

1. Timoshenko, S. and Wernowsky, “*Theory of plates and shells*“, 2nd Edition, Krieger, 1961.
2. Ramaswamy, G.S., “*Design and Construction of Shells*“, 1st Edition, Mc Graw Hill, 1999.

REFERENCES

1. Flugge, W., “*Stresses in shells*“, 2nd Edition, Springer, 2000.
2. Varghee P.C., “*Design of Reinforced Concrete shells and folded plates*“, 1st Edition, PHI Publishers, November, 2011.
3. Bandgopadhayag J.N. “*Tier shall Structures*“, *classical and modern analysis*”, 1st Edition, New age International (P) Ltd., reprint 2008.

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GVPCE(A)

M.Tech. Structural Engineering

2014

BRIDGE ENGINEERING

(Elective – II)

Course Code: 13CE 2214

L	P	C
4	0	3

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

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.

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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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GVPCE(A)

M.Tech. Structural Engineering

2014

PORTS AND HARBOUR STRUCTURES

(Elective – II)

Course Code: 13CE2115

L	P	C
4	0	3

Course Outcomes:

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

- CO1 : Explain the significance of port and harbours as a mode of transport
- CO2 : Demonstrate the fundamental principles of wave hydrodynamics and port cargo handling.
- CO3 : Demonstrate the basic design of port layout
- CO4 : Design, plan and integrate port and harbour infrastructure.
- CO5 : Explain the construction, maintenance and renovation aspects of ports and inland waterways

UNIT-I

Introduction: Ports and harbours – an infrastructure layer between two transport media, planning of ports and harbours.

The fundamentals: Waves, Tide and current conditions inside harbour, water circulation; breakwaters, jetties and quay walls; mooring, berthing and ship motion inside the port; model studies, physical and mathematical studies.

UNIT-II

Design Issues: Sea port layout with regards to (1) wave action (2) siltation (3) navigability berthing facilities.