

**SCHOOL OF VOCATIONAL STUDIES  
& APPLIED SCIENCES**

**Programme and Course Objectives**

***DEPARTMENT OF ENVIRONMENTAL SCIENCE***

# Department of Environmental Sciences

## NUMBER OF PROGRAMMES OFFERED : 04

Ph.D in Environmental Sciences

M. Sc. Environmental Sciences

Post Graduate Diploma In Environmental Management

Post Graduate Diploma In Environmental Law And Policy

## **PROGRAMME – M.Sc. ENVIRONMENTAL SCIENCE**

### **PROGRAMME OBJECTIVE**

To develop professional human resource well equipped with holistic perspective and ability to understand and practice the cross disciplinary issues of environment and development at local, national, regional and global levels.

### **COURSE-WISE OBJECTIVES**

#### **SEMESTER - I**

##### **ES- 401 FUNDAMENTALS OF ENVIRONMENTAL SCIENCE**

**CREDIT: (L-T-P): 3 (3-0-0)**

##### **OBJECTIVE**

To provide substantive knowledge of understanding of environmental science, Earth environment, environmental factors, ecosystem, environmental issues and challenges, and social perspective of environment

##### **ES 403 ENVIRONMENTAL CHEMISTRY**

**CREDIT: (L-T-P): 3 (3-0-0)**

##### **OBJECTIVE**

To paraphrase basics of environmental chemistry, green chemistry and toxic chemicals

##### **ES 405 ENVIRONMENTAL BIOLOGY**

**CREDIT: (L-T-P): 3 (3-0-0)**

##### **OBJECTIVE**

To provide substantive knowledge of fundamentals of ecology and microbial ecology as basis for environmental studies and conservation

##### **ES 407 INTRODUCTION TO ENVIRONMENTAL MODELLING**

**CREDIT: (L-T-P): 2 (2-0-0)**

##### **OBJECTIVE**

To provide fundamental knowledge about environmental modeling in regard to pollutants dispersion and forecasting

##### **ES 409 NATURAL HAZARDS**

**CREDIT: (L-T-P): 3 (3-0-0)**

##### **OBJECTIVE**

To understand natural hazards, causes of their occurrence, effects of their occurrence on environment, life and property, and risk management

##### **ES 415 ENERGY AND ENVIRONMENT**

**CREDIT: (L-T-P): 3 (3-0-0)**

##### **OBJECTIVE**

To provide in-depth knowledge of renewable and non-renewable energy resources, their harnessing techniques and energy-environment issues

**ES 411 LABORATORY – I**  
**CREDIT : L–T–P : 4 (0–0–4)**  
**OBJECTIVE**

To provide opportunity to learners for hands-on practice on environment-related knowledge inputs as provided to them in courses during classroom learning in the first semester

**ES 413 FIELD VISIT**  
**CREDIT: (L-T-P): 2 (0-0-2)**  
**OBJECTIVE**

To create a broad understanding of environment, environment-human interactions and environmental conservation-oriented initiatives among learners, and promote their observation and action-oriented real-life skills

**DISCIPLINE SPECIFIC ELECTIVE COURSE (DSE-I)**

**ES 417 DISASTER MANAGEMENT**  
**Credit: (L-T-P): 3 (3-0-0)**  
**OBJECTIVE**

To explain disasters, their effects and approaches to manage them for the well-being of humans and environmental quality

**ES 421 URBAN GREEN SPACE MANGEMENT**  
**CREDIT: (L-T-P): 3 (3-0-0)**  
**OBJECTIVE**

To develop an understanding of importance of green spaces in urban ecosystems and techno-managerial issues associated with them

**ES 423 OCEANOGRAPHY**  
**CREDIT: (L-T-P): 3 (3-0-0)**  
**OBJECTIVE**

To impart knowledge about oceans, oceanic environment and resources

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**SEMESTER - II**

**ES 402 EARTH RESOURCES AND PROCESSES**  
**CREDIT: (L–T–P) : 3 (3-0-0)**  
**OBJECTIVE**

To impart fundamental knowledge related to geosphere and geographic and geological processes

**ES 406 SOIL SCIENCE**  
**CREDIT: (L-T-P): 3 (3-0-0)**  
**OBJECTIVE**

To explain formation and properties of soil, factors causing soil erosion and land degradation, and soil conservation practices

**ES 408 ENVIRONMENTAL POLLUTION AND HUMAN HEALTH**

**CREDIT: (L-T-P): 4 (4-0-0)**

**OBJECTIVE**

To provide in-depth knowledge of environmental pollution, its causes, consequences (with focus on human health) and control measures

