Semester	JAN 2022
Open to semester	4
Course code	**EC2213**
Course title	**Principles of Planetary Climate**
Credits	3 /
Course Coordinator & participating faculty (if any)	Joy Merwin Monteiro
Nature of Course	Lectures
Pre-requisites	Introduction to the Climate System and Python programming course
Objectives (goals, type of students for whom useful, outcome etc)	This course introduces a hierarchical system of mathematical models to analyse the climate system, and the basic physics behind planetary climate
Course contents (details of topics /sections with no. of lectures for each)	Energy balance in the climate system; zero dimensional energy balance model; Notion of radiating temperature; application to snowball earth dynamics and planetary habitability; Shell model, implications for surface energy balance, radiating height; Radiative transfer in planetary atmospheres; optical thickness; solutions in idealised cases; Grey gas approximation; Radiative transfer in a grey gas; radiative equilibrium; Instability of radiative equilibrium and radiative-convective equilibrium Real gases and their behaviour; atmospheric scattering; impact on climate of a planet. Energy balance in a single column model; Surface energy balance; transport of energy by dynamics; general circulation of the atmosphere and ocean as diffusive processes.
Evaluation /assessment	End-Sem Examination-30% Mid-Sem Examination-30% Others-40% Assignments%

Suggested readings (with full list of authors, publisher, year, edn etc.)	Principles of Planetary Climate by Raymond Pierrehumbert Selected research papers and popular articles