DEPARTMENT OF ENVIRONMENTAL SCIENCE
P. G. Diploma in Environment Protection & Management [DEPM]
New Syllabus
2019 – 2020

- **PROGRAMME OUTCOMES (PO'S):**

The post graduates diploma students will be able to

PO-1) Aware and sensitise about the present days environmental issues at global and local scale.

PO-2) Get acquainted with environmental and social impacts of any developmental activity.

PO-3) Analyse the gravity of ecological problems.

PO-4) Develop a positive attitude to solve the environmental problem concerning the principles of sustainable development.

PO-5) Extend the environmental consciousness and responsibility to solve the problems of nature.

PO-6) Develop a mindset to spread the awareness regarding environmental issues in the society.

PO-7) Consider the environmental ethics in occupation.

P. G. Diploma in Environment Protection & Management [DEPM]
Sem. I (Duration 12 Months)

Sr. No.	Course Code	Title of the course	Theory Hours	Marks
1.	CC-101	Basic Concepts in Nature	40	**100**
2.	CC-102	Human Impact on Environment	40	**100**
3.	CC-103	Natural Resources Management	40	**100**
4.	CC-104	Pollution Monitoring and Control	40	**100**
5.	CC -105	Project and Assignment	One Year	**200**
			Total Marks	**600**

CC-101: Basic Concepts in Nature

Students will be able to:

CO1: Get acquainted with basic concepts in Ecology

CO2: Familiarise with the principles and scope of environment.

CO3: Understand the major ecosystems of the world.

CO4: Comprehend the basics of habitat, ecological niche and guild.

CO5: Analyse the characteristics of population.

Syllabus

Unit 1: Basic concepts in Ecology

Definition, principles, scope of ecology and its relation with other divisions of science, sub-divisions of ecology.

Unit 2: Environmental Science

Definition, principles and scope of environment, components of environment, importance of environmental science in changing times, interdisciplinary and multidisciplinary nature of Environmental Science and its applications.

Unit 3: Ecosystem

Concept of ecosystem, biotic and abiotic components, structure and functions of ecosystem, energy flow in ecosystem, food chain, food web, ecological pyramids and their types, concept of carrying capacity, material cycles in ecosystem **(**Carbon cycle, oxygen cycle, nitrogen cycle, phosphorus cycle, sulphur cycle, mineral cycle.)

Unit 4: Population Ecology

Characteristics of population: natality, mortality, density, age distribution and sex ratio, population growth, population regulation, community ecology, predator-prey relationship.

Unit 5: Habitat

Concept of habitat, ecological niche and guild, biodiversity and its types (species diversity, genetic diversity, ecosystem diversity), ecotones and edge effect, ecological succession, sere and climax.

Unit 6: Major ecosystems of the world

Wetlands, grasslands, marine, desert, mountains, islands. biomes, biogeography.

References:

1. Carson, R. 2002. Silent Spring. Houghton Mifflin Harcourt.
2. Gadgil, M., & Guha, R. 1993. This Fissured Land: An Ecological History of India. Univ. of California Press.
3. Ecology - E.P. Odum, 1983, Holt-Saunders International Edition
4. Concepts of Ecology, E.J. Kormondey,1984, Indian reprint 1991, Prentice-Hall of India.
5. Ecology and Environment, P. D. Sharma, Ashish publications, 1994.

CC-102: Human Impact on Environment

Students will be able to:

CO1: Get acquainted with the environmental degradation, causes and effects.

CO2:.Compare the development and environment

CO3: Understand the pollution monitoring aspects of air, soil, water and noise pollution.

CO4: Realise the measures for environmental protection.

CO5: Define the environmental impact assessment with its objectives and procedure.

Syllabus

Unit 1: Environmental degradation, causes and effects

Man and his environment, evolution of man with changing environment, major components of environment as lithosphere, hydrosphere, atmosphere and biosphere - air, water and soil. General composition, their degradation and effects on man and vegetation.

