



**DHANALAKSHMI SRINIVASAN ENGINEERING COLLEGE
(AUTONOMOUS)**

(Approved by AICTE & Affiliated to Anna University, Chennai)
Re-Accredited by NAAC with 'A' Grade
Accredited by NBA for AERO, BME, CSE, ECE, EEE, IT & MECH.
PERAMBALUR-621212, TAMILNADU, INDIA.
Website: www.dsengg.ac.in



COURSE PLAN

Name of the Faculty				
Designation/Department				
Course Code/Name	U23GET41 - Environmental Science and Engineering			
Year/Section/Department				
Credits Details	L: 3	T: 0	P: 0	C: 3
Total Contact Hours Required	45			

Syllabus:

UNIT I Ecosystem 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: habitat loss, poaching of wildlife, man-wildlife conflicts – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ.	
UNIT II Environmental Pollution	9
Causes, Effects and Preventive measures of Water, Soil, Air and Noise Pollutions. Solid, Hazardous and E-Waste management. Case studies on Occupational Health and Safety Management system (OHASMS). Environmental protection, Environmental protection acts.	
UNIT III Renewable Sources of Energy	9
Energy management and conservation, New Energy Sources: Need of new sources. Different types new energy sources. Applications of- Hydrogen energy, Ocean energy resources, Tidal energy conversion. Concept, origin and power plants of geothermal energy.	
UNIT IV Environmental Issues	9
Social Issues and possible solutions – climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust - Population growth, variation among nations population explosion – family welfare programme – human rights – value education – HIV / AIDS – women and child welfare.	
UNIT V Sustainability Practices	9
Zero waste and R concept, Circular economy, ISO 14000 Series, Material Life cycle assessment, Environmental Impact Assessment. Sustainable habitat: Development, GDP, Sustainability- Green buildings, Green materials, Energy efficiency, Sustainable transports. Sustainable energy Non-conventional Sources, Energy Cycles-carbon cycle, emission and sequestration, Green Engineering: Sustainable urbanization- Socio-economic and technological change.	

Objective:

- ❖ To introduce the basic concepts of environment, ecosystems and biodiversity and emphasize on the biodiversity of India and its conservation.
- ❖ To impart knowledge on the causes, effects and control or prevention measures of environmental pollution and natural disasters.
- ❖ To facilitate the understanding of global and Indian scenario of renewable and non-renewable resources, causes of their degradation and measures to preserve them.
- ❖ To familiarize the concept of sustainable development goals and appreciate the interdependence of economic and social aspects of sustainability, recognize and analyze climate changes, concept of carbon credit and the challenges of environmental management.
- ❖ To inculcate and embrace sustainability practices and develop a broader understanding on green materials, energy cycles and analyze the role of sustainable urbanization..

Text Book:

1. Anubha Kaushik and C. P. Kaushik's "Perspectives in Environmental Studies", 6th Edition, New Age International Publishers, 2018.
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, Prentice Hall.
5. Bradley. A.S; Adebayo, A.O., Maria, P. Engineering applications in sustainable design and development, Cengage learning.
6. Environment Impact Assessment Guidelines, Notification of Government of India, 2006.

Reference Book:

1. R. K. Trivedi, 'Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards', Vol. I and II, Enviro Media. 38 . edition 2010.
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, Third Edition, 2015.
5. Erach Bharucha "Text book of Environmental Studies for Undergraduate Courses" Orient Blackswan Pvt. Ltd. 2013

Website:

- W1: <https://www.brainkart.com>
W 2. <https://www.padeepz.net>
W 3 . <https://learnengineering.in>
W 4. <https://www.studentsfocus.com>

Online Mode of Study:

- W1: <https://nptel.ac.in/courses/122/106/1221106028/>
W2: <https://www.seek.com.au/learning/search/environmental-studies-courses/mode-online>
W3: <https://www.shiksha.com/online-courses/environmental-studies-certification>

