GENERIC ELECTIVE –7:

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/ Practice		
Insect Ecology ALS ZOOGE 07	**4**	**2**	**0**	**2**	Class XII pass with Biology and Chemistry	NA

Learning Objectives:

The learning objectives of this course are as follows:

- The course aims to give knowledge about the basic ecology and role of different biotic and abiotic factors.
- The course introduces the concepts of ecosystem, energy flow, attributes of insect population and different factors affecting the distribution, abundance and prey- predator relationship of insects.

Learning Outcomes:

By studying this course, students will be able to:

- understand the key concepts of ecology and role of insects in ecosystem.
- learn about the commUnity characteristics, ecosystem development and climax theories.
- gain knowledge about the types of ecosystems, energy models, and ecological efficiencies.

Unit 1: Fundamentals of Insect ecology (3 Hours)

abiotic factors and biotic factors, Laws of limiting factors.

Unit 2: Ecosystem (5 Hours)

Concept,types, role of insects in ecosystems. Food chain, Food web and energy flow through the ecosystem, Productivity, Ecological pyramids and ecological efficiencies, interactions of insects and their environment.

Unit 3: Population (12 Hours)

Attributes of Insect population: Density, Natality, Mortality, Life tables, Survivorship curves, Dispersal and Dispersion, Exponential *vs* Logistic growths, Carrying capacity. Population regulation, Basic concepts of Insect abundance: factors responsible for changes in the distribution and abundance of insects. Density dependent and independent factors.

Unit 4: Insect Population interactions (5 Hours)

Basic factors governing the interspecific interactions, Classification of interspecific interactions, Understanding of Gause's principle with insects as examples, Prey-predator interactions, Lotka-Volterra Model. Functional and numerical response.

Unit 5: Community ecology (5 Hours)

Characteristics, Abundance and diversity of insects, Species richness, Ecotone and edge effect. Food as a limiting factor for distribution. Insects as regulators of ecosystem processes. Ecological succession.

PRACTICAL (60 hours)

1. Study of Life tables and plotting of survivorship curves of different types from the hypothetical data provided/real data of insect population obtained from the field.
2. Determination of insect population density in a natural or hypothetical commUnity by quadrate method and calculation of the Shannon Wiener Index.
3. Study of abiotic factors in aquatic ecosystems: Temperature, turbidity, pH, dissolved oxygen content (by Winkler's method) and light intensity.
4. Biochemical estimation of nitrates and phosphates from the pond water samples.
5. Estimation of water quality using insects/other organisms as bio-indicators.
6. Estimation of primary productivity by light and dark bottle method.
7. Field visits to understand different ecosystems and to study insect diversity.

Essential/recommended readings

1. Odum, E.P. (2008) Fundamentals of Ecology. Indian Edition. Brooks/Cole.
2. Smith, R. L. (2000) Ecology and field biology. Harper and Row publisher.
3. Krebs, C. J. (2001) Ecology. VI Edition. Benjamin Cummings.

Suggestive readings

1.Schowalter D. Timothy, (2006) Second edition, Insect Ecology an ecosystem approach, Academic Press.

2.Ricklefs, R.E. (2000) Ecology. V Edition. Chiron Press.

Note: Examination scheme and mode shall be as prescribed by the Examination Branch, University of Delhi, from time to time.