BRIDGE ENGINEERING
(Professional Elective-III)

Course Code: 19CE2256

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Course Outcomes:
At the end of the course, the student will be able to:

CO1: Discuss the IRC standard live loads and design the deck slab bridge.
CO2: Analyse and box pipe culverts for the given loading and detail the box culverts.
CO3: Design and detail the T-Beam bridges.
CO4: Design and check the stability of piers and abutments.
CO5: Discuss about the construction techniques of precast members.
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UNIT-I **(10-Lectures)**

GENERAL CONSIDERATIONS FOR ROAD BRIDGES:
Introduction – Site selection – Soil exploration for site – Selection of bridge type – Economical span – Number of spans – Determination of HFL – General arrangement drawing.

STANDARD SPECIFICATIONS FOR ROAD BRIDGES:
Width of carriageway- Clearances- Loads to be considered- Dead load – I.R.C. standard live loads- Impact effect- Review of I.R.C. loadings- Application of live loads on deck slabs – Wind load – Longitudinal forces- Centrifugal forces- Horizontal forces due to water currents.

LO1: Summarise the general considerations for Road Bridges.
LO2: Describe the standard specifications for Road bridges.

UNIT-II **(10-Lectures)**

CULVERTS: Introduction, Analysis and design of box culverts- slab culverts – pipe culverts- Reinforcement detailing and bar bending schedule need to be prepared.

LO1: Anlayse and design different types of culverts.
LO2: Detailing and prepare bar bending schedule.

UNIT-III **(10-Lectures)**

REINFORCED CONCRETE T-BEAM BRIDGES: Introduction– Analysis and Design of T – Beam Girder bridges- Reinforcement detailing and bar bending schedule need to be prepared.

LO1: Anlayse and design T-Beam Girder bridge.

LO2: Detailing and preparing bar bending schedule.

UNIT-IV **(10-Lectures)**

DESIGN OF SUBSTRUCTURE: Analysis and Design of Abutments and pier- Reinforcement detailing to be prepared.

LO1: Anlayse, design and detailing of substructure abutment elements.

LO2: Anlayse, design and detailing of substructure pier elements.

UNIT-V **(10-Lectures)**

BRIDGE BEARINGS: Bearings, forces on bearings, types of bearings design of elastomeric bearings, basics for selection of bearings. Construction techniques for Via–Ducts, Methods of erection – Pre-cast girders, Launching procedures, design of launching girders.

LO1: Understand the concept of bearings.

LO2: Design of elastomeric bearings.

Text Books

1. Johnson victor D, ―Essentials of Bridge Engineering‖, 7th edition, Oxford, IBH Publishing Co., Ltd., 2006.
2. Ponnuswamy, ―Bridge Engineering‖, 4th edition, McGraw-Hill Publication, 2008.
3. KrishnamRaju N., *"Design of Bridges"*, 4th edition, Oxford and IBH Publishing Co., Ltd., 2008.

References

1. Vazirani, Ratvani&Aswani, *"Design of Concrete Bridges"*, 5th edition, Khanna Publishers, 2006.
2. Jagadish T.R. & M.A. Jayaram, *"Design of Bridge Structures"*, 2nd edition, 2009.
3. Swami Saran, *"Analysis and Design of sub-structures"*, 2nd edition, Oxford IBH Publishing co ltd., 2006.