SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Department of Information Technology	LP: GE 16451 Rev. No: 00 Date: 26-06-2017
B.E/~~B.Tech/M.E/M.Tech~~ : **Information Technology** Regulation: 2016 PG Specialisation : NA Sub. Code / Sub. Name : **GE 16451 ENVIRONMENTAL SCIENCE AND ENGINEERING** **Unit** : **I. ENVIRONMENT, ECOSYSTEMS AND BIODIVERSITY**	

3 CREDITS

UNIT I ENVIRONMENT, ECOSYSTEMS AND BIODIVERSITY **12**

Definition, scope and importance of Risk and hazards; Chemical hazards, Physical hazards, Biological hazards in the environment – concept of an ecosystem – structure and function of an ecosystem – producers, consumers and decomposers-Oxygen cycle and Nitrogen cycle – energy flow in the ecosystem – ecological succession processes – 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 – bio-geographical 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 ex-situ conservation of biodiversity. Field study of common plants, insects, birds. Field study of simple ecosystems – pond, river and hill slopes, etc.

Objective: To create an awareness about the fundamentals and importance of ecosystems and biodiversity to the students.

Session No *	Topics to be covered	Ref	Teaching Aids
1	Definition, scope and importance of Risk and hazards; Chemical hazards, Physical hazards	T1, Ch4, p127-166	PPT
2	Biological hazards in the environment and concept of an ecosystem	R4, Ch2, p20-24	PPT
3	Structure and function of an ecosystem, producers, consumers and decomposers	R4, Ch2, p25-30	PPT
4	Bio Geo chemical cycles: Oxygen cycle and Nitrogen cycle	T2, Ch4, p79-84	PPT/BB
5	Energy flow in the ecosystem and ecological succession processes	R1, Ch. 3, p113-118,	PPT/BB
6	Introduction, types, characteristic features, structure and function of the Forest ecosystem and Grassland ecosystem	R4, Ch4, p36-43	PPT
7	Introduction, types, characteristic features, structure and function of the Desert ecosystem and Aquatic ecosystems such as ponds, streams, lakes, rivers	R4, Ch4, p43-65	PPT
8	Introduction, types, characteristic features, structure and function of the Aquatic ecosystems such as oceans, estuaries.	R3, Ch4, p43-65	PPT
9	Introduction to biodiversity definition: genetic, species and ecosystem diversity – **bio-geographical classification of India** – value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values	T2, Ch5, p94-101	PPT
10	Biodiversity at global, national and local levels, India as a mega biodiversity nation, hot-spots of biodiversity	R4, Ch6, p71-82	PPT
11	Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts, endangered and endemic species of India & Revision	R4, Ch6, p83-84	PPT
12	Conservation of biodiversity: In-situ and ex-situ conservation of biodiversity. Field study of common plants, insects, birds. Field study of simple ecosystems – pond, river and hill slopes, etc.	R5, Ch6, p85-95	PPT

Content beyond syllabus covered (if any):

Discussion about the bio-geographical classification of India

* Session duration: 50 minutes

Sub. Code / Sub. Name: GE 16451 ENVIRONMENTAL SCIENCE AND ENGINEERING

Unit II : II. ENVIRONMENTAL POLLUTION

UNIT II ENVIRONMENTAL POLLUTION 10

Definition – causes, effects and control measures of: (a) Air pollution (Atmospheric chemistry- Chemical composition of the atmosphere; Chemical and photochemical reactions in the atmosphere - formation of smog, PAN, acid rain, oxygen and ozone chemistry;- Mitigation procedures- Control of particulate and gaseous emission, Control of SO2, NOX, CO and HC) (b) Water pollution : Physical and chemical properties of terrestrial and marine water and their environmental significance; Water quality parameters – physical, chemical and biological; absorption of heavy metals - Water treatment processes. (c) Soil pollution - soil waste management: causes, effects and control measures of municipal solid wastes – (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards–role of an individual in prevention of pollution – pollution case studies Field study of local polluted site – Urban / Rural / Industrial / Agricultural.