**ES 410 CLIMATOLOGY AND GLOBAL CLIMATE CHANGE**

**CREDIT: (L-T-P) : 3 (3-0-0)**

**OBJECTIVE**

To provide knowledge about climate, meteorological attributes, weather processes, global climatic conditions, and global climate change

**ES 412 HYDROLOGY**

**CREDIT: (L-T-P): 3 (3-0-0)**

**OBJECTIVE**

To impart knowledge of hydrology, hydrobiology and conservation and management of water resource

**ES 414 LABORATORY II**

**CREDIT: (L-T-P) : 4 (0-0-4)**

**OBJECTIVE**

To provide opportunity to learners for hands-on practice on environment-related knowledge inputs as provided to them in courses during classroom learning in the second semester

**DISCIPLINE SPECIFIC ELECTIVE COURSE (DSE-II)**

**ES 416 ENVIRONMENTAL PLANNING, POLICY AND LEGISLATION**

**CREDIT: (L-T-P): 3 (3-0-0)**

**OBJECTIVE**

To develop broad understanding of institutional aspect of environmental conservation and management

**ES 418 MICROBIAL ECOLOGY**

**CREDIT: (L-T-P): 3 (3-0-0)**

**OBJECTIVE**

To impart knowledge of microbes, microbial ecology and microbes-environment interactions

**ES 420 AGROECOLOGY AND AGROFORESTRY**

**CREDIT: (L-T-P): 3 (3-0-0)**

**OBJECTIVE**

To explain fundamentals of agroecology and agroforestry, and role of agroforestry in environmental conservation

## **GENERIC ELECTIVE-I (GE-I)**

### **FT 312 FOOD PROCESSING WASTE MANAGEMENT**

**CREDIT: (L-T-P) 3 (3-0-0)**

#### **OBJECTIVE**

To impart knowledge of wastes and by-products of food processing, their effects on the quality of environment, and measures to minimize the production of wastes and food processing waste management

### **UP 102 SETTLEMENT PLANNING**

**CREDIT: (L-T-P): 3 (3-0-0)**

#### **OBJECTIVE**

To impart knowledge about human settlement planning, growth and development in urban ecosystem

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## **SEMESTER - III**

### **ES 501 ENVIRONMENTAL TOXICOLOGY AND BIOREMEDIATION**

**CREDIT: (L-T-P): 3 (3-0-0)**

#### **OBJECTIVE**

To impart knowledge about environmental toxicology and applications of microbes and macro plant species in controlling pollution

**ES- 503 BIODIVERSITY AND ENVIRONMENTAL CONSERVATION CREDIT: (L-T-P): 4 (4-0-0)**

#### **OBJECTIVE**

To familiarize learners about biological diversity in broader perspective as a basis for environmental suitability and sustainable human living on the Earth

### **ES 505 REMOTE SENSING AND GEOGRAPHIC INFORMATION SYSTEM**

**CREDIT: (L-T-P): 3 (3-0-0)**

#### **OBJECTIVE**

To provide fundamental knowledge of remote sensing and GIS, and their application in environmental monitoring, forecasting and resource management

### **ES 507 WASTE MANAGEMENT**

**CREDIT: (L-T-P) : 3 (3-0-0)**

#### **OBJECTIVE**

To sensitize learners about different wastes, waste-specific environmental concerns and waste management

### **ES 509 ENVIRONMENTAL IMPACT ASSESMENT AND SUSTAINABLE DEVELOPMENT**

**CREDIT: (L-T-P): 3 (3-0-0)**

#### **OBJECTIVE**

To explain the concepts and tools of environment management and holistic inter-generational development

**ES 511 ADVANCED ANALYTICAL TECHNIQUES FOR ENVIRONMENTAL MONITORING**

**CREDIT: (L-T-P) 4 (4-0-0)**

**OBJECTIVE**

To explain theoretical knowledge of advanced analytical techniques useful for monitoring the quality of environment

**ES 513: RESEARCH METHODOLOGY**

**CREDIT: (L-T-P) : 3 (3-0-0)**

**OBJECTIVE**

To explain the concept of research, steps in and methods of research, report writing, presentation and research ethics

**ES 521 LABORATORY III**

**CREDIT: L-T-P : 4 (0-0-8)**

**OBJECTIVE**

To provide opportunity to learners for hands-on practice on environment-related knowledge inputs as provided to them in courses during classroom learning in the third semester

