

Shyam Lal College
University of Delhi
Department of Botany

Teaching Plan for 2024-25

Teacher Name: Dr Pooja Gupta

Course:

1. B.Com (Prog.) IInd Year
2. B.Com (Hons.) IInd Year
3. B.Sc. Physical Sciences IInd Year

Semester: III

Paper: AEC 1: Environmental Sciences: Theory into Practice – II

Learning Objectives

The Ability Enhancement Course on Environmental Science: Theory into Practice (II) at Undergraduate level (AEC- I) aims to train students to cater to the need for ecological citizenship through development of a strong foundation on the critical linkages between ecology-society-economy.

The Learning Objectives of this course are as follows:

- **Disciplinary knowledge** - Enable students to develop a comprehensive understanding of various facets of life forms, ecological processes, and the impacts on them by humans during the Anthropocene era.
- **Critical thinking** - Build capabilities to identify relevant environmental issues, analyse the various underlying causes, evaluate the practices and policies, and develop framework to make informed decisions.
- **Moral and ethical awareness/reasoning** - Develop empathy for all life forms, appreciation for the various ecological linkages within the web of life, awareness and responsibility towards environmental protection and nature preservation.

Learning outcomes

The Learning Outcomes of this course are as follows.

After the course the students will be empowered and able to:

- Analyse natural processes and resources that sustain life and govern economy.

- Predict the consequences of human actions on the web of life, global economy, and quality of human life.
- Think critically and develop appropriate strategies (scientific, social, economic, administrative, and legal) for environmental protection, conservation of biodiversity, environmental equity, and sustainable development.
- Demonstrate values and show compassionate attitudes towards complex environmental-economic-social challenges, and participate at national and international levels in solving current environmental problems and preventing the future ones.
- Adopt sustainability as a practice in life, society, and industry.

| S.No. | Topics to be covered | Week |
|-------|--|-----------|
| 1. | <p>Unit V Global Environmental Issues and Policies:</p> <ul style="list-style-type: none"> • Causes of Climate change, Global warming, Ozone layer depletion, and Acid rain; Impacts on human communities, biodiversity, global economy, and agriculture • International agreements and programmes: Earth Summit, UNFCCC, Montreal and Kyoto protocols, Convention on Biological Diversity (CBD), Ramsar convention, The Chemical Weapons Convention (CWC), UNEP, CITES, etc. • Sustainable Development Goals: India’s National Action Plan on Climate Change and its major missions • Environment legislation in India: Wildlife Protection Act, 1972; Water (Prevention and Control of Pollution) Act, 1974; Forest (Conservation) Act 1980; Air (Prevention & Control of Pollution) Act, 1981; Environment Protection Act, 1986; Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 | Week 1-5 |
| 2. | <p>Unit VI Biodiversity and Conservation:</p> <ul style="list-style-type: none"> • Definition of Biodiversity; Levels of biological diversity: genetic, species and ecosystem diversity • India as a mega-biodiversity nation; Biogeographic zones of India; Biodiversity hotspots; Endemic and endangered species of India; IUCN Red list criteria and categories • Value of biodiversity: Ecological, economic, social, ethical, aesthetic, and informational values of biodiversity with examples; sacred groves and their importance with examples • Threats to biodiversity: Habitat loss, degradation, and fragmentation; Poaching of wildlife; Man-wildlife conflicts; Biological invasion with emphasis on Indian biodiversity; Current mass extinction crisis • Biodiversity conservation strategies: in-situ and ex-situ methods of conservation; National Parks, Wildlife Sanctuaries, and Biosphere reserves; Keystone, Flagship, Umbrella, and Indicator species; Species reintroduction and translocation • Case studies: Contemporary Indian wildlife and biodiversity issues, movements, and projects (e.g., Project Tiger, Project Elephant, Vulture breeding program, Project Great Indian Bustard, Crocodile conservation) | Week 6-10 |

