SARVAJANIK UNIVERSITY
Sarvajanik College of Engineering and Technology
Master of Technology
Structural Engineering

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M. Tech. IInd year Semester – III

Subject Name: Design of Bridge Structures **Subject Code: MTST14303**

Type of course: **PE-V**
Prerequisite:

Rationale: For the passage of railways, road ways, footpaths and even for carriage of fluids, construction of bridge is necessary. Further, the constant increase in traffic loads associated with the economic growth in modern societies imparts large demands to build such structures. Therefore, the study of analysis and design of bridges is essential for the structural engineering students.

Teaching and Examination Scheme:

TEACHING SCHEME				Theory Marks			Practical Marks		Total
L	T	P	C	TEE	CA1	CA2	TEP	CA3	150
3	0	2	4	60	25	15	30	20	

CA1: Continuous Assessment (assignments/projects/open book tests/closed book tests **CA2:** Sincerity in attending classes/class tests/ timely submissions of assignments/self-learning attitude/solving advanced problems **TEE:** Term End Examination **TEP:** Term End Practical Exam (Performance and viva on practical skills learned in course) **CA3:** Regular submission of Lab work/Quality of work submitted/Active participation in lab sessions/viva on practical skills learned in course

Content:

Sr. No.	Topics	Teaching Hrs.	Module Weightage
1	**Introduction** Introduction, Engineering and aesthetic requirements in bridge design, Introduction to codal provision for bridge designing, Economic evaluation of a bridge project. Site investigation and planning;	5	15 %
2	**Load Consideration** Loading criteria as per I.R.C. and other international specifications on live loads, Various forces acting on bridges, Load distribution theories: Courbon's Method, Hendry Jaeger Method, Grillage analogy, Pigeaud's curves	12	25%
3	**Superstructure** Superstructure: General design considerations, analysis and design of reinforced concrete slab culverts, tee beam and slab bridges, Design principles of prestressed bridges, continuous bridges, box girder bridges, balanced cantilever bridges	12	30%
4	**Substructure** Substructure : Types of substructures, Various parts of substructures, Loads acting on substructures, Design of pier and pier cap, Design of	15	30 %

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	different types of foundation – Open, pile & well foundation, its construction aspects & related issues, types and functions of bearings, design of elastomeric bearings, railings, drainage system, lighting.		

Suggested Specification table with Marks (Theory/Practical):

% Distribution of Marks					
R Level	**U Level**	**A Level**	**N Level**	**E Level**	**C Level**
10%	**20%**	**30%**	**15%**	**20%**	**05%**

Legends: R: Remembrance, **U:** Understanding; **A:** Application, **N:** Analyze, **E:** Evaluate **C:** Create and above Levels **(Revised Bloom's Taxonomy)**

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Text Books:

Sr. No.	Title of book /article	Author(s)	Publisher and details like ISBN	Year of publication	Publication Edition
1.	Design of Bridges	Krishnaraju, N.	Oxford and IBH Publishing Co., Bombay ISBN-10 : 8120417984 ISBN-13 : 978-8120417984	2019	5th
2.	Principles and Practice of Bridge Engineering	S P Bindra	Dhanpat Rai & Sons New Delhi ISBN-10 : 8189928848 ISBN-13 : 978-8189928841	2012	-
3.	Design of Bridge Structures	Jagadish & Jayaram	Prentice Hall ISBN-13:978-8120338524	2009	2nd
4.	IRC 6 –1966 "Standard Specifications And Code Of Practice For Road Bridges"- Section II Loads and Stresses,		The Indian Road Congress New Delhi	1966	-
5.	IRC 21 – 1966 "Standard Specifications And Code Of Practice For Road Bridges"-Section III Cement Concrete (Plain and reinforced)		The Indian Road Congress New Delhi	1966	-

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Course Outcome:

Sr. No.	CO Statement After learning this subject, students will be able to	Marks % weightage
CO-1	Understand the design philosophy of bridge structures	30
CO-2	Understand the load distribution and its calculation	15
CO-3	Design the bridge deck and box girder systems	25
CO-4	Design the pier and pier cap, piles and wells.	15
CO-5	Propose the abutments and bridge bearings.	15

List of Open learning website:

https://onlinecourses.nptel.ac.in/noc20_ce40/preview (Reinforced Concrete Road Bridges)

List of Tasks to be performed by Students:

Group of Students have to prepare presentation based on topics of subject as well as individually students have to write / solve assignments. It is suggested to visit the bridge site under construction.

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