

Compulsory (Practical Knowledge/skill-1) Fourth Semester
LAND RESOURCES

UNIT-I

Physical Elements: Soil, Soil components, types and properties, major types of soil, soil formation, soil texture, porosity, acidity, Soil erosion: Natural and human induced, desertification Types of Land Use: Agricultural Land: For food and crop production. Forest Land: For timber, biodiversity, and ecosystem services. Grazing Land: For livestock. Wasteland: Unused or degraded land. Built-up/Urban Land: For housing, industries, roads, and settlements.

UNIT-II

Land Degradation: Clearing forests for other uses. Urbanization: Expansion of cities consuming land. Mining: Destruction of vegetation and water systems with respect to sewage water. Soil conservation and land use control: contour farming, terracing, strip cropping, gully reclamation, land use classification, restoring soil fertility. Soil contamination, irrigation problem, salinization and water logging, contamination by hazardous waste,

References;

1. Resource Conservation and Management by G Tyler Miller *Wadsworth Publishing company -1989*
2. Methodology for land use planning – N C Gowtham -2001
3. Technical Guidelines for mapping- IRIS-DA NRSA-2003
4. Sustainable Management of Land Resource - An Indian Perspective- G P Obey reddy e., al 2021
5. Land Resources –Now and Future – Anthont Young

Land Resources – Process, degradation and evolution- HS Sharma and S Padmaja

Open Elective: Industrial Minerals

Unit-I

Introduction to minerals and rocks: Introduction to rock forming and economically important minerals. Principles of rock cycle, origin and classification of economically important mineral deposits. Properties of minerals and rocks, and their occurrences: Physical properties, chemical composition, and diagnostic criteria for the identification of minerals. Ore minerals and gangue minerals, tenor and grade of the ore for industrial processing of minerals. Selection criteria followed for quarrying of decorative and dimensional rock blocks/slabs. National mineral policy.

Unit-II

Properties, occurrences and distribution of the following minerals/rocks in India, with special reference to Karnataka:

Jewelry: gold, diamonds, precious minerals, corals, pearl and opals, sapphires, rubies, and emeralds.

Metallic: Bauxite, chromite, ilmenite, magnetite, hematite, sphalerite, galena, chalcopyrite, pyrolusite.

Cement and Refractory minerals: Calcite, lime stone, gypsum, clay minerals, magnesite, graphite, chalk, marble, dolomite, zircon, kaolin, magnesia and alumina minerals

Ceramics and glass: clay minerals, kaolinite, silica sand and bauxite, limestone and feldspar.

Abrasives, and rock and mineral polishing : industrial diamond, corundum, garnet and quartz magnesite, pumice, and diatomaceous

Electronic and electrical: Rare earth elements, mica, wolframite, native metallic minerals, ores of copper, aluminium.

Strategic/defense: Rare earth elements, Ilmenite, monazite, mica, vanadium from magnetite, poly metallic nodules and rock encrustation in the ocean to extract cobalt and nickel.

Chemicals and fertilizers: Barite, calcite, magnesite, asbestos, diatomite, feldspar, gypsum, kaolinite, phosphorite, mica, talc, zeolite, bauxite, chromite, ilmenite, magnetite, hematite, sphalerite, galena, clay minerals chalcopyrite, pyrolusite, pyrite and monazite.

Dimensional and decorative rocks & dimensional: Marble, granites, gneiss, dolerite, phyllite, slate, sand stones, sand, gravel, pebble and boulders.

Nanotechnology: Clay minerals, ilmenite, polymorphs of carbon, titanium and anhydrous iron oxide minerals and mineral composite for rare mineral substitutes.

Open Elective: Geohazards and mitigation strategies

Unit-I

Geohazards: assessment and planning- Introduction, types of hazards; characteristic features, occurrence and impact of different types, Causes and Strategies for Mitigation of Geological Hazards; Risk assessment, Hazard maps, Land-use planning and hazards **Earthquake, Mitigation Approaches:** Causes, Specific threats, Community impacts, and Mitigation strategies. Characteristic features; Earthquake Risk Mitigation| Magnitude and Intensity of earthquake; Major earthquakes;| Seismic zoning; Earthquake vulnerability of India; Earthquake risk mitigation - Seismic performance examination off RCC. Buildings, retrofitting of vulnerable buildings, Construction of earthquake resistant buildings following proper IS codes, Earthquake preparedness: Case study - Bhuj Earthquake

Unit-II

Volcanic hazards: Introduction, Types of volcanoes, volcanic form and structure, Types of central eruption, Causes of volcanic eruptions, volcanic products: volatiles, volcanic products: pyroclasts, volcanic products: lava flows, Specific threats, Community impacts, volcanic hazard and prediction Mitigation strategies. **Tsunami events, Mitigation Approaches:** An introduction to Tsunami; Magnitude Intensity of a Tsunami; Types of Tsunami; features of Tsunamis: Prediction of Tsunamis: Tsunami Hazard Mitigation. **Flood and Mitigation Approaches:** Types of floods, Causes of floods, Specific threats, Community impacts. Mitigation strategies: Floodplain Management, Flood Insurance, Flood Mitigation Programs, Property acquisitions, retrofitting flood Prone Residential Structures. **Mass Movement:** Soil creep and valley bulging, Causes of landslides, Classification of landslides, Landslides in soils Landslides in rock masses, A brief note on slope stability analysis. Monitoring slopes, Landslide hazard, investigation and mapping, Methods of slope control and stabilization Landslide Specific threats, Community impacts, Mitigation strategies.

Reference:

1. Alexander, D. 1993: Natural disasters. London: UCL Press
2. Alden, W. C., 1928. Landslide and Flood at Gros Ventre, Wyoming, Focus on Environmental Geology, Tank R., Ed., Oxford University Press, New York (1973), 1928, pp. 146-153.
3. Baker, P.E. (1979) Geological aspects of volcano prediction. Journal of Geological Society, 136, 341-346.
4. Bell, F.G., (1999). Geological hazards: their assessment, avoidance, and mitigation. (an imprint of Routledge). E&FN Spon London, UK, Hardbound, ISBN 0419-16970-9; 631 Pages. September
5. Bell, F.G. (1994) Floods and landslides in Natal and notably the greater Durban region, 1987: a Engineering Geologists, 31, 59-74.
6. Broms, BB., Landslides , retrospective Foundation view. Bulletin Association Engineering Handbook Winterkorn, H. F. and Fang, H.-Y., eds., Van Nostrand Reinhold Co.,