

**Department of Hydrology
Indian Institute of Technology Roorkee**

Training Program on Ecohydrology

COURSE OUTLINE

Ensuring clean water supply and management of freshwater resources is one of the curial sustainable development goals (SDGs), particularly important for developing nations, where freshwater availability is challenged by overexploitation and environmental degradation of natural water resources. The gap between water availability and demands has been increasing with population growth, lifestyle changes and economic activities. The degradation of water quality in natural rivers due to untreated wastes and return flow from agricultural areas has also been a major concern. Traditionally, engineering solutions have been adopted to ensure adequate water supply. In recent decades, Ecohydrology, a branch of hydrology that deals with ecosystem-water-climate connections, has emerged as an effective approach for finding nature-based solutions to these problems. This training program intends to introduce the ecohydrology concept and its applications in solving environmental issues to the students/practitioners/working professionals. The recent developments in ecohydrology research will be discussed through lectures and case studies. The advanced techniques of ecohydrological measurements and modeling will be demonstrated.

PROGRAMME OBJECTIVES

The training program aims at understanding the ecohydrology concept and its applications in water-related socio-environmental issues. The lectures are designed to understand the ecohydrological processes, dynamics of terrestrial and aquatic ecosystems, ecohydrological modeling and various techniques of measuring ecosystem parameters.

The objectives of the program are:

1. To understand the ecohydrology concept and its role in solving real-world problems, especially in the context of developing countries.
2. To discuss the current water-related socio-environmental issues in the developing countries.
3. To evaluate the existing ecohydrological modeling tools and demonstrate their applicability through hands-on session.
4. To discuss the recent advances in understanding and implementing ecohydrology concepts through case studies.

COURSE STRUCTURE

The course consists of 11 lectures and 2 tutorials, each of 1 hour duration.

Lectures:

- L1. Introduction to ecohydrology and ecohydrological processes
- L2. Biogeochemical cycles and nutrient transport
- L3. An insight into terrestrial and aquatic ecosystems
- L4. Environment quality concepts, monitoring and assessment
- L5. Advances in monitoring and assessment of soil & water processes
- L6. Ecohydrological systems under changing climate
- L7. Modeling of ecohydrological systems
- L8. Ecohydrological indicators and assessment

- L9. Remote sensing and GIS in Ecohydrology
- L10. Integrated watershed management
- L11. Ecosystem services: concepts and assessment

Tutorials:

- T1. Working with remote sensing datasets for ecohydrological studies

TIMETABLE

Day/Time (Indian Standard Time, IST)	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00
<i>Day 1 (Mar 27, 2023, Monday)</i>	Inaugural and orientation	L1	L2
<i>Day 2 (Mar 28, 2023, Tuesday)</i>	L3	L4	L5
<i>Day 3 (Mar 29, 2023, Wednesday)</i>	L6	L7	L8
<i>Day 4 (Mar 30, 2023, Thursday)</i>	L9	T1	
<i>Day 5 (Mar 31, 2023, Friday)</i>	L10	L11	Responses and Valedictory

EXPECTED OUTCOME OF THE COURSE

1. Create awareness of ecohydrology concept and its applications in different sectors.
2. Better understanding of existing ecohydrological datasets and modeling tools for utilization of ecohydrology research in the field.
3. Hands-on training on ecohydrological data collection and modeling.
4. Encourage applicability of ecohydrological research through discussion on different application areas.

ELIGIBILITY CONDITIONS OF THE PARTICIPANTS

Minimum under graduation in civil/environmental/agriculture/water resource engineering or environmental science.