SARVAJANIK UNIVERSITY

SARVAJANIK COLLEGE OF ENGINEERING AND TECHNOLOGY

BACHELOR OF TECHNOLOGY

B.Tech	1	Semester	1/2	Teaching Scheme				Evaluation Scheme	
Subject Name	**Energy & Environmental Engineering**			**L**	**T**	**P**	**Credits**	**CCE**	**SEE**
Subject Code	**BTCH22101**			2	-	-	2	50	50
Type of course	Engineering Science			CCE: Continuous and Comprehensive Evaluation SEE : Semester End Evaluation					
Prerequisite	No Prerequisite								
Rationale	This course designed to ignite awareness about local and global environmental issues and sensitizes youth for preservation of ecosystem and environment through adopting the concept of reduce, reuse and recycle in order to minimize human waste by proper energy management. Sustainability is a matter of environmental concern. Sustainable goals can only be achieved when proper application of all things is demonstrated in engineering, considering the environment and energy balance as a key factor.								

Course Outcomes (COs): At the end of the course, students will be able to		Marks % Weightage
CO – 1	Identify components of the environment and ecosystem.	15
CO – 2	Identify and explore different types of pollution & waste and delineate waste management and their sources.	25
CO – 3	Comprehend global environmental issues and SDGs.	10
CO – 4	Explore, compare, and contrast various energy sources and their impact on the environment and society.	20
CO – 5	Comprehend the need for energy management, and audit and energy conservation act.	15

Course Contents			
Unit	**Content**	**Tentative Teaching Hours**	**Tentative Unit Weightage**
1	**Environment, Ecology & Ecosystem** Definition, Concepts of Ecosystem-Structures and functions, Food chain and Food web, Energy flow in ecosystem, Ecological pyramids, Biodiversity Conservation (In situ-Ex situ), Biogeochemical cycles-Nitrogen and Hydrological cycle.	**04**	**13%**
2	**Environmental Pollution**		

	Water Pollution: Introduction – Water Quality Standards, Sources of Water Pollution, Classification of water pollutants, Effects of water pollutants. Centralized and decentralized treatment systems. Air Pollution: Composition of air, Structure of atmosphere, Ambient Air Quality Standards, Classification of air pollutants, Sources of common air pollutants like PM, SO2, NOX, Auto exhaust, Effects of common air pollutants Noise Pollution: Introduction, Sound and Noise, Noise measurements, Causes and effects. Thermal Pollution: Sources, Effects and Engineering control strategies. Radioactive pollution: Sources, effect and Impact on society.	08	20%
3	**Global Environmental Issues** Engineering aspects of Climate change, Carbon Footprint, CO2 sequestration, Sustainability & Introduction of Sustainable Development Goals (SDG) and significance, Acid-rain.	04	12%
4	**Energy Sources and Conservation** Global and National Energy Scenario, Classification of energy sources, Conventional and non-conventional (renewable) energy sources (solar, wind, hydro and bio and major features), Need for energy conservation and impact on environment and society, barriers, measures of promotion, introduction to energy management and audit, Energy and environment policy, Introduction to Energy Conservation(EC) Act.	10	40%
5	**Waste Management & Handling** Types of waste, Solid Waste, Biodegradable and Non-Biodegradable, Plastics waste, Bio-Medical Waste, E-waste- sources and management, Cleaner Development Mechanism (Montreal and Kyoto Protocol)	04	15%

Suggested Specification table with Marks

% Distribution of Marks					
R Level	**U Level**	**A Level**	**N Level**	**E Level**	**C Level**
35	40	25	0	0	0

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

Recommended Reference Books

1 Erach Bharucha, Textbook of Environmental Studies for Undergraduate Courses, 2nd edition, Publisher: Universities Press (India) Private Ltd, Hyderabad, 2013, ISBN: 978-8173718625.
2 Dr. Suresh K Dhameja, Environmental Studies, 4th edition, Publisher: S K Kataria & Sons, New Delhi, 2018, ISBN: 978-93-5014-385-8.
3 Prof Dr N S Varandani, Basics of Environmental Studies, Ist edition, Publisher: LAP -Lambert Academic Publishing, Germany, 2013, ISBN: 978-3-8473-2102-6.

4	Anindita Basak, Environmental Studies, Ist edition, Publisher: Darling Kindersley(India) Pvt. Ltd Pearson, 2009, ISBN: 978-8131721186.
5	U K Khare, Basics of Environmental Studies, Ist edition, Publisher: Tata McGraw Hill, 2011, ISBN: 978-0071077781.
6	Dr. K Raghvan Nambiar, A Textbook of Environmental Studies, Ist edition, Publisher: Sci Tech, 2009. ISBN: 97881837111111.
7	Dr. B S Chauhan, Environmental Studies, Ist edition, Publisher: University Science Press,2008, ISBN: 9788131803288.
8	Daniel B Botkin & Edward A Keller, Environmental Sciences, 8th edition, Publisher: John Wiley & Sons, 2011, ISBN: 9788126534142.
9	Er. R K Rajput, Environmental Studies, 3rd edition, Publisher: Oxford University Press, 2015, ISBN: 978-0199459759.
10	Er. R K Rajput, Non-Conventional Energy Sources and Utilisation (Energy Engineering), 2nd edition, Publisher: S Chand Publishing, 2014, ISBN : 9788121939713.
11	Dr. R.K. Singal, Non-Conventional Energy Resources, 3rd edition, Publisher: S.K. Kataria & Sons, 2010, ISBN:978-93-5014-312-4.
12	Energy Conservation Act, 2001 along with allied Rules, Publisher: Universal, 2025.
13	Y P Abbi, Handbook on Energy Audit and Environment Management, Publisher: TERI Press, 2006, ISBN: 9788179930922,
14	Anil Kumar, Om Prakash, Prashant Singh Chauhan, Samsher Gautam, Energy Management Conservation and Audits, Ist edition, Publisher: CRC Press, 2020, ISBN: 9781032728766.

CO-PO-Mapping

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO – 1	1	1	1	1	-	1	3	-	-	1	-	1
CO – 2	2	1	1	1	-	1	3	-	-	1	-	1
CO – 3	1	1	1	2	1	1	3	1	-	2	-	1
CO – 4	2	2	2	1	1	2	3	1	-	1	-	1
CO – 5	2	1	1	1	1	1	3	1	-	1	-	1

List of Open Source/Learning website:

- https://nptel.ac.in/courses/127/106/127106004/
  - It covers the Environment, Ecology and LCA for sustainability.
- https://nptel.ac.in/noc/courses/noc19/SEM2/noc19-ge22/
  - It covers basic of Environment and water, soil and noise pollution.
- https://nptel.ac.in/courses/103/106/103106162/
  - Its covers the basics of Environment analysis.
- https://nptel.ac.in/courses/105/104/105104099/

- It covers the basics of Air pollution.

- https://sdgs.un.org/goals/
  - It covers the sustainable development goals.
- https://onlinecourses.swayam2.ac.in/cec21_ge08/preview
  - It covers all types of pollution and its management.
- https://onlinecourses.nptel.ac.in/noc20_ar01/preview
  - It covers the sustainable architecture designing of green buildings.
- https://nptel.ac.in/courses/103103206
  - It covers renewable energy engineering.
- https://onlinecourses.nptel.ac.in/noc24_hs77/preview
  - It covers renewable energy economics.

List of Open Software: Nil