Revised Syllabus
Under NEP-2020
Advance P.G. Diploma in Environmental Economics
W.e.f. **Academic Session 2025-2026 onwards**

Course structure for 1-Year P.G. Diploma Program

First Semester for 1-year P.G. Diploma program

Semester	Course category	Course Code	Course title	Credits		Total Credit
				T	P	
I	**Discipline Specific Core**	SOLS/PGDEE-C-001	**DSC-1** Fundamentals of Environmental Study	**3**	**-**	**3**
		SOLS/PGDEE- C-002	**DSC -2** Environmental Economics and Green Development	**3**	**-**	**3**
		SOLS/PGDEE-C-003	**DSC** -3 Environmental Statistics	**3**	**-**	**3**
		SOLS/PGDEE-C-004	DSC Practical	**-**	**4**	**4**
	Discipline Specific Elective (Any 1 out of Minimum 2 electives)	SOLS/PGDEE-E-001	**DSE-1** Environmental Monitoring and Pollution Control	**4**	**-**	**4**
		SOLS/PGDEE-E-002	**DSE-2** Traditional Ecological Knowledge	**4**	**-**	**4**
		SOLS/PGDEE-E-003	DSE Practical *Or* Field Work / Project Work	**-**	**3**	**3**
Total				**13**	**07**	**20**

Note: ***1. In lieu of only Elective Practical (3 credits) the departments may offer 3 credit additional course (Field work/Project).***

Second Semester for 1-year P.G. Diploma program

Semester	Course category	Course Code	Course title	Credits		Total Credit
				T	P	
II	**Discipline Specific Core**	SOLS/PGDEE-C-005	**DSC-1** Ecosystem Services and their valuation	**3**	**-**	**3**
		SOLS/PGDEE-C-006	**DSC -2** Biodiversity Conservation	**3**	**-**	**3**
		SOLS/PGDEE-C-007	**DSC** -3 EIA and Environmental Auditing	**3**	**-**	**3**
		SOLS/PGDEEE-C-008	DSC Practical	**-**	**4**	**4**
	Discipline Specific Elective (Any 1 out of Minimum 2 electives) *Or* Dissertation/ Industrial Training)	SOLS/PGDEE-E-004	**DSE-1** Environmental Laws and Policies	**4**	**-**	**4**
		SOLS/PGDEE-E-005	**DSE-2** Green Business, IPR and International Agreements	**4**	**-**	**4**
		SOLS/PGDEE-E-006	DSE Practical	**-**	**3**	**3**
Total				**13**	**07**	**20**
NHEQF Level- 6.5	***Student on successfully completing one-year PG Diploma programme (i.e., securing minimum required 40 credits will be awarded "Advance Postgraduate Diploma in Environmental Economics.***					

Note: 1. ***In lieu of elective (Theory and practical= 4+3 credits) the students may opt Dissertation/Industrial training of 7credits.***

First Semester for 1-year P.G. Diploma program

Course Code: SOLS/PGDEM-C- 001
Course Title: DSC-1 Fundamentals of Environmental Study (03 credits)

Unit I. Environment

1.1 Definition, scope and importance of Environmental Sciences
1.2 Components of environment: atmosphere, hydrosphere, lithosphere and biosphere
1.3 Concept of Biosphere-2, Technosphere and Noosphere
1.4 Various activities under national environment awareness Campaigns (NEAC)

Unit II. Ecosystem

2.1 Structure and types of an ecosystem
2.2 Energy pathways and ecological processes
2.3 Ecosystem productivity (primary and secondary)
2.4 Biogeochemical cycles: Nitrogen, Carbon, Phosphorus, Sulphur, Water and Oxygen
2.5 Food chain, food web and ecological pyramids
2.6 Ecological succession: primary and secondary succession, climax communities and trends in succession

Unit III. Population, Community, Ecological Succession

3.1 Characteristics of population
3.2 Population growth
3.3 Concept and characteristics of communities (concept of habitat, niche, keystone species, dominant species, flagship species and ecotones)
3.4 Ecological succession: primary and secondary succession, climax communities and trends in succession
3.5 Ecological adaptations (Air, Hill, Stream water, Desert and Deep Sea)

