Birla Institute of Technology & Science, Pilani
Hyderabad Campus

FIRST SEMESTER 2020-2021

Course Handout Part II

Date: 18-08-2020

In addition to Part-I (General Handout for all courses appended to the time table) this portion gives further specific details regarding the course.

Course No. : CE G616
Course Title : Bridge Engineering
Instructor-in-Charge : P N Rao

Description: Purpose of bridge; classification of bridges; characteristics of each bridge; loads stresses and combinations; design of RC bridges; design of non-composite and composite bridges; prestressed bridge; continuous spans, box girders, long span bridges; substructure design for bridges

Scope and Objective of the Course:

Bridges are inseparable part of any communication network as they are the key elements in roadways and Highways network. This course intends to impart skills for planning and analysis & design of different types of bridge structures at basic as well as at advance level.

Textbook:

1.*Johnson Victor, D. (2010), "Essentials of Bridge Engineering", 6th Edition, Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.*

Reference books:

1. Krishna Raju, N, (2018) "Design of Bridges". Oxford & IBH Publishing Co. Pvt, Ltd, New Delhi.
2. Ponnuswamy, S, (2017) "Bridge Engineering", 3rd edition, McGraw-Hill Pub., New Delhi.
3. IRC: 5-2015, "Standard Specifications and code of Practice for road bridges: section I-General features of Design", Indian Road Congress.
4. IRC: 6-2017, "Standard Specifications and code of Practice for road bridges: section II-Loads and Stresses", Indian Road Congress.
5. IRC: 22-2015, "Standard Specifications and code of Practice for road bridges: section III-Cement Concrete (Plain and Reinforced)", Indian Road Congress.

6. IRC:18-2000, "Design criteria for Pre-Stressed Concrete Road Bridges (post-tensioned concrete)", Indian Road Congress.
7. IRC: 24-2015, "Standard Specifications and code of Practice for road bridges: section V-Steel Road Bridges", Indian Road Congress.
8. IRC:78-2017, "Standard Specifications and code of Practice for road bridges: section VII-Foundation and Substructures", Indian Road Congress.
9. IRC:83-2018, "Standard Specifications and code of Practice for road bridges, Section IX Bearings; (Part I): Roller & Rocker Bearings, (Part II): Elastomeric Bearings and (Part III): POT, PIN, Metallic Guide and Plane Sliding Bearings", Indian Road Congress.
10. IRC:112-2011," Code of Practice for Concrete Road Bridges", Indian Road Congress.

Course Plan:

Lecture No.	Learning objectives	Topics to be covered	Chapter in the Text Book
1-3	Introduction	Importance of Bridges, components of bridge, classification of bridges, Economical span.	Ch-1
4-6	Bridge Loading standards	Emphasis on IRC loadings, Impact factors, loading for Indian Railway bridges	Ch-3&4
7-13	Design of culverts	Design of (i) box culverts (ii) slabs spanning in one direction (slab culverts),	Ch-6
14-20	RCC Bridges	Slabs spanning in two directions using Pigeaud's Method, Load distribution in longitudinal girders using Courbon's method, Design of simply supported Tee-beam bridges.	Ch-7
21-26	Pre-stressed Concrete Bridges	Analysis of pre-stressed section, design aspects of pre-stressed girders	Ch-8
27-32	Steel Bridges	Design of stringers, Cross girders and main girders, Wind loads on truss bridges; Design of steel truss bridges, Effect of repeated loading	Ch-9
33-36	substructure	Types of piers and abutments; Loads to be considered on piers and abutments; Stability analysis of pier and abutment, wing walls and approach slabs, features of wing walls	Ch-12
37-40	Bridge Foundations	Types of Bridge foundations, design aspects of Pile and well foundations	Ch.- 13
41-43	Bearings and joints	Necessity of bearings, types of bearings, design of steel bearings, designs of elastomeric bearings, necessity and types of expansion joints.	Ch-14

Evaluation Scheme:

S. No.	Evaluation Component	Duration (min)	Weightage (%)	Date & Time	Remarks
1	Test I	30	15	To be announced later	OB
2	Test II	30	15	To be announced later	OB
3	Test III	30	15	To be announced later	OB
4	Assignments (Nos. 3 to 5)	-	10	-	OB
5	Quizzes (Nos.: 3 to 5)	-	10	-	OB
6	Project	-	10	-	OB
7	Compre Exam	120	25	08/12 FN	OB

Chamber Consultation Hour: Tue:4 pm to5 pm.(Google meet)

Notices: Concerning this course will be displayed on CMS/ Notice Board ofCivil Engineering Department

Make-up Policy: Make-up would be granted only for genuine cases with prior permission.

Academic Honesty and Integrity Policy: Academic honesty and integrity are to be maintained by all the students throughout the semester and no type of academic dishonesty is acceptable.

INSTRUCTOR-IN-CHARGE
CE G616