Course Type	Course Code	Name of Course	L	T	P	Credit
DP	NCEC504	Computational Laboratory-I	0	0	3	1.5

Course Objective
The course aims at imparting knowledge on computational aspect of Civil Engineering
Learning Outcomes
Upon successful completion of this course, the students should be able to: • Learn the theories in mechanics of geomaterials, mechanics of deformable solids, engineering hydrology and hydraulics and transport system design & management

Unit No.	Topics to be Covered	Contact Hours	Learning Outcome
1	**Problem-1:** Problem on consolidation in layered soil profile	**3**	Solution by finite difference scheme
2	**Problem-2:** Problem on seepage in layered soil profile	**3**	Solution by finite difference scheme
3	**Problem-3:** Prediction of drained responses of soil through critical state mechanics	**3**	Application of critical state mechanics
4	**Problem-4:** Prediction of undrained responses of soil through critical state mechanics	**3**	Application of critical state mechanics
5	**Problem-5:** Development of unit hydrograph and flood hydrograph from storm data of catchment	**3**	Application of hydrograph theory
6	**Problem-6:** Design of hydraulically efficient irrigation channel	**3**	Application of Lacey's and Kennedy's theory
7	**Problem-7:** Computation of infiltration using Horton's, Philip's and Green-Ampt Method	**3**	Application of infiltration theories
8	**Problem-8:** Trip generation prediction modeling using statistical/econometric software packages	**3**	Application trip generation concept
9	**Problem-9:** Trip distribution modeling using statistical/econometric software package	**3**	Application trip distribution concept

Unit No.	Topics to be Covered	Contact Hours	Learning Outcome
10	**Problem-10:** Solution of one-dimensional structural element by using Galerkin's weighted residual method.	**3**	Weighted residual method through programming
11	**Problem-11:** Solution of two-dimensional structural element by using Galerkin's weighted residual method.	**3**	Weighted residual method for 2D problems through programming
12	**Problem-12:** Solution of springs-bar discrete system by using direct stiffness method	**3**	Direct stiffness method for discrete system through programming
13	**Problem-13:** Solution of continuous beam by using direct stiffness method.	**3**	Direct stiffness method for continuous beam through programming
14	**Review and Practice**	**3**	
	Total Contact Hours	**42**	

Text Books:

1. Budhu, M. (2010). Soil Mechanics and Foundations, 3rd Edition, Wiley.
2. Srinath, L.S. (2009). Advanced Mechanics of Solids. Tata McGraw-Hill
3. Garg, S.K. (2015), "Hydrology and Water Resources Engineering", 20th edition, Khanna Publishers.
4. Sarkar, P.K., Maitri, V., and Joshi, G.J. (2016). Transportation Planning, Principles, Practices and Policies, PHI Pvt. Ltd.