| | | |
|--|---|---|
| | project, Silent Valley movement, Save Western Ghats movement, etc) | |
| 3. | Unit VII Human Communities and the Environment: <ul style="list-style-type: none"> • Human population growth: Impacts on environment, human health, and welfare; Carbon foot-print • Resettlement and rehabilitation of developmental project affected persons and communities; relevant case studies • Environmental movements: Chipko movement, Appiko movement, Silent valley movement, Bishnois of Rajasthan, Narmada Bachao Andolan, etc • Environmental justice: National Green Tribunal and its importance • Environmental philosophy: Environmental ethics; Role of various religions and cultural practices in environmental conservation • Environmental communication and public awareness: case studies (e.g., CNG vehicles in Delhi, Swachh Bharat Abhiyan, National Environment Awareness Campaign (NEAC), National Green Corps (NGC) “Eco-club” programme, etc) | Week 11-15 |
| | Assignment, Class Test and Internal Practical Test | Assignment to be allocated in week 5-6 and week 9-11. Class test to be held as per schedule during week 12-13 |
| Marks Breakup: 50 marks for continuous internal assessment (Project work, Assignment, Practical record, Class test/Discussion/Presentation etc.) 30 marks for final Theory exam | | |

Practical component (15 Weeks)

Practical Exercises/Experiential activities/Outreach activities (College may choose as per requirement)

Unit V Global Environmental Issues and Policies

- Depict temperature/precipitation trend of a given study area using online data
- Formulate questionnaire/online surveys for assessment of the impact of climate change on people
- Assess Nationally Determined Contributions (NDCs) of developed and developing countries
- Development and simulation of Model UNFCCC for inoculating negotiation skills at climate change summits

- Development and simulation of Moot Court for Mock Trials in Negotiation Green Tribunal • Identify carbon footprint of your college/home/locality (refer wwf@envis.nic.in).
- Analyze the status of at least 3 sustainable development goals in your neighbourhood and write a proposal to help achieve them at global standard

Unit VI Biodiversity and Conservation

- Acquaintance with open-source databases of biodiversity
- Determine species location in a given study area
- Depict distribution of biodiversity across latitude and altitude
- Show species distribution across space and time
- Quantify species loss across different time periods
- Sampling of plant and animal biodiversity of the College campus
- Identification of the floral diversity of Delhi and other states.
- Exercise to understand the socio-economic-environmental impact of wildlife conservation.

Unit 7 Human Communities and the Environment

- Assessment of carbon foot-print of different countries using online databases and mathematical tools
- Visit to marginalized localities and students for environmental education and environmental awareness
- Formulation of questionnaire/online surveys for assessment of the impact of environmental education
- Visit to any developmental project affected locality for assessing the impacts of economic development on human lives
- Correlation analysis of human population growth and impacts on the environment and human health

Essential/recommended readings

Unit V Global Environmental Issues and Policies

1. Divan, S. and Rosencranz, A. (2002). Environmental Law and Policy in India: Cases, Material&Statutes, 2nd Edition. Oxford University Press, India. Chapter 2 (Pages: 23-39); Chapter 3 (Pages: 41-86).

2. Raven, P.H, Hassenzuhl, D.M., Hager, M.C, Gift, N.Y. and Berg, L.R. (2015). Environment, 9thEdition. Wiley Publishing, USA. Chapter 19 (Pages: 370-376); Chapter 20 (Pages: 385-399).
3. Singh, J.S., Singh, S.P. and Gupta, S.R. (2017). Ecology, Environmental Science and Conservation. S. Chand Publishing, New Delhi. Chapter 23 (Pages: 555-598); Chapter 30 (Pages: 801-807).

Unit VI Biodiversity and Conservation

1. Primack, R.B. (2014). Essentials of Conservation Biology, Oxford University Press, USA. Page.1-536.
2. Raven, P.H, Hassenzuhl, D.M., Hager, M.C, Gift, N.Y. and Berg, L.R. (2015). Environment, 9thEdition. Wiley Publishing, USA. Chapter 5 (Pages: 97-99); Chapter 16 (Pages: 299-318).
3. Singh, J.S., Singh, S.P. and Gupta, S.R. (2017). Ecology, Environmental Science and Conservation. S. Chand Publishing, New Delhi. Chapters 24 (Pages: 599-690); Chapter 26 (Pages: 664-714).

