

## **ESP472 REMOTE SENSING AND GIS LAB.**

### **Course Outcomes:**

*CO1 Determine pollution status in different areas using map.*

*CO2 Learn image interpretation of land use.*

*CO3 Understand GPS survey, compass survey, plane table survey and chain survey.*

*CO4 Learn different survey method to measure different areas.*

*CO5 Study remote sensing and GIS techniques which help in employability.*

1. Survey of a given area using Chain survey method.
2. Survey of a given area using Plane table survey method.
3. Survey of a given area using Compass survey method.
4. Survey of a given area using GPS survey method.
5. Image interpretation of land use/water, vegetation and lithology.
6. Study of geological maps.
7. Study of contour maps.
8. Study of drainage pattern maps.
9. Assessment of pollution status in the given map.

## **OPEN ELECTIVE COURSES**

### **ESE473 BASICS OF ENVIRONMENTAL SCIENCE**

**39 hrs.**

### **Course Outcomes:**

*CO1 Describe the fundamental aspects of environment and to know the scope of environmental science.*

*CO2 Understand the structure and composition of atmosphere and hydrosphere.*

*CO3 Understand fundamental aspects of environment.*

*CO4 Learn different biogeochemical cycles of elements.*

### **UNIT I (13 hours)**

Definition and scope of Environmental Science, Ecosystems - Types, abiotic factors - Soil, Water, Temperature and Light, biotic factors – freshwater, marine water and estuarine habitats. Wetlands and swamps.

Earth and its environment: Structure and Composition. Biosphere-Atmosphere, Lithosphere, Hydrosphere and Water cycle.

### **UNIT II (13 hours)**

Atmosphere: Structure and composition. Temperature, pressure, humidity of atmosphere. Aeroallergens, air particulates and diseases. Winds and clouds – their classification, formation and circulation, artificial rain, acid rain, ozone hole, global warming/greenhouse effect.

### **UNIT III (13 hours)**

Hydrosphere: Water as a resource, sources of water, physico-chemical and biological properties of water, water related issues, purification of water, water management.

Biogeochemical Cycles: Sedimentary cycles, gaseous cycles, cycling of heavy metals and radioactive compounds, Effect of anthropogenic activities on biogeochemical cycles.

### References:

1. Agrawal, K.C. 2001. Fundamentals of Environmental Biology, Nidhi Publishers, Bikaner, India.
2. Arya, S.P. 2002. 2<sup>nd</sup> Ed. Introduction to Micrometeorology.
3. Asthana, D.K. and Meera Asthana, 2006. A text Book of Environmental Studies, S. Chand & Co. Ltd., New Delhi.
4. Gilbertson, D.D., Kent, M. & Pyatt, K.B. 1985. Practical ecology for Geography and Biology: Survey, Mapping and Data Analysis. Hutchinson.
5. Haines – Young, R.H. & Petch, J.R., 1986. Physical Geography: Its nature and Methods. Harper.
6. John, J.W.R. and Geoffrey, F.P. 1998. People and the Earth, Cambridge University Press.
7. Tucker, M., 1988. Techniques in Sedimentology. Blackwell.

## **ESE474 ENVIRONMENTAL EDUCATION AND AWARENESS**

**39 hrs.**

### **Course Outcomes:**

*CO1 Educate and give awareness to the public about the current environmental issues.*

*CO2 Discuss the major environmental movements in India.*

*CO3 Understand international agreements on climate change.*

*CO4 Learn different public awareness programmes.*

### **UNIT I (13 hours)**

Introduction to environment, components of environment – biosphere, atmosphere, lithosphere, hydrosphere; biotic and abiotic components; environmental problems including acid rain, ozone hole, global warming, deforestation.

### **UNIT II (13 hours)**

Environmental Education: Definition, goals, objectives, principles; environmental education programmes – PAP (Public Awareness Programme), strategies for environmental education - authorization, curriculum manual teaching methods and evaluations of environmental education. formal and non-formal environmental education, Status and policy of environmental education – Action Plan. Environmental Institutions and NGOs.

### **UNIT III (13 hours)**

Environmental movements: Global and National environmental movements. Major environmental movements in India - Chipko, Silent Valley movement, Appiko movement, Narmada Bachao Andolana, Tehri dam conflict. Environmental conferences – importance,

goals and achievement. International agreements –, United Nations conventions on climate change, earth summit, Copenhagen summit.

### References:

1. Agrawal, K.C. 2001. Fundamentals of Environmental Biology, Nidhi Publishers, Bikaner, India.
2. Asthana, D.K. and Meera Asthana. 2006. A text book of Environmental Studies, S. Chand & Co. Ltd., New Delhi.
3. Behera, Basic Environmental Education, Super Book Service, Bangalore.
4. Essential Learnings in Environmental Education. 1991. A Handbook of Environmental Concepts, Centre for Environment Education.
5. Deshbandu *et al.*, 1995. Environmental Education for Sustainable Development, India Environmental Society, New Delhi.
6. Kumar. 2008. Environmental Awareness, Jain Books& Periodicals, New Delhi.
7. Mohanka, R., Environmental Education, Vol. 1 & 2, Agro-Sciences Centre, New Delhi.
8. Nanda A.N. 1996. Environmental Education.
9. Pandey, G.N. 1998. Environmental Science and Technology, Annual Publication, New Delhi.
10. Sharma, P.D. 2012. Ecology and Environment, Rastogi Publications, Meerut.
11. UNESCO. Environmental Education Series.