

TEQIP-III Sponsored FDP COURSE
on
APPLIED GROUNDWATER FLOW AND CONTAMINANT TRANSPORT
MODELLING

JUNE 24 (Monday) – JUNE 28 (Friday), 2019

Organized By: Department of Hydrology, IIT Roorkee, Roorkee – 247667
(Uttarakhand)

General Information:

Department of Hydrology, IIT Roorkee is organizing a ONE WEEK TEQIP assisted FDP course on **Applied groundwater Flow and Contaminant Transport Modelling** from **June 24 - 28, 2019** for the faculty members from TEQIP-III approved Universities/Institutions/Colleges. Only 25 seats are available in this course. There is no fee for teachers from TEQIP-III approved Universities/Institutes/Colleges. The selected candidates will be provided suitable single/double room accommodation. Other expenses (e.g. food, course kit etc.) will also be taken care by IIT Roorkee. Only travel expenses will be borne by their parent organizations. The application on the enclosed form **duly signed by the sponsoring authority** should be sent by email (brijkfhy@iitr.ac.in and brijeshy@gmail.com) latest by **May 31, 2019**. Selected candidates will be informed by e-mail by June 05, 2019. The boarding and lodging arrangement for all the participants will be made in Guesthouses/Visiting Hostels of IIT Roorkee from June 23- June 28, 2019 (5 nights only).

Course Motivation

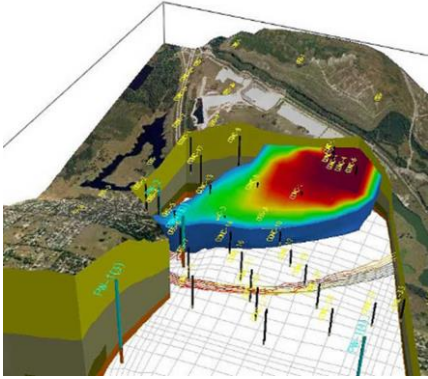
The use of computer modeling tools has become a standard practice in many groundwater investigations. Groundwater resources evaluation, groundwater management, groundwater quality assessment, contamination site assessment and remediation, environmental impact review, and other groundwater related activities frequently rely on numerical modeling. This course introduces the conceptual principles and practical aspects of groundwater modeling in an intuitive yet comprehensive manner. The key objectives of the course are for the participants: 1) To have a well-founded knowledge of the principles in groundwater flow and transport modeling, 2) To have familiarity with the major elements of groundwater modeling studies, 3) To be familiar with using popular groundwater modeling software, 4) To obtain fundamental understanding of the capabilities and limitations of groundwater modeling, and 5) To understand the appropriate role of groundwater models in groundwater flow and contaminant transport assessment and management.

The course will be taught by experienced instructors familiar with many aspects of groundwater modeling and hydrogeology. At the end of the course, participants should be able to understand and actively engage in planning, supervision, and/or review of groundwater modeling projects.

Contact Person / Mailing Address:

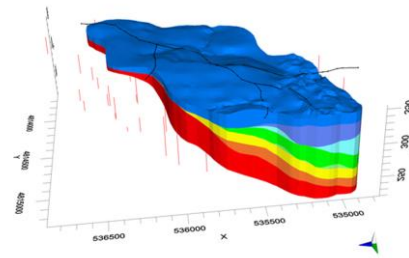
Dr. Brijesh Kumar Yadav
Associate Professor Department of Hydrology
IIT Roorkee, Roorkee-247 667, India
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Phone: 01332-284755 (Office)

