VMADDPH03 – OBSERVATIONAL ASTRONOMY

Add-on Course (30 hrs)

Offered by

DEPARTMENT OF PHYSICS

VIMALA COLLEGE (AUTONOMOUS), THRISSUR

COURSE OUTCOME

- To impart a scientific understanding on astronomy
- To acquire an ability to distinguish astronomy from astrology
- To be aware of astronomical instruments
- To gain practice wisdom through night sky watch sessions

SYLLABUS (30 hours)

Module I: Overview of Astronomy (8 hours)

Origins of astronomy, night sky, celestial sphere, Constellation, zodiac constellation, magnitudes - apparent, absolute, bolometric, radiometric magnitudes, colour, solar system, planets and their satellites, minor bodies in the solar system: asteroids, Kuiper Belt, comets, Earth's motion, Moon and its motion

Module II: Galaxies (6 hours)

Visual structure, formation of spiral arms, star formation in arms, The galactic center, nebulae, Stellar populations in galaxies; Galax distances, age universe, Hubble expansion, Big Bang, stars and their evolutionary tracks, mass gain and mass loss, end states of stars: red giant, ABG stars, white dwarfs, high mass stars, neutron stars

Module III: Sun (5 hours)

Structure and appearance of the sun, composition, limb darkening, granulation, faculae, convection cells, sunspots, solar chromosphere and corona, sun's magnetic field, Sun-Earth interactions on satellites and weather phenomena

Module IV: Spatial Orbit and Instrumentation (5 hours)

Interplanetary orbit, Hohmann transfer orbit, geosynchronous orbit, geo-stationary orbit, polar orbit, walking orbit, sun-synchronous orbit; space-craft specification, astronomical telescopes, physical limits of telescopes, types of astronomical instruments

Module V: Measurement of time in Early Astronomy (6 hours)

Solar and moon calendar, identify time, season and age, birth star, origin and expansion of astrology, planets used and its belief, Astronomy and Astrology, Astrology as pseudo-science

Practical:

1. Finding the latitude of a place by noting the altitude of the pole star
2. Suns declination
3. Measurement of the Solar angular diameter
4. Number of Sun spots and observing the phenomenon of Solar limb darkening by means of a photocell
5. Scintillation of the Stars
6. Identification of constellations, ecliptic, equinox, and some prominent stars using star chart
7. Telescope alignments and various mountings, measurements of magnitudes of stars

Mode of Evaluation:

The mode of evaluation towards attaining a certificate shall be based on continuous assessment which includes:

Assignments - 1 (written), 1 (practical)

Assessments - 1 (descriptive), 1 (objective)

Reference Books

1. Astronomy-Andrew Fraknoi, David Morrison and Sidney C. Wolff-OpenStax, Rice University
2. Philip's Astronomy Encyclopedia-Patrick Moore-Octopus Publishing Group 2002
3. Astronomy - Principles and Practice - A. Roy, D. Clarke- Institute of Physics Publishing