Unit IV. Environmental Issues and Problems

4.1 Green house effect, Global warming and climate change
4.2 Conflicts on emission of green house gases
4.3 Eutrophication
4.4 Mega dams and its impact on Environment
4.5 International and national water disputes and coastal zone conflicts

Course Code: SOLS/PGDEM-C- 002
Course Title: DSC-2 Environmental Economics and Green Development (03 credits)

Unit I. Fundamentals of Environmental Economics

1.1 Definition, concepts, issues and scope of Environmental Economics
1.2 Concept of the commons, tragedy of commons, externalities (indirect costs), economic goods/ services, supply, demand, intangibles, public goods and bads
1.3 Limitations of Environmental Economics

Unit II. Economic Tools

2.1 Valuing the environment and natural resources
2.2 Ecology and equity
2.3 Natural resource accounting, cost-benefit analysis
2.4 Life cycle assessment (LCA)

Unit III. Sustainable Development

3.1 Principles of Sustainable Development: History and definition of Sustainable Development
3.2 Goals of Sustainable Development
3.3 Approaches from unsustainable to sustainable development

Unit IV. Urbanization and Environmental Economics

4.1 Urban Growth and Environmental Stress
4.2 Economics of Urban Pollution (air, water, waste)
4.3 Sustainable Urban Planning and Transport
4.4 Green Infrastructure and Urban Resilience

Course Code: SOLS/PGDEM-C- 003
Course Title: DSC-3 Environmental Statistics (03 credits)

Unit I. Introduction to Environmental Statistics

1.1 Scope and importance of statistics in environmental science
1.2 Types of environmental data (discrete, continuous, etc.)
1.3 Scales of measurement (nominal, ordinal, interval, ratio)
1.4 Basics of data collection: sampling methods and survey design
1.5 Sources of environmental data (monitoring stations, remote sensing, etc.)

Unit II. Descriptive Statistics and Data Visualization

2.1 Measures of central tendency and dispersion
2.2 Frequency distributions
2.3 Graphical representation: histograms, box plots, scatter plots, time-series graphs
2.4 Data transformation and normalization techniques
2.5 Maen deviation and Standard deviation

Unit III. Probability and Distributions

3.1 Basic probability theory
3.2 Random variables and probability distributions
3.3 Binomial, Poisson, and Normal distributions in environmental context
3.4 Sampling distributions and the Central Limit Theorem

Unit IV. Inferential Statistics, Correlation and Regression Analysis

4.1 Hypothesis testing (Z-test, t-test, Chi-square test, ANOVA)
4.2 Confidence intervals
4.3 Environmental applications: comparing pollution levels, testing regulatory compliance
4.4 Pearson correlation
4.5 Simple and multiple linear regression
4.6 Applications: predicting air/water quality parameters, rainfall, etc.

Unit V. Statistical Quality Control and Environmental Risk Assessment

5.1 Control charts for environmental monitoring
5.2 Environmental risk assessment basics using statistics
5.3 Exposure assessment and uncertainty analysis
5.4 Monte Carlo simulations (introductory)

Course Code: SOLS/PGDEM-C- 004
Course Title: DSC-4 Practical **(04 credits)**

1. Analysis of various components of ecosystems.
2. Calculation of frequency, density and abundance of different ecosystem.
3. Calculation of Importance Value Index (IVI) for grassland ecosystems/forest patches.
4. Monitoring of biological diversity and calculation of Shannon Wiener diversity index in aquatic/ terrestrial habitats.
5. Inventorization of local NTPFs.
6. Economic evaluation of a forest area/lake/river.
7. Cost-benefit analysis of a river valley project.
8. Market survey for forest products.
9. Descriptive statistics for air and water quality data
10. Regression analysis on rainfall vs. crop yield
11. PCA for environmental pollutant variables
12. Correlation between urbanization and PM2.5 levels

Course Code: SOLS/PGDEM-E- 001
Course Title: DSE-1 Environmental Monitoring and Pollution Control (04 credits)

Unit I. Environmental Monitoring

1.1 Concept and objectives of environmental monitoring
1.2 Global environmental monitoring system (GEMS)
1.3 National environmental monitoring programmes
1.4 Bio-indicators and biological monitoring

