

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

Undergraduate Program, Value Added Course

(B.A./B.Com./B.Sc./BRS/BSW)

(3 Years Degree; 4 Years Honours/Honours with Research)

SEMESTER – 4 Course: ZO – VAC – ENV – 401, ENVIRONMENT - II

Name of Program	B.A./B.Com./B.Sc./BRS/BSW
Objective of Program	The Environmental Science program aims to equip students with an understanding of ecosystems, human-environment interactions, and current environmental challenges. It emphasizes critical thinking, sustainable solutions, and the application of scientific methods to address issues like climate change and resource management. Students are also encouraged to engage in environmental advocacy and promote ethical responsibility toward sustainability.
Program Outcome	PO-01: Scientific Knowledge & Conceptual Understanding: Develop a strong foundation in scientific principles, theories and concepts across disciplines, fostering interdisciplinary learning, advance knowledge and problem-solving abilities. PO-02: Analytical & Critical Thinking: Apply critical thinking and analytical reasoning to evaluate scientific data, hypotheses and real-world problems, leading to evidence-based conclusions. PO-03: Research & Inquiry-based Learning: Develop investigative skills through experimentation, data analysis and scientific inquiry to contribute to research and innovation. PO-04: Laboratory & Technical Skills: Gain hands-on experience with laboratory techniques, instrumentation and computational tools relevant to scientific research and industry applications. PO-05: Digital & Computational Literacy: Utilize digital tools, computational techniques and emerging technologies such as AI, bioinformatics and statistical modelling to enhance scientific learning and problem-solving. PO-06: Environmental & Societal Responsibility: Understand the role of science in addressing environmental, health and societal challenges, promoting sustainability and ethical responsibility. PO-07: Effective Communication & Collaboration: Develop proficiency in scientific communication, both written and oral, for effective dissemination of knowledge while collaborating in multidisciplinary teams. PO-08: Innovation & Entrepreneurship: Foster an entrepreneurial mind-set by applying scientific knowledge for innovation, technology development, and industry-oriented applications. Develop sustainable solutions to address real-world challenges in research and environmental management. PO-09: Lifelong Learning & Professional Growth: Cultivate curiosity and adaptability for continuous learning, equipping students for higher

	education, research, and professional careers. PO-10: Ethical Leadership & Value-based Education: Develop leadership qualities, ethical values, and a sense of responsibility in applying science for societal progress, aligning with Indian knowledge systems and global perspectives.
Program Specific Outcomes	1. Remembering (Knowledge) PSO1: Recall fundamental concepts of environmental science, including ecosystems, biodiversity, and conservation. Identify key environmental issues, such as climate change, pollution, and deforestation. 2. Understanding (Comprehension) PSO2: Explain the relationships between human activities and environmental impacts. Interpret environmental data, including graphs, charts, and maps. 3. Applying (Application) PSO3: Apply environmental principles to real-world scenarios, such as sustainable development and environmental policy. Use environmental concepts to analyze case studies and propose solutions. 4. Analyzing (Analysis) PSO4: Break down complex environmental issues into component parts and evaluate the relationships between them. Critique environmental policies and management strategies. 5. Evaluating (Synthesis) PSO5: Design and propose environmental solutions, including sustainable practices and conservation strategies. Evaluate the effectiveness of environmental policies and programs. 6. Creating (Evaluation) PSO6: Develop innovative approaches to environmental problem-solving, including the use of technology and interdisciplinary collaboration. Communicate environmental information effectively to diverse audiences.

Course code	ZO – VAC – ENV – 401
Course title	ENVIRONMENT - II
Course level	200-299
Credit	02
Total engagement	2Credits X 15 hrs. = 30 hrs
Teaching per week	02 hrs.
Minimum weeks per semester	15 weeks
Effective from	2025-26

