Course Type	Course Code	Name of Course	L	Т	Р	Credit
DE	CED403	Advanced Hydrology	3	0	0	9
Course Objective						

The course will familiarize the students with the advanced concepts in hydrology.

Learning Outcomes

After studying this course, the students should be able to:

• perform analysis of hydrologic systems using the knowledge of hydrologic processes, their relationship with climate and hydrologic statistics

Unit No.	Topics to be Covered	Lectures	Learning Outcome
1	Hydrologic cycle: Hydrologic cycle and its components, Watershed, Regional Water Balance, Storage effects, Residence time, Hydrologic Modeling, Types of Models	11	Knowledge of the distribution of water in terrestrial, oceanic and atmospheric components of the global water system Understanding the basics of hydrologic modeling
2	Hydrology and Climate: Energy Budget of the Earth, Latitudinal energy transfer, General circulation and distribution of Pressure and Temperature, Teleconnections, Fluxes in the Global cycle, Distribution of Precipitation, Evaporation and Runoff, Climate change and the hydrologic cycle	10	Understanding of the interrelationship of hydrology and climate
3	Hydrologic Statistics: Hydrologic data analysis, Estimating parameters of probability distributions, Persistence and autocorrelation, Effects of persistence on uncertainty of time series statistics and correlation estimates, Statistical criteria for model calibration and validation.	10	Knowledge of the standard statistical techniques applicable for analyzing hydrologic quantities
4	Hydrologic Analysis: Hydrograph, Floods, Framework for Floodplain Management, Low-flow frequency analysis, Drought, Types of Drought, Estimation of Drought Indices	11	Understanding of hydrological extremes, ie., floods and droughts

Text Books:

1. Dingman L. S. (2002), "Physical Hydrology", 2nd Ed. Waveland Press, Inc., USA

Reference Books:

- 1. Chow, V T., D. R. Maidment and L. W. Mays (1988), "Applied Hydrology", McGraw-Hill, Inc., New York.
- 2. Maity R. (2018), "Statistical methods in Hydrology and Hydroclimatology", 1st Edition, Springer, Singapore.
- **3.** Hann C.T. (1995), "Statistical Methods in Hydrology", First East-West Press Edition, New Delhi. Box, G. E. P., G. M. Jenkins, and G. C. Reinsel (2003), "Time Series Analysis, Forecasting and Control", Pearson Education, Singapore.