ASSAM ROYAL GLOBAL UNIVRSITY

Course/Program: Pre-PhD Course Work **Semester: Paper III**

Subject Name: Atmospheric and Space Sciences

Subject Code:

Detailed Syllabus

Modules	Topics / Course content	Periods
I.	**Introductory survey of the Atmosphere**: Origin and Composition of the Atmosphere, Distribution of Pressure and Density, Ionosphere, Atmospheric Electric Field and Magnetosphere, Distribution of Temperature and Winds, Atmosphere as a Fluid and Fluid Continuum.	**10**
II.	**Atmospheric Radar and Lidar:** Radar equation and return signal, Signal processing and detection, Various type of atmospheric radars, Application of radars to study atmospheric phenomena, Lidar and its applications, Application of Lidar to study atmospheric phenomenon. Data analysis tools and techniques.	**10**
III.	**Ionosphere:** Ion production and loss, determination of ionospheric density. Magnetosphere: magnetopause, magnetotail, magnetic reconnection, plasma flow in the magnetosphere, magnetic field configuration of the Earth's magnetosphere, plasma in the Earth's middle and inner magnetosphere, Ionosphere-Magnetosphere coupling, coupling among different layers of atmosphere, perturbation at the ionosphere due to earthquake, importance of study in connection to advancement in space physics.	**10**
IV.	**Space Physics:** Introduction: early studies on geomagnetic field, ionosphere and magnetosphere, magnetospheric exploration, planetary and interplanetary exploration. Solar phenomena: structure of the Sun, Solar activity, prominences, coronal heating, Solar flares, Sunspots. Solar Wind: Properties, solar wind formations. **Space environment and its effects on biosphere:** Solar activity and its influence on Earth's atmosphere, different solar and geophysical indices, effects of solar events on troposphere: cloud formation and its activity, possible relation to thunderstorm activity, long term climate change and global warming.	**10**
Total		**40**

Text:

1. *An Introduction to Atmospheric Physics,* Andrews David G., Cambridge University Press; 2nd edition (29 April 2010).
2. *Atmospheric Science: An Introductory Survey,* John M. Wallace, Academic Press; 2nd edition (24 March 2006)
3. Introduction to Space Physics; Russell C. T., Cambridge University Press ; 1st Ed., 1995,Cambridge

References:

1. Gurnett D. A. and Bhattacharjee A.; *Introduction to Plasma Physics with space and laboratory applications*, Cambridge University Press, 1st Ed., 2005,Cambridge.
2. Robert J. G. and Rutherford P. H.; *Introduction to Plasma Physics*, IOP Publishing Ltd, 1st Ed. (Reprint) 1995, Philadelphia