Unit 2: Population pressure

Population growth and its impact on natural resources, Modernization and population. Joint and nuclear families. Global Environmental Issues (Global warming, Ozone depletion, Acid Rain, Climate change, etc)

Unit 3: Concept of development

Growth and development, Development and environment, Causes for industrialization, changing life styles, regulatory aspects of industrialization, overall impact of industrialization on quality of human life, negative impacts of industrialization and urbanization.

Unit 4: Global environmental issues

Green House Effect, Global Warming, Acid Rain, Ozone Layer Depletion, Nuclear Accidents and Holocaust.

Unit 5: Pollution, Monitoring and Control of Air, Water, Soil .

Definition, types and sources of pollution, Quality standards for air, water, soil; types of pollutants; Methods of monitoring and control of air, water, soil Pollution (Physico-chemical and bacteriological sampling and analysis); effects of pollution on plants, animals and Human being, Sewage and waste water treatment and recycling; Sources, measurement, effects and control of noise pollution.

Unit 6: Solid waste:

Nature of problem of solid waste, sources of biodegradable, non-biodegradable wastes, biomedical waste, general characteristics, their effects, recycling techniques and management of solid waste and hazardous waste Solid waste management control rules.

Unit 7: Measures for Environmental Protection.

Formal and informal environmental education, awareness for nature conservation and protection, environmental ethics and morality, conservation of natural habitats, National

parks and wild life sanctuaries, role of youth and women, role of NGO's, waste land development wetland conservation, conservation of forest and wildlife, urban planning and land-use pattern, sources,

Unit 8: Environmental Impact Assessment:

Definition, significance and scope of impact assessment, Need & objective, types of environmental impacts, methods of environmental impacts, major steps in impact assessment procedure, generalised approach to impact analysis, use computer, social impact assessment.

References:

1. McCully, P. 1996. Rivers no more: the environmental effects of dams (pp. 29-64). Zed Books.
2. McNeill, John R. 2000. Something New Under the Sun: An Environmental History of the Twentieth Century.
3. Odum, E.P., Odum, H.T. & Andrews, J. 1971. Fundamentals of Ecology. Philadelphia: Saunders.
4. Pepper, I.L., Gerba, C.P. & Brusseau, M.L. 2011. Environmental and Pollution Science. Academic Press.
5. Rao, M.N. & Datta, A.K. 1987. Waste Water Treatment. Oxford and IBH Publishing Co. Pvt. Ltd.

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CC-103: Natural Resources Management

Students will be able to:

CO1: Define the term resources with its classification.

CO2: Relate the natural resources and carrying capacity

CO3: Understand the concept of environmental management.

CO4: Analyse the role of public participation in watershed management..

CO5: Sensitise the methods of resource conservation.

Syllabus

Unit 1: Natural Resources:

Definition, Resource, types, perpetual and non perpetual, renewable and non renewable, Fuel and Energy Resources, Wildlife resources, their exploitation and impacts on environment, mineral resources and reserves, water, energy, soil, wildlife resources, oceanic resource, mineral resources, exploitation, recycling.

Unit 2: Use, Overuse and Exploitation of Natural Resources:

Use of natural resources, conventional use of resources, overuse, abuse, exploitation of resources, unequal distribution of natural resources, resource crunch, protection, conservation and sustainable use of natural resources.

Unit 3: Management of Natural Resources:

Sustainable use of natural resources, just and equitable distribution of resources, watershed management and its methods, management of soil, wildlife and its methods, agriculture management, Public participation in resource management.

Unit 4: Environmental Management.

Objectives and components of environmental management need for training, Environmental Impact Statement and Environment Manage mental Plan, Role of remote sensing in environmental management.

Unit 5: Resource conservation

Reuse, reduce, regulate, and recycle of the natural resources, case studies, Indian examples of resource conservation

Unit 6: Environmental audit:

Concept and objectives, general guidelines for environmental audit, audit procedure, merits and demerits, water audit, social audit and energy audit, carbon footprint, water footprint.

