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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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.

Design of Port Infrastructures: Design of port infrastructures with regards to (1) cargo handling (2) cargo storage (3) integrated transport of goods, planning multipurpose port terminals.

UNIT-III

Port operations: Allowable wave conditions for cargo handling, wave conditions for human safety on quays and breakwaters, forecasting/nowcasting of wave and current conditions for port operations, dredging and navigability, hazard scenarios; VTMS and management of computerized container terminal, safety and environment (handling of fire, oil spill, rescue, etc.).

UNIT-IV

Inland Waterways and Ports: Maintenance of waterways, construction of environmentally engineered banks, dredging and disposal processing and storing of polluted dredged materials, development of river information services.

UNIT-V

Construction aspects: Planning and construction, expansion and renovation of port and Inland Port Infrastructure.

Sustainability: Global trade and port restructuring/reforms, impact of possible climate change scenarios, sustainable development strategies for cities and ports.

TEXT BOOKS

1. Muir Wood, A.M., and Fleming. C.A.*,"Coastal Hydraulics Sea and Inland Port Structures",* 1st Edition, Hallstead Press, , 2002

2. Ozha & Ozha, *"Dock and Harbour Engineering"*, 1st Edition, Charotar Books, Anand., 1990

REFERENCES

1. S.Seetharaman, *"Construction Engineering and Management",* 4th Edition, Umesh publications, New Delhi, 1999

2. Richand L. SilIster, *"Coastal Engineering Volume I & II"*, Elsevier Publishers, 2000

3. Pera Brunn, *"Port Engineering",* 1st Edition, Gulf Publishing Company, 2001.

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ADVANCED CONCRETE TECHNOLOGY

Course Code: 13CE 2215 **L P C**
4 0 3

Course Outcomes:
At the end of the course, the student will be able to:
CO1 : Discuss the concrete ingredients and its influence at gaining strength.
CO2 : Design of concrete mix and grade as per IS codes.
CO3 : Summarise the concepts of conventional concrete and its differences with other concretes like no fines, light weight etc.
CO4 : Describe the application and use of fibre reinforced concrete.
CO5 : Design and develop the self compacting and high performance
concrete.

UNIT I
Properties of cement, fine aggregate and coarse aggregates, Additives and Admixtures in Concrete, Rheology of Concrete

UNIT – II
Manufacturing and methods of concreting, Properties of fresh and hardened concrete, mix design by I.S. method