BRIDGE ENGINEERING

Course Code: 15CE2205

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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 type bridges.
CO2: Analyse the box culverts for the given loading and detail the box culverts.
CO3: Design and detail of T-Beam bridges.
CO4: Design and check the stability of piers and abutments.
CO5: Discuss the bridge foundations and prepare the bar bending schedule.

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.

UNIT-II (10-Lectures)

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

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.

UNIT-IV (10-Lectures)

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

BRIDGE BEARINGS: Bearings, forces on bearings, design of elastomeric bearings, basics for selection of bearings.

UNIT-V (10-Lectures)

Construction techniques for Via–Ducts, Methods of erection - Pre-cast girders, Launching procedures, design of launching girders.

TEXT BOOKS

1. Johnson victor D, *"Essentials of Bridge Engineering",* 7th edition, Oxford, IBH Publishing Co., Ltd., 2006.
2. Ponnu Swamy, *"Bridge Engineering",* 4th edition, Mc Graw-Hill Publication, 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.
4. Krishnam Raju N., *"Design of Bridges",* 4th edition, Oxford and IBH Publishing Co., Ltd., 2008.