

Name of the Department : DEPARTMENT OF ENVIRONMENTAL SCIENCES

Academic Year : 2018-19

**A. Program Outcome and Program Specific Outcomes**

Name of the programme (UG/PG/M.Phil./ Diploma etc.)	Programme Outcomes  Students will be able to	Program Specific Outcomes  Students will be able to
UG	1. To gain a multi-disciplinary and an interdisciplinary approach.	1. Students will be knowledgeable in Multi-disciplinary and interdisciplinary level in understanding of Earth systems.
	2. To employ the terminologies used in Environmental Science.	2. Students will be proficient in Environmental science terminology, nomenclature and classification systems used in environmental science.
	3. To understand about Environmental issues.	3. Students will acquire, interpret and analyze the environmental issues and develop a concern about the Earth and its people.
PG	1. To understand the processes that shapes the natural world at different temporal and spatial scales and their influence on and by human activities.	1 To articulate the basic structure, functions, and processes of key social systems affecting the environment.
	2. To master the core concepts of Environmental Science with a higher level of understanding.	2 To apply specific models of social system processes derived from various social science theories to explain environmental issues (including current and past conditions), and to propose future solutions to environmental problems.
	3 To gain comprehensive understanding of sustainable use of the earth's resources.	3 To identify, interpret, and apply basic measures (metrics and formulae) of social system variables to assess socio-environmental conditions.
	3. To gain the career paths open to become an Environmental scientist.	4 To articulate basic understanding of various social science theories/ frameworks and how they apply to environmental issues.

Name of the programme (UG/PG/M.Phil./ Diploma etc.)	Programme Outcomes  Students will be able to	Program Specific Outcomes  Students will be able to
<b>P.G. Diploma Industrial Safety and Occupational Health</b>	1. Students will be knowledgeable about occupational health, Industrial hygiene, and accidental prevention techniques.	1 To create a Job Safety Analysis (JSA) for a given work project, and will be able to describe the appropriate OSHA regulations that apply.
	2. Each graduate will understand the role of safety in the business community.	2 To understand the acute and chronic health effects of exposures to chemical, physical and biological agents in the workplace.
	3 Each graduate will understand the policies, procedures and equipment needed to deal with hazardous materials.	3 To get training and skills on environmental policy, Industrial safety, occupational health regulation, safety risk assessment and management.
		4 To have an awareness on safety auditing and management systems, pollution prevention techniques etc.,
<b>Certificate Programme in Industrial Safety and Hygiene</b>	1 The students will acquire basic knowledge in Industrial safety and hygiene	1 To develop an expert manpower to handle the complex industrial environment.
	2 The Certificate holders will understand the importance of maintaining a safe workplace environment.	2 be knowledgeable about occupational health, Industrial hygiene, and accidental prevention techniques
	3 The students will be familiar with safety standards to be maintained in compliance with regulatory requirements and within engineering limits.	3 become familiar with safety auditing and management systems, pollution prevention techniques etc.,
		4 be trained in Environmental and safety standards and certification, Environmental trading and green innovation.

**B1. Course Outcomes of all Programmes Offered by the Department**

**Name of the Programme : B.Sc. Environmental Sciences**

<b>Sl. No.</b>	<b>Name of the Course</b>	<b>Course Code</b>	<b>Program Specific Outcomes (After completing this course, the students will be able to)</b>
1.	Core 1 - Physical Environment	U17ES101	1 To recall the physical environment encompassing atmosphere, hydrosphere, lithosphere and biosphere.
			2 To review the importance of interactions along various spheres and appreciate the inter-relationships among them.
			3 To describe the influence of these spheres on humans and other life forms
2	Allied 1 Environmental Botany	U17ESBY1	1 To recognize the lower group of plants and their reproduction.
			2 To distinguish the structural and functional aspects of various tissue systems and organs in plants.
			3 To describe the morphology and Taxonomy flowering plants and their reproductive cycle.
			4 To classify the various methods of plant propagation and plant pathology.
			5 To explain the basic physiological mechanisms of plants.
3	Allied Practical: I - Environmental Botany Lab	U18ESBP1	1 To identify diverse forms of plants. (Lower to higher plants).
			2 To familiarize and expertise in plant science techniques - anatomy, embryology, plant propagation, plant pathology and physiology studies.
			3 To familiarize with ecological indicators