Purpose of course	The course aims to provide students with a comprehensive understanding of environmental systems, challenges, and the impact of human activities on the environment.						
Course objective	- Analyze current environmental issues such as climate change, pollution, and resource depletion. - Promote sustainable practices and solutions for environmental preservation and conservation.						
Course outcomes	CO1: Program Outcome of learning environment studies aims to enlighten the students to realize our prime social responsibility to conserve our environment in the face of increasing human population and anthropogenic activities which is the major cause of depletion of environmental resources and ecological balance. CO2: An Environmental Studies major will be able to apply lessons from various courses through field experiences. These experiences will allow students to develop a better sense of not only individual organisms, but of the systems in which these organisms live. Students will also see how natural systems and human-designed systems work together, as well as in conflict with each other. CO3: An Environmental Studies major will be able to do independent research on human interactions with the environment. CO4: Developing values and attitudes towards comprehending intricate environmental economic-social issues and actively taking part in resolving present environmental issues and averting those that arise in the future.						
Mapping between COs with PSOs		PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
	CO1	✓					
	CO2	✓	✓				
	CO3	✓	✓	✓			
	CO4	✓	✓	✓	✓	✓	✓
Pre-requisite	Biology						
Course content	UNIT: 1 Types of Environmental Pollution 1.1.1 Water pollution: Introduction Water Quality Standards, Sources of Water Pollution: Industrial Agricultural, Municipal; Classification of water pollutants, Effects of water pollutants, Eutrophication. 1.1.2 Marine Pollution 1.1.3 Air pollution: Composition of air, Structure of atmosphere, Ambient Air Quality Standards. Classification of air pollutants, Sources of common air pollutants like PM, SO₂, NO_x, Natural & Anthropogenic Sources, Effects of common air pollutants. 1.1.4 Land Pollution: Land uses, Land degradation; causes, effects and						

	control, soil erosion. 1.1.5 Noise Pollution: Introduction, Sound and Noise, Noise measurements, Causes and Effects 1.1.6 Thermal Pollution: Causes and effects Role of individual in the prevention of pollution UNIT: 2 Energy Resources and Global Environmental Issues 2.1.1 Energy resources: Global and Indian energy demand scenario, future Projections, Conventional and Non-conventional sources of energy, Advantages and Limitations, Utilization, Exploitation and related Environmental problems, Environmental implications of Non-conventional Energy Sources. 2.1.2 Global Environmental Issues: Climate change, Global Warming and Green House Effect, Acid Rain, Depletion of Ozone layer.
Reference books	• Agarwal, K.C.: 2001 Environmental Biology. Nidi publication Ltd., Bikaner. (TB) • Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt.Ltd. Ahmedabad -380013. India. • Brunner R.C., 1989, Hazardous Waste incineration, McGraw Hill Inc.480p. (R) • Clark R.S. Marine Pollution, Clarendon Press Oxford (TB) • Cunningham, W.P. Cooper, T.H. Grohani, E. & Hepworth, M.T. 2001, Environmental Encyclopedia, Jaico Pub. House, Mumbai, 1196p. (R) • De A.K., Environmental Chemistry. Wiley Eastern Ltd. (R) • Down to Earth, Centre for Science and Environment (R) • Gleick, H.P., 1993. Water in crisis. Pacific Institute for Studies in Dev. Environment & Security: • Stockholm Env. Institute. Oxford Univ. Press. 473p. (R) • Hawkins, R.E., Encyclopedia of Indian Natural History. Bombay Natural History Society, • Heywood, V.H. & Weston R.T. 1995, Global Biodiversity Assessment. Cambridge Univ. Press. 1140p. (R) • Jadhav, H & Bhonsale, V.M. 1995. Environmental Protection and Laws. Himalaya Pub. House, Delhi. 284p. (R) • McKinne, M.L. & Schoel R.M. 1996. Environmental Science System & Solutions, Web enhanced edition. 639p. (R) • Mhaskar A.K. Matter Hazardous, Techno-Science Publication (TB) • Miller T.G. Jr. Environmental Science. Wadsworth Publishing

	Co., (TB) • Odum, E.P.1971. Fundamentals of Ecology. W.B. Saunders Co. USA. 574p. (R) • Rao M.N &Datta, A.K. 1987. Water treatment. Oxford & IBH Publ. Co. Pvt. Ltd. 345p. (R) • Sharma, B.K. 2001. Environmental Chemistry. Goel Publ. House, Meerut. (TB) • Survey of Environmental. The Hindu @ • Townsend C., Harper J, and Michael Begoñ. Essentials of Ecology. Blackwell Science (TB). • Trivedi R.K. Handbook of Environmental Laws, Rules, Guidelines, Compliances Publications (TB). • Trivedi R.K. and P.K. Goel, Introduction to air pollution. Techno-Science Publications (TB). • Wagner K.D. 1998. Environmental. W.B. Saunders Co. Philadelphia, USA. 499p. (R)
e-learning resources	Sawyam Portal
Teaching methodology	Class work, Discussion, Self Study, Projects, Seminars or / and Assignment