References:

1. Environmental Chemistry by B. K. Sharma S. H. Kaur Goel Publishing House, Meerut
2. Environmental Chemistry - A.K. De, New Age Int. Pub. Co., New Delhi, 1990
3. Toxic Chemicals, health and the Environment, Lave, L.B and Upton, A.C. 1987. The Hopkins Press Ltd., London.
4. Vogel's Textbook of quantitative Chemical analysis, 5th Edition-J. H. Basett, J. Nendham and Denny, R.C.

CC-104: Pollution Monitoring and Control

Students will be able to:

CO1: Relate the concept of major conflicts of development and environment

CO2: Learn the sources of air pollution and its control.

CO3: Comprehend the term water pollution with its classification and impacts.

CO4: Understand regulatory aspects of pollution control.

CO5: Analyse the hazardous waste with its management.

Syllabus

Unit 1: Introduction to Pollution

Concept of pollution, causes of environmental pollution, Environmental problems due to pollution, concept of Development, Major conflicts of Development and Environment, Mining and Environment.

Unit 2: Air Pollution and its control

Definition, major air pollutants, Classification of air pollutants, their sources and impacts, acid rain, oil pollution, photochemical smog, effects on organisms and on materials, impact of meteorological factors. Methods of air pollution control. Noise Pollution and its impact, methods of noise pollution control

Unit 3: Water Pollution

Concept, classification, major sources and impacts, oil pollution, thermal pollution, oceanic pollution, eutrophication, water treatment processes.

Unit 4: Soil Pollution

Soil pollution, causes of soil pollution, soil salinity, sources of soil pollutants, major impacts and remedial measures.

Unit 5: Regulatory Aspects and legislation

Industrial Emissions Liquids and gasses; pollution caused by various chemical industries and its overall effect on quality of human life and the environment, water quality management in India. MINAS for sugar industries, distilleries, pesticides industry and mercury from caustic soda industry, Good analytical practices for proper assessment of pollutants, Environmental Protection Act, Air (Prevention and Control of Pollution) Act, Water (Prevention and control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act, National and International conventions and agreements on environment.

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Unit 6: Pollution and its Measurement

Nature of industrial effluents, gaseous effluents, methods of gas analysis, analysis of natural water, analysis of waste water for BOD, free acids and basic; dissolved organic and inorganic compounds like alkali and alkaline salt, SO_4^{--}, PO_4^{--}, NO_2^{--} determinations. Industrial effluent treatment recovery and recycle techniques.

Unit 7: Removal of pollutants

Methods for removal of pollutants from gaseous effluents; particulate matter, waste water treatment Activated sludge process. Removal of Nitrogenous pollution, Removal of nitrogen; physico-chemical processes; biological method of pollution control. Analytical methods of small amount of the metal pollutants; removal and recovery techniques of heavy metals.

Unit 8: Hazardous waste and Biomedical waste management

Hazardous waste, characterization and site assessment waste minimization and resource recovery, chemical physical and biological, treatment; hazards of improper treatment and disposal method; accidental exposure of dangerous waste and emergency measures. Biomedical waste classification and its management methods

References:

1. Waste water engineering, Met Calf and Eddy, INC, Tata Mc Graw Hill
2. Fundamentals of Environmental Pollution, Krishnan Khannan, S. Chand and Company Ltd.,1994.
3. Environmental Pollution Control, C.S.Rao, Wiley Eastern Ltd.,1993
4. Air Pollution Control and Engineering, De Nevers, Mc Graw Hills, 1993.

CC -105: Project and Assignment

One year compulsory Project on any environmental problem to be completed before Theory examination and a Report to be submitted to the Department.

PG Diploma in Environmental Protection and Management
Examination
Environmental Science

Paper- :
Subject code:

Day and Date: **Total Marks: 100**
Time:

I**nstructions**: 1) Answer **any five** questions.
2) All questions carry **equal** marks
3) Attempt **all** the questions either in **English** or **Marathi**.
4) Question number **1** is **compulsory.**

Q. 1. Write in brief on **any five** of the following: (20)
a)
b)
c)
d)
e)
f)

Q. 2. (20)

3. a) (10)

b) (10)

4) (20)

5. a) (10)

b) (10)

6. Write **Short notes** on: (20)
a)
b)

- : 40