Course: Introduction to Atmospheric and Space Sciences

Course Code: noc20-ph11

Session: 2019-20

Duration: 12 Weeks

Assessment procedures: Weekly Assignment (25%) + proctored certification Exam (75%)

Curriculum of the Course:

Week 1 : Atmospheric evolution, solar radiation, present day atmospheric constituents, various stages in the evolution of earth's atmosphere, formation of ozone, carbon budget, oxygen chemistry and life on earth.

Week 2 : Variation of temperature with height, density and ionization with altitude, classification of atmosphere based on temperature and pressure, hydrostatic equation, hypsometric equation

Week 3 : Fundamental forces, non-inertial forces, momentum equations governing the motions in atmosphere, curvature effect, various scales of atmospheric motions.

Week 4 : Hydrostatic equilibrium, hypsometric equation, geopotential height, thermodynamic system, equilibrium state, stability, gas laws, Avogadro hypothesis, gas constant, dry air, mixture of gases, mean molecular mass, humidity variables, moist air, virtual temperature

Week 5 : Enthalpy, adiabatic processes, air parcel, mixing ratio and specific humidity, saturation vapor pressure, relative humidity, dew point, frost point, lifting condensation level, wet-bulb temperature, latent heats

Week 6 : Pseudo-adiabatic processes, equivalent potential temperature, parcel lapse rates, convection of air, collision and coalescence processes, cloud formation, ascent of clouds and types, cloud morphology, cloud classification

Week 7 : Atmospheric stability conditions, Brunt-vaisala frequency, stable, unstable and neutral atmosphere

Week 8 : Cloud seeding and precipitation, Droplet growth, curvature effect and solute effect, radial growth of droplets by diffusion

Week 9 : Earth's upper atmosphere, Ionosphere, various layers and chemistry of ionosphere, types of reactions, Chapman's theory of layer production

Week 10 : Hydrogen in ionosphere, Debye's shielding and Debye's potential

Week 11 : Particle motion in uniform electric field, particle motion in uniform magnetic field and guiding center, particle motion in gradient magnetic fields

Week 12 : Gradient drift and curvature drift, vacuum drift and planetary ring current, magnetic mirroring and loss cone, airglow and aurora.

List of students enrolled

1	Poonam Vijay
2	Pranav Parashar
3	Prateek Goyal
4	Rohit Kumar Meerwal
5	Vinay Vyas
6	Vishal Bothra