**ES 502 SEMINAR**

**CREDIT: (L-T-P): 1 (0-0-2)**

To develop broad understanding of an environmental topic and hands on practice of the art of reporting of the study/work

**ES 506 PROJECT**

**CREDIT: (L-T-P): 12 (0-0-24)**

## **PROGRAMME - DOCTORAL RESEARCH IN ENVIRONMENTAL SCIENCE**

### **PROGRAMME OBJECTIVE**

To develop human resource of advance ability of environmental research and its application in development planning, academic, research and development and industries

### **COURSE-WISE OBJECTIVES**

#### **ES - 601 METHODS IN ENVIRONMENTAL SCIENCE – I**

**CREDIT : (L-T-P) : 3 (3-0-0)**

##### **OBJECTIVE**

To provide opportunity to learners on the basics of analysis of different components of environment and pollution (air, water, soil, and noise) and biodiversity

#### **ES - 602 METHODS IN ENVIRONMENTAL SCIENCE – II**

**CREDIT : (L-T-P) : 3 (3-0-0)**

##### **OBJECTIVE**

To explain theoretical knowledge of advanced analytical techniques useful for monitoring the quality of environment

#### **ES - 603 SEMINAR**

**CREDIT : (L-T-P) : 2 (2-0-0)**

##### **OBJECTIVE**

To develop broad understanding of an environmental topic and hands on practice of the art of reporting of the study/work

#### **ES - 604 FIELD STUDY**

**CREDIT : (L-T-P) : 2 (0-0-2)**

##### **OBJECTIVE**

To develop belongingness to field reality concerning environment, environment-human interactions and conservation oriented activities/initiatives among learners and promote their observation and action-oriented real-life skills.



**PROGRAMME-POST GRADUATE DIPLOMA IN ENVIRONMENTAL  
MANAGEMENT**

**PROGRAMME OBJECTIVE**

To promote excellence in learners for managing quality environment, using latest knowledge and practices of environmental science and management.
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**COURSE-WISE OBJECTIVES**

**ES 402 EARTH RESOURCES AND PROCESSES**

**CREDIT: (L-T-P) : 3 (3-0-0)**

**OBJECTIVE**

To impart fundamental knowledge related to geosphere and geographic and geological processes

**ES 403 ENVIRONMENTAL CHEMISTRY**

**CREDIT: (L-T-P): 3 (3-0-0)**

**OBJECTIVE**

To paraphrase basics of environmental chemistry, green chemistry and toxic chemicals

**ES 408 ENVIRONMENTAL POLLUTION AND HUMAN HEALTH**

**CREDIT: (L-T-P): 4 (4-0-0)**

**OBJECTIVE**

To provide in-depth knowledge of environmental pollution, its causes, consequences (with focus on human health) and control measures

**ES 425 ENVIRONMENT AND ECOLOGY**

**CREDIT: (L-T-P): 3 (3-0-0)**

**OBJECTIVE**

To provide substantive knowledge of understanding of Earth environment, environmental factors, ecology, and environmental issues and challenges

**ES- 503 BIODIVERSITY AND ENVIRONMENTAL CONSERVATION**

**CREDIT: (L-T-P): 4 (4-0-0)**

**OBJECTIVE**

To familiarize learners about biological diversity in broader perspective as a basis for environmental suitability and sustainable human living on the Earth

**ES 513: RESEARCH METHODOLOGY**

**CREDIT: (L-T-P) : 3 (3-0-0)**

**OBJECTIVE**

To explain the concept of research, steps in and methods of research, report writing, presentation and research ethics

**ES 427 LABORATORY I**

**CREDIT : L T P : 4 (0 0 8)**

**OBJECTIVE**

Hands-on practice on monitoring of environmental attributes

**GENERIC ELECTIVE (GE)**

**ES 416 ENVIRONMENTAL PLANNING, POLICY AND LEGISLATION**

**CREDIT: (L-T-P): 3 (3-0-0)**

**OBJECTIVE**

To develop broad understanding of institutional aspect of environmental conservation and management

**ES 502 SEMINAR**

**CREDIT: (L-T-P): 1 (0-0-2)**

To develop broad understanding of an environmental topic and hands on practice of the art of reporting of the study/work

**ES 506 PROJECT**

**CREDIT: (L-T-P): 12 (0-0-24)**

**DISCIPLINE SPECIFIC ELECTIVE COURSE (DSE-I)**

**ES 421 URBAN GREEN SPACE MANGEMENT**

**CREDIT: (L-T-P): 3 (3-0-0)**

**OBJECTIVE**

To develop an understanding of importance of green spaces in urban ecosystems and techno-managerial issues associated with them

