



GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering

Subject Code: 3144006

Semester – IV

Subject Name: Environmental Sustainability

Type of course: Humanities and Social Science

Prerequisite: Environmental Science subject of First Year. Preliminary knowledge of sustainability.

Rationale: Environmental sustainability is desperately essential to protect environmental resources for the future generations. This subject helps to reveal the students about need of preserving planet using renewable resources, cleaner and green production. It is also necessary to aware the students regarding policies for environmental sustainability in order to reduce the pollution level of environment.

Teaching and Examination Scheme:

Teaching Scheme			Credits C	Examination Marks				Total Marks
L	T	P		Theory Marks		Practical Marks		
			ESE (E)	PA (M)	ESE (V)	PA (I)		
3	0	0	3	70	30	0	0	100

Content:

Sr. No.	Content	Total Hrs
1	Principles of Sustainable development: Introduction. Pillars of sustainability-Social, Environmental and Economy. Sub domain of sustainability-cultural, technological and political. Socio-ecological process. Ways of sustainable living. Introduction to Concepts of Green chemistry.	8
2	Ecosystem: Health of ecosystem. Protecting the long-term productivity and health of resources to meet future economic and social needs, protecting food supplies, farm land and fishing stocks.	6
3	Pollution control: Types of Pollutants. Effects of Pollutants. Avoiding excess Pollution	4
4	Renewable resources: Introduction. Shift to Renewable resources. Use of solar, wind, hydro, tidal, geo-thermal energy. Renewable vs Non-Renewable resources. Semi-Renewable resources.	6
5	Concept of Cleaner Production, Definition of Cleaner Production, Cleaner Production, Good House Keeping checklist, tools.	6
6	Green Productivity concepts, methodology & techniques, Guidelines of APO on Green Productivity, CEPI Index	6
7	Policies to promote environmental sustainability: Carbon Tax. Government regulation. Subsidizing. Environmental consequences.	6



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Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
30	30	20	10	5	5

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Books:

- 1) An Introduction to Green Chemistry Matlack A.S., Marcel Dekker, 2001
- 2) Green Chemistry: Theory and Practice, Anastas P.T. and Wavner J.C.;Oxford University Press, 1998
- 3) An Introductory Text on Green Chemistry, Lancaster M., Royal Society of Chemistry, Cambridge, 2002
- 4) Handbook of Green Chemistry and Technology, Clark J.H. and Macquaries, Blackwell Publishers, 2002
- 5) Cleaner Production and its implementation in Industries, Dr Bharat Jain, GCPC
- 6) Renewable energy sources and emerging technologies, D.P.Kothari and K.C.Singal, PHI 2011.
- 7) Global Environment problems and policies, K.R.Gupta and Prasenjit Maiti, Atlantic 2009.

Note: Apart from above references one can use some other books and material if required.

Course Outcomes:

Sr. No.	CO statement	Marks % weightage
CO-1	Understand the different principles of sustainable development and green chemistry.	25
CO-2	Understand the health of eco system and pollution control.	12
CO-3	Be aware of use of renewable resources for better environment.	18
CO-4	Empathize the concepts of cleaner technologies	15
CO-5	Know about practical applications of green productivity and emerging technologies.	20
CO-6	Apprehend the policies to promote environmental sustainability.	10



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List of Experiments: Nil

Major Equipment: Nil

List of Open Source Software/learning website:

- 1) <https://www.economicshelp.org>
- 2) <https://www.rsc.org>
- 3) <https://www.nptel.ac.in>