Semester	AUG 2022
Open to semester	7,21
Course code	**EC4144/EC6194**
Course title	**Tropical Meteorology**
Credits	4 /4
Course Coordinator & participating faculty (if any)	Suhas Ettammal,Sibin T. P. (IITM Pune)
Nature of Course	Lectures and Tutorials
Pre-requisites	Physics of Atmosphere or Geophysical Fluid Dynamics
Objectives (goals, type of students for whom useful, outcome etc)	This is an advanced course which explores the weather and climate phenomena in the Tropics in detail. Topics on atmospheric physics and dynamics covered in the previous courses will be used to understand different climate phenomena. The course will help students explain various weather and climate variability in the tropics quantitatively
Course contents (details of topics /sections with no. of lectures for each)	Basic state of the tropics, Observational overview, Energy and moisture budgets, Tropical convection, ITCZ, General circulation of the tropics- Hadley and Walker circulation, Brewer Dobson circulation, Quasi-Biennial Oscillations. Thunderstorms: CAPE and CINE, Life cycle and structure of thunderstorm, growth of a thunderstorm to a supercell and multi-cell thunderstorm, Thunderstorm electrification –sequence of events in a discharge, the mechanism of earth – atmospheric charge balance – role of thunderstorms Tropical cyclones: Development and climatology; TC structure; Dynamics and thermodynamics of TC evolution, Observing and forecasting TCs Tropical variability: 1) Interannual Fluctuations of the Walker Circulation –El Niño/Southern Oscillation; Ocean-Atmosphere interaction in the tropics, Bjerkenes feedback; Genesis and characteristics of ENSO; Global impacts of ENSO; Indian Ocean dipole 2) Tropical Intraseasonal Oscillations: The Madden Julian Oscillations, life cycle and evolution. 3) Monsoons: annual cycle, seasonality, a conceptual

	mechanistic model of the Indian summer monsoon; ITCZ over Indian ocean – structure and movement, 30-50 day oscillations, 10-20 day oscillations, the role of the oceans in the life cycle of Indian monsoon system, ENSO and the Indian Monsoon.
Evaluation /assessment	End-Sem Examination-40% Mid-Sem Examination-40% Others-Quizzes and assignments: 20%%
Suggested readings (with full list of authors, publisher, year, edn etc.)	1. Climate and circulation of the tropics, by S Hastenrath, Kluwer Academic Publishers, 1985. 2. Monsoon Meteorology by C.P. Chang and T.N. Krishnamurti 3. El Nino, La Nina and the Southern Oscillation, George Philander, Academic press, 1990.