

SPECIMEN OF ACADEMIC PLANNER & UNITIZATION OF SYLLABUS

Department of PHYSICS

Bankura Christian College

ACADEMIC YEAR 2023 (Semester: 6th SEM (H))

6th Semester (H) (March 2023 to June 2023) [Electromagnetic Theory + Physics of Earth]

[C13/ T13 + DSE T5]

Submitted by: Dr. Chinmoy Taraphdar

Electromagnetic Theory (C13/ T13) [Ch.4+Ch.5+ Ch.6]:

4.Polarization of Electromagnetic Waves:

Description of Linear, Circular and Elliptical Polarization. Propagation of E.M. Waves in Anisotropic Media. Symmetric Nature of Dielectric Tensor. Fresnel's Formula. Uniaxial and Biaxial Crystals. Light Propagation in Uniaxial Crystal. Double Refraction. Polarization by Double Refraction. Nicol Prism. Ordinary & extraordinary refractive indices. Production & detection of Plane, Circularly and Elliptically Polarized Light. Phase Retardation Plates: Quarter-Wave and Half-Wave Plates. Babinet Compensator and its Uses. Analysis of Polarized Light Rotatory Polarization: Optical Rotation. Biot's Laws for Rotatory Polarization. Fresnel's Theory of optical rotation. Calculation of angle of rotation. Experimental verification of Fresnel's theory. Specific rotation. Laurent's half-shade Polarimeter. Electro-optic and magneto-optic effects: Faraday effect. Verdet's constant. Kerr effect. Kerr cell as a fast optical shutter. Use of a Kerr cell in the determination of the speed of light. Pockels effect.

5.Wave guides:

Planar optical wave guides. Planar dielectric wave guide. Condition of continuity at interface. Phase shift on total reflection. Eigenvalue equations. Phase and group velocity of guided waves. Field energy and Power transmission.

6.Optical Fibres:

Numerical Aperture. Step and Graded Indices (Definitions Only). Single and Multiple Mode Fibres (Concept and Definition Only).

Physics of Earth: (DSE T5) [Ch.3 + Ch.4]:

3.Dynamical Processes:

The Solid Earth: Origin of the magnetic field. Source of geothermal energy. Convection in Earth's core and production of its magnetic field. Mechanical layering of the Earth. Introduction to geophysical methods of earth investigations. Concept of plate tectonics; seafloor spreading and continental drift. Geodynamic elements of Earth: Mid Oceanic Ridges, trenches, transform faults and island arcs. Origin of oceans, continents, mountains and rift valleys. Earthquake and earthquake belts. Volcanoes: types products and distribution. The Hydrosphere: Ocean circulations. Oceanic current system and effect of coriolis forces. Concepts of ecstasy, tend- air-sea interaction; wave erosion and beach processes. Tides. Tsunamis. The Atmosphere: Atmospheric circulation. Weather and climatic changes. Earth's heat budget. Cyclones. Climate: Earth's temperature and greenhouse effect. Paleoclimate and

recent climate changes. The Indian monsoon system. Biosphere: Water cycle, Carbon cycle, Nitrogen cycle, Phosphorous cycle. The role of cycles in maintaining a steady state.

4.Evolution:

Nature of stratigraphic records, Standard stratigraphic time scale and introduction to the concept of time in geological studies. Introduction to geochronological methods in their application in geological studies. History of development in concepts of uniformitarianism, catastrophism and neptunism. Law of superposition and faunal succession. Introduction to the geology and geomorphology of Indian subcontinent. Time line of major geological and biological events. Origin of life on Earth. Role of the biosphere in shaping the environment. Future of evolution of the Earth and solar system: Death of the Earth.

MONTH/YEAR	WEEK	PORTIONS
March 2023	3	Polarization of Electromagnetic Waves: Description of Linear, Circular and Elliptical Polarization. Propagation of E.M. Waves in Anisotropic Media. Symmetric Nature of Dielectric Tensor. Fresnel's Formula. Uniaxial and Biaxial Crystals. Light Propagation in Uniaxial Crystal. Double Refraction. Polarization by Double Refraction.
	4	Polarization of Electromagnetic Waves: Nicol Prism. Ordinary & extraordinary refractive indices. Production & detection of Plane, Circularly and Elliptically Polarized Light. Phase Retardation Plates: Quarter-Wave and Half-Wave Plates. Babinet Compensator and its Uses.
MONTH/YEAR	WEEK	PORTIONS
April 2023	1	Polarization of Electromagnetic Waves: Analysis of Polarized Light Rotatory Polarization: Optical Rotation. Biot's Laws for Rotatory Polarization. Fresnel's Theory of optical rotation. Calculation of angle of rotation.
	2	Polarization of Electromagnetic Waves: Experimental verification of Fresnel's theory. Specific rotation. Laurent's half-shade Polarimeter. Electro-optic and magneto-optic effects:
	3	Polarization of Electromagnetic Waves: Faraday effect. Verdet's constant. Kerr effect. Kerr cell as a fast optical shutter. Use of a Kerr cell in the determination of the speed of light. Pockels effect.
	4	Wave guides: Planar optical wave guides. Planar dielectric wave guide. Condition of continuity at interface. Phase shift on total reflection. Eigenvalue equations. Phase and group velocity of guided waves. Field energy and Power transmission.

MONTH/YEAR	WEEK	PORTIONS
May 2023	1	Optical Fibres: Numerical Aperture. Step and Graded Indices (Definitions Only). Single and Multiple Mode Fibres (Concept and Definition Only).
	2	Dynamical Processes: The Solid Earth: Origin of the magnetic field. Source of geothermal energy. Convection in Earth's core and production of its magnetic field. Mechanical layering of the Earth. Introduction to geophysical methods of earth investigations. Concept of plate tectonics; seafloor spreading and continental drift.
	3	Dynamical Processes: Geodynamic elements of Earth: Mid Oceanic Ridges, trenches, transform faults and island arcs. Origin of oceans, continents, mountains and rift valleys. Earthquake and earthquake belts. Volcanoes: types products and distribution. The Hydrosphere:
	4	Dynamical Processes: Ocean circulations. Oceanic current system and effect of Coriolis forces. Concepts of ecstacy, tend-air-sea interaction; wave erosion and beach processes. Tides. Tsunamis. The Atmosphere: Atmospheric circulation.
MONTH/YEAR	WEEK	PORTIONS
June 2023	1	Dynamical Processes: Weather and climatic changes. Earth's heat budget. Cyclones. Climate: Earth's temperature and greenhouse effect. Pale climate and recent climate changes. The Indian monsoon system. Biosphere: Water cycle, Carbon cycle, Nitrogen cycle, Phosphorous cycle. The role of cycles in maintaining a steady state.
	2	Evolution: Nature of stratigraphic records, Standard stratigraphic time scale and introduction to the concept of time in geological studies. Introduction to geochronological methods in their application in geological studies. History of development in concepts of uniformitarianism, catastrophism and neptunism.
	3	Evolution: Law of superposition and faunal succession. Introduction to the geology and geomorphology of Indian subcontinent. Time line of major geological and biological events. Origin of life on Earth. Role of the biosphere in shaping the environment. Future of evolution of the Earth and solar system: Death of the Earth.
	4	Practice Class Test – 1