



VIJAYANAGARA SRI KRISHNADEVARAYA UNIVERSITY

JNANASAGARA CAMPUS, BALLARI-583105

Department of Studies in

Botany

IV Semester Syllabus

Bachelor of Science

With effect from

2022-23

Content Details for B.Sc. Botany Programme
Semester-IV
DSC-4 ECOLOGY AND CONSERVATION BIOLOGY

Course: Ecology and Conservation Biology	Course code: 21BSC4C4BOL
L-T-P per week: 4-0-0	No of credits: 04
Internal Assessment: 30 marks	Semester end Examination: 70 marks
Total contact hours: 56 hrs	Duration of SEE: 02 Hrs

COURSE OUTCOMES

Upon completion of the course, the student will be able to

1. Describe how interactions between organisms and their environment influence population, communities and ecosystems
2. Explain strategies for conserving biodiversity and protecting or restoring ecosystems
3. Design and conduct investigations applying the processes and tools of scientific inquiry (both hypothesis testing and discovery science) to test the biological hypothesis
4. Familiar with ex-situ and in-situ conservation techniques.

Contents of Theory Course		
Unit	Topics	Teaching Hours
I	<p>Introduction to Ecology and Conservation Biology: Definitions, Principles of Ecology, Brief History, Major Indian Contributions, Scope and importance. Ecological levels of the organisation.</p> <p>Ecological factors: Climatic factors: light, temperature, precipitation and humidity.</p> <p>Edaphic factors: Soil and its types, soil texture, soil profile, soil formation; Physico-chemical properties of soil - mineral particle, soil pH, soil aeration, organic matter, soil humus and soil microorganisms.</p> <p>Topographic Factors: Altitude</p>	11 hrs

<p style="text-align: center;">II</p>	<p>Ecological groups of plants and their adaptations: Morphological and anatomical adaptations of hydrophytes, xerophytes, epiphytes and halophytes.</p> <p>Ecosystem Ecology: Introduction, types of ecosystems with examples -terrestrial and aquatic, natural and artificial.</p> <p>Structure of ecosystem: Biotic and Abiotic components, detailed structure of a pond ecosystem.</p> <p>Ecosystem functions and processes: Food chain-grazing and detritus; Food web. Ecological pyramids -Pyramids of energy, biomass and number. Principles of Energy flow in the ecosystem.</p> <p>Bio-geo chemical cycles: Gaseous cycles -carbon and nitrogen, Sedimentary cycle- Phosphorus.</p> <p>Ecological succession: Definition, types- primary and secondary. General stages of succession. Hydrosere and Xerosere.</p>	<p style="text-align: center;">12 hrs</p>
<p style="text-align: center;">III</p>	<p>Community Ecology: Community and its characteristics – frequency, density, Abundance, cover and basal area, phenology, stratifications, life-forms. Concept of Ecotone and Ecotypes.</p> <p>Intra-specific and Inter-specific interactions with examples.</p> <p>Ecological methods and techniques: Methods of sampling plant communities – transects and quadrates. Remote sensing as a tool for vegetation analysis, land use – land cover mapping.</p> <p>Population Ecology: Population and its characteristics – Population density, natality, mortality, age distribution, population growth curves, and dispersal.</p>	<p style="text-align: center;">11 hrs</p>
<p style="text-align: center;">IV</p>	<p>Phytogeography and Environmental issues:</p> <p>Phytogeographical regions – concept, phytogeographical regions of India.</p> <p>Vegetation types of Karnataka – Composition and distribution of evergreen, semi-evergreen, deciduous, scrub, mangroves, shola forests, and grasslands. An account of the vegetation of the Western Ghats.</p> <p>Pollution: Water pollution: Causes, effect, types; water quality indicators, water quality standards in India, control of water pollution (Wastewater treatment).</p> <p>Water pollution disasters – Causes, effects, and control measures of water pollution.</p> <p>Air pollution: Causes, effects, air quality standards, acid rain, control.</p> <p>Soil pollution: Causes, effect, solid waste management, control measures of soil pollution.</p>	<p style="text-align: center;">11 hrs</p>

