



## Refresher Course on Mountain Hydrology and Climate Change

Sponsored by

Indian Academy of Sciences, Bengaluru  
Indian National Science Academy, New Delhi  
The National Academy of Sciences, India, Allahabad

Organized by

**G. B. Pant University of Agriculture and Technology, Pantnagar, Uttarakhand**

In technical collaboration with National Institute of Hydrology (NIH), Roorkee, Uttarakhand  
28 March–8 April 2016

A Refresher Course on Mountain Hydrology and Climate Change, will be held at G. B. Pant University of Agriculture and Technology (GBPUAT), Pantnagar ([www.gbpuat.ac.in](http://www.gbpuat.ac.in)) during 28 March–8 April 2016 and at National Institute of Hydrology, Roorkee ([www.nih.ernet.in](http://www.nih.ernet.in)) during 4–8 April 2016.

The programme focuses on hydrology of mountains, which provide water around 40% of the world population. Changes in temperature and precipitation have in recent years led to the retreat of glaciers in mountains. Climatic changes do not only affect glaciers or the nival zone; a change in climatic conditions also has an impact on the entire hydrological and biogenous system of mountainous environments. The transport of water through the atmosphere to mountainous regions and subsequent precipitation in the form of rain and snow is of great importance to mountain hydrology. It feeds the glaciers, infiltrates to become groundwater, runs off into rivers or evaporates to the atmosphere again. However, exact precipitation patterns in the mountains are often difficult to understand. Complex small and large scale orographic effects can have significant effects on the spatial distribution of precipitation. Rain, glacial melt water and groundwater all end up in one place, rivers. They transport the water from the mountain ranges via the lowlands back to the seas and oceans. People in downstream areas are often dependent on this water for their livelihoods. Temperature is a spatially highly variable component in mountain ranges due to the fact that it lapses with altitude, complex winds and shading are present in valleys, and radiation budgets can vary locally. As the state of matter of water is determined by the temperature, it dictates where glaciers will form, where rain will fall and where evaporation takes place.

The refresher course will also provide an excellent opportunity to participants to know about the science of climate change, climate change modellings/projections, impacts of climate change on water resources, energy, natural ecosystems, forests, agriculture, international systems, climate change policies, vulnerability and adaptation strategies with special reference to mountains.

Objective of this course is to understand the science of climate change, climate change modelling/projections, impacts of climate change on water, glaciers, agriculture, natural ecosystems and forests, international systems of UNFCCC, IPCC and national scenario and climate change policies, vulnerability and adaptation strategies with reference to mountains. Since climate change is of paramount importance in the study of various branches of science and technology, the objective of this course is to create interest in students, research scholars, young faculty of colleges and institutions. These diverse aspects of hydrology will be explored in this refresher course, expose participants to many important aspects of climate change.

**Topics:** Basics of hydrology with special reference to mountains/hilly regions, Mountain hydrology and climate change, Surface science of water, Water management and harvesting. Hydrologic extremes of floods and droughts, Climate change – Basics including IPCC reports, assessment, projections and related models (GCMs and RCMs), Climate change impacts on water resources in river basins and energy sector, Scale Issues and uncertainties in climate change impacts, Climate change impacts on agriculture, Natural ecosystems and on glaciers and adaptation to climate change and management with special reference to hilly areas. Group discussion/Movie show/Case studies/Presentations/Laboratory visits/Institutions visit will be a part of the course. Field visit to nearby mountainous areas like Almora, to know about the aspects of mountain hydrology. One day Excursion to lakes visit to Bhimtal, Sattal, Naukuchiya Tal, Nainital on Sunday.

**Experts:** Prof. Pradeep Mujumdar (IISc, Bangalore), Dr Sharad K. Jain (NIH, Roorkee), Prof. A. K. Gosain (IIT, Delhi), Dr Ram Boojh (UNESCO, Delhi), Dr Sanjay K. Jain (NIH), Dr Renoj J. Thayyen (NIH, Jammu), Kireet Kumar (GBPIHED), Dr C. T. Dhanya (IITD), Prof. H. C. Sharma (GBPUAT), Prof. Uma Melkania (GBPUAT), Prof. Jyothi Prasad (GBPUAT) and also experts from IITR, CBRI, IRI, NIH, Roorkee; IIRS, Dehradun and GBPUAT, Pantnagar.

College/university teachers/scientists/students/research scholars with at least a Master's degree in science or degree in engineering can apply. Teachers/research scholars who wish to participate in this Refresher Course should submit their completed application form online by clicking on the following link: <http://web-japps.ias.ac.in:8080/Refreshcourse/RCMH.jsp>

**Course Director: Professor P. P. Mujumdar**, Chairman, Interdisciplinary Centre for Water Research (ICWaR), Indian Institute of Science (IISc), Bengaluru 560 012. A hard copy of the application should also be sent by post and e-mail to: **Course Coordinator: Prof. H. J. Shiva Prasad**, Department of Civil Engineering, G. B. Pant University of Agriculture and Technology, Pantnagar 263 145, e-mail: [sep@ias.ernet.in](mailto:sep@ias.ernet.in) (CC to [sptce@gbpuat-tech.ac.in](mailto:sptce@gbpuat-tech.ac.in) and [pradeep@civil.iisc.ernet.in](mailto:pradeep@civil.iisc.ernet.in)). Mobile: 97192 45303/84498 59593. For more details visit: [www.ias.ac.in](http://www.ias.ac.in) or [www.gbpuat.ac.in](http://www.gbpuat.ac.in)

Selected teachers/research scholars/students will be provided local hospitality and round trip shortest train fare (3-tier AC) or equivalent. No participation fee will be charged.

Last date for receipt of applications: **29 January 2016**.