Objective: To improve the knowledge about the various types of environmental pollution and their effects on plants and animals.

Session No *	Topics to be covered	Ref	Teaching Aids
13	Definition, causes, effects and control measures of Air pollution (Atmospheric chemistry, Chemical composition of the atmosphere, Chemical and photochemical reactions in the atmosphere	T2, Ch6, p118-130	PPT
14	Formation of SMOG, PAN, Acid rain, Oxygen and Ozone chemistry, Mitigation procedures	R4, Ch11, p174-176	PPT
15	Control of particulate and gaseous emission, Control of SO2, NOX, CO and HC	R4, Ch11, p177-178	PPT
16	Water pollution :- Physical and chemical properties of terrestrial and marine water and their environmental significance; Water quality parameters such as physical, chemical and biological	T2, Ch6, p137-145	PPT
17	Absorption of heavy metals, Water treatment processes.	T2, Ch6, p146-152	PPT/BB
18	Soil pollution, soil waste management: causes, effects and control measures of municipal solid wastes	T2, Ch6, p153-160	PPT
19	Causes, effects and control measures of Marine pollution and Noise pollution	T2, Ch6, p160-168	PPT
20	Causes, effects and control measures of Thermal pollution	T2, Ch6, p168-169	PPT
21	Causes, effects and control measures of nuclear hazards, role of an individual in prevention of pollution	T2, Ch5, p204-206	PPT
22	Pollution case studies & Revision	T2, Ch6, p200-202	Group Discussion
	CAT - 1		

Content beyond syllabus covered (if any):

Discussion about the Air Pollution and Nuclear pollution case studies

* Session duration: 50 mins

Sub. Code / Sub. Name: GE 16451 ENVIRONMENTAL SCIENCE AND ENGINEERING

Unit : III. NATURAL RESOURCES

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 overutilization of surface and ground 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. Energy Conversion processes – Biogas – production and uses, anaerobic digestion; 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. Introduction to Environmental Biochemistry: Proteins – Biochemical degradation of pollutants, Bioconversion of pollutants. Field study of local area to document environmental assets – river / forest / grassland / hill / mountain.

Objective: To impart knowledge about the dynamic process available in the nature and resources available on this earth crust.

Session No *	Topics to be covered	Ref	Teaching Aids
23	**Forest resources**: Use and over-exploitation, deforestation, case studies. Timber extraction, Mining, Dams and their effects on forests and tribal people	T2, Ch2, p17-27	PPT
24	**Water resources:** Use and overutilization of surface and ground water, **Dams:- benefits and problems**	T2, Ch2, p28-47	PPT
25	**Mineral resources:** Use and exploitation, environmental effects of extracting and using mineral resources, case studies	R4, Ch10, p161-169	PPT
26	**Food resources:** World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems	R4, Ch10, p156-161	PPT
27	Water logging, salinity, case studies. **Energy resources**: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources.	R4, Ch10, p153-156	PPT
28	Energy Conversion processes – Biogas – production and uses, anaerobic digestion; case studies	R4, Ch8, p119-135	PPT
29	**Land resources:** Land as a resource, land degradation, man induced landslides, soil erosion and desertification	R4, Ch10, p153-156	PPT
30	Role of an individual in conservation of natural resources – Equitable use of resources for sustainable lifestyles	R4, Ch2, p82	PPT
31	**Introduction to Environmental Biochemistry:** Proteins	R4, Ch6, p94-99	PPT
32	Biochemical degradation of pollutants, Bioconversion of pollutants & Revision	R4, Ch6, p100-102	PPT

Content beyond syllabus covered (if any):

Discussion about the Dams:- benefits and problems

* Session duration: 50 mins

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Sub. Code / Sub. Name : **GE 16451 ENVIRONMENTAL SCIENCE AND ENGINEERING**

Unit : IV. SOCIAL ISSUES AND THE ENVIRONMENT

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 – 12 Principles of green chemistry- nuclear accidents and holocaust, case studies. – wasteland reclamation – consumerism and waste products – Environment protection act – Air act – Water act – Wildlife protection act – Forest conservation act –The Biomedical Waste (Management and Handling) Rules; 1998 and amendments- scheme of labeling of environmentally friendly products (Eco-mark). Enforcement machinery involved in environmental legislation- central and state pollution control boards- disaster management: floods, earthquake, cyclone and landslides. Public awareness.