V	<p>BIODIVERSITY AND ITS CONSERVATION Biodiversity: Definition, types of biodiversity - habitat diversity, species diversity and genetic diversity, Global and Indian species diversity.</p> <p>Values of Biodiversity – Economic and aesthetic value, Medicinal and timber yielding plants. NTFP. Threats to biodiversity.</p> <p>Concept of Biodiversity Hotspots, Biodiversity hot spots of India. Concept of endemism and endemic species.</p> <p>ICUN plant categories with special reference to Karnataka/ Western Ghats. Biodiversity Conservation-Indian Forest conservation act, Biodiversity bill (2002).</p> <p>Conservation methods – <i>In-situ</i> and <i>ex-situ</i> methods <i>In-situ</i> methods - Biosphere reserves, National parks, Sanctuaries, Sacred grooves. <i>Ex-situ</i> methods- Botanical gardens, Seed bank, Gene banks, Pollen banks, Culture collections, Cryopreservation.</p>	11 hrs
Total		56 Hours

Course: Ecology And Conservation Biology Lab	Course code: 21BSC4C4BOP
L-T-P per week: 0-0-4	No of credits: 02
Internal Assessments: 25marks	Semester end examination: 25 marks
Total contact hours: 52 hrs	Duration of SEE: 03 Hrs

Practical No.	EXPERIMENTS
1	Determination of pH of different types of Soils, Estimation of salinity of soil/water samples.
2	Study of Ecological instruments – Wet and Dry thermometer, Altimeter, Hygrometer, Soil thermometer, Rain Gauge, Barometer, etc
3	Hydrophytes: Morphological adaptations in <i>Pistia</i> , <i>Eichhornia</i> , <i>Hydrilla</i> , <i>Nymphaea</i> . Anatomical adaptations in <i>Hydrilla</i> (stem) and <i>Nymphaea</i> (petiole).
4	Xerophytes: Morphological adaptations in <i>Asparagus</i> , <i>Casuarina</i> , <i>Acacia</i> , <i>Aloe vera</i> , <i>Euphorbiatirucalli</i> . Anatomical adaptations in phylloclade of <i>Casuarina</i> .
5	Epiphytes: Morphological adaptations in <i>Drynaria</i> . Anatomical adaptations in epiphytic root of <i>Vanda</i> . Halophytes: Morphology and anatomy of Pneumatophores.
6	Study of a pond/forest ecosystem and recording the different biotic and abiotic components
7	Demonstration of different types of vegetation sampling methods – transects and quadrats. Determination of Density and frequency.
8	Field visits to study different types of local vegetation /ecosystems and the report to be written in practical record book.
9	Determination of water holding capacity of soil samples
10	Determination of Biological oxygen demand (BOD)
11	Determination of Chemical oxygen demand (COD)
12	Estimation of Chloride, Phosphate contents of different soil samples.

REFERENCE BOOKS:

1. Sharma, P.D. 2018. Fundamentals of Ecology. Rastogi Publications.
2. Odum E.P. (1975): Ecology by Holt, Rinert& Winston.
3. Oosting, H.G. (1978): Plants and Ecosystem Wadworth Belmont.
4. Kochhar, P.L. (1975): Plant Ecology. (9th Edn.,) New Delhi, Bombay, Calcutta-226pp.,
5. Kumar, H.D. (1992): Modern Concepts of Ecology (7th Edn.,) Vikas Publishing Co., New Delhi.
6. Kumar H.D. (2000): Biodiversity & Sustainable Conservation. Oxford & IBH Publishing Co Ltd. New Delhi.
7. Newman, E.I. (2000): Applied Ecology, Blackwell Scientific Publisher, U.K.
8. Chapman, J.L&M.J. Reiss (1992): Ecology (Principles & Applications). Cambridge University Press, U.K.
9. Malcolm L. Hunter Jr., James P. Gibbs, Viorel D. Popescu, 2020. Fundamentals of Conservation Biology, 4th Edition. Wiley-Blackwell
10. Saha T. K., 2017. Ecology and Environmental Biology. Books and Allied Publisher