CE 517: ANALYSIS AND DESIGN OF BRIDGES (3- 0- 0:3)

Loading standard and design

Types of bridges; structural configurations; bridge loading standards in India and other countries (IRC, IRS and AASHTO guidelines); Impact effect; Standard specifications for road and railway bridges; analysis of bridge deck.

Design of Reinforced concrete bridges

Design of deck slab; T-beam bridge; balanced cantilever type; design and details of articulation.

Design of Pre-stressed concrete bridges

Pre-tensioned and post tensioned concrete bridges; analysis of section for flexure, shear and bond; losses in pre-stress, deflection of girder; partial pre-stressing; analysis and design of anchorage block; box girder bridge.

Design of Steel bridges

Steel-concrete composite constructions, shear connectors and their design; types of bearings and layout.

Design of bridge sub-structures

Abutment and piers; scour at abutment and piers; types of foundations; analysis for stresses and design; introduction to soil-structure interaction.

Numerical modeling and analysis

Introduction to earthquake resistant design of bridges.

Text Books and reference

1. *Victor D. J,"Essentials of Bridge Engineering",* Oxford and IBH, 6th edition 2015.
2. *Raju N. K,* "*Design of Bridges",* Oxford and IBH, 4th edition 1998.
3. *N. Rajagopalan, Bridge Superstructure, Narosa Publishing House,* 1st edition 2005.
4. *Mallick S.K. and Gupta A.P, "Prestressed Concrete",* Oxford & IBH, 1983.
5. *Raina, V. K. ,"Concrete bridge Practice: Analysis, Design and Economics"*, Tata McGraw Hill, 3rd edition 2007.
6. *Fryba, L.*"*Dynamics of Railway Bridges"*, Thomas Telford,1996.
7. *Nawy E.G, "Prestressed Concrete: A fundamental approach",* Prentice Hall, 1989.