteorological hazards and weather modification: Thunder storms, dust storms, cloud burst, cyclones and related processes, floods, drought and famine, and pollution/hazards from aircrafts and space crafts. General weather systems of India, - cyclone and jet stream, Western disturbances and severe local convective systems, distribution of precipitation over India. Western disturbances and severe local convective systems. Utilities of satellites in meteorology. Interactive sessions of teaching to enhance students-teacher interactions through hands-on demonstrations and exercises in the recent advancement of the subject related to the curriculum.	8 hrs

Climatology

Unit 4	Principles of climatology: Differences between meteorology and climatology. Intergovernmental Panel on Climate Change.Causes of climate variation: tectonic (changes in the redistributions of continents and oceans), orbital (changes in the solar output) and sub-orbital parameters, including human factors (Changes in the concentration of Greenhouse Gases in the atmosphere).	6 hrs
Unit 5	Climate system and feedbacks. Classification of continental and oceanic climates : Greeks, Koppen's and Thornthwaite's schemes of classification. Climate and climatic zones of India. Principles of General Circulation and Climate Modelling.	6 hrs