

UNIT-IV:

BioStatistical Methods: Measures of central tendency and dispersal; probability distributions (Binomial, Poisson and normal); Sampling distribution; Difference between parametric and non-parametric statistics; Confidence Interval; Errors; Levels of significance; Regression and Correlation; t-test; Analysis of variance; X^2 test;; Basic introduction to Multivariate statistics.

Suggested Reading:

1. Veer Bala Rastogi. 2002. Organic Evolution.
2. Singh BD. 1996. PlantBreeding
3. Stickberger, Genetics. Macmillan Company, NewYork
4. Alalrd RW. 1961: Principles of PlantBreeding
5. JonesWilkins – Variation and adaptation in plant species. HeinemannEducational
6. Stebbins, J.L. – Chromosomal evolution in Higher Plants. EdwardArnold Publishers Ltd.,London.

SEMESTER – IV

COURSE - III

ENVIRONMENTAL BIOLOGY AND BIODIVERSITY

Teaching hours for week	Credits	Internal marks	SEM end/ External marks	Max. marks
4	4	25	75	100

Course outcome: By the end of this course the student will develop a complete understanding on:

- Concept of environment, environmental impact assessment, climate and climate change factors
- Ecosystem stability, perturbations and restoration
- Concept of soil formation and the factors affecting its formation, soil composition and profile
- Sources, quality parameters of air, water and soil pollution and their effects on plants and ecosystems
- Concept, levels and distribution of biodiversity. Status in India
- Role of biodiversity in ecosystem functions and stability, speciation and extinction
- World centers of primary diversity of domesticated plants, plant introduction and secondary centers; Indo-Burmese Centre.
- Threats to biodiversity, IUCN, Hotspots, Utilization and concerns,
- Principles and modes of conservation, organizations for conservation in India

- Basic concepts, principles and applications of remote sensing in biodiversity conservation
- Application of GIS in phyto diversity and natural resource status
- Concept and strategies of SDGs

After completion of this course the students can find employability in Pollution Boards / Environmental research Institutes / Biodiversity Boards

UNIT- I

Ecosystem stability: Concept (resistance and resilience) ecological perturbations (Material and anthropogenic) and their impact on plants and ecosystems

Environmental impact assessments. Ecosystem restoration Climate: Koppen – Thorntwait’s classification of climate

Climate change: Greenhouse gases (CO₂, CH₄, NO₂, CFCS sources trends and role) Ozone layer, Ozone hole and consequences of climate change (CO₂, fertilization, global warming, sea level rise, UV radiation)

UNIT- II

Composition of soil: Factors affecting soil formation and soil profile (Laterizationpodosolization, gleixation, mineralization and soil classification, soil water, soil solution). Soil organic matter or humus and soil organisms

Pollution: Air, Water and Soil, kinds, sources, quality parameters, effects on plants and ecosystems.

Plant Biodiversity: Concept, levels of biodiversity, Magnitude and distribution, Mega diversity centers, Status of BD in India.

UNIT-III

The role of biodiversity in Ecosystem: functions and stability, speciation and extinction, global patterns of terrestrial bio-diversity

Hotspots, Keystone species, Umbrella and Indicator species.

Threats to Biodiversity, Utilization and concerns, IUCN categories of threat.

World Centers of primary diversity of domesticatedplants. The Indo Burmese Centre, plant introduction and secondarycenters.

UNIT-IV

Principles of Conservation: Strategies for conservation, *in situ* conservation, protected areas network, Biosphere reserves, wetlands, mangroves strategies for conservation – *ex situ* conservation. Principles and practices. Botanical gardens, BSI, ICAR and CSIR. Remote Sensing Applications in biodiversity conservation: Remote sensing-Concept, Principles, Applications and Role in study and Identification of Phyto Diversity and Natural Resources


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usingGIS.

Sustainable development: concept and strategies; SD goals (SDGs/Millennium DevelopmentGoals)

Suggested Reading:

1. Mahua Basu, Xavier S. 2017. Fundamental of Environmental Studies. Cambridge publishers
2. Singh DK. 2006. Environmental Science. S. Chandu publishers
3. Sharma PD. 2016. Ecology and Environment, Rastogi Publications, Meerut
4. Purohit SS, Ashok A. 2007. Ecology and Environmental Biology, Student Edition, Jodhpur
5. Russell PJ, Wolfe SL, Hertz PE, Starr C, Mc Million B. 2008. Ecology, Cengage Learning India Pvt. Ltd., NewDelhi
6. Odum EP, Gary W Barrett. 2005. Ecology. Tomson Brooks/Cole, Singapore
7. Erach Barucha. 2002. Biodiversity of India. Mapin publishing in association with TATA Power company Pvt.Ltd

SEMESTER – IV
COURSE - IV
PLANT METABOLISM

Teaching hours for week	Credits	Internal marks	SEM end/ External marks	Max. marks
4	4	25	75	100

Course outcome: The course aims to provide to the students an understanding of:

- The mechanism of various metabolic processes in plants
- The mechanism of enzyme action and identify the classes of enzymes and factors affecting action
- The catabolic reactions of carbohydrates, lipids and amino acids
- The overall concept of cellular metabolism – anabolic and catabolic pathways, energy storage and release, production of building blocks for macromolecule synthesis.
- Glucose homeostasis (pathways and hormonal regulation). Discuss Krebs cycle, electron transport, and the pentose phosphate pathway.
- The analysis of the role of fat in energy production, membrane synthesis, and production of bioactive molecules.
- The structure, biosynthesis, oxidation and storage of fatty acids.


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