SARDAR PATEL UNIVERSITY
SECOND YEAR B. Sc. (FOURTH SEMESTER)
ENVIRONMENTAL SCIENCE
US04CENV21 (T): ECOLOGY AND SOIL SCIENCE
(Four Credit Course, Four hours per week)
(Effective from June – 2019)
(Total Marks-100, Internal-30 marks, External -70 marks)

UNIT 1: ECOLOGICAL CYCLES AND ADAPTATIONS:
Morphological and Anatomical ecological adaptations of plants (Hydrophytes, Xerophytes and Halophytes), Morphological and Anatomical ecological adaptations of animals (Mesocoles, Xerocoles), Biogeochemical cycles (Oxygen cycle, Phosphorus cycle, Sulphur cycle)

UNIT 2: BIOGEOGRAPHY AND WILDLIFE:
Introduction, Species' habitats, Island biogeography theory, Equilibrium theory of Insular Biogeography geography of diversification and invasion, Phylogeography, Phytogeography (Definition, major plant communities of the world, Phytogeographical regions of the world, Floristic regions of India), Zoogeography (Definition, Factors determining distribution of animals with space, Zoogeographical regions of the world, Biodiversity in India, Wildlife of India, Endangered flora and fauna of India, Wildlife management in India)

UNIT 3: SOIL CHEMISTRY:
Introduction, Types of soil, Classification of soil, Physicaland Chemical properties of soil, Mechanism of nitrogen fixation,Soil profile, Soil texture, Soil composition, Soil Weathering and Paedogenesis, Inorganic and Organic components in soil, Organic matter decomposion, Soil humus, Cation and Anion exchange reactions in soil

UNIT 4: LAND AND SOIL CONSERVATION:
Land as a resource, Soil biodiversity and micronutrients, Ecological and economic importance of soil, Types of land use, Topographic factors (Height of mountain, Direction, Steepness of slop), Soil health, Soil erosion, Types and causes of soil degradation, Impact of soil loss and soil degradation, Need for soil conservation, Land conservation strategies, Soil conservation techniques

SUGGESTED READING:

- Fundamentals of Ecology – E.P.Odum (1997) Natraj Publishers, Dehradun
- Fundamentals of Ecology – M.C.Dash (1993) Tata Mc. Graw Hill Pub.
- Ecology and Environment – P.D.Sharma
- Brady, N.C. & Well, R.R. 2007.The Nature and Properties of Soils (13th edition), PearsonEducation Inc.
- Johnson, D.L. 2006. Land Degradation (2nd edition). Rowman& Littlefield Publishers.
- Marsh, W. M. &Dozier,J. 1983. Landscape Planning: Environmental Applications. John Wiley and Sons.

(* Designed following UGC curriculum)

SARDAR PATEL UNIVERSITY
SECOND YEAR B. Sc. (FOURTH SEMESTER)
ENVIRONMENTAL SCIENCE
US04CENV22 (T): ECOSYSTEM AND EARTH SCIENCE
(Four Credit Course, Four hours per week)
(Effective from June – 2019)
(Total Marks-100, Internal-30 marks, External -70 marks)

UNIT 1: ECOSYSTEM:
Introduction, Energy flow in ecosystem, Single channel energy model, Y shaped energy model, Productivity of ecosystems, Measurement of productivity in terrestrial and aquatic ecosystems, Factors affecting productivity, Climatic factors of Ecosystem- Light (Effect of light quality, intensity and duration on plant and animal life), Temperature (Effect of temperature, thermal stratification in lakes)

UNIT 2: METEOROLOGY:
Importance of meteorology, Earth Sun relationship, Ecliptic and equatorial plane, Rotation and revolution of the Earth Equinoxes, Solstices, Perihelion and Aphelion, Causes of seasons, Seasonal and latitudinal variation of insolation, Scale of Meteorology, Concept, Aims, Measurement and Data collection on Meteorological parameters (temperature, pressure, relative humidity, Wind speed and direction, precipitation), Atmospheric stability and mixing heights.

UNIT 3: EARTH SCIENCE:
Solar system formation and planetary differentiation, Formation of the Earth (formation and composition of core, mantle, crust), Chemical composition of Earth, Geological time scale and major changes on the Earth's surface, Holocene and the emergence of Humans, Role of humans in shaping landscapes, Development of cultural landscapes.

UNIT 4: ATMOSPHERE AND CLIMATE CHANGE:
Atmosphere- Composition, Vertical layers of the atmosphere, Major and trace gases, Atmospheric photochemistry, Reaction of nitrogen, oxygen, ozone, chlorides etc., Properties of dust and aerosols in the atmosphere, Radiative Balance and the Natural Greenhouse effect, Major greenhouse gases, Kyoto Protocol, Atmospheric Circulation Patterns, El-Nino and La-Nina, climatic cycles, Global ozone problem (Ozone in atmosphere, Ozone depletion process, Ozone hole, Worldwide Ozone trends, Montreal Protocol, Consequences of Ozone depletion (climate, Human health, Terrestrial and Aquatic ecosystems)

(* Designed following UGC curriculum)

SUGGESTED READINGS:

- The Earth System (3rd Edition) 3rd Edition- Lee R. Kump, James F. Kasting, Robert G. Crane
- Holmes' Principles of Physical Geology 4th ed. 1993 Edition- Arthur Holmes (Ed) P. Mc L. D. Duff
- Introduction to Physical Geology 1998. G.R. Thompson, & J. Turk
- Planet Earth: Cosmology, Geology, and the Evolution of Life and Environment- CesareEmiliani
- Environmental Geology – K.S. Valdiya

SARDAR PATEL UNIVERSITY
SECOND YEAR B. Sc. (FOURTH SEMESTER)
ENVIRONMENTAL SCIENCE
US04CENV23 (P): PRACTICAL BASED ON ECOLOGY AND SOIL SCIENCE
(Two Credit Course, Four hours per week)
(Effective from June – 2019)
(Total Marks-50, External -50 marks)

1. Analysis of soil organic carbon and organic matter
2. Study soil profile and soil taxonomy maps of given soil sample
3. Assessment of Soil bulk density
4. Assessment of Soil particle density and pore space
5. Assessment of water holding capacity
6. Determination of salinity and sodicity
7. To calculate Soil temperature and soil colloids
8. Study of morphological and anatomical adaptations of Hydrophytes
9. Study of morphological and anatomical adaptations of Xeroophytes
10. Study of Wildlife map of India
11. Preapration of Soil health Chart
12. Preparation of Soil health Card for Farmers of nearby agricultural fields

PRACTICAL BASED ON ECOSYSTEM AND EARTH SCIENCE
(Two Credit Course, Four hours per week)
(Effective from June – 2019)
(Total Marks-50, External -50 marks)

1. Determination of Primary productivity by light and dark bottles
2. To calculate sums based on Productivity
3. To estimate Sodium & Potassium from given sample
4. To analyse effect of light and temperature
5. Measurement of Biological Oxygen Demand from water samples
6. Study of meteorological instruments (Part 1)– Simple Thermometer, Minimum-Maximum Thermometer, Wet and Dry bulb Thermometer
7. Study of meteorological instruments (Part 2)–Stevenson's screen, Cup anemometer, Rain Gauge, Hygrograph, Lux meter, Barometer, Planimeter
8. Study of Greenhouse Gas Simulation
9. Determination of Carbon dioxide
10. Estimation of Carbonates from soil sample
11. Study of 3d models of Earth and activity of atmospheric stratification
12. Study Geological scale of Earth
13. Academic Visit (meteorological department of Anand Agri Uni.)