W4: <https://www.publicservicedegrees.org/online-degrees/environmental-science/>

W5: <https://www.manchester.ac.uk/study/online-blended-learning/courses/pollution-environmental-control-online/>

Course Plan:

Topic Number	Topic	Reference Detail	Page Number	Mode of teaching	Number of Periods Required	Cumulative Period
UNIT I						
1	Concept of an ecosystem structure and function of an ecosystem.	T1	2	BB	1	1
2	Oxygen cycle and Nitrogen cycle, energy flow in the ecosystem.	T1	76	BB	1	2
3	Forest ecosystem, grass and ecosystem.	T1	82	BB	1	3
4	Desert ecosystem, aquatic ecosystems.	T1	75	BB	1	4
5	Classification of India value of biodiversity, hotspots of biodiversity.	T2	76	BB	1	5
6	India as a mega diversity nation.	W1	-	PPT	1	6
7	Threats of biodiversity.	T1	88	BB		7
8	Endangered and endemic species.	T1	88	BB	1	8
9	Conservation of biodiversity.	T2	88	BB	1	9
Outcome of Unit I:						
CO 1: Demonstrate the General concepts of Ecosystem, biodiversity and its importance.						
UNIT II						
10	Air pollution	W 2	-	PPT	1	10
11	Water pollution	T1	158	BB	1	11
12	Soil pollution	T1	160	BB	1	12
13	Marine pollution	T2	165	BB	1	13
14	Noise pollution	T1	168 , 187	BB	1	14
15	Thermal pollution	R1	169	BB	1	15
16	Nuclear hazards, Solid waste management.	T1	198	BB	1	16
17	Disaster management: floods, earthquake.	R1	223	BB	1	17
18	Cyclone and landslides.	R2	228	BB	1	18

Outcome of Unit II:

CO 2: Understand about the major pollutants and their problems on environment; analyze a preventive measure of pollution.

UNIT III

19	Energy management and conservation	T1	17, 18	BB	1	19
20	New Energy Sources: Need of new sources	T1	20	BB	1	20
21	Solar Energy	T1	23, 25,	BB	1	21
22	Wind Energy	T2	29	BB	1	22
23	Tidal energy, Geothermal energy	R1	35	BB	1	23
24	Applications of- Hydrogen energy	R1	27	BB	1	24
25	Ocean energy resources	T1	48	BB	1	25
26	Tidal energy conversion	W 1	-	PPT	1	26
27	power plants of geothermal energy	T2	52	BB	1	27

Outcome of Unit III:

CO 3: Knowledge about the natural resources and also Understand the problems of using fertilizers & Pesticides in agriculture field.

UNIT IV

28	Social Issues and possible solutions	T1	210, 212	BB	1	28
29	climate change, global warming, acid rain	T1	215, 220	BB	1	29
30	ozone layer depletion	R2	224, 246	BB	1	30
31	nuclear accidents and holocaust	T1	223, 224	BB	1	31
32	Population growth	R2	225	BB	1	32
33	variation among nations population explosion	T1	238, 237	BB	1	33
34	family welfare programme – human rights	W2	-	PPT	1	34
35	value education	T1	245	BB	1	35
36	HIV / AIDS – women and child welfare	T1	248	BB	1	36

Outcome of Unit IV:

CO 4 : Analyze the importance of green chemistry

UNIT V						
37	Zero waste and R concept, Circular economy	W 3	-	PPT	1	37
38	ISO 14000 Series, Material Life cycle assessment	T1	282	BB	1	38
39	Environmental Impact Assessment	R2	274	BB	1	39
40	Sustainable habitat: Green buildings, Green materials	R1	278	BB	1	40
41	Energy efficiency, Sustainable transports	T1	286	BB	1	41
42	Sustainable energy: Non-conventional Sources	T1	290	BB	1	42
43	Energy Cycles carbon cycle,	T1	294	BB	1	43
44	emission and sequestration, Green	T1	295	BB	1	44
45	Sustainable urbanization- Socio-economic and technological change	R3	115	BB	1	45

Outcome of Unit V:

CO 5: Know about the population growth how it is interfere with the environment.

