

**B. Tech. Civil Engineering**

Course code: Course Title	Course Structure			Pre-Requisite
<b>CE427: Advanced Hydrology</b>	<b>L</b>	<b>T</b>	<b>P</b>	Nil
	<b>3</b>	<b>1</b>	<b>0</b>	

**Course Objective:** The objective of this course is to provide an in-depth understanding of the complex processes governing the distribution, movement, and quality of water on Earth. By integrating theoretical concepts with practical applications, students will develop the skills necessary to analyze and solve advanced hydrological problems. The course will cover topics such as surface and groundwater hydrology, hydrological modelling, climate change impacts on hydrological cycles, and water resource management. Upon completion, students will be equipped to conduct independent research, apply advanced hydrological techniques, and contribute effectively to water resource planning and management.

S. No	Course Outcomes (CO)
<b>CO1</b>	Understand and Analyze Hydrological Processes.
<b>CO2</b>	Apply Hydrological Models.
<b>CO3</b>	Evaluate Climate Change Impacts.
<b>CO4</b>	Conduct Independent Research.
<b>CO5</b>	Implement Water Resource Management Strategies.

S. No.	Contents	Contact Hours
<b>UNIT 1</b>	<b>Introduction:</b> Hydrologic system and hydrologic budget, fundamental laws of hydrology; atmospheric water vapour. Hydrologic Inputs: Precipitation and its forms, snowfall and rainfall; measurement techniques and space-time characteristics.	8
<b>UNIT 2</b>	<b>Hydrologic Abstractions:</b> Infiltration, depression storage, evapotranspiration; measurement techniques, space-time characteristics and their modelling.	8

<b>UNIT 3</b>	<b>Stream flow:</b> Measurement techniques, space-time characteristics, rating curves.	8
<b>UNIT 4</b>	<b>System Approach:</b> Unit Hydrograph IUH, GIUH. Mathematical Modelling: Linear and Nonlinear models, physically based models.	8
<b>UNIT 5</b>	<b>Hydrological routing,</b> Flood forecasting. Advanced Method of Frequency Analysis: Outliers, Time series analysis. Impact of climate change and Land use/Land cover on basin response.	10
	<b>Total</b>	<b>42</b>

<b>REFERENCES</b>		
<b>S. No.</b>	<b>Name of Books/Authors/Publishers</b>	<b>Year of Publication / Reprint</b>
<b>1</b>	Chow, V.T., Maidment, D.R. and Mays, W.L., "Applied Hydrology", McGraw-Hill.	1988
<b>2</b>	Ojha, C.S.P., Berndtsson, R. and Bhunya, P., "Engineering Hydrology", Oxford University Press.	2008
<b>3</b>	Wanielista, M., Kersten, R. and Eaglin, R., "Hydrology", John Wiley.	1997
<b>4</b>	Subramanya, K., "Engineering Hydrology", Tata McGraw-Hill Education Private Limited.	2008
<b>5</b>	Kumar, D. Nagesh, "Water Resources Systems Planning and Management".	2014