Sl. No.	Name of the Course	Course Code	Program Specific Outcomes (After completing this course, the students will be able to)
4	PS :Internship I - Explore Your Environment	U17ES1F1	1 To analyze environmental challenges (wastewater/air pollution/noise/ solid wastes etc.) in the neighboring environment.
			2 To describe selected ecosystems and to learn the ecological principles.
			3 To appraise the usage of resources through water audit and energy audit
5	Environmental Studies	U16EST 11	1 To realize the importance of interactions among various spheres and appreciate the inter- relationships among them and need for public awareness.
			2 To analyze the natural resources and understand its importance and uses.
			3 To define the different types of ecosystem; food chain and web; significance of energy flow.
			4 To recognize the importance of Biological diversity and its conservation; various types of environmental pollution;
			5 To analyze various issues of the Society and environment; concept of disaster management and effects of fireworks.
			6 To get an exposure to visit the local village and assess its present environmental and socio-economic status and to document .
6	Value Education (RI/MI)	U15VL1:1/ U15VL1:2	1 To inculcate the life values in the minds of the students which will help them to face life challenges
			2 To familiarize with challenges in day to day life
			3 To develop interpersonal skills

Sl. No.	Name of the Course	Course Code	Program Specific Outcomes (After completing this course, the students will be able to)
7	Core II - Ecology	U17ES202	1 To describe the ecological principles governing the environment.
			2 To analyze and appreciate the interrelation existing between Abiotic and Biotic environment.
			3 To compare various habitats – fresh water, marine, and terrestrial habitats
8	Core Practical. I - Ecology Lab	U17ES2P1	1 To assess the biotic and abiotic factors of the environment.
			2 To analyze species diversity and compute biodiversity indices.
			3 To conduct ecological surveys
9	Allied II - Environmental Zoology	U17ESZY2	1 To explain animal diversity, adaptation, organization and taxonomic status of invertebrates and chordates.
			2 To analyze the behavior of various animals.
			3 To describe economic importance of beneficial animals
			4 To develop enterpreunerial skills through vermicomposting
10	Allied Practical. II - Environmental Zoology Lab	U18ESZP1	1 To expertise in dissection of digestive system and nervous system of Arthropoda and Annelida.
			2 To identify the macro and microorganisms.
			3 To develop the skill of mounting the microscopic slides

Sl. No.	Name of the Course	Course Code	Program Specific Outcomes (After completing this course, the students will be able to)
11	PS - Internship II - Ecology and Biodiversity	U17ES2F2	1 To document the biodiversity, landscape, and types of forests, natural vegetation.
			2 To list the conservation practices in natural parks and sanctuaries.
			3 To formulate reports on flora & fauna.
			4 To identify the environmental impacts and to suggest mitigation measures
12	Core III - Environmental Microbiology and Biotechnology	U17ES303	1 To distinguish the harmful and useful role of the microbes in Sanitary Environment.
			2 To apply the Microbial Biotechnology as a tool for Bioremediation.
			3 To describe the preparation of biofertilizers
13	Core Practical. II - Environmental Microbiology and Biotechnology Lab	U17ES3P2	1 To experiment the microbiological culture techniques.
			2 To apply the Bioremediation and Recombinant DNA Technique in Biotechnology.
			3 To analyze water quality through MPN technique
14	Allied III - Allied Chemistry- I	U18ESCY3	1 To differentiate the basics of organic and inorganic chemistry.
			2 To categorize different parameters involved in bonding and its types.
			3 To describe the chemistry of hydrocarbons.

Sl. No.	Name of the Course	Course Code	Program Specific Outcomes (After completing this course, the students will be able to)
15	PS - Internship III - Industrial Exposure Training (IET ) and Green Initiatives	U17ES3F3	1 To develop an ability to face the smooth transition from academics to professional world.
			2 To enhance interpersonal skills, communication skills, leadership qualities etc.
			3 To provide a platform to learn the manufacturing processes and pollution control in various industries
			4 To observe the functioning of selected common treatment facilities
			5 To gain hands on experience in environmental monitoring.
16	SBEC I - Environmental Education and Awareness	U17ES3S1	1 To review the importance, need and methodologies of environmental education.
			2 To acquire skills to conduct Environmental awareness programs.
			3 To plan and implement awareness programs to various target groups – school children, college students and general public
17	NMEC I - <i>Global warming and Climate Change</i>	U17ES3E1	1 To estimate the causes of global warming and climate change.
			2 To describe socioeconomic and environmental implication of climate change
			3 To review the climate adaptation programmes of UNFCCC.
18	Core IV - Environmental Pollution	U17ES404	1 To classify the various forms of pollution their causes, effects and control.
			2 To recognize the chemical reactions taking place in the environment.
			3 To discuss the role of microbes in oil pollution control