Course Outcome:

At the end of the course the students would be able to:

- CO1:** **Demonstrate** a comprehensive understanding of the world's biodiversity and the Importance of its conservation.
- CO2:** **Discover** knowledge in ecological perspective and value of environment
- CO3:** **Categorize** different types of pollutions and their control measures.
- CO4:** **Understand** the significance of various natural resources and its management.
- CO5:** **Analyze** global environmental problems and come out with best possible solutions.
- CO6:** **Understand** environmental laws and sustainable development.

Course Outcome Vs Program Outcome Mapping:

CO No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	CO Attainment (Avg)
CO1	3	2	-	-	-	2	3	-	-	-	-	-	2.5
CO2	3	3	-	2	-	3	3	-	-	-	-	-	2.8
CO3	3	2	2	-	2	2	3	-	-	-	-	-	2.5
CO4	3	3	-	2	-	3	3	2	-	-	-	-	2.7
CO5	3	3	2	2	2	3	3	2	-	-	-	-	2.8
CO6	2	2	-	-	-	3	3	3	2	2	-	2	2.4

Content beyond Syllabus:

- ❖ Water treatment,
- ❖ Various methods,
- ❖ Quality & importance.
- ❖ Role of Information technology to Environmental Science.

Internal Evaluation Components:

Webportal	Assignment	Components	Topic Number with Topic / Unit Details	Relevance to CO
Webportal 1	--	Assessment - I (60)	Unit I and II	CO 1 & CO2
	1	Assignment - Handwritten (20)	1. Explain the structure, component and Function of Eco System. 2. Discuss about the values and conservation of Bio Diversity	CO1 CO1
	2	Assignment - Poster Presentation / PPT (20)	1. Sources, causes, Effect and Control of Air Pollution. 2. Hazardous and E-Waste management, OHASMS	CO2 CO2
Webportal 2	--	Assessment - II (60)	Unit III and IV	CO3 & CO4
	3	Seminar (20)	1. Applications of- Hydrogen energy, Ocean energy resources. 2. Concept, origin and power plants of geothermal energy	CO3 CO3
	4	Case Study Report (20)	Social Issues and possible solutions	CO4
Webportal 3	--	Model Exam (75)	Unit I to V	CO1 to CO6
	5	MCQ (15)	Unit I to V	CO1 to CO6
	-	Course Attendance (10)	--	--

Submission Details:

Phase 1 (Before AT 1)		Phase 2 (Before AT 2)		Phase 3 (Model)
Assignment 1	Assignment 2	Assignment 3	Assignment 4	Assignment 5

PLAN OF ASSESSMENT TEST –DISTRIBUTION OF MARKS:

TEST	CO- MARK WISE DISTRIBUTION						BLOOM'S LEVEL MARK WISE DISTRIBUTION					
	CO1	CO2	CO3	CO4	CO5	CO6	BTL1	BTL2	BTL3	BTL4	BTL5	BTL6
AT-1	30	30					14	46				
			30	30			14	46				
MODEL	20	20	20	20	10	10	10	90				

Prepared By

Verified By
(HOD)Approved By
(PRINCIPAL)

CO No	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	CO Attainment (Avg)
C01	3	2	-	-	-	2	3	-	-	-	-	-	2.5
C02	3	3	-	2	-	3	3	-	-	-	-	-	2.8
C03	3	2	2	-	2	2	3	-	-	-	-	-	2.5
C04	3	3	-	2	-	3	3	2	-	-	-	-	2.7
C05	3	3	2	2	2	3	3	2	-	-	-	-	2.8
C06	2	2	-	-	-	3	3	3	2	2	-	2	2.4