Objective:

To elucidate the students about the various laws available in the country to protect the environment

Session No *	Topics to be covered	Ref	Teaching Aids
33	From unsustainable to sustainable development – urban problems related to energy – Water conservation, Rain Water Harvesting,	T2, Ch7, p210-220	PPT
34	**Resettlement and Rehabilitation of people**; its problems and concerns, case studies, Role of Non-Governmental Organization,	R5, Ch18, p289-	Group Discussion/
35	Nuclear accidents and Holocaust, case studies. Wasteland reclamation, consumerism and waste products.	T2, Ch7, p243-246	PPT
36	**Air (Prevention and Control of Pollution) act, Water (Prevention and Control of Pollution) act, Wildlife protection act, Forest conservation act**	T2, Ch7, p243-246	PPT
37	**Biomedical Waste** (Management and Handling) Rules; 1998 and amendments, scheme of labeling of environmentally friendly products	R3, Ch5, p74-78	PPT
38	Enforcement machinery involved in environmental legislation, Central and State pollution control boards & Revision	R3, Ch5, p79-94	PPT
39	**Disaster management: floods, earthquake, cyclone and landslides**. Public awareness & Revision	T2, Ch6, p200-202	PPT
	CAT - 2	-	

Content beyond syllabus covered (if any):

Discussion about the disaster management

* Session duration: 50 mins

Sub. Code / Sub. Name : **GE 16451 ENVIRONMENTAL SCIENCE AND ENGINEERING**

Unit : V. HUMAN POPULATION AND THE ENVIRONMENT

UNIT V HUMAN POPULATION AND THE ENVIRONMENT 6

Population growth, variation among nations – population explosion – family welfare program – environment and human health – human rights – value education – HIV / AIDS – women and child welfare –Environmental impact analysis (EIA) -GIS-remote sensing-role of information technology in environment and human health – Case studies.

Objective:

To impart knowledge about the Environmental Management to the students.

Session No *	Topics to be covered	Ref	Teaching Aids
40	Population growth, variation among nations, population explosion, family welfare program	R4, Ch15, p200-	PPT
41	Environment and Human health, Human rights	T2, Ch8, p274-277	PPT
42	**Value education** : **HIV / AIDS** – Women and Child welfare	T2, Ch8, p277 R6,	PPT
43	Environmental Impact Analysis (EIA), GIS, remote sensing	T2, Ch7, p246-251	PPT
44	Role of information technology in environment and human health, Case studies	T2, Ch8, p288-289	PPT
45	Revision	--	Group Discussion
Content beyond syllabus covered (if any): Discussion about the **HIV / AIDS**			

* Session duration: 50 mins

TEXT BOOKS:

1. Gilbert M.Masters, 'Introduction to Environmental Engineering and Science', 2nd ed, Pearson Education 2004.
2. Benny Joseph, 'Environmental Science and Engineering', Tata McGraw-Hill, New Delhi, (2006).

REFERENCES:

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. Wager. K. D. "Environmental Management", W.B. Saunders Co., Philadelphia.
6. Townsend C, Harper J and Michel Begon, "Essentials of Ecology", Blackwell Science.
7. Trivedi R. K, and P.K. Goel, "Introduction to Air Pollution", Techno-Science Publications.

REFERENCES:

	Prepared by	Approved by
Signature		
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Designation	Professor and Head	Professor and Head, Dept of Information Technology
Date	26-06-2017	26-06-2017
Remarks *: This lesson plan may be used for teaching **GE 6351 ENVIRONMENTAL SCIENCE AND ENGINEERING** in even semester also.		

* If the same lesson plan is followed in the subsequent semester/year it should be mentioned and signed by the Faculty and the HOD