Course Type	Course Code	Name of Course	L	T	P	Credit
DP	NCEC505	Civil Engineering Model Development Laboratory	0	0	3	1.5

Course Objective

The course aims at exploring the behaviour of different civil engineering model structures.

Learning Outcomes

Upon successful completion of this course, the students should be able to:

- Acquire knowledge about basic dynamic properties of different model structures, exposure towards the variation of different parameters upon buckling behaviour of the column, and understanding the stress analysis of structures subjected to loading
- Acquire the knowledge of model testing for different geotechnical problems and comprehend the dynamic performance of foundation systems
- Perform model studies based on theories learnt in Engineering Hydrology and Hydraulics
- Perform model studies related to highway materials used for construction of sustainable pavement

Unit No.	Topics to be Covered	Contact Hours	Learning Outcome
1	**Dynamic Properties of Different Structures:** Basic dynamic properties of SDOF and MDOF System.	**6**	Understand the basic dynamic properties of different structures.
2	**Buckling of Columns:** Buckling behaviour of columns under different parameter variations like length, support condition and material types.	**3**	Knowledge about the buckling effect on columns.
3	**Stress Analysis:** Stress analysis by electric resistance strain gauges and observation of stress concentration.	**3**	Understanding the stress analysis and stress concentration.
4	**Liquefaction analysis:** Demonstration of effect of liquefaction on foundation using shaking table using raft and pile foundations	**6**	Effect of liquefaction on different foundations
5	**Bearing capacity:** Demonstration of load test on footing	**3**	Load transfer mechanism through soil

6	**Interface mechanism:** Interface properties of geomaterial	**3**	Shear resistance of geomaterial
7	**Hydrology system:** Development of hydrographs for a typical scaled model watershed under simulated rainfall	**3**	Understand the concepts of hydrograph
8	**Open channel flume:** Study of flow characteristics in an open channel under varying hydraulic conditions	**3**	Understand free surface flow behaviour
9	**Infiltration:** Demonstration of infiltration characteristics using infiltrometer	**3**	Understand infiltration characteristics
10	**Flexural Properties:** Evaluation of flexural properties of stabilized alternate materials for pavement construction	**3**	Understating on the flexural behaviour of stabilised alternate materials
11	**Tensile Properties:** Evaluation of indirect tensile strength properties of stabilized alternate materials for pavement construction	**3**	Understating on the tensile behaviour of stabilised alternate materials
12	**Practice and Review**	**3**	
	Total Contact Hours	**42**	

Text Books:

1. Moondra H S, Gupta Rajiv (2009), " Laboratory Manual For Civil Engineering", 2nd Edition, CBS Publication.

2. Garg, S.K. (2015), “Hydrology and Water Resources Engineering”, 20th edition, Khanna Publishers.

Reference Books:

1. Respective Indian Standard/ International Standard Codes of Practices.