Sl. No.	Name of the Course	Course Code	Program Specific Outcomes (After completing this course, the students will be able to)
19	Core V - Energy Resources and Biostatistics	U17ES405	1 To explain the sustainable use of energy.
			2 To recall the basics of energy resources and their application.
			3 To apply Bio-statistical tools in environmental problems.
20	Allied IV - Chemistry for Environmental Sciences	U18ESCY4	1 To describe the chemistry of air and water.
			2 To recognize the elementary concepts of chemical analysis.
			3 To apply the principles of analytical techniques like chromatography and colorimetry.
21	Allied Practical. III - Allied Chemistry Practical	U18ESCP3	1 To describe the basic principles and classify the types of volumetric analysis.
			2 To gain skills in identifying organic compounds.
			3 To appreciate the importance qualitative and quantitative analysis.
22	PS - Internship IV - Industrial Practice School	U17ES4F4	1 To recognize the processes in various industries, environmental organizations and biodiversity conservation centers.
			2 To compare and interpret the pollution control in various Industries.
			3 To get the Job opportunities.
23	NMEC II - <b>Environmental Safety, Health and Management</b>	U17ES4E2	1 To describe the basics of environmental safety and health.
			2 To classify the management approaches towards environment and health.
			3 To explain the importance of public hygiene



Sl. No.	Name of the Course	Course Code	Program Specific Outcomes (After completing this course, the students will be able to)
24	SBC - Life Skills	U16LFS41	1
			2
			3
25	Extension Activities	U16ETA41	1
			2
			3
26	Core VI - Conservation Biology	U17ES506	1 To identify the sources, quantity of surface and ground water bodies and their demand for the public distribution.
			2 To analyze the quality of water and their treatment techniques.
			3 To state characteristics of sewage, primary and secondary treatment of sewage as well as disposal of sludge and treated wastewater.
27	Core VII - Fundamentals of Environmental Engineering	U17ES507	1 To describe the sources and quantities of surface water / ground water and their demand
			2 To explain the water supply through public distribution system
			3 To distinguish water and waste water treatment techniques
			4 To describe the various control methods of air pollution
28	Core Practical III - Water Pollution Lab	U17ES5P3	1 To perform collection, handling and preserving the environmental samples.
			2 To analyze the water quality parameters.
			3 To determine water quality through pollution indicators

Sl. No.	Name of the Course	Course Code	Program Specific Outcomes (After completing this course, the students will be able to)	
29	Elective – I - Tools and Techniques in Environmental Sciences	U17ES5:1	1	To apply GIS technique for environmental mapping
			2	To perform environmental monitoring – air quality, water quality, soil quality
			3	To analyze the environmental data with computers.
30	Elective II - Environmental Safety Health and Management	U17ES5:2	1	To identify the significance of occupational health and industrial safety.
			2	To describe the importance of safety management system.
			3	To explain causes and prevention of occupational hazards
31	PS -Internship V - Environmental Monitoring and Assessment	U17ES5F5	1	To develop observation skills to monitor micro-meteorological, air, noise, water and land environment parameters.
			2	To assess the environmental setting of a developmental activity.
			3	To formulate environmental management plan
32	SBEC II - Ecology and Biodiversity of Birds	U17ES5S2	1	To describe the importance of the local ecology, culture, history and economic development balanced with a social responsibility.
			2	To identify birds and assess their diversity
			3	To present the report through group project
33	SBEC III - Waste Management	U17ES5S3	1	To differentiate various types of waste and its management.
			2	To establish waste management unit.
			3	To identify the hazardous wastes
			4	To handle the hazardous wastes scientifically

Sl. No.	Name of the Course	Course Code	Program Specific Outcomes (After completing this course, the students will be able to)	
34	Core VIII - Instrumental Analysis and Methods	U17ES608	1	To classify and analyze various forms of pollution and contaminants of the environment – their sources / causes and effects.
			2	To report the chemical reactions /processes taking place in the environment.
			3	To use GIS in preparing maps on environmental quality
35	Core IX - Sustainable Development and Environmental Legislation	U17ES609	1	To explain the concepts of sustainable development.
			2	To analyze the global issues.
			3	To construct ideas and initiatives taken for sustainable development.
36	Core X - Global Warming and Climate Change	U17ES610	1	To explain the causes of global warming and climate change
			2	To describe the international initiatives in combating global warming
			3	To discuss the mitigation strategies.
37	Core Practical. IV - Air and Soil Pollution Lab	U17ES6P4	1	To demonstrate the collection, handling and preservation of the environmental samples.
			2	To analyze the air pollutants
			3	To identify soil quality parameters.
38	Elective III - Ecotourism	U17ES6:3	1	To describe the principles and importance of ecotourism.
			2	To evaluate the impact of ecotourism
			3	To characterize management practices of ecotourism.

