Course Type	Course Code	Name of Course	L	T	P	Credit
DP	NCEC545	Computational Laboratory in Hydraulics	0	0	3	1.5

Course Objective
The course aims at imparting knowledge on computational aspect of Water Resources Engineering

Learning Outcomes
Upon successful completion of this course, the students should be able to: ● Learn the basics of programming to apply in water resources problems. ● Learn to do the analysis of steady and unsteady flood routings. ● Learn to estimate bed load and suspended load in alluvial rivers. ● Learn to estimate reservoir sedimentation.

Unit No.	Topics to be Covered	Contact Hours	Learning Outcome
1	Basics of Matlab/Python/Fortran	6	Able to get basic programing skill.
2	Steady state flood routing analysis	6	Learn to estimate flood discharge.
3	Incipient motion analysis	3	Able to calculate incipient flow discharge, depth and velocity.
4	Computation and prediction of bed load in alluvial rivers	3	Able to estimate bed load discharge in alluvial river.
5	Problem on computation and prediction of suspended load in alluvial rivers	3	Able to estimate bed load discharge in alluvial river.
6	Prediction of reservoir sedimentation	3	Able to estimate reservoir sediment load
8	Numerical solution of Saint Vennant equation using Matlab/Python/Fortran Unsteady flood routing Demonstration of HEC-RAS/TUFLOW etc.	12	Learn to write program in finite volume/finite difference/finite element method to solve unsteady flow problem. Learn basic of hydraulic modelling software.

Unit No.	Topics to be Covered	Contact Hours	Learning Outcome
9	Design of various river training work such as embankment, spurs, porcupine etc	6	Learn to design river training work.
	Total Contact Hours	**42**	

Text Books:
1. Wu, W. (2007). *Computational river dynamics*. Crc Press.
2. Garde, R. J., & Raju, K. R. (2000). *Mechanics of sediment transportation and alluvial stream problems*. Taylor & Francis.

Reference Books:

1. Subramanya K. (2023), *Engineering hydrology*, Tata MacGraw Hill.
2. Pratap R. (2002), *Getting started with Matlab*, Oxford University Press.