IV B.Tech I Semester

15ACE52-BRIDGE ENGINEERING

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Course Objectives:

1. *Familiarize Students with different types of Bridges and IRC standards.*
2. *Equip student with concepts and design of Slab Bridges, T Beam Bridges, Box Culverts.*
3. *Understand concepts of design of Plate Girder Bridges.*
4. *Familiarize with different methods of inspection of bridges and maintenance.*

UNIT I

INTRODUCTION:

Importance of site investigation in Bridge design. Highway Bridge loading standards. Impact factor. Railway Bridge loading standards (B.G. ML Bridge) various loads in bridges.

BOX CULVERT:

General aspects. Design loads, Design of Box culvert subjected to RC class A A tracked vehicle only.

BRIDGE BEARINGS:

General features – Types of Bearings – Design principles of steel Rocker & Roller Bearings – Design of a steel Rocker Bearing – Design of Elastometric pad Bearing.

UNIT II

DECK SLAB BRIDGE:

Introduction – Effective width method of Analysis Design of deck slab bridge (Simply supported)subjected to class AA Tracked Vehicle only.

UNIT III

BEAM & SLAB BRIDGE (T-BEAM BRIDGE):

General features – Design of interior panel of slab – Pigeauds method – Design of a T-beam bridge subjected to class AA tracked vehicle only.

UNIT IV

PLATE GIRDER BRIDGE:

Introduction – elements of a plate girder and their design. Design of a Deck type welded plate girder– Bridge of single line B.G.

COMPOSITE BRIDGES:

Introduction – Advantages – Design philosophy of Composite Bridges consisting of RCC slabs over steel girders including shear connectors

UNIT V

PIERS & ABUTMENTS:

General features – Bed Block – Materials piers & Abutments Types of piers – Forces acting on piers –Stability analysis of piers – General features of Abutments – forces acting on abutments – Stability analysis of abutments – Types of wing walls – Approaches – Types of Bridge foundations (excludingDesign).

Course Outcomes:

On completion of the course, the students will be able to:

- *Design the basic components of bridge structures like bridge deck slabs, longitudinal girders, transverse girders, piers and well foundations.*

TEXT BOOKS:

1. Victor D.J - Essentials of bridge Engineering, Oxford and IBH Publishers.
2. Arya and Azmani - Design of steel structures, Nemchand Publishers.
3. Design of Bridges Structure by T.R.Jagadish&M.A.Jayaram Prentice Hall of India Pvt., Delhi.
4. Design of Bridges by N.KrishnamRaju, Oxford & IBH, Publishing Company Pvt.ltd., Delhi.
5. Relevant – IRC & Railway bridge Codes.

REFERENCE:

1. Design of Concrete Bridges by Aswini, Vazirani, Ratwani.
2. Bridge Engineering by PonnuSwamy, TATA Mcgraw Hill Company, New Delhi.
3. Design of RC Structures by B. C. Punmai, Jain & Jain, Lakshmi Publications.
4. Design of Steel structures, by B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi Publications, New Delhi.
5. Design of R.C.C. structures B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi Publications, New Delhi.