Sl. No.	Name of the Course	Course Code	Program Specific Outcomes (After completing this course, the students will be able to)	
39	Group Project - Project Work	U17ES6PJ	1	To demonstrate the ability to carry out and write up an independent piece of work on a topic that is relevant to the course.
			2	To illustrate the ability to think critically and develop original ideas.
			3	To analyze data or literature and form conclusions based on the analysis.
			4	To demonstrate independent research skills.
40	Gender Studies	U16GST 61	1	
			2	
			3	

**B2. Course Outcomes of all Programmes Offered by the Department**Name of the Programme : **M.Sc. Environmental Sciences**

Sl. No.	Name of the Course	Course Code	Program Specific Outcomes (After completing this course, the students will be able to)
1	Core I - Fundamentals of Physical Environment	P16ES101	1 To explain about atmosphere, hydrosphere, lithosphere and biosphere
			2 To discuss the importance of interactions among various spheres.
			3 To appreciate the interrelationships among them.
2	Core II - Fundamentals of Ecology	P16ES102	1 To describe the concept, principles and dynamics of ecosystem.
			2 To realize the importance of interactions among the various components of Ecosystem.
			3 To appreciate the interrelationships among the components of Ecosystem.
3	Core III - Environmental Chemistry	P16ES103	1 To review the basic chemical principles governing the reactions of the Environment (in various spheres).
			2 To explain the chemical reactions taking place in natural environment.
			3 To explain biochemical processes
4	Core IV - Environmental Microbiology and Biotechnology	P16ES104	1 To classify the kind of microorganisms.
			2 To describe its importance and role in the environment.
			3 To analyze the basic concepts of biotechnology in solving the environmental issues (in treatment of wastes, bioremediation etc.)

Sl. No.	Name of the Course	Course Code	Program Specific Outcomes (After completing this course, the students will be able to)
5	Core Practical I - Ecology and Environmental Chemistry	P16ES1P1	1 To classify the methods of assessing the abiotic factors of the environment.
			2 To evaluate the biodiversity and compute the biodiversity indices.
			3 To analyze the basic methods in analytical chemistry.
6	Elective I - Energy and Environment	P16ES1:1	1 To list the energy sources (both renewable and non-renewable).
			2 To realize the importance of conservation of energy
			3 To identify and explain various sources renewable energy resources
7	Core V- Environmental Toxicology and Bioremediation	P16ES205	1 To discuss the applications of basic concepts of biotechnology in solving the environmental issues (in treatment of wastes, bioremediation etc.).
			2 To identify various toxic agents of the environment
			3 To explain the mode of action of these toxic substances in human body.
8	Core VI - Research Design and Instrumental Methods	P16ES206	1 To construct a research design
			2 To design a research proposal and produce research report
			3 To describe the basic principles of various instruments used in environmental monitoring/ sampling and analysis.
9	Core VII - Mathematical Models in Environmental Sciences	P16ES207	1 To recall the basic concepts of statistics and its role as an important tool in arriving at conclusions in the study of environment.
			2 To apply statistical techniques for environmental data analysis
			3 To develop programs using R software for analyzing the environmental data

Sl. No.	Name of the Course	Course Code	Program Specific Outcomes (After completing this course, the students will be able to)
10	Elective II - Environmental Management, Sustainable Development	P16ES2:1	1 To explain the concepts of environmental management.
			2 To analyze environmental problems and develops skills to solve for sustainable development.
			3 To explain environmental legislation and various Acts
11	NMEC		1
			2
			3
12	RI / MI	P17VL2:1/ 2:2	1 To inculcate the life values in the minds of the students which will help them to face life challenges
			2 To familiarize with challenges in day to day life
			3 To develop interpersonal skills
13	Core VIII - Environmental Pollution	P16ES308	1 To categorize various forms of pollution and contaminants of the environment–their sources
			2 To explain the causes and effects of air pollution, water pollution, radioactive pollution and noise pollution.
			3 To describe the chemical reactions /processes taking place in the environment.
14	Core IX - Environmental Engineering	P16ES309	1 To define the concepts of water distribution systems, sewer networks, working principles and design of various treatment systems.
			2 To apply the basic engineering principles in controlling the air and noise pollution.
			3 To identify and choose the appropriate solid waste disposal methods

