BRIDGE ENGINEERING
(Elective – II)

Course Code: 13CE 2214

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Course Educational Objectives:

1. To impart overall knowledge of about the Analysis and design of RC bridges.
2. To familiarize student with the knowledge of bridge sub structure and bearings.

Course Outcomes:

1. Students should be able to design slab bridges, box culverts and T-beam bridges.
2. To impart the students, with the knowledge of general considerations for road bridges
3. To impart the students, with the knowledge of culverts

UNIT-I

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 – Buoyancy effect- Earth pressure.

UNIT-II

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

UNIT-III

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

DESIGN OF SUBSTRUCTURE: Analysis and Design of abutments and pier- Reinforcement detailing and bar bending schedule need to be prepared.

BRIDGE BEARINGS: Bearings, forces on bearings, design of elastomeric bearings, basics for selection of bearings, expansion joints, and closed joints.

UNIT-V

BRIDGE FOUNDATIONS: Types of foundations, well foundation – open well foundation, components of well foundation – pile foundations (designs not included) - Reinforcement detailing and bar bending schedule need to be prepared.

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.

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