SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Department of Applied Chemistry	LP: Sub Code GE22451
B.E/B.Tech: Common to all Branches Semester : Even (IV) Sub. Code / Sub. Name: GE22451 / ENVIRONMENTAL SCIENCES AND SUSTAINABILITY Regulation : 2022 Unit : I	Date: 22-01-24

Unit Syllabus: ENVIRONMENT AND BIODIVERSITY 9

Definition, scope and importance of environment – need for public awareness. Eco-system and energy flow – ecological succession. Types of biodiversity: genetic, species and ecosystem diversity– values of biodiversity, India as a mega-diversity nation – hot-spots of biodiversity – threats to biodiversity: fragmentation and habitat loss, poaching of wildlife, human-wildlife conflicts – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ.

Objective:

To introduce the basic concepts of environment, ecosystems and biodiversity and emphasize the biodiversity of India and its conservation.

Session No *	Topics to be covered	Ref	Teaching Aids
1.	Definition, scope and importance of environment - need for public awareness	T2, Ch1.6, 8-11	PPT
2.	Ecosystem structure and its function- Energy flow in the ecosystem	T2, Ch3.4, 70-74	PPT
3.	Food chains, food webs and ecological pyramids	T2, Ch2, 74-76	PPT
4.	Ecological succession, Types of biodiversity: genetic, species and ecosystem diversity	T2, Ch3, 74-75	PPT
5.	Values of biodiversity, India as a mega-diversity nation	T2, Ch4, 96-105	PPT
6.	Hot-spots of biodiversity – hotspots in india	T2, Ch4, 108-110	PPT
7.	Threats to biodiversity - Fragmentation and habitat loss, poaching of wildlife, human-wildlife conflicts	T2, Ch4, 106-108	PPT
8.	Endangered and endemic species of India	T2, Ch4,111-113	PPT
9.	Conservation of biodiversity: In-situ and ex-situ	T2, Ch4,113-118	PPT

Content beyond syllabus covered (if any): Definition, importance of Risk & hazards

* Session duration: 50 minutes

Sub. Code / Sub.Name:ESS / ENVIRONMENTAL SCIENCE AND SUSTAINABILITY

Unit : II

Unit Syllabus : ENVIRONMENTAL POLLUTION: 9

Definition, causes, effects and preventive measures of air, water and soil pollution. Marine and thermal pollution - causes, effects and control measures. Light and noise pollution - effect on flora and fauna. Nuclear pollution- Sources, effects and control measures. Disposal of radioactive wastes (Nuclear hazards). Pollution case studies. Role of an individual in the prevention of pollution. Solid, hazardous and E-waste management. Occupational health and safety management system (OHASMS). Environmental protection, Environmental protection acts, categorization of species according to IUCN.

Objective:

To impart knowledge on the causes, effects and control or prevention measures of environmental pollution.

Session No *	Topics to be covered	Ref	Teaching Aids
10.	Definition - causes, effects and control measures of air pollution	T2, Ch6, 118-130	PPT
11.	Water pollution - causes, effects and control measures	T2, Ch6, 137-145	PPT
12.	Definition - causes, effects and control measures of soil pollution	T2, Ch2, p17- 27	PPT
13.	Marine - causes, effects and control measures- causes, effects and preventive measure of Thermal pollution.	T2, Ch6, 160-168	PPT
14.	Light and noise pollution – effect on flora and fauna	T2, Ch6, 168-169, RK, Ch2. 2.23	PPT
15.	Nuclear pollution- source, effects and control measures, Disposal of radioactive wastes (Nuclear hazards)	T2, Ch6, 260-261	PPT
16.	Pollution case studies. Role of an individual in the prevention of pollution.	T2, Ch5.9.1, 200-203	PPT
17.	Solid, hazardous and E-waste. Occupational health and safety management (OHAMS)	T4, Ch1, 26-27 T4, Ch3,79-81	PPT
18.	Environmental protection, Environmental protection acts, categorization of spices according to IUCN	T2, Ch6, 199-200 T2,Ch6,256-257	PPT

Content beyond syllabus covered (if any):

*** Session duration: 50 mins**

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COURSE DELIVERY PLAN - THEORY

Sub Code / Sub Name: **GE22451/ ENVIRONMENTAL SCIENCES AND SUSTAINABILITY**

Unit : III

Unit Syllabus : RENEWABLE SOURCES OF ENERGY: 9

Energy resources: Growing energy needs, Non-renewable resources – types, uses. Energy management and conservation - New energy sources, Need of new sources - geo suitability of establishing renewable energy sources, different types new energy sources. Applications of hydrogen energy, ocean energy resources, Tidal energy conversion. Concept, origin and power plants of geothermal energy. Role of an individual in conservation of energy.

Objective:

To study and understand the various types of renewable sources of energy and their applications.