Unit VII Human Communities and the Environment

1. Divan, S. and Rosencranz, A. (2002). Environmental Law and Policy in India: Cases, Material & Statutes, 2nd Edition. Oxford University Press, India. Chapter 10 (Pages: 416-473).
2. Raven, P.H, Hassenzuhl, D.M., Hager, M.C, Gift, N.Y. and Berg, L.R. (2015). Environment, 9thEdition. Wiley Publishing, USA. Chapter 2 (Pages: 33-36); Chapter 8 (Pages: 148-162).
3. Singh, J.S., Singh, S.P. and Gupta, S.R. (2017). Ecology, Environmental Science and Conservation. S. Chand Publishing, New Delhi. Chapter 1 (Pages: 23-26); Chapter 31 (Pages:826-842).

Suggested readings

1. Brusseau, M.L., Pepper, I.L. and Gerba, C.P. (2019). Environmental and Pollution Science, 3rdEdition. Academic Press, USA.
2. Carson, R. (2002). Silent Spring. Houghton Mifflin Harcourt, USA.
3. Raven, P.H, Hassenzuhl, D.M., Hager, M.C, Gift, N.Y. and Berg, L.R. (2015). Environment, 9thEdition. Wiley Publishing, USA.
4. van Wormer, K. and Besthorn, F. (2017). Human Behavior and the Social Environment, Macro Level Groups, Communities, and Organizations, Third Edition, Oxford University Press.

Shyam Lal College
University of Delhi
Department of Botany

Teaching Plan for 2024-25

Teacher Name: Dr Pooja Gupta

Course:

Undergraduate Ist & IInd Year

Semester: I & III

Paper: SEC: Nursery, Gardening and Landscaping

Learning objectives

The program is aimed to teach students the basic knowledge required to develop entrepreneurship skills in the development of Nursery, Gardening and Landscaping. This course would train students to initiate a remunerative enterprise owing to a high demand of skilled professionals in this field.

Learning Outcomes

After completing this course, the learners will be able to:

- describe and differentiate between the types of gardens.
- practice different methods for propagation of plants.
- execute several nursery and gardening operations.
- assess growing conditions of different horticultural plants, their general requirements and understand their role in landscaping.

| S.No. | Topics to be covered | Week |
|--------------|---|-------------|
| 1. | Methods of preparation of nursery beds and sowing of seeds. Media for propagation of plants in Nursery Beds, Pots and Mist chamber | Week 1-3 |
| 2. | Study and practice of different propagation methods viz., cutting, layering, division, grafting and budding. | Week 4-5 |
| 3. | Identification of key horticultural plants, Herbs including different types of grasses – foliage and flowering, Shrubs including hedge plants- foliage and flowering, Avenue trees – foliage and flowering, Climbers, Lianas, Epiphytes, Creepers, Trailers, Aquatic plants, Succulents, Weeds. | Week 6-7 |
| 4. | Study of different types of gardens (indoor and outdoor) and key features of gardens (Paths & Avenues, Hedges & Edges, Lawn, Flowerbeds, Arches & Pergolas, Fencing, Water bodies, Rock garden). | Week 8-9 |
| 5. | Methods of Landscape designing of Residential areas and Public | Week 10-11 |

| | | |
|----|---|----------------------------|
| | Gardens, Aquatic Garden, Rock Garden, Industrial gardens along with selection of suitable plants. | |
| 6. | Introduction and practicing Bonsai training, pruning and wiring. | Week 12-13 |
| 7. | Concept and Application of Computer aided Designing (CAD) for landscape designing/ Preparation of landscape designs for school and college using CAD technology | Week 14-15 |
| | Project work | Allocated in week 4-5 |
| | Dissertation submission/ presentation/ CE - continuous evaluation | Submission in week 10-11. |
| | Field Visit and outreach | Carried out intermittently |
| | Assessment | Continuous Evaluation |

Project Work: Corelated to developed skills in aforementioned topics.

Suggested Projects (not restricted to):

- Landscape development within college campus
- Producing different Cacti and Succulents using grafting and various propagation methods
- Creating a Bonsai using different *Ficus* sp. within the college
- Designing a landscape map of any urban setup using computer aided softwares.

