Course syllabus

Department of Civil Engineering, Indian Institute of Technology Madras

**CE5034W - Design of Bearings, Joints and Ancillaries of Bridges**

**Credit Distribution:** C:9 L:3 T:0 P:0 E:0 O:6 TH:0

**Course Type:** Theory

**Description:** To provide students with understanding of:

(1) Choice and Design of Bearings,

(2) Types of Joints and their design, and

(3) Ancillaries and their design considerations.

**Course Content:** Bearings Types - Anchor and friction type; Developments in bearings - POT, PTFE, POT PTFE, Spherical, Elastomeric (Neoprene and Chloropene), Pendulum Bearings; Selection, Design and Testing Joints Causes - Temperature, Vehicular, Wind and Earthquake Shaking Type of Joints - Expansion Joints versus Seismic Joints; Range of Movement â€“ Small, Medium and Large; Connections between Concrete to Concrete, Steel to Steel, Concrete to Steel General Design Criteria; Estimate of Movement Available Devices and ongoing developments in expansion joints Strengths and shortcomings of Integral (Monolithic) Bridges with no Joints Special Devices Tuned mass damper during construction stages of superstructure - requirements and design Shock Transmission Units - Requirements and Design; Aerodynamic stabilizers - Requirements and Design Device selection criteria Ancillaries Barriers - Noise, safety and view barriers; Fenders - Foundation and substructure protection systems

**Text Books**

* None

**Reference Books**

* Eggert,H., and Kauschke,W., (2002), Structural Bearings, Ernst & Sohn, Berlin, Germany
* Unsworth,J.F., (2010), Design of Modern Steel Railway Bridges, CRC Press LLC, Florida, USA
* Kelly,J.M., and Konstantinidis,D.A., (2011), Essentials of Bridge Engineering, 6th Edition, John Wiley and Sons Limited, West Sussex, UK
* Chen,W.-F., and Duan,L., (2000), Bridge Engineering Handbook, CRC Press LLC, Floraida, USA
* Raina,V.K., (1994), Concrete Bridge Practice - Analysis, Design and Economics, 2nd Edition, Tata McGraw-Hill Publishing Company Limited, New Delhi

**Prerequisite**: NIL