Unit II. Air Pollution

2.1 Sources of air pollution
2.2 Effects of pollutants on human beings, plants and animals
2.3 Methods of monitoring of gaseous and particulate pollutants
2.4 Control of air pollution

Unit III. Water Pollution

3.1 Major sources of water pollution
3.2 Effects of water pollution on animals, plants and human beings
3.3 Sewage and wastewater treatment and recycling
3.4 Industrial effluent treatment

Unit IV. Noise Pollution

4.1 Sources of noise pollution
4.2 Measurement of noise, exposure levels and standards
4.3 Impact of noise on human health
4.4 Noise control and abatement measures

Unit V. Radioactive and Thermal Pollution

5.1 Radioactive pollution: causes and consequences
5.2 Radioactive fallout, Chernobyl Accident: Three Mile Island accident, Fukushima radio-active leakage
5.3 Radioactive waste management
5.4 Thermal pollution: causes and consequences

Course Code: SOLS/PGDEM-E- 002
Course Title: DSE-2 Traditional Ecological Knowledge (04 credits)

Unit I. Introduction

1.1. Definition, concept, and scope of TEK
1.2. TEK in different forms (stories, legends, folklore, rituals, folk songs, dictums, crafts and artifacts)
1.3. Language and traditional knowledge

Unit II. Culture, Sacred, Myth, Rituals and Beliefs

2.1. Basic concept of society, culture and religion
2.2. Nature and objectives of comparative religion (caste, community and their culture)
2.3. Basic feature of religion and myths, rituals and beliefs associated with TEK in Hinduism, Buddhism, Islam, Jainism and Christianity etc.
2.4. TEK in Indian Himalayan states

Unit III. TEK and Natural Resources Management

3.1. TEK for forest and biodiversity conservation and wildlife management
3.2. TEK for water harvesting and land management
3.3. TEK related with medicinal plants and healthcare system
3.4. TEK related with agriculture, horticulture and cattle rearing

Unit IV. Knowledge Transfer: Old Concepts and Barriers

4.1. Old concepts and barriers in transferring indigenous traditional knowledge
4.2. Old myths in transferring traditional knowledge
4.3. Ways of prayers, rituals in different communities

Unit V. Documentation and Preservation of TEK

5.1. Need for Documentation and Preservation
5.2. International laws and policy of TEK
5.3. Laws and policy in India for TEK

Course Code: SOLS/PGDEM-C- 001
Course Title: DSE-3 Practical (03 credits)

(Environmental Monitoring and Pollution Control)

1. Determination of total microbial count in water sample.
2. Determination of total count (MPN) of coliform in a water sample.
3. Quantitative analysis of heavy metals in environmental samples. Lead, Cadmium, Mercury, Chromium and Arsenic in air, water and soil samples.
4. Study of risk assessment model through flow chart.
5. Assessment and calculation of toxicity (LD50 / LC 50) through dose response relation.

Or

(**Traditional Ecological Knowledge**)

1. To study origin and evolution of various environmental movement.
2. Preparation of an inventory of TEK for water conservation.
3. Preparation of an inventory of TEK for biodiversity conservation.
4. Preparation of an inventory of TEK related to medicinal plants.
5. Documentation of traditional technology of subsistence (Artifacts, Crafts, Handlooms etc.)

Second Semester for 1-year P.G. Diploma program

Course Code: SOLS/PGDEM-C- 005
Course Title: DSC-1 Ecosystem Services and their valuation (03 credits)

Unit I. Freshwater Ecosystem

1.1 Definition, concept and scope of Freshwater Ecosystem
1.2 Goods and services of freshwater ecosystem
1.3 Distribution of Freshwater
1.4 Basic concept of Hyporheic biodiversity and crenobiodiversity
1.5 Drivers of degradation of freshwater ecosystems and their conservation and management

Unit II. Terrestrial Ecosystem

2.1 Structure and function of terrestrial ecosystem
2.2 Biomes and Biogeographic realms of the worlds
2.3 Goods and services provided by terrestrial ecosystems
2.4 Degradation of terrestrial ecosystems and their conservation and management

