CE(HS)401	**Civil Engineering – Societal and Global Impact**	2L + 0T	2 Credits
Course Outcome	On completion of the course, the students will be able to: **1.** The impact which Civil Engineering projects have on the Society at large and on the global arena and using resources efficiently and effectively. **2.** The extent of Infrastructure, its requirements for energy and how they are met: past, present and future **3.** The Sustainability of the Environment, including its Aesthetics, **4.** The potentials of Civil Engineering for Employment creation and its Contribution to the GDP **5.** The Built Environment and factors impacting the Quality of Life **6.** The precautions to be taken to ensure that the above-mentioned impacts are not adverse but beneficial. **7.** Applying professional and responsible judgement and take a leadership role;		
Prerequisite			
Module 1	**Introduction** to Course and Overview; Understanding the past to look into the future: Preindustrial revolution days, Agricultural revolution, first and second industrial revolutions, IT revolution; Recent major Civil Engineering breakthroughs and innovations; Present day world and future projections, Ecosystems in Society and in Nature; the steady erosion in Sustainability; Global warming, its impact and possible causes; Evaluating future requirements for various resources; GIS and applications for monitoring systems; Human Development Index and Ecological Footprint of India Vs other countries and analysis;		3L
Module 2	**Understanding the importance of Civil Engineering** in shaping and impacting the world; The ancient and modern Marvels and Wonders in the field of Civil Engineering; Future Vision for Civil Engineering		3L
Module 3:	**Infrastructure** - Habitats, Megacities, Smart Cities, futuristic visions; Transportation (Roads, Railways & Metros, Airports, Seaports, River ways, Sea canals, Tunnels (below ground,under water); Futuristic systems (ex, Hyper Loop)); Energy generation (Hydro, Solar (Photovoltaic, Solar Chimney), Wind, Wave, Tidal, Geothermal, Thermal energy); Water provisioning;		8L

	Telecommunication needs (towers, above-ground and underground cabling); Awareness of various Codes & Standards governing Infrastructure development; Innovations and methodologies for ensuring Sustainability;	
Module 4:	**Environment**-Traditional & futuristic methods; Solid waste management, Water purification, Wastewater treatment & Recycling, Hazardous waste treatment; Flood control (Dams, Canals, River interlinking), Multi-purpose water projects, Atmospheric pollution; Global warming phenomena and Pollution Mitigation measures, Stationarity and non-stationarity; Environmental Metrics & Monitoring; Other Sustainability measures; Innovations and methodologies for ensuring Sustainability.	7L
Module 5:	**Built environment**–Facilities management, Climate control; Energy efficient built environments and LEED ratings, Recycling, Temperature/ Sound control in built environment, Security systems; Intelligent/ Smart Buildings; Aesthetics of built environment, Role of Urban Arts Commissions; Conservation, Repairs & Rehabilitation of Structures & Heritage structures; Innovations and methodologies for ensuring Sustainability	5L
Module 6	**Civil Engineering Projects** – Environmental Impact Analysis procedures; Waste (materials, manpower, equipment) avoidance/ Efficiency increase; Advanced construction techniques for better sustainability; Techniques for reduction of Green House Gas emissions in various aspects of Civil Engineering Projects; New Project Management paradigms & Systems (Ex. Lean Construction), contribution of Civil Engineering to GDP, Contribution to employment(projects, facilities management), Quality of products, Health & Safety aspects for stakeholders; Innovations and methodologies for ensuring Sustainability during Project development	4L

Reference	**Sl.**	**Book Name**	**Author**	**Publishing House**
	1	Global Challenges and the Role of Civil Engineering. Chapter 3 in: Fischinger M. (eds) Performance-Based Seismic Engineering: Vision for an Earthquake Resilient Society. Geotechnical, Geological and Earthquake Engineering, Vol. 32.	Žiga Turk (2014)	Springer
	2	Elements of Environmental Pollution Control	O.P. Gupta	Khanna Publishing House
	3	Engineering impacting Social, Economical and Working Environment	Brito, Ciampi, Vasconcelos, Amarol, Barros (2013)	120th ASEE Annual Conference and Exposition