**M. Sc. Meteorology**

**M-303: Applied Meteorology**

**UNIT-1: Air Pollution Meteorology**

Sources and Classification of air pollutants, Meteorology and air pollution. Micrometeorological studies in Air pollution - Monin – Obukhov length scale – Effects of air pollution on human health, animals, vegetation, materials and property, acid rains. Ekman-spiral characteristics, Urban Heat islands, Asian brown cloud, Forest fires. Detection of Aerosols. Modelling of Air Pollutants- Box Model, Gaussian Model, diffusion and dynamic models.

**UNIT-2: Aviation Meteorology**

Role of meteorology in aviation, SIGMET, weather hazards associated with takeoff cruising and landing, inflight – icing, turbulence, visibility, fog, clouds, rain, gusts, wind shear and thunderstorms. Understanding the Jet stream. Nowcasting and very short range forecasting. Air masses and fronts: sources, origin and classification of air masses.

**UNIT-3: Hydrometeorology**

Definition and its scope. Hydrological cycle and its components. Storm modelling, Rainfall return periods, PMP models. Rainfall-Runoff models, Flood forecasting, Drought categories and assessment techniques. Fundamentals of the evaporation and Evapotranspiration process, methods to determine evaporation: energy balance, aerodynamic; Penman-Monteith methods. Water balance techniques, stream flow analysis.

**UNIT-4: Climate Change**

Definition of climates-climate change on different time scales-decadal centuries and millennia. forcing influencing the climate and their variations. Greenhouse gases and global warming – GHGs trend, Global temperature trend, Global distribution of emissions, IPCC. The Kyoto Protocol, Climate change Extreme weather events, The Measurement of Climate Change, Global warming.

**UNIT 5: Basics of Disaster**

Disaster-Definition and Significance, Major Disaster events in India. Natural disasters: Famine, Cyclone, Tsunami, Earthquake, Volcanic eruptions, Fire and Rip currents. Disaster mitigation**:** Pre-Post disaster concept and principles of disaster mitigation - Risk assessment-Prevention, rescue and evacuation operations, Preparedness**:** evacuation, search and rescue operation, FIRSTAID. Impact of disaster on physical, economic, spatial, political and social conditions during, post disaster, recovery and risk assessment.

**Text Books:**

1 Hydrometeorology - C.J.Wiesner

2 Aviation Meteorology – Navale Pandharinath

3 Atmospheric Chemistry and Physics of Air Pollution- John H. Seinfeld

4 Causes of Climate - J.G.Lockwood

 5. Bryant Edwards (2005): Natural Hazards, Cambridge University Press, U.K

 6. Carter, W. Nick, 1991: Disaster Management, Asian Development Bank, Manila.