Kadi Sarva Vishwavidyalaya's
LDRP Institute of Technology & Research
Gandhinagar-382 015

M.E. (Civil) (Infrastructure Engineering), Semester- II
Subject Name: Design of Special Structures [Subject Name: MECV205-A]

A. Learning objectives:

The educational objectives of this course are

- The subject will help to get the behavior of special structures under various types of loads.
- Students will learn the designing procedures

B. Teaching scheme (credits and hours):

Teaching Scheme				Credit Scheme			Evaluation Scheme				
Lect Hrs	Tut Hrs	Pract. Hrs	Total	Theory	Pract/TW	Total	UE	IE	CIA	PRAC/VIVA	Total
03	00	00	03	03	00	03	70	30	20	30	120

C. Detailed Syllabus

1. **Transmission towers:** Components of transmission towers, Analysis of towers for wind load and dead load, design if each component
2. **Bridges:** Types of bridges, Components of bridges, Classification, investigations and planning, choice of type of bridges, I.R.C. and other international live load specifications for road bridges, Various forces acting on bridges ,Load distribution theories: Courbon's Method, Hendry Jaeger Method, Grillage analogy, Pigeaud's curves ,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, Substructure : Various parts of substructures, Various types of substructures, Loads acting on substructures, Design of pier and pier cap, Design of piles, Design of wells and sinking of wells
3. **Chimneys:** Components of chimney, various loads acting on chimneys, analysis of chimneys for dead load, wind load, and temperature load, designing according to IS 4998-1975 and according to draft code

D. Lesson Planning:

Unit No	Topics	Hours	Weightage
1	Transmission towers	13	30%
2	Bridges	19	40%
3	Chimneys	13	30%
	Total	**45**	**100**

E. List of Tutorials:

- Complete design of transmission tower, bridge, chimney with analysis.

F. Instructional Method and Pedagogy (Continuous Internal Assessment (CIA) Scheme):

- At the start of course, the course delivery pattern, prerequisite of the subject will be discussed.
- Lectures will be conducted with the aid of multi-media projector, black board, OHP etc.
- Attendance is compulsory in lectures and laboratory which carries 5 Marks weightage.
- Two internal exams will be conducted and average of the same will be converted to equivalent of 15 Marks as a part of internal theory evaluation.
- Assignments based on course content will be given to the students at the end of each unit/topic and will be evaluated at regular interval. It carries a weightage of 5 Marks as a part of internal theory evaluation.
- Surprise tests/Quizzes/Seminar will be conducted which carries 5 Marks as a part of internal theory evaluation.
- The course includes a laboratory, where students have an opportunity to build an appreciation for the concepts being taught in lectures.
- Experiments/Tutorials related to course content will be carried out in the laboratory.

G. Students Learning Outcomes:

- On the successful completion of this course the course helps student to understand the behavior of the special structures under different loading. Works that they come across in their professional and also in personal life.

L. Recommended Study Materials

(A) Reference Books:

- Raina V.K. "Concrete Bridge Practice", Tata McGraw Hill Publishing Company, New Delhi, 1991.
- Krishnaraju, N., "Design of Bridges" Oxford and IBH Publishing Co., Bombay, Calcutta, New Delhi, 1988
- Bakht, B. and Jaegar, L.G., "Bridge Analysis simplified", McGraw Hill, 1985.
- Ponnuswamy, S., "Bridge Engineering", Tata McGraw Hill, 1989
- Derrick Beckett, "An introduction to Structural Design of Concrete Bridges", Surrey
- University Press, Henley Thomes, Oxford Shire, 1973.
- Taylor, F.W., Thomson, S.E., and Smulski E., "Reinforced Concrete Bridges", John Wiley and Sons, New York, 1955.
- Edwin H.Gaylord Jr., Charles N.Gaylord, James, E.,Stallmeyer "Design of Steel Structures" McGrew Hill International Editions, 1992.
- IS: 4998-1975, 1992, Draft code for chimney, S.N. Manohar "Design of reinforced concrete chimneys" Mcgraw-Hill Book Comp., 1985
- S.K. Duggal "Design of steel structures" Tata McGraw-Hill Education, 2009 - Building, Iron and steel

(B) Web Materials:

- http://www.nptel.iitm.ac.in/courses.php?branch=Civil
  http://www.nptel.iitm.ac.in/courses/Webcourse-contents/IIT