Sl. No.	Name of the Course	Course Code	Program Specific Outcomes (After completing this course, the students will be able to)
15	Core X - Industrial Pollution and Safety Management	P16ES310	1 To explain the manufacturing process and control measures available to mitigate the impact of industrial emissions and discharges into the environment.
			2 To apply the different treatment and control methods of waste.
			3 To plan and design safety management practices in industries
16	Core XI - Environmental Impact Assessment	P16ES311	1 To state the basic concepts and recent developments of Environmental Impact Assessment.
			2 To execute the methods of preparation of Environmental Impact Assessment reports.
			3 To carry out risk assessment, Life Cycle Assessment, cost benefit analysis
17	Core IV - Water Pollution and Its Control Engineering	P16ES3P4	1 To recognize the methods of collection, handling and preservation of the water samples.
			2 To analyze the water quality parameters.
			3 To design water and waste water treatment processes
18	Elective III - Remote Sensing & GIS	P16ES3:1	1 To review the principles and applications of remote sensing and Geographic Information System (GIS) technologies.
			2 To apply the techniques of GIS for environmental studies.
			3 To generate environmental maps using GIS
19	Core Practical V - Air and Soil Pollution and Air Pollution Control	P16ES4P5	1 To list the sampling techniques.
			2 To classify the air pollutants and soil pollutants.
			3 To design air pollution control techniques



Sl. No.	Name of the Course	Course Code	Program Specific Outcomes (After completing this course, the students will be able to)
20	Elective IV - Internship & Field Work	P16ES4F1	1 To describe the environmental pollution and control practices in various Industries.
			2 To locate the selected ecosystems and the ecological principles
			3 To handle and operate the Water / Waste Water treatment facility / waste management facility of an industry / community
21	Project	P16ES4PJ	1 To formulate hypothesis
			2 To collect data
			3 To perform data analysis and interpretation

**B3. Course Outcomes of all Programmes Offered by the Department**

**Name of the Programme : PG Diploma in Industrial Safety and Occupational Health**

<b>Sl. No.</b>	<b>Name of the Course</b>	<b>Course Code</b>	<b>Program Specific Outcomes (After completing this course, the students will be able to)</b>
1	Core I - Industrial Safety & Management	PD17ES21	1 To identify the common occupational diseases.
			2 To comprehend the occupational health and safety management system.
			3 To design safety systems in industries
2	Core II - Safety in Industries	PD17ES22	1 To state the importance of safety, health and environment.
			2 To recognize the different types of hazardous and major accidents
			3 To develop accident prevention strategies
3	Core III - Legislation on environment, health & safety	PD17ES23	1 To define the legislation and acts with regard to industry.
			2 To relate the biomedical and hazardous waste management rules.
			3 To identify relevant laws / rules related to health and safety
4	Core IV - Accident and loss prevention techniques	PD17ES24	1 To classify the various types of accident.
			2 To identify the hazards.
			3 To describe the plant safety.
5	Core V - Industrial Hygiene & Occupational Health	PD17ES25	1 To locate various occupational health hazards.
			2 To recognize the impacts of different types of hazards.
			3 To apply industrial hygiene practices

<b>Sl. No.</b>	<b>Name of the Course</b>	<b>Course Code</b>	<b>Program Specific Outcomes (After completing this course, the students will be able to)</b>
6	Internship - Industrial Visit Report	PD17ESF1	1 To interpret various kinds of environmental pollutions.
			2 To formulate pollution control practices in various industries.
			3 To produce the report
7	Project Report	PD17ESPJ	1 To formulate hypothesis
			2 To collect data
			3 To perform data analysis and interpretation

**B4. Course Outcomes of all Programmes Offered by the Department**

**Name of the Programme** : Certificate Programme In Industrial Safety and Occupational Hygiene

<b>Sl. No.</b>	<b>Name of the Course</b>	<b>Course Code</b>	<b>Program Specific Outcomes (After completing this course, the students will be able to)</b>
1	Core I - Industrial Safety Hygiene	C18ES201	1 To state the importance of safety, health and environment
			2 To interpret the safety management with regard to personal protective equipment.
			3 To identify the safe working practices.
2	Core II – Environmental Safety	C18ES202	1 To distinguish different types of pollutions.
			2 To classify the kind of pollution with respect to physical, chemical and biological nature.
			3 To recognize the importance of hazardous management.
3	Core III – Occupational Health	C18ES203	1 To discuss various occupational health hazards.
			2 To list the impacts of different types of hazards
			3 To explain the preventive measures
4	Core Practical I – Industrial Safety Laboratory	C18ES2P1	1 To demonstrate the usage of breathing apparatus and Emergency evacuation drill.
			2 To acquire skills to rescue employees using emergency rescue equipments inside confined space.
			3 To measure the level of oxygen and other gases in industries with the help of gas detector.