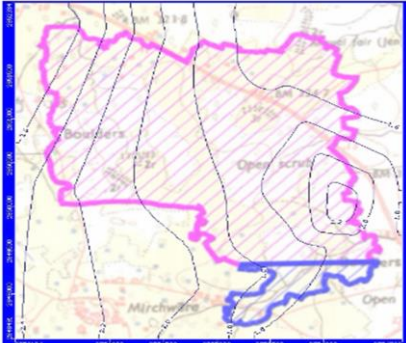
Course module



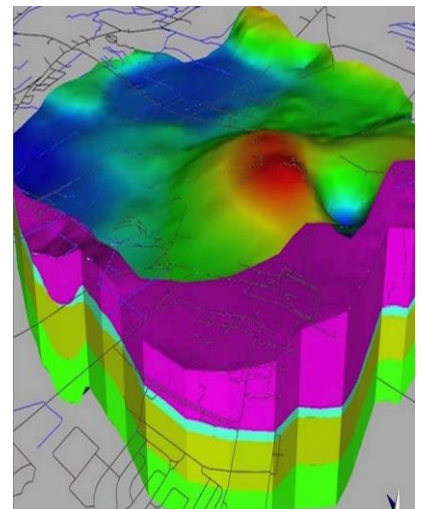
- Groundwater Fundamental; The Water Balance ‘Engine’ of Flow Models
- Principles of Modeling: Finite Difference, Finite Element
- The Drivers of Groundwater Flow: Boundary Conditions, Parameters
- Overview of Groundwater Modeling Software: MODFLOW, HYDRUS, COMSOL etc.

- Integrated flow modelling approach; integrating geological data, rock properties, with flow equations; different integration models
- Use of experiments in measuring parameters controlling flow in porous medium; focus on capillary pressure; relative permeability etc.; review of experimental methodology
- Equations governing basics of flow and transport in porous medium; review and derivations



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- Numerical modelling of subsurface flow; Designing numerical and steady state models; Transient Flow Simulation: time-stepping, rewetting
 - Numerical discretization, Open source codes; capabilities and limitations of the tools,
 - Particle Path Tracking for Source Area Determination and Simplified Contaminant Transport Modeling

- Boundary conditions, packages/sinks and sources
- Transport Modeling, Sensitivity Analysis, Calibration and Validation
- Hand on training with the different experimental setups used in contamination transport investigation.
- Case studies examples: Management and remediation of contaminated sites.
- Case-studies examples; worked example of setting up a numerical model for flow and transport using one of the tool; plot results



The Faculty Coordinators

Course Coordinator



Dr. Brijesh Kumar Yadav is an Associate Professor at Department of Hydrology, IIT Roorkee since June 2012. He is an awardee of the prestigious Ramanujan Fellow by Government of India and has received many research and constancy projects from various funding agencies.

His current research focuses on multiphase flow modelling, soil water flow and solute transport analysis, Nonpoint source pollutant movement through deep and heterogeneous vadose zone, Phytoremediation of heavy metal polluted sites, Bioremediation of hydrocarbon polluted soil and groundwater resources, CO₂ sequestration in subsurface and risk analysis. Dr. Yadav has published about 30 peer reviewed international journals/Book chapters and made more than 35 presentations at various international conferences/workshops.

Course Co-coordinator



Dr. Manoj K. Jain is currently Professor and the Head of Department in Department of Hydrology, Indian Institute of Technology Roorkee. He has obtained PhD (Hydraulics and Water Resources Engineering) from IIT Roorkee in 2002. He has published more than 40 peer reviewed international journals.

His areas of expertise include Watershed Modelling & Management, Development of Spatial Decision Support Systems, Soil Erosion and Sediment Transport Modelling, Distributed Modelling of Rainfall-Runoff Soil Erosion Processes, Remote Sensing and GIS Applications in Hydrology and Watershed Management, Surface Water Hydrology, Spatial and Temporal data Analysis using Image Processing and GIS, Long term Water Resources Management and Modelling, Drought Studies.

ABOUT ROORKEE

Roorkee is a part of the State of Uttarakhand and is located at the foothills of Himalayas. Roorkee Railway Station is on the main line of Northern Railways having direct links to Delhi, Mumbai, Calcutta, Amritsar, Jodhpur and Shri Ganga Nagar. The place is also within easy reach by road from Delhi (200 km) and Chandigarh (180 km). It is located on Delhi – Haridwar and Delhi – Dehradun bus routes.



Course Co-ordinator

Dr. Brijesh Kumar Yadