

**IV Year I Semester**  
**Code: 17CE734**

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**BRIDGE ENGINEERING**  
**(Dept.Elective-I)**

**Course Learning Objectives**

The objectives of this course are:

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

**Course Outcomes:**

At the end of this course the student will be able to

1. Understand different types of Bridges with diagrams and Loading standards
2. Carryout analysis and design of Slab bridges,
3. Carryout analysis and design of T Beam bridges,
4. Understands analysis and design of boxculverts
5. Carryout analysis and design of Plate girder bridges
6. Organize for attending inspections and maintenance of bridges and prepare reports.

**SYLLABUS**

**UNIT-I**

**Introduction-** Bridges- Types- Slab bridges, T Beam, Arch bridges, Cable Stayed bridges, prestressed concrete bridges, Truss Bridges, Culverts, - Nomenclature- Selection of Bridge Site- Economical span- Abutments pier and end connections- types of foundations- Open, Pile, Well Foundations, Bearings – Types- Introduction to Loading standards- Railway and IRC Loading

**UNIT-II**

**Slab bridges-** Wheel load on slab- effective width method- slabs supported on two edges- cantilever slabs- dispersion length- Design of interior panel of slab- Guyon's – Massonet Method –Hendry- Jaegar Methods- Courbon's theory- Pigeaud's method.

**UNIT-III**

**T-Beam bridges-** Analysis and design of various elements of bridge –Design of deck slab, Longitudinal girders, Secondary beams-Reinforcement detailing

**UNIT-IV**

**Plate Girder Bridges:** Elements of plate girder and their design-web- flange intermediate stiffener- vertical stiffeners- bearing stiffener- Splices, Design problem with detailing

**UNIT-V**

**Box Culverts:** Loading – Analysis and Design-Reinforcement detailing.

## **UNIT-VI**

**Sub structure-**Abutments-Stability analysis of abutments-piers-loads on piers- Analysis of piers-Wing walls-Design problems.

### **Text Books:**

1. Essentials of Bridge Engineering, Jhonson Victor. D
2. Design of Bridge Structures, T. R. Jagadeesh, M.A. Jayaram, PHI
3. Design of Bridges, N. Krishna Raju, Tata McGraw Hill

### **References:**

1. Design of Concrete Bridges, Aswini, Vazirani, Ratwani.
2. Design of Steel Structures, B. C. Punmai, Jain & Jain, Lakshmi Publications.
3. Design of R C Structures, B. C. Punmai, Jain & Jain, Lakshmi Publications.