II Year-II Semester

(20CE4639) Bridge Engineering

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	-	-	3

Pre- Requisites: Fundamentals of Engineering Mechanics

UNIT-I:
Concrete Bridges: Introduction-Types of Bridges-Economic span length-Types of loading-Dead load-live load-Impact Effect-Centrifugal force-wind loads-Lateral loads-Longitudinal forces Seismic loads-Frictional resistance of expansion bearings-Secondary Stresses-Temperature Effect-Erection Forces and effects-Width of roadway and footway-General Design Requirements.

UNIT-II:
Pigeaud's method-design of longitudinal girders- Guyon-Messonet method- Hendry Jaegar method-Courbon's theory. (Ref: IRC-21), voided slabs, Super Structure: Slab bridge- Wheel load on slab-effective width method- slabs supported on two edges- cantilever slabs- dispersion length- Design of interior panel of slab- T-Beam bridges.

UNIT-III:
Box Culverts- Single Cell Box Culvert – Design Loads, Design Moments, Shears and Thrusts.Design of Critical sections.

UNIT-IV:
Plate girder bridges- Elements of plate girder and their design-web-flange- intermediate stiffener- vertical stiffeners- bearing stiffener-design problem

UNIT-V:
Sub structure- Abutments- Stability analysis of abutments- piers- loads on piers – Analysis of piers-Design problem(Ref: IRC-13, IRC-21, IRC-78)- Pipe culvert- Flow pattern in pipe culvers- culvert alignment-culvert entrance structure- Hydraulic design and structural design of pipe culverts-reinforcements in pipes .(Ref: IRC: SP-13)

Course Outcomes:

S.No	Course Outcomes	BTL
1	Design theories for super structure and substructure of bridges	L4
2	Design Culvert, R.C.C T Beam Bridge.	L4
3	Understand the behavior of continuous bridges, box girder bridges.	L2
4	Possess the knowledge to design prestressed concrete bridges.	L3
5	Design Railway bridges, Plate girder bridges, different types of bearings, abutments, piers and various types of foundations for Bridges	L4

Text Books:

1. Design of Bridges by N. Krishna Raju CBS Publishers and Distributors
2. Design of Concrete Bridges- M.G. Aswini, V.N. Vazirani, M.M Ratwani, Khanna Publishers
3. Essentials of Bridge Engineering- Jhonson Victor D, 7e, Oxford IBH Publications