

1. Subject Code: **EP-423** Course Title: **Space and Atmospheric Science-I**
2. Contact Hours : L : 3 T : 0 P : 2
3. Examination Duration (Hrs.) : Theory : 3 Practical : 2
4. Relative Weight : CWS : 15 PRS : 15 MTE : 30 ETE : 40 PRE : 0
5. Credits : 4
6. Semester : ODD
7. Subject Area : DEC-6
8. Pre-requisite: Basic knowledge of Space and Atmosphere.
9. Objective: To impart the fundamental knowledge pertaining to space and atmosphere. Measurement of meteorological parameters using various techniques. Global warming its consequences. Effect of trace gases, aerosols on climatic conditions will be discussed.
10. Details of Course :

S.No.	Contents	Contact Hours
1.	Earth's Atmosphere: Definition of Climate, Physical factors of climate, earth sun relationship, ecliptic and equatorial plane, rotation of earth, seasons, climatic controls. Climatic classification: methods of Koppen and Thornthwaite, Microclimate-basic concepts. Layers of atmosphere, variation of temperature, pressure with height in the atmosphere. Composition of the atmosphere. Maxwell's equation & Electromagnetic wave; black body radiation law-Planck's law and Stefan-Boltzmann law and Wien's displacement law.	10
2.	Spectral Characteristic of solar and thermal infrared radiation, Geographical and seasonal distribution of incoming solar radiation, outgoing radiation, net radiation, Energy balance of earth and atmosphere; Greenhouse effect and atmospheric scattering, clouds and aerosols. Indian Climatology: Climate zones of India, Pressure, wind temperature and rainfall distribution during the four seasons. Western disturbances, fog, thunderstorm, hail, cold waves, subtropical jet stream, south-west and north-east monsoon.	12
3.	Atmospheric thermodynamics: Ideal gas equation of state; Dry air as a mixture of ideal gases; First Law: work, heat, specific heat and energy conservation; Second Law: entropy, adiabatic processes, potential temperature, Thermodynamic potentials; Thermodynamic cycles. Hydrostatic equation, scale height, geopotential, Dry adiabatic lapse rate and static stability.	10
4.	Meteorological Instrumentation: Ground based climatic station and automatic weather station for the measurement of air temperature, humidity, atmospheric pressure; wind speed, velocity and rain fall. Air borne systems for upper air observations-Rawinsonde, Radiosonde, GPS sonde-estimation of convective boundary layer height, thermodynamical parameters and construction of T-phigram; Introduction to Space borne systems for the measurement of meteorological parameters.	10
Total		42

11. Suggested Books

S.No.	Name of Books/ Authors	Year of Publication/ Reprint
1.	Hand book of the Atmospheric Science-Principles and Applications by C.N.Hewitt and Andrea V.Jackson Black, Wiley	1970
2.	Atmospheric Chemistry and Physics by John H.Seinfeld and Spyros N. Pandias., Prentice Hall	1990