

Course Type	Course Code	Name of Course	L	T	P	Credit
DE	NESD512	Applied Hydrology	3	0	0	3

Course Objective

To understand the hydrological concepts of water movement in atmospheric, surface, and subsurface water systems, and their application in solving hydrological problems

Learning Outcomes

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

- Understand the different hydrological process and their interconnection
- Understand the mathematical representation of hydrological processes
- Solve a variety of surface and subsurface hydrological problems

Unit No.	Topics to be Covered	Lecture hours	Learning Outcome
1	Introduction: Hydrologic Cycle, Systems Concept, Hydrologic System Model, Classification of Hydrologic Model	4	To learn the basics of hydrologic system model
2	Hydrologic Processes: Reynolds Transport Theorem, Continuity Equations, Momentum Equations, Energy balance of a Hydrologic System, Heat Energy Transport Processes	8	To derive the fundamental conservation laws of hydrology
3	Atmospheric Water: Atmospheric Circulation, Water Vapour, Precipitation, Rainfall, Evaporation, Continuity and Energy Equations for Evaporation, Evapotranspiration	8	To understand hydrological processes governing water movement in the atmosphere
4	Subsurface Water: Unsaturated Flow, Continuity Equation for an Unsaturated Flow, Soil Moisture Flux, Infiltration, Green-Ampt Model for Infiltration, Ponding Time, Saturated Flow	7	To understand the flow through unsaturated and saturated porous media.
5	Surface Water: Streamflow Hydrograph, Excess Rainfall, Direct Runoff, Abstractions Using Infiltration Equations, SCS Method for Abstractions, Flow Depth and Velocity, Travel Time, Stream Networks	8	To learn about the interaction of surface water with atmospheric and subsurface water.
6	Hydrologic Design: Design Precipitation Depth, Intensity-Duration-Frequency (IDF) Relationships, Design Hyetographs from Storm Event Analysis, Probable Maximum Precipitation	7	To design the hydrological systems through historical precipitation events.
Total		42	

Text Books:

1. Chow, V. T., Maidment, D. R., & Mays, L. W. (1988). Applied Hydrology, McGraw-Hill.
2. Viessman, W., Jr., & Lewis, G. L. (2002). Introduction to Hydrology, Pearson.

Reference Books:

1. Dingman, S. L. (2015). Physical Hydrology, Waveland Press.
2. Todd, D. K., & Mays, L. W. (2005). Groundwater Hydrology, John Wiley & Sons.