

Semester	AUG 2022
Open to semester	5,7,21
Course code	<b>EC3124/EC6124</b>
Course title	<b>Physics of the Atmosphere</b>
Credits	4 /4
Course Coordinator & participating faculty (if any)	Neena Joseph Mani
Nature of Course	Lectures and Tutorials
Pre-requisites	None
Objectives (goals, type of students for whom useful, outcome etc)	Understanding the concept of stability in the atmosphere is critical for appreciating the weather systems. This course provides an introduction to meteorology focusing on understanding the transfer of energy, momentum and water vapor fluxes by atmospheric circulation, thermodynamics of the atmosphere and cloud and precipitation processes.
Course contents (details of topics /sections with no. of lectures for each)	<p>Atmospheric mean state: Observed horizontal and vertical distribution of pressure, temperature, wind and humidity fields, clouds and precipitation, Global circulation features.</p> <p>Various decompositions of circulation: mean, transient and stationary eddies, basic forms of energy in the atmosphere, meridional transport of potential, kinetic and internal energy, momentum and water vapor fluxes.</p> <p>Thermodynamic state of the atmosphere : Equation of state for air, dry and moist adiabatic processes, Clausius–Clapeyron equation, entropy, potential temperature</p> <p>Understanding atmospheric convection: Static stability, conditional and convective instability, analysis of thermodynamic diagrams</p> <p>Cloud formation and precipitation processes: colligative properties of water solutions, nucleation of liquid phase and ice phase; curvature and solute effects, growth of clouds, warm and cold cloud precipitation processes.</p>
Evaluation /assessment	<p>End-Sem Examination-40%</p> <p>Mid-Sem Examination-30%</p>

	Others-Quiz/Assignment/presentation=30%%
Suggested readings (with full list of authors, publisher, year, edn etc.)	<ol style="list-style-type: none"> <li>1) Physics of the Atmosphere and Climate by Murray L Salby, Cambridge University Press (2012)</li> <li>2) Thermodynamics of Atmospheres and Oceans by Judith Curry &amp; Peter Webster, International Geophysics Series, Elsevier (1998)</li> <li>3) Physics of Climate by Jose Peixoto &amp; Abraham Oort, American Institute of Physics, NY (1992)</li> <li>4) Atmospheric Science: An Introductory Survey by JM Wallace and PV Hobbs, Academic Press (2006)</li> </ol>