

COURSE TITLE: ECOLOGY & CONSERVATION (THEORY) w.e.f June 2020

COURSE CODE: BOT-III.E-1

MARKS: 100 (75 Theory+ 25 Practical)

CREDITS: 4 (3 Theory+ 1 Practical)

COURSE DURATION: 45 HOURS

COURSE OBJECTIVES:

Objective of this paper is to provide introductory knowledge on biotic and abiotic environmental factors,

pollution and phytogeography with regards to Government regulations towards environmental management with respect to agriculture and food security.

COURSE OUTCOMES:

Upon successful completion of the course, students will be able:

CO 1: To discuss, explain and review the role and importance of biotic and abiotic environment factors in the sustenance of plant life

CO 2: To analyze and evaluate the pollution scenario of the area.

CO 3: To quantitatively estimate the oxygen and Carbon dioxide from different water samples.

CO 4: To evaluate and determine minimum area of sampling unit (using quadrat) for the study of local vegetation.

CO 5: To relate the theory in the natural environment and work towards conservation of the environment.

Sr.No.	UNITS, TOPICS AND SUB-TOPICS	HOURS
	Module 1: CONCEPT OF ECOSYSTEM, PHYTOGEOGRAPHY AND POPULATION ECOLOGY	15
1.1	Concept of Ecosystem, Ecological adaptations of plants belonging to following ecological groups: Hydrophytes, Xerophytes and Halophytes. Shelford's law of tolerance; Introduction to Species diversity indices (Simpson's & Shannon-Weiner) of herbaceous vegetation.	

1.2	Phytogeography- plant distribution, theories on plant distribution Endemism, Biomes of the world, and phytogeographical regions of India, biosphere reserves, Forest training institutes, Land bridge theory	
1.3	Population Ecology: Survivorship curves- Type I, Type II, Type III. Population growth: Population growth curves – Carrying capacity K, Exponential growth (J shaped curve) and Logistic growth (S shaped curve).	
MODULE II: ECOLOGICAL FACTORS AND COMMUNITY RELATIONSHIPS		15
2.1	Light - quality, duration, absorption, intensity & effects on plants Temperature-variation due to altitude effects on plants, thermal constant and stratification Water- precipitation, moisture & measurement of rainfall	
2.2	Wind - speed, advantages and damage caused to plants	
2.3	Soil- Soil profile, texture, classification and organic matter	
2.4	Community relationships: Biotic interactions, Gaia Hypothesis, Introduction to Optimal foraging theory	
MODULE III: POLLUTION, LAWS AND ORGANISATIONS		15
3.1	Air pollution- polluting gases; ozone depletion, greenhouse effect, global warming, acid rain and smog	
3.2	Water pollution- eutrophication, sewage, industrial waste, heavy metal pollution	
3.3	Soil pollution – chemical pollutants	
3.4	Bioremediation	
3.5	Forest conservation act, Indian forest act, Biodiversity act, western Ghat protection act, Kasthurirangan Act, Gadgil committee report, Mining committee reports, wild life act (recent acts to be studied).	
3.6	Organizations (National & International) working for conservation (NEERI, TERI, MSSRF, IUCN, TRAFFIC)	

	TOTAL	45
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COURSE TITLE: ECOLOGY & CONSERVATION (PRACTICAL)

COURSE CODE: BOT-III.E-1

MARKS: 25

CREDITS: 1

PRACTICAL SESSIONS: 15

Sr. No	Module IV- Topics	Practical sessions
1.	Study of ecological instruments i.e. lux meter, rain guage, hygrometer, wet and dry bulb thermometer, maximum and minimum thermometer	02
2.	To study the physical and chemical characters (moisture, texture and pH) of Sand, Loam and Clay.	02
3.	Analysis of different water samples for oxygen and carbon-dioxide content	03
4.	Estimation of total carbonates from soil sample	01
5.	Visual interpretation of remotely sensed image for vegetation types (Land use land cover, NDVI)	01
6.	Anatomical study of Hydrophytes (leaf), Xerophytes (succulents) and Halophytes (leaf)	01
7.	Mini project: To determine minimum area of sampling unit (quadrat) for the study of local community and to determine species diversity index (Simpson's & Shannon-Weiner) of herbaceous vegetation	05
Total		15

REFERENCES:

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3. Jogdand, SN, (1995), Environmental Biotechnology, Himalaya Publishing House, Mumbai.
4. Sharma B. K., (2001), Environmental chemistry ,Sixth revised edition , Goel publication house, Meerut
5. Day A. K., (2002) Environmental Chemistry, Fourth Edition, New Age International Publishers.
6. Santra S.C., (2017), Environmental Science, New Central Agency, New Delhi.
7. Odum E.P. and Barret G.W., (2004) Fundamental of Ecology. Fifth edition, Brooks/Cole Publishers.
8. Moore, P.W. and Chapman, S.B. (1986). Methods in Plant Ecology. Blackwell Scientific Publications.
9. Piper, C.S. (1950). Soil and Plant Analysis. University of Adelaide, Australia.
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13. Science Direct: <https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/carrying-capacity>.
14. World Wide Fund – India : <https://www.wwfindia.org/>
15. NEERI: <https://www.neeri.res.in/>
16. TRAFFIC: <https://www.worldwildlife.org/initiatives/traffic-the-wildlife-trade-monitoring-network>
17. International Union for conservation of nature: <https://www.iucn.org/>
18. MSSRF- <https://www.mssrf.org/>
19. TERI- <https://www.teriin.org/>