

# 19CE215 CIVIL ENGINEERING – SOCIETAL & GLOBAL IMPACT

Hours Per Week :

L	T	P	C
2	-	-	2

Total Hours :

L	T	P	WA/RA	SSH/HSH	CS	SA	S	BS
30	-	-	25	50	-	-	5	5



## COURSE DESCRIPTION AND OBJECTIVES:

The course is designed to provide a better understanding of the impact which Civil Engineering has on the Society at large and on the global arena. Civil Engineering projects have an impact on the Infrastructure, Energy consumption and generation, Sustainability of the Environment, Aesthetics of the environment, Employment creation, Contribution to the GDP, and on a more perceptible level, the Quality of Life. It is important for the civil engineers to realise the impact which this field has and take appropriate precautions to ensure that the impact is not adverse but beneficial.

## COURSE OUTCOMES:

Upon completion of the course, the student will be able to achieve the following outcomes:

COs	Course Outcomes	POs
1	Describe about recent civil engineering breakthroughs & innovates	1
2	Explain the awareness of various codes & standards governing infrastructure development	1
3	Describe about environmental metrics & monitoring	1
4	Explain the sustainability of structure and environment	1
5	Explain the innovations and methodologies for ensuring sustainability during project development	1

## SKILLS:

- ✓ *Aware of the importance of Civil Engineering and impact on the society.*
- ✓ *Aware of the impact of Civil Engineering for various fields of human endeavour.*
- ✓ *Innovative thinking to ensure sustainability.*

**UNIT I****L-6**

**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; 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.

**UNIT II****L-6**

**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;

**UNIT III****L-6**

**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.

**UNIT IV****L-6**

**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

**UNIT V****L-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.

**TEXT BOOKS:**

1. 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

**REFERENCES:**

- 1 Ziga Turk (2014), Global Challenges and the Role of Civil Engineering, Chapter 3 in: Fischinger M. (eds) Performance-Based Seismic Engineering: Vision for an Earthquake
2. NAE Grand Challenges for Engineering (2006), Engineering for the Developing World, The Bridge, Vol 34, No.2, Summer 2004.
3. Allen M. (2008) Cleansing the city. Ohio University Press. Athens Ohio.