Project to include: Final Outcome, Report, Marketing Strategy. The design of the project should be such that it includes a continuous work of at least 6 weeks and a dissertation submission/ presentation/ CE - continuous evaluation.

Field Visit and outreach: Visit to different gardens of Delhi, Interaction with landscape designer and field experts.

Teaching Methodology/Activities in the classroom

Theoretical Foundation: Basic Methods for understanding nursery and landscaping as a skill

Practical Demonstrations: Practical demonstrations to illustrate key concepts. Methods to plant seeds, propagate plants, transplant seedlings, and care for different types of plants.

Hands-on Activities: Design hands-on activities to engage students and reinforce learning. Assign tasks such as potting plants, preparing soil mixes, pruning, watering, and fertilizing. Ensuring students to gain experience in various aspects of gardening and nursery management.

Field Trips and Guest Speakers: Organize field trips to botanical gardens, nurseries, farms, or horticultural centres. Invite guest speakers such as experienced gardeners, botanists, landscape designers, or agricultural experts to share their knowledge and experiences with the class.

Project-based Learning: Incorporate project-based learning into the curriculum. Assign projects such as designing a garden layout, creating a plant propagation plan, developing a pest

management strategy, or starting a community garden initiative. Encourage creativity, research, and problem-solving skills.

Assessment Pattern

| Continuous Evaluation | | 30 marks |
|--|---|-----------------|
| Practical | Assessment Method | Marks |
| Methods of preparation of nursery beds and sowing of seeds. Media for propagation of plants in Nursery Beds and Pots | Knowledge Evaluation Test (Hand-on Practical/ Viva-Voce/Presentations) | 10 |
| Study and practice of different propagation methods viz., cutting, layering, division, grafting and budding. | | |
| Identification of key horticultural plants, Herbs including distinct types of grasses –foliage and flowering, Shrubs including hedge plants - foliage and flowering, Avenue trees– foliage and flowering, Climbers, Lianas, Epiphytes, Creepers, Trailers, Aquatic plants, Succulents Weeds. | | |
| Study of distinct types of gardens (indoor and outdoor) and key features of gardens (Paths & Avenues, Hedges & Edges, Lawn, Flowerbeds, Arches & Pergolas, Fencing, Water bodies, Rock Garden). | Knowledge Evaluation Test (Hand-on Practical/ Viva-Voce/Presentations) | 10 |
| Methods of Landscape designing of Residential areas and Public Gardens, Aquatic Garden, Rock Garden, Industrial gardens along with selection of suitable plants | | |
| Introduction and practicing Bonsai training, pruning, and wiring. | Knowledge Evaluation Test (Hand-on Practica/ Viva-Voce/Presentations) | 10 |
| Concept and Application of Computer aided Designing (CAD) for landscape designing/ Preparation of landscape designs for school and college using CAD technology. | | |
| Project /Portfolio and Viva Voce | | 30 marks |
| Report of Field Visit | | 05 marks |
| Practical Records | | 10 marks |
| Attendance | | 05 marks |
| Total | | 80 Marks |

Essential Readings:

- A handbook of Landscape: CPWD
- Gopaldaswamiengar, K. S., Parthasarathy, G., Mukundan, P. (1991). Complete Gardening in India. India: Gopaldaswamy Parthasarathy, 'Srinivasa'.
- Hartmann, H. T., Kester, D. E., Hartmann, H. T., Kester, D. E. (1975). Plant Propagation: Principles and Practices. India: Prentice-Hall.

- Roy, R. K., Roy, R. K. (2013). Fundamentals of Garden Designing: A Colour Encyclopedia. India: New India Publishing Agency.
- Littlepage, R., Littlepage, R. (2017). Fundamentals of Garden Design: An Introduction to Landscape Design. (n.p.): CreateSpace Independent Publishing Platform.

Suggestive reading:

- Hodge, G., Hodge, G. (2014). Practical Botany for Gardeners: Over 3,000 Botanical Terms Explained and Explored. United Kingdom: University of Chicago Press.
- The Royal Horticultural Society Gardening Manual. (2000). United Kingdom: Dorling Kindersley.