



# SURFACE WATER HYDROLOGY

## PROF. RAJIB MAITY

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**INTENDED AUDIENCE :** Students in the fields of Civil Engineering, Earth Sciences and Water Resources Engineering related courses will find significant value in this course. Additionally, hydrology/water practitioners will also be benefitted from this course as a valuable resource.

## COURSE OUTLINE :

Surface water hydrology is a core course in civil engineering that covers a wide range of topics related to different components, at or near earth's surface of the global hydrological cycle. It is also important for the earth sciences, engineering hydrology etc. in the perspectives of climate change. The spread of knowledge base is wide and relevant topics are multiple in this major field of study. To provide a comprehensive learning strategy, this course is sub-divided into three major modules, namely Hydrological Processes, Hydrological Analysis and Hydrological Design. The first module starts with the fundamental concept of hydrology and hydrologic cycle and its importance on earth. This module ends with an overall discussion on the importance of this subject in the context of climate change as a part of motivation. Next module focuses on different important components of the hydrologic cycle, starting with the most vital one i.e., precipitation and gradually discussing evaporation, evapotranspiration, infiltration, run-off, streamflow, flood etc. All necessary theoretical concepts of each process, their physical modelling and their real-life measuring arrangements are discussed elaborately. Necessary schematics diagrams and practical photographs are used along with illustrative examples to make the theoretical concepts clear. More real-life applications are considered in the last module in which Hydrological design concepts are developed.

## ABOUT INSTRUCTOR :

Prof. Rajib Maity is a Professor in the Department of Civil Engineering, Indian Institute of Technology Kharagpur, India. His research area includes Hydroclimatology, Climate Change Impact on Water Resources, Analysis of Hydroclimatic Extremes, Sea Level Rise, Remote Sensing Applications in Hydrology, Artificial Intelligence and Machine Learning applications in hydroclimatology.

Recently, he became a Fellow of the Royal Meteorological Society, UK. He is also conferred with AK Singh Chair Faculty by IIT Kharagpur. Some of his other professional recognitions include Humboldt Fellowship (Experienced Researchers, Germany), James Rennell MoES Young Fellow (MoES, GoI) Faculty Excellence Award (IIT Kharagpur), Prof. R. J. Garde Research Award, Emerging Leaders Fellowship (Australia), BOYSCAST Fellowship, IEI Young Engineers Award, DAAD Fellowship (Germany), International ICE WaRM Fellowship (Australia), Prof. N. S. Govinda Rao Memorial Medal from Indian Institute of Science, Bengaluru.

Prof. Maity has published two books and more than 185 research articles in different peer reviewed journals and conferences and chapters in books. His recent book on Statistical methods in Hydrology and Hydroclimatology (2nd Edition) is published by Springer. More updated information can be found on his homepage at <http://www.facweb.iitkgp.ac.in/~rajibmaity/>.

## COURSE PLAN :

**Week 1:** Introduction to Hydrological Processes

**Week 2:** Hydrologic Analysis of Precipitation

**Week 3:** Abstraction from Precipitation

**Week 4:** Streamflow measurement

**Week 5:** Hydrologic Analysis of Run-off

**Week 6:** Analysis of Hydrograph-I

**Week 7:** Analysis of Hydrograph-II

**Week 8:** Floods and Flood Control

**Week 9:** Flood Routing

**Week 10:** Hydrologic Frequency Analysis

**Week 11:** Applications of Frequency Analysis

**Week 12:** Hydrologic Design