Unit III. Agro-ecosystem and their Management

3.1 Agriculture in India and the World
3.2 Key concepts of Agro-ecosystems
3.3 Functional basis for the sustainable management of Agro-ecosystems

Unit IV. Valuation of Ecosystem Services

4.1 Rationale and Objectives of Valuation
4.2 Types of Values: Use, Non-use, Option, and Existence
4.3 International Initiative regarding Ecosystem Services: MA,TEEB, IPBES, CICES

Course Code: SOLS/PGDEM-C- 006
Course Title: DSC-2 Biodiversity Conservation (03 credits)

Unit I. Introduction to Biodiversity

1.1 Concept and values of biodiversity
1.2 Biodiversity at different levels (genetic, species and ecosystem)
1.3 Magnitude and distribution of biodiversity

Unit II. Threats to Biodiversity

2.1 Threats to biodiversity: Habitat loss and fragmentation, Genetic drift, Inbreeding, Disturbance, Pollution, Climate Change, Overexploitation, Invasive Species, Disease
2.2 Concept of endemism and Biodiversity hotspots
2.3 Human wildlife conflicts and its solutions

Unit III. Biodiversity Conservation and Management

3.1 Need for biodiversity conservation and management
3.2 Various methods of *In -situ* and *Ex-situ* conservation
3.3 Biodiversity and livelihood security
3.4 Extinction to species: IUCN threatened species categories, causes of species extinction, endangered species, Red and Green Data Books

Unit IV. Legal Framework for Biodiversity Conservation

4.1 The Biological Diversity Act, Rules and Regulations
4.2 International efforts for conserving biodiversity *viz.*, CITES, CBD, IUCN, MAB, UNEP, UPOV and WTO
4.3 International treaty on Plant Genetic Resources, International Agreement for conserving biodiversity, wetland conservation, rangeland management

Course Code: SOLS/PGDEM-C- 007
Course Title: DSC-3 EIA and Environmental Auditing (03 credits)

Unit I. Environmental Impact Assessment (EIA)

1.1 Concept, scope and objectives of EIA
1.2 Developmental projects under EIA
1.3 EIA law, policy and notifications
1.4 Concept, objectives and procedures of Public Consultation

Unit II. Methods of Impact Analysis

2.1 Procedure of EIA
2.2 Impact assessment methodologies (Ad-hoc, Simple Checklist, Overlays, Matrices, Network, Combination Computer aided)
2.3 Impact prediction on air, water, land, biota, socio-economic environment
2.4 Concept of Cumulative Environmental Impact Assessment (CEIA)

Unit III. Statuary Clearance Procedure and Public Consultation

3.1 Expert Appraisal Committee(EAC)
3.2 Environmental Clearance, Wildlife Clearance and Forest Clearance
3.3 State Expert Appraisal Committee (SEAC) and State EIA Authority (SEIAA)

Unit IV. Environmental Auditing

4.1 Principles, objectives and guidelines of environmental auditing
4.2 Methodology and basic structure of environmental auditing
4.3 Procedure of environmental auditing
4.4 ISO: 9001, ISO:14000 series

Unit V. Environmental Management Plan

5.1 Concept, objectives and scope of environmental management.
5.2 Guidelines for EMP development
5.3 Rehabilitation and resettlement
5.4 Compensatory Afforestation and Green Belt Development

Course Code: SOLS/PGDEM-C- 008
Course Title: DSC-4 Practical **(04 credits)**

1. Collection and identification of aquatic diversity in nearby river or streams.
2. To study forest stratification, dominant vegetation, and ecological services in a nearby forest area.
3. A case study of ecosystem services provided by any ecosystem(forest/lake/river).
4. To study the different economic value and valuation methods for ecosystem services.
5. To calculate the Alpha ($\propto$) diversity, Beta (β) diversity and total diversity of given community.
6. Survey of biological resources in your locality.
7. Assessment of threats to biodiversity of a given region.
8. Preparation of inventory of endangered and extinct species of plants/animals of Garhwal Himalaya.
9. Presentation of procedure of Environmental Impact Assessment (EIA) through flowchart
10. Presentation of procedure of Environmental Clearance through flowchart
11. Presentation of procedure of Forest Clearance through flowchart
12. Presentation of procedure of Environmental Auditing through flow chart

