

OPEN ELECTIVE COURSES
BSE 461 BIODIVERSITY AND CONSERVATION

Course Outcomes:

After successful completion of the course, students will be able to :

- CO 1. Understand the relevance of biodiversity and conservation.
- CO 2. Describe the levels of biodiversity organization.
- CO 3. Understand Indian ecological/geographical diversity, including Himalayan region, Desert, Western Ghats, Coastal region and Hotspots of biodiversity.
- CO 4. Understand microbial diversity and its importance.

Unit I (13 hours)

Basic concepts and definitions, scope, biosphere, habitats, food chain, food web. Levels of biodiversity organizations – Genetic diversity, Species diversity and Ecosystem diversity. Indian ecological/geographical diversity: Himalayan Region, Deserts, Semiarid region, Gangetic plains, Western Ghats, Coastal region; Hotspots of biodiversity, Microbial diversity: Bacteria, Cyanobacteria, Fungi and Lichens, Algae, Protozoa and viruses, habitat. Mushrooms – edible and nonedible. Plant and animal association with microbes. Beneficial and harmful microbes, Culture, Cultivation of bacteria. Microbial products.

Unit II (13 hours)

Plant diversity: Lower and higher group of plants, plant ecosystem and its classification. Major ecosystem types, tropical forests, temperate forests. Arid and Semiarid ecosystems, boreal forests, Arctic and Alpine systems, grasslands, wetland ecosystem. Marine ecosystems, Epiphytes, parasites and orchids. Values and uses of plant diversity. Animal diversity: Lower and higher group of animals, their ecological niches. Zoogeographical regions of the world and India. Animals in temperate, tropical and boreal forests, cave and mountains, Coastal ecosystems, mangrove and estuaries, coral reefs.

Unit III (13 hours)

Biodiversity Conservation: Causes and prevention of Plant and Animal biodiversity loss; IUCN Red List Categories and Criteria. Conservation strategies – *Ex-situ* and *In-situ* conservation, Protected ecosystems – Biosphere reserves, National parks, Sanctuaries, Botanical gardens, Sacred groves; Wildlife conservation and wildlife conservation act; Centers of diversity study.

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BSE 462 CANCER BIOLOGY

Course Outcomes:

After successful completion of the course, students will be able to :

- CO 1. Understand the molecular biology and etiology of cancer.
- CO 2. Understand cell transformation mechanisms and role of oncogenes and tumour suppressor genes.
- CO 3. Perform the tests for identification of different types of cancers.
- CO 4. Describe carcinogenic agents
- CO 5. Understand diagnosis and conventional and advanced cancer therapies.
- CO 6. Understand mechanisms of neoplasia and signaling pathways.

Unit I (13 hours)

Cellular hallmarks of cancer, Molecular biology of cancer development, Cell transformation mechanisms, benign and metastatic tumour, Protooncogenes, Oncogenes and tumour suppressor genes, Cellular senescence, Telomeres, cellular immortalization and tumorigenesis, Carcinogen- types and identification tests

Unit II (13 hours)

Multistep tumorigenesis, Mechanisms of neoplasia and signaling, tumor virology, Growth factors, receptors and cancer, cytoplasmic signaling circuitry programs and cancer, Cell cycle control, Genome integrity and cancer, pRb and control of cell cycle clock, DNA damage checkpoints and repair, Mismatch repair pathway and cancer.

Unit III (13 hours)

Tumor immunology and immunotherapy, rational design of Cancer therapeutics and diagnostics, Cancer nanotechnology, sequelae of cancer and its treatment, Genomic and proteomic technologies and application of new technologies in prevention, assessing risk, diagnostics and treatment of cancer.

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