KOLHAN UNIVERSITY, CHAIBASA

FYUGP

GEOLOGY MAJOR

SEMESTER I

MAJOR COURSE – MJ01 (Credits: Theory-03, + Practicals-01)

Marks: 15(5 Attd. + 10 SIE: 1Hr) + 60 (ESE: 3Hrs) = 75	Pass Marks: Th (SIE+ESE) = 30

EARTH SYSTEM SCIENCE Theory: 45 Class Hours

Learning Objectives

1. To provide a fundamental understanding of the Earth in the solar system along with its origin, evolution, and different components; to understand the potential field associated with earth; the evolution of life through geological time scale.

Learning Outcomes

After the completion of the course, the students will be able to:

1. Acquire the fundamental understanding of the Earth and its components, thorough an understanding of materials and processes of the earth, and apply the knowledge of earth science to address societal issues.

Course Content:

The emphasis of course is on applications in solving problems of interest to physicists. The students are to be examined entirely on the basis of problems, seen and unseen.

Unit 1: (12 Class hours)

Earth as a planet: holistic understanding of dynamic planet 'Earth' through Geology. Introduction to various branches of Earth Science. General characteristics and Origin of the Universe, Solar System, and its planets. The terrestrial and Jovian planets. Meteorites and Asteroids. Earth in the solar system- Origin, size, shape, mass, density, rotational and revolution parameters, and age.

Unit 2: (08 Class hours)

Interior of Earth: internal Structure of the early Earth's magnetic field: Convection in Earth's core and production of its magnetic field.

Unit 3: (13 Class hours)

Plate Tectonics: Concept of plate tectonics, sea-floor 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 their distribution.

Unit 4: (12 Class hours)

Hydrosphere and Atmosphere: introduction to hydrosphere and atmosphere; Oceanic current system and effect of Coriolis force; Wave erosion and beach processes; Atmospheric circulation; Earth's heat budget.

Soils: processes of formation, soil profile and soil types.

Reference Books:

1. Duff, P. M. D., & Duff, D. (Eds). (1993). Holmes' principles of physical geology. Taylor & Francis.
2. Emiliani, C. (1992). Planet earth: cosmology, and the evolution of life and environment. Cambridge University Press.
3. Gross, M. G. (1977). Oceanography: A View of the Earth.
4. Krishnan, M. S. (1982). Geology of India and Burma, C.B.S. Publication, Delhi.
5. Kumar, R. (1991). Fundamentals of Historical Geology and Stratigraphy of India. New Age International Publication.
6. Wadia, DN (1919). Geology of India, Macmillan publication.
7. Holmes, A. (1945). Principles of Physical Geology. Thomas Nelson and Sons Ltd. London Edinburgh Paris Melbourne, Toronto and New York.

GEOLOGY PRACTICAL – MJ 1 LAB

Marks: Pr (ESE: 3Hrs) = 25	Pass Marks: Pr (ESE)= 10

PRACTICALS: 30 Class Hours

1. Study of major geomorphic features and their relationship with outcrops through physiographic models.
2. Detailed study of topographic sheets and preparation of physiographic description of an area
3. Study of soil profile of any specific area (Jharkhand)
4. Study of distribution of major lithostratigraphic units on the map of India.
5. Study of distribution of major dams on the map of India and their impact on river systems

Reference Books:

1. Laboratory manual of Geology- A. K. Sen (Modern Book Agency Pvt. Ltd. Calcutta)
2. Singh, R. P. (1995) Structural Geology: A Practical Approach, Ganga Kaveri Publication House, Varanasi. 133p.
3. Benison, G.M. (1990): An Introduction to geological Structures and Maps, Fifth Edition, Edward Arnold. London. 5th edition, 67p.

KOLHAN UNIVERSITY, CHAIBASA

FYUGP

GEOLOGY MINOR

SEMESTER I

MINOR (MN 1)

(Credits: Theory-03, + Practicals-01)

Marks: 15(5 Attd. + 10 SIE: 1Hr) + 60 (ESE: 3Hrs)= 75	Pass Marks: Th (SIE+ESE)= 30

ESSENTIALS OF GEOLOGY AND MINERALS

Theory: 45 Class Hours

Learning Objectives

1. To provide a fundamental understanding of the Earth in the solar system along with its origin, age, and its internal structure; various physical processes; concepts of plate tectonics; concepts of minerals, fossils, and rocks and its different types.

Learning Outcomes

After successful completion of the course, the students are expected to:

1. Acquire the fundamental understanding of the Earth and its components, thorough an understanding of materials, fossils and rooks and processes of the earth surface such as earthquake and volcanoes, and apply the knowledge of earth science to address societal issues.

Course Content:

Unit 1: (12 Class hours)

Introduction to Geology, scope, sub-disciplines and relationship with other branches of Sciences, Earth in the solar system: Origin. Solar System-Introduction to Various Planets-Terrestrial and Jovian Planets, Internal constitution of the Earth: core, mantle and crust

Unit 2: (12 Class hours)

Convention in the Earth's core and production of the magnetic field; Earthquake: causes, effects and distribution; Volcanoes: types, products and distribution, Introduction to hydrosphere, biosphere and atmosphere; Origin of mountains; Elementary idea about Plante tectonics.

Unit 3: (11 Class hours)

Age of the Earth: Radioactivity and its application in determining the age of the Earth. Basic concept of:

- Rocks: types with examples
- Minerals: Definition and Classification.
- Fossils: Mode of preservation and uses.

Unit 4: (10 Class hours)

Minerals: Definitions, Classification and Physical properties of minerals. Mineral structures. Silicate Structure. Nature of light and principles of optical mineralogy. Classification of minerals based on optical properties; Petrological Microscope; optical properties of minerals.

Reference Books:

1. Holme's Principles of Physical Geology (1992). Chapman & Hall.
2. Emiliani, C. (1992). Planet Earth, Cosmology, Geology and the Evolution of Life and Environment. Cambridge University Press.
3. Gross, M. G. (1977). Oceanography; A view of the Earth, Prentice Hall.
4. Earth Materials-Introduction to Mineralogy and Petrology, Cornelis Klein and Anthony Philpotts, Cambridge University Press, 2013.
5. Understanding Earth (Sixth Edition), John Grotzinger and Thomas H. Jordan, 2010, W.H. Freeman and Company, New York.

GEOLOGY PRACTICAL – MN 1 LAB

Marks: Pr (ESE: 3Hrs) = 25	Pass Marks: Pr (ESE)= 10

PRACTICALS: 30 Class Hours

1. Contour maps: profile drawing, identification and description of important topographical features.
2. Physical properties of minerals: Study and Documentation.
3. Study of physical properties of important rock-forming minerals in hand specimen:
4. Plotting of major Dams on the outline map of India, mention the name of the river and utility of the dam.
5. Study of Seismic Zones of India.
6. Observation and documentation of important structures of sedimentary and metamorphic Rocks.

Reference Books:

1. Laboratory manual of Geology- A. K. Sen (Modern Book Agency Pvt. Ltd. Calcutta)
2. Singh, R. P. (1995) Structural Geology: A Practical Approach, Ganga Kaveri Publication House, Varanasi. 133p.
3. Benison, G.M. (1990): An Introduction to geological Structures and Maps, Fifth Edition, Edward Arnold. London. 5th edition, 67p.