Course Code: SOLS/PGDEM-E- 004
Course Title: DSE-1 Environmental Laws and Policies (04 credits)

Unit I. National and International Efforts

1.1 Global Environmental issues and problems
1.2 Environmental protection in the Indian Constitution(Article 48a, Article 51A (g)
1.3 International efforts (Stockholm Conference, Montreal,Kyoto protocol, Ramsar Convention, CITES)

Unit II. National Environmental Laws-1

2.1 Wildlife Protection Act 1972 and successive amended
2.2 The Water (Prevention and Control of Pollution) Act 1974 and Rules 1975 and successive amended
2.3 The Air (Prevention and Control of Pollution) Act 1981 and Rules 1982 and successive amended
2.4 The Forest Conservation Act1980 and rules 1981
2.5 The Environmental (Protection) Act and Rules 1986
2.6 National Green Tribunal Act 2010

Unit III. National Laws –II

3.1 Biomedical waste (Management and handling) Rules1998
3.2 Hazardous waste (Management and handling) Rules 1989
3.3 E-waste (Management and handling) Rules
3.4 Plastic Waste (Management and handling) Rules

Unit IV. National Policies

4.1 Forest Policy
4.2 Environmental Policy
4.3 Water Policy

Course Code: SOLS/PGDEM-E- 005
Course Title: DSE-2 Green Business, IPR and International Agreements (04 credits)

Unit I: Introduction to Green Business

1.1 Concept, definition and scope of Green Business
1.2 Evolution of green economy and sustainable development
1.3 Principles of sustainability and the Triple Bottom Line approach (People, Plant, Profit)
1.4 Role of green business in achieving Sustainable Development Goals (SDGs)
1.5 Scope, challenges and future prospects of green business in India

Unit II: Tools and Practices of Green Business

2.1 Green production, clean technology and eco-efficient processes
2.2 Green marketing, eco-labeling and green consumer behavior
2.3 Green supply chain management and green logistics
2.4 Carbon footprint, Life Cycle Assessment (LCA) and energy audits
2.5 Corporate environmental responsibility

Unit III: Intellectual Property Rights (IPRs): Concepts and Types

3.1 Meaning, nature and objectives of Intellectual Property Rights (IPRs)
3.2 Patents: concept, procedure, rights and duration
3.3 Copyrights, trademarks and industrial design
3.4 Geographical Indications (GI) and protection of traditional knowledge
3.5 Importance of IPRs in innovation, startups and green technologies

UNIT IV: IPRs in the International Framework

4.1 Role and functions of World Intellectual Property Organization (WIPO)
4.2 TRIPS Agreement: objectives and provisions
4.3 IPRs under the World Trade Organization (WTO)
4.4 Technology transfer and access to environmentally sound technologies
4.5 Issues of biopiracy, biodiversity and IPR challenges for developing countries

Unit V: International Environmental Agreements and Green Governance

5.1 Need and importance of international environmental agreements
5.2 Paris Agreement and global climate action
5.3 Kyoto Protocol and carbon trading mechanisms
5.4 Role of United Nations Environment Programme (UNEP), India's participation and global environmental governance

Course Code: SOLS/PGDEM-E- 006
Course Title: DSE-3 Practical **(03 credits)**

(Environmental Laws and Policies)

1. Presentation of salient features of Wildlife Protection Act 1972
2. Presentation of salient features of Water (Prevention and Control of Pollution) Act 1974
3. Presentation of salient features of the Air (Prevention and Control of Pollution) Act 1981
4. Presentation of salient features of The Environmental (Protection) Act and Rules 1986
5. Presentation of salient features of The Indian Forest Conservation Act 1980

Or

(Green Business, IPR and International Agreements)

1. Green marketing case study
2. Preparation of a green business plan
3. Patent search and drafting patent (Google Patents, WIPO, InPASS)
4. Copyright and trademark study
5. Comparative analysis of major agreements (CBD, UNFCCC, Kyoto, Paris, Ramsar, CITES)