Session No *	Topics to be covered	Ref	Teaching Aids
19.	Energy resources: Growing energy needs	T2, Ch2.5, 52-56	PPT
20.	Non-renewable resources and its types, uses.	T2, Ch6, 224-225	PPT
21.	Energy management and conservation - new energy sources	RK, Ch3, 3.11-3.13	PPT
22.	Need of new sources - geo suitability of establishing renewable energy sources,	RK, Ch3, 3.6	PPT
23.	Different types new energy sources. Source and applications of hydrogen energy,	RK, Ch3, 3.13	PPT
24.	Concept, origin, power plants and applications of Ocean energy resources	RK, Ch3, 3.16	PPT
25.	Application of Tidal energy conversion	RK, Ch3, 3.18	PPT
26.	Concept, origin and power plants of geothermal energy	T2, Ch4,57-58	PPT
27.	Role of an individual in conservation of energy.	T2, ch4, 52-63	PPT

Content beyond syllabus covered (if any): Biochemical degradation of pollutants

Sub Code / Sub Name: **GE22451 / ENVIRONMENTAL SCIENCES AND SUSTAINABILITY**
Unit : IV

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Unit Syllabus : SUSTAINABILITY AND MANAGEMENT:

Development, GDP, Sustainability- concept, needs and challenges-economic, social and aspects of sustainability-from unsustainability to sustainability-millennium development goals, and protocols. Sustainable Development Goals-targets, indicators and intervention areas - Principles of green chemistry, Climate change- Global, Regional and local environmental issues and possible solutions- case studies - Role of non-governmental organization, Concept of carbon credit, carbon footprint - Environmental management in industry - A case study.

Objective:

To familiarize the concept of sustainable development goals, economic and social aspects of sustainability, recognize and analyze climate changes, and environmental management challenges.

Session No *	Topics to be covered	Ref	Teaching Aids
28.	Need and Development of sustainability and management, GDP-Gross Domestic Product, Significance of GDP.	T2,Ch6.1, 213-221	PPT
29.	Sustainability- concept, needs and challenges	T4, Ch 1,1-5	PPT
30.	Economic, social and aspects of sustainability from unsustainability to sustainability	T4,Ch5, 117-123	PPT
31.	Millennium development goals, and protocols	RK, Ch4, 4.16-4.17	PPT
32.	Sustainable Development Goals-targets, indicators and intervention areas	RK, Ch4, 4.18	PPT
33.	Principles of green chemistry, Climate change	T2, Ch6, 232-233	PPT
34.	Global, Regional and local environmental issues and possible solutions-case studies	RK, Ch4, 4.26	PPT
35.	Role of non-governmental organization, Concept of carbon credit, carbon footprint	T2, Ch6, 274-275	PPT
36.	Environmental management in industry - A case study.	T2, Ch6, 275-276	PPT

Content beyond syllabus covered (if any): Biomedical Waste Management

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Sub Code / Sub Name: **GE22451 / ENVIRONMENTAL SCIENCES AND SUSTAINABILITY**
Unit : V

Unit Syllabus : SUSTAINABILITY PRACTICES: 9

Zero waste and R concept, circular economy, ISO 18000 series, material life cycle assessment, environmental impact assessment. Wasteland reclamation, Sustainable habitat: green buildings, green materials, energy efficiency and energy audit, sustainable transports. Energy cycles, carbon cycle, emission and sequestration, Green engineering: sustainable urbanization- socio-economical and technological change. Rainwater harvesting, watershed management, environmental ethics: Issues and possible solutions.

Objective:

To inculcate and embrace sustainability practices, develop a broader understanding of green materials and energy cycles, and analyze the role of sustainable urbanization.

Session No *	Topics to be covered	Ref	Teaching Aids
37.	Zero waste and R concept, circular economy, ISO 18000 series, material life cycle assessment	T2, Ch6,276-277	PPT
38.	Environmental impact assessment (EIA)	T2, Ch6, 263-269	PPT
39.	Wasteland reclamation - importance, and their advantages and disadvantages.	RK, Ch 5, 5.13	PPT
40.	Sustainable habitat: Green buildings, green materials.	RK, Ch 5, 5.17-5.22	PPT
41.	Energy efficiency and energy audit, sustainable transports.	RK, Ch 5, 5.27-5.31	PPT
42.	Energy cycles, carbon cycle, emission and sequestration,	RK, Ch 5, 5.41	PPT
43.	Green engineering: sustainable urbanization-socio-economical and technological change.	RK, Ch 5, 5.52	PPT
44.	Rainwater harvesting, watershed management	T2, Ch6, 225-230	PPT
45.	Environmental ethics: Issues and possible solutions.	T2, Ch6, 230-232	PPT

Content beyond syllabus covered (if any): Environmental Impact Analysis

TEXT BOOKS:

1. Anubha Kaushik and C. P. Kaushik's "Perspectives in Environmental Studies", 7th Edition, New Age International Publishers, 2022.
2. Benny Joseph, 'Environmental Science and Engineering', Tata McGraw-Hill, New Delhi, 2016.
3. Gilbert M. Masters, 'Introduction to Environmental Engineering and Science', 2nd edition, Pearson Education, 2004.
4. Allen, D. T. and Shonnard, D. R., Sustainability Engineering: Concepts, Design and Case Studies, Pearson, 2011.
5. Bradley, A.S; Adebayo, A.O., Maria, P. Engineering applications in sustainable design and development, CL Engineering, 2015.
6. Environment Impact Assessment Guidelines, Notification of Government of India, 2006.
7. Mackenthun, K.M., Basic Concepts in Environmental Management, Lewis Publication, London, 1998.

REFERENCES:

1. R.K. Trivedi, 'Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards', Vol. I and II, Enviro Media. 38
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, 3rd edition, 2015.
5. Erach Bharucha "Textbook of Environmental Studies for Undergraduate Courses" Orient Blackswan Pvt. Ltd. 3rd edition, 2021.

	Prepared by	Approved by
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Date	22-01-2024	22-01-2024
Remarks *:		
Remarks *:		

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