

M. Sc. II Year		MPH-E305			Semester-III
ELECTIVE PAPER- I		FUNDAMENTAL ATMOSPHERIC PHYSICS			
Total Lectures	Time Allotted for End Semester Examination	Marks Allotted for Continuous Assessment	Marks Allotted for End Semester Examination (ESE)	Maximum Marks (MM)	Total Credits
60	3 Hrs	30	70	100	04

NOTE: The question paper shall consist of two sections (Sec.-A and Sec.-B). Sec.-A shall contain 10 short answer type questions of six marks each and student shall be required to attempt any five questions. Sec.-B shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Questions shall be uniformly distributed from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT-I

STRUCTURE & ELEMENTARY DYNAMICS OF ATMOSPHERE

Thermal structure of atmosphere, Composition of atmosphere, Hydrostatic equation and lapse rate, Ambient lapse rate and vertical mixing, Cloud formation and precipitation, General circulation, Forces driving horizontal motion, Geostrophic flow, Vertical wind shear, Horizontal wind shear-weather fronts, Tropical cyclone & hurricanes.

(12 Lectures)

UNIT-II

SOLAR AND TERRESTRIAL RADIATION

Physics of radiation, Interaction of light with matter, Rayleigh- and Mie- scattering, Laws of radiation (Kirchoffs law, Planck's law, Beer's law, Wien's displacement law, etc.), Solar and terrestrial spectra, UV radiation, Ozone depletion problem, IR absorption, Energy balance of the earth atmosphere system.

(12 Lectures)

UNIT-III

THE GLOBAL CLIMATE

Solar spectrum, Radiation balance and temperature of Earth's surface, Global warming and radiative forcing, Feedback effects, Role of carbon di oxide, Climate variations, Impact of global climate change, Climate change in international politics.

(12 Lectures)

UNIT- IV

SOLAR ULTRAVIOLET RADIATION & LIFE

Solar ultraviolet spectrum, The ozone filter: Chapman reactions, Reaction rates; Ozone depletion: Thinning of ozone layer and ozone holes, Chlorine cycle. Destruction of ozone by NO_x and HO_x reactions, The antarctic ozone hole: Biological impacts of ultraviolet radiation: Action spectra and damage, Absorption by DNA and proteins;(Ozone in troposphere, Montreal Protocol.

(12 Lectures)

UNIT-V

ATMOSPHERIC MEASUREMENT TECHNIQUES

Ground based measurements of temperature, Pressure and humidity, Air-born measurement of above parameters, Measurement of air, water and noise pollutions, Measurement of precipitation, Measurement of cloud parameters using Radar.

(12 Lectures)

Text Books / Reference Books

1. Physics of the Environmental - A.W. Brinkman, Imperial college Press.
2. Atmospheric Science: John M.Wallace & Peter V. Hobbs, Academic Press(2006)