SARDAR PATEL UNIVERSITY
Programme & Subject: M.Sc (Earth Science)
Semester: I
Syllabus with Effect from: June - 2014

Paper Code: PT01EESC01	Total Credit: 4
Title Of Paper: Planet Earth & Its Subsystems	

Unit	Description in Detail	Weightage (%)
I	**Dynamic interacting subsystems:** The Earth and the Solar System: Milky Way and the Solar System. Modern theories on the origin of the Earth and other planetary bodies. Earth's orbital parameters, Kepler's laws of planetary motion. A holistic understanding of planet Earth; lithosphere (crust, mantle and core), hydrosphere, atmosphere, cryosphere, magnetosphere and biosphere. Distribution of chemical elements in the solar system and on the Earth, chemical differentiation and composition of the Earth, Origin, basic properties and significance of the geo-magnetic field. atmosphere and oceans. Age of the Earth radioactive isotopes and their applications in earth sciences. Basic principles of stratigraphy. Theories about the origin of life and the nature of fossil record. Earth's gravity and magnetic fields and its thermal structure: Concepts of Geoid and, spheroid; Isostasy. Geological Time Scale; Space and time scales of processes in the solid Earth.	25%
II	**Earth's Atmosphere and Radiation budget** Atmospheric turbulence and boundary layer. Structure and chemical composition of the atmosphere, lapse rate and stability, scale height, geopotential, greenhouse gases and global warming. Cloud formation and precipitation processes, air-sea interactions on different space and time scales. Insolation and heat budget, radiation balance, general circulation of the atmosphere and ocean.Climatic and sea level changes on different time scales. Coupled ocean- atmosphere system.El Nino Southern Oscillation (ENSO).Marine and atmospheric pollution, ozone depletion.	25%
III	**The ocean sub-system** Oceans - Basic physical features, hypsography, Ocean currents and the Coreolis forces, waves and tides, mean-sea-level and ecstasy, The upper ocean, the coupled air-sea system and interactions. The ocean bottom surface and minerals, Paleoclimatic indicators, Geological records. Physical and chemical properties of sea water and their spatial variations. Residence times of elements in sea water. Ocean currents, waves and tides, important current systems, thermohaline circulation and the oceanic conveyor belt. Major water masses of the world's oceans. Biological productivity in the oceans.	25%
IV	**Geophysical Fluid Dynamics** Equation of motion for a rotating stratified theory, scaling analysis, potential vorticity dynamics line Motion of fluids, waves in atmospheric and oceanic systems. waves, energetic and instability theory with application to the mean circulation and venturing	25%

Basic Text & Reference Books:-

- An Introduction to Dynamic Meteorology, J. R. Ho Hon. Academic Press.
- Atmosphere Ocean Dynamics, Adrian E. Gill, Academic Press.
- Planet Earth, Cesare Emiliani, Cambridge University Press (Low Priced Edition)
- Atmosphere Ocean Dynamics, Adrian E. Gill, Academic Press.