SUBJECT DESCRIPTION AND OBJECTIVES

DESCRIPTION:

It deals with the structure and function of the environment, problems created in it and solution for such problems. The aim of this course is to create awareness in every engineering graduate about the importance of environment, the effect of technology on the environment and ecological balance and make them sensitive to the environment problems in every professional endeavour that they participates.

OBJECTIVES:

At the end of this course the student is expected to understand what constitutes the environment, what are precious resources in the environment, how to conserve these resources, what is the role of a human being in maintaining a clean environment and useful environment for the future generations and how to maintain ecological balance and preserve bio-diversity. The role of government and non-government organization in environment managements.

GE 2021 ENVIRONMENTAL SCIENCE AND ENGINEERING L T P C
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UNIT I ENVIRONMENT, ECOSYSTEM AND BIODIVERSITY 14

Definition, scope and importance of environment – need for public awareness - Concept of an ecosystem – structure and function of an ecosystem – producers, consumers and decomposers – energy flow in the ecosystem – ecological succession – food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the (a) forest ecosystem (b) grassland ecosystem (c) desert ecosystem (d) aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) –Introduction to biodiversity definition: genetic, species and ecosystem diversity – biogeographical classification of India – value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values – Biodiversity at global, national and local levels – India as a mega-diversity nation – hot-spots of biodiversity – threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – endangered and endemic species of India – conservation of biodiversity: In-situ and exsitu conservation of biodiversity. Field study of common plants, insects, birds

Field study of simple ecosystems – pond, river, hill slopes, etc

UNIT II ENVIRONMENTAL POLLUTION 8

Definition – causes, effects and control measures of: (a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards – soil waste management: causes, effects and control measures of municipal solid wastes – role of an individual in prevention of pollution – pollution case studies – disaster management: floods, earthquake, cyclone and landslides.

Field study of local polluted site – Urban / Rural / Industrial / Agricultural.

UNIT III NATURAL RESOURCES 10

Forest resources: Use and over-exploitation, deforestation, case studies- timber extraction, mining, dams and their effects on forests and tribal people – Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies – Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. case studies – Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification – role of an individual in conservation of natural resources – Equitable use of resources for sustainable lifestyles. Field study of local area to document environmental assets – river / forest / grassland / hill / mountain.

UNIT IV SOCIAL ISSUES AND THE ENVIRONMENT 7

From unsustainable to sustainable development – urban problems related to energy – water conservation, rain water harvesting, watershed management – resettlement and rehabilitation of people; its problems and concerns, case studies – role of non- governmental organization- environmental ethics: Issues and possible solutions – climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies. – wasteland reclamation – consumerism and waste products – environment production act – Air (Prevention and Control of Pollution) act – Water (Prevention and control of Pollution) act – Wildlife protection act – Forest conservation act – enforcement machinery involved in environmental legislation- central and state pollution control boards- Public awareness.

UNIT V HUMAN POPULATION AND THE ENVIRONMENT 6

Population growth, variation among nations – population explosion – family welfare programme – environment and human health – human rights – value education – HIV / AIDS – women and child welfare – role of information technology in environment and human health – Case studies.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Gilbert M.Masters, ‘Introduction to Environmental Engineering and Science’, 2nd edition, Pearson Education (2004).
2. Benny Joseph, ‘Environmental Science and Engineering’, Tata McGraw-Hill,NewDelhi, (2006).

REFERENCES BOOKS

1. R.K. Trivedi, ‘Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards’, Vol. I and II, Enviro Media.
2. Cunningham, W.P. Cooper, T.H. Gorhani, ‘Environmental Encyclopedia’, Jaico Publ., House, Mumbai, 2001.
3. Dharmendra S. Sengar, ‘Environmental law’, Prentice hall of India PVT LTD, New Delhi, 2007.
4. Rajagopalan, R, ‘Environmental Studies-From Crisis to Cure’, Oxford University Press (2005)
5. Dr.A. Ravikrishnan ‘Environmental Science and Engineering’. Sri Krishna Hitech Publishing Company Pvt. Ltd

MICRO LESSON PLAN

WEEK	HOURS	LECTURE TOPIC	READING
UNIT I ENVIRONMENT, ECOSYSTEM AND BIODIVERSITY			
I	1	Definition, scope and importance of environment – need for public awareness	R5
	2	Concept of an ecosystem – Structure and function of an ecosystem – Producers, Consumers and decomposers – Energy flow in the ecosystem	R5
	3	Ecological succession – Food chains, Food webs and Ecological pyramids	R5
	4	Introduction, types, characteristic features, structure and function of the (a) forest ecosystem	R5
II	5	(b) grassland ecosystem	R5
	6	(c) desert ecosystem	R5
	7	(d) aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)	R5
	8	Introduction to biodiversity definition: genetic, species and ecosystem diversity – biogeographical classification of India	R5
III	9	Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values	R5
	10	Biodiversity at global, national and local levels – India as a mega-diversity nation	R5
	11	Hot-spots of biodiversity	R5
	12	Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – Endangered and endemic species of India	R5
IV	13	Conservation of biodiversity: In-situ and ex-situ conservation of biodiversity	R5
	14	Field study of common plants, insects, birds Field study of simple ecosystems – pond, river, hill slopes, etc	R5
	UNIT III ENVIRONMENTAL POLLUTION		
	15	Definition – causes, effects and control measures of: (a) Air pollution (b) Water pollution	R5
	16	(c) Soil pollution (d) Marine pollution	R5
V	17	(e) Noise pollution (f) Thermal pollution (g) Nuclear hazards	R5
	18	Soil waste management: causes, effects and control measures of municipal solid wastes	R5
	19	Role of an individual in prevention of pollution	R5
	20	Pollution case studies	R5
VI	21	Disaster management: floods, earthquake, cyclone and landslides	R5
	22	Field study of local polluted site – Urban / Rural / Industrial / Agricultural.	R5

	UNIT III NATURAL RESOURCES		
VI	23	Forest resources: Use and over-exploitation, deforestation, case studies-timber extraction, mining, dams and their effects on forests and tribal people	R5
	24	Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems	R5
VII	25	Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies	R5
	26	Food resources: World food problems, changes caused by agriculture and overgrazing,	R5
	27	effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies	R5
	28	Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. case studies	R5
VIII	29	Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification	R5
	30	Role of an individual in conservation of natural resources	R5
	31	Equitable use of resources for sustainable lifestyles	R5
	32	Field study of local area to document environmental assets – river / forest / grassland / hill / mountain.	R5
	UNIT IV SOCIAL ISSUES AND THE ENVIRONMENT		
IX	33	From unsustainable to sustainable development – Urban problems related to energy	R5
	34	Water conservation, rain water harvesting, watershed management	R5
	35	Resettlement and rehabilitation of people; its problems and concerns, case studies – Role of non-governmental organization	R5
	36	Environmental ethics: Issues and possible solutions	R5
X	37	Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies.	R5
	38	Wasteland reclamation – Consumerism and waste products	R5
	39	Environment Pollution Act environment production act – Air (Prevention and Control of Pollution) act – Water (Prevention and control of Pollution) act – Wildlife protection act – Forest conservation act – enforcement machinery involved in environmental legislation- central and state pollution control boards- Public awareness.	R5
	UNIT V HUMAN POPULATION AND THE ENVIRONMENT		
	40	Population growth, variation among nations – population explosion	R5
XI	41	Family welfare programme	R5
	42	Environment and Human Health, Human Rights	R5
	43	HIV / AIDS	R5
	44	Women and Child welfare	R5
	45	Role of information Technology in Environment and human health.– Case studies	R5

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