HAS-401	Civil Engineering- Societal & Global Impact	2L:0T:0P	2 credits

Course Objectives:

CO1	To analyze the effect of growth in the past and prepare accordingly for future.
CO2	To understand the significance of Civil Engineering and the impact it has on the Society and at global levels.
CO3	Awareness of the impact of Civil Engineering for the various specific fields of human endeavor
CO4	To ensure the need to think innovatively in order to contribute towards Sustainability.

Module 1:

Introduction to Course and Overview; Understanding the past to look into the future: Pre-industrial revolution days, Agricultural revolution, first and second industrial revolutions, IT revolution; Recent major Civil Engineering breakthroughs and innovations; Present day world and future projections,; Global warming, its impact and possible causes; Evaluating future requirements for various resources; GIS and applications for monitoring systems;

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.

Module 2:

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; Telecommunication needs (towers, above-ground and underground cabling); Awareness of various Codes & Standards governing Infrastructure development; Innovations and methodologies for ensuring Sustainability.

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.

Module 3:

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.

Course Outcomes: After the completion of this course the students will be able to:

CO1	Access the impact which Civil Engineering projects have on the Society at large and on the global arena and using resources efficiently and effectively.
CO2	Explore the potentials of Civil Engineering for Employment creation and its

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	Contribution to economic development.
CO3	Understand the extent of infrastructure required and use clean energy for sustainable development.
CO4	Apply professional and responsible judgment and take a leadership role.

Reference Books:

1. Žiga Turk (2014), "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. Springer, Dordrecht.
2. Brito, Ciampi, Vasconcelos, Amarol, Barros (2013) "Engineering impacting Social, Economical and Working Environment" 120th ASEE Annual Conference and Exposition.
3. NAE Grand Challenges for Engineering (2006), "Engineering for the Developing World" The Bridge, Vol 34, No.2, Summer2004.
4. Allen M. (2008) "Cleansing the city" Ohio University Press. Athens Ohio.
5. Ashley R., Stovin V., Moore S., Hurley L., Lewis L., Saul A. (2010). London Tideway Tunnels Programme – Thames Tunnel Project Needs Report – Potential source control and SUDS applications: Land use and retrofit options.
6. Ashley R M., Nowell R., Gersonius B., Walker L. (2011). Surface Water Management and Urban Green Infrastructure. Review of Current Knowledge. Foundation for Water Research FR/R0014.
7. Barry M. (2003) Corporate social responsibility – unworkable paradox or sustainable paradigm? Proc ICE Engineering Sustainability 156. Sept Issue ES3 paper 13550. P129-130.
8. Blackmore J M., Plant R A J. (2008). Risk and resilience to enhance sustainability with application to urban water systems. J. Water Resources Planning and Management. ASCE. Vol. 134, No. 3, May.
9. Bogle D. (2010) UK's engineering Council guidance on sustainability. Proc ICE Engineering Sustainability 163. June Issue ES2 p61-63.
10. Brown R R., Ashley R M., Farrelly M. (2011). Political and Professional Agency Entrapment: An Agenda for Urban Water Research. Water Resources Management.Vol.23, No.4.European Water Resources Association (EWRA) ISSN0920-4741.

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