

DEPARTMENT OF PHYSICS

VALUE ADDED COURSE

Semester	Course Code	Course Title	Hours
III	22UPHVAC1	GLIMPSES OF ASTRONOMY	30

Course Outcomes:

At the end of the course, the students

- CO1. will have a correct perspective of our planetary system
- CO2. will appreciate the features of our sun, stars, pulsars and the whole cosmos
- CO3. would have understood stellar evolution, birth of galaxies, super nova and inter stellar extinction etc.
- CO4. would have learnt the classification of stars, galaxies, spiral structure of our own galaxy, the milky way
- CO5. would become familiar with principles of astronomy, cosmological models and instrumentation details

Unit – I: Our Star – The Sun

6 Hours

Physical Properties of the Sun – Structure of the Sun – Solar Atmosphere – Photosphere – Chromosphere – Corona – Energy flow in the Sun – Sunspots – Sunspot cycle – Butterfly diagram – Solar wind - Auroras – Solar Prominences – Solar Flares - Space weather effects.

Unit – II: The Universe of Stars

6Hours

Birth of Stars –Stellar evolution and the Hertzsprung-Russell diagram – Stellar Anatomy-Spectral classification of Stars – Luminosity of a Star - Supernova explosion – Observational evidence of Stellar evolution - Black holes –Neutron Stars – Pulsars - Activity: # Sky watching with Celestron Telescope AstroMaster 130 EQ#.

Unit – III: Our Planetary System and the Moon

6 Hours

Introduction - Mercury – Venus - Earth – Mars – Jupiter - Saturn - Uranus and Neptune. The Moon – The Lunar surface - The Lunar interior – Eclipse - Lunar Eclipse – Solar Eclipse

Unit – IV: System of Galaxies

6Hours

Classification of Galaxies – Elliptical, Spiral, Barred spiral and Irregular galaxies – Milky Way Galaxy – Galactic clusters – Rotation and Mass distribution – Rotation curve and Doppler shift - Spiral structure in the Milky Way – Optical and Radio tracers of spiral structure.

Unit – V Cosmology and Astronomical Instruments

6 Hours

Cosmological models – Big Bang theory – Steady State theory – Hubble’s law – Olber’s Paradox – Interstellar extinction – Dark matter.
Refracting telescope – Reflecting telescope – Radio telescope – Spectrograph – Photographic Photometry – Photoelectric Photometry - Spectrophotometry – Detectors and Image processing.

Self Study

Books for Study:

Concepts of Astrophysics by Dr.A.Mujiber Rahman, SciTech Publications(India) PVT. LTD.

Unit I : Page Nos. 2.1 – 2.28

Unit II : Page Nos. 3.1 – 3.24

Unit III b : Page No. 4.15 – 4.19

Unit III a

<https://www.sisd.net/cms/lib/TX01001452/Centricity/Domain/834/Astronomy%20textbook%20Part%201.pdf> : Page No. 21 - 46

Unit IV : Page Nos. 5.1 – 5.26

Unit V : Page Nos. 6.1 – 6.13, 7.4 – 7.19

Book for Reference: Astrophysics of the Solar System - KD Abhyankar, Universities Press India Pvt. Ltd. Hyderabad, 1999.

Semester	Course Code	Course Title	Hours
V	22UPHVAC2	NON-DESTRUCTIVE TESTING – RADIOGRAPHY TECHNIQUE	30

Course Outcomes:

At the end of the course, the students

- CO1. would have learnt the fundamental principles of radiographic testing
- CO2. could identify the various radiation sources, their attenuation and effects
- CO3. could appreciate radiographic imaging and inspection studies
- CO4. would become familiar with units of radiation, limits of radiation exposure radiation monitoring and control
- CO5. would have learnt the principles and application of neutron radiography

UNIT I: Radiographic testing 6 Hours

Fundamental principles – general procedure for radiographic testing – different forms of radiographic testing – personal safety and radiation protection – applications – range and limitations

UNIT II: Radiography Sources 6 Hours

Basic principle – electromagnetic radiation sources – X-ray source – production of X-rays – high energy X-ray source – gamma ray sources – properties of X- and gamma rays – Radiation attenuation – effect of radiation in film

UNIT III: Radiographic imaging and inspection techniques 6 Hours

Imaging: Geometrical factors – radiographic film – intensifying screens – film density – radiographic sensitivity – penetrometer – determining radiographic exposure
Inspection: Single wall single image technique – double wall penetration technique – latitude technique – special techniques

UNIT IV: Applications and safety 6 Hours

Applications of radiographic inspection – limitations – real time radiography – radiation units – limits for radiation exposure – methods for exposure control – radiation monitoring - standards

UNIT V: Neutron radiography 6 Hours

Principle – neutron sources – moderator and collimator – neutron detection – Indirect or Transfer Imaging Techniques – Direct Neutron Imaging – Radioscopy – Neutron Computed Tomography – Other Neutron Imaging Techniques – Contrast Agents – Regulatory Control – general and aerospace Applications

BOOKS FOR STUDY:

Units	Title of the Book	Page No.
Unit – I	International Atomic Energy Agency, Vienna , Non-destructive Testing: A Guidebook for Industrial Management and Quality Control Personnel, 1999, Austria	86-100
Unit – II	Baldev Raj, T. Jayakumar and M.Thavasimuthu, Practical Non-Destructive testing, second Edition 2002, Narosa Publishing House, New Delhi	54 - 70
Unit – III		
Unit – IV		
Unit – V	Harold Berger , Neutron Radiography, Nondestructive Testing Information Analysis Center publications, 1998, Louisiana State	8 – 21, 30-39, 47-49

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