**ES 505 REMOTE SENSING AND GEOGRAPHIC INFORMATION SYSTEM**

**CREDIT: (L-T-P): 3 (3-0-0)**

**OBJECTIVE**

To provide fundamental knowledge of remote sensing and GIS, and their application in environmental monitoring, forecasting and resource management

**MB 561 PROJECT MANAGEMENT**

**CREDIT: (L-T-P): 3 (3-0-0)**

**OBJECTIVE**

To impart knowledge on principles and practices of managing projects

**PROGRAMME - POST GRADUATE DIPLOMA IN ENVIRONMENTAL LAW AND  
POLICY (PGDELP)**

**PROGRAMME OBJECTIVE**

To develop professionals/entrepreneurs well-equipped with the wise understanding of energy-environment-economy interface, and national, regional and global environmental laws, treaties, conventions and institutions for environmental planning, decision-making and regional/global cooperation for environment and development issues for different walks of life, viz., development functionaries, government officials, planners and policy makers, industrialists and citizens interest groups.

**COURSE-WISE OBJECTIVES**

**ES 429 ENVIRONMENT, ECOLOGY AND RESOURCES**

**CREDIT: (L-T-P): 03 (3-0-0)**

**OBJECTIVE**

To provide substantive understanding of environment, ecology and ecosystem, environmental resources and social perspective of environment

**ES 431 ENVIRONMENTAL POLITICS**

**CREDIT: (L-T-P): 03 (3-0-0)**

**OBJECTIVE**

To introduce learners to the politics of environmental issues at national (India) and international levels

**ES 433 ENVIRONMENTAL MANAGEMENT**

**CREDIT: (L-T-P): 03 (3-0-0)**

**OBJECTIVE**

To introduce learners about the concept and practices of environmental management with special reference to the Indian environment

**ES 435 INTERNATIONAL ENVIRONMENTAL ORGANIZATIONS AND LAW**

**CREDIT: (L-T-P): 04 (4-0-0)**

**OBJECTIVE**

To impart substantive knowledge of international environmental organizations and sustainability-centric environmental governance

**ES 437INTERNATIONAL ENVIRONMENTAL LAW AND POLICY- I  
(PHYSICAL ENVIRONMENT)**

**CREDIT: (L-T-P): 03 (3-0-0)**

**OBJECTIVE**

To impart knowledge of the basics of international environmental law and major international environmental policies

**ES 439INTERNATIONAL ENVIRONMENTAL LAW (IEL) AND POLICY- II  
(BIOLOGICAL ENVIRONMENT)**

**CREDIT: (L-T-P): 03 (3-0-0)**

**OBJECTIVE**

To impart knowledge of international environmental laws and policies related to traditional knowledge and bio-resources.

**ES 428NATIONAL ENVIRONMENTAL LAW AND POLICY- INDIA**

**CREDIT: (L-T-P): 04 (4-0-0)**

**OBJECTIVE**

To develop broad understanding of institutional aspect of protection and conservation of environment in India

**ES 430NATIONAL (INDIA) ENVIRONMENTAL LAW IN PRACTICE- INDIA**

**CREDIT: (L-T-P): 03 (3-0-0)**

**OBJECTIVE**

To promote skills of learners on the bio-physical and socio-economic environment management in post-millennial scenario in India

**ES 432 NATIONAL ENVIRONMENT PROTECTION MECHANISMS- INDIA**

**CREDIT: (L-T-P): 03 (3-0-0)**

**OBJECTIVE**

To develop understanding of institutional set-up of environmental protection in India, and familiarize learners about the contribution of notable Indian environment and natural resources protectors

**DISCIPLINE SPECIFIC ELECTIVE COURSE (DSE-II)**

**ES 416 ENVIRONMENTAL PLANNING, POLICY, CONVENTION AND LEGISLATION**

**CREDIT: (L-T-P): 03 (3-0-0)**

**OBJECTIVE**

To develop broad understanding of institutional aspect of environmental conservation and management

**COMPULSORY SIX MONTHS CORE MODULE COURSE FOR UNDERGRADUATE  
PROGRAMME IN ALL BRANCHES OF HIGHER EDUCATION AS ABILITY  
ENHANCEMENT COMPULSORY COURSE (AECC)**

**ES 101: ENVIRONMENTAL STUDIES**

**CREDIT: L-T-P: 4 (4-0-0)**

**OBJECTIVE**

To impart knowledge on environment and environmental issues and challenges of local, national and global significance for achieving environmental security and sustainable living