

# Introductory Course in Physical Sciences

IC/105

Credits 3

**Unit 1 Earth:** Hypothesis about the origin of Earth, Geological time scale, Position of Earth in the Solar system, origin, size, shape, mass, density, rotational and revolution parameters and its age.

**Universe:** Constellation, Galaxy- Milky way, Solar systems, Planets, Satellites- natural and artificial, geostationary satellite. Asteroids, Comets, Meteoroids, Blackhole. General characteristics of Universe: physical properties, composition: ordinary matter, dark matter and dark energy, particles- hadrons, leptons and photons. origin of the Universe: Big bang theory and its chronology.

**Unit 2 Energy and Chemistry:** Brief discussion of fossil fuels and their limitations, biofuels and Nuclear energy: Nuclear reaction- Fission and Fusion.

**Alternate Sources of Energy:** Need for renewable sources of energy, Qualitative ideas of: Wind energy, Tidal energy, Wave energy, Ocean thermal energy, Geothermal energy and Hydroelectricity.

Solar energy: Sun as source of Energy, solar radiation and its spectral distribution, solar pond and their application, solar water heater, solar distillation, solar cooker, solar cell.

Photovoltaic cell: principal and characteristics of photovoltaic system, photovoltaic models.

**Unit 3 Chemicals in food:** Minerals, food preservatives, artificial sweetening agents, antioxidants and edible colours.

**Agrochemicals:** Fertilizers, herbicides, and pesticides (different types and uses).

**Dyes, Ceramics, Polymers and Plastics:** Different varieties, their properties and uses.

**Soap and Detergents:** Classification, properties and uses. Cleansing action of soap, hardness of water, effect of hardness and softening of hard water.

**Chemicals in medicine and health care:** Brief discussion of Drug-target interaction, Analgesics, tranquilizers, antiseptics, disinfectants, antimicrobials, birth control pills, antihistamines, antibiotics and antacids.

## Suggested Readings

1. H. Jay Melosh: *Planetary Surface Processes*, Cambridge University Press, 2011.
2. C. Emiliani: *Planet Earth, Cosmology, Geology and the Evolution of Life and Environment*. Cambridge University Press, 1992.
3. G. D. Rai: *Non-Conventional Energy Sources*, Khanna Publishers, New Delhi (latest edition).
4. Kirpal Singh: *Chemistry in Daily Life*, PHI Learning Private Ltd, New Delhi.
5. G.D. Gem Mathew: *Chemistry in Everyday Life*, Vishal Publishing Co.
6. Shardendu Kislaya: *Chemistry in Everyday Life*, Discovery Publishing House Pvt. Ltd., New Delhi.
7. Frank D Stacey and Paul M Davis: *Physics of the Earth*, Cambridge Univ. Press, 2014.
8. N K Giri: *Alternate Energy*, Khanna Publishers, 2012.
9. Vikram Singh: *A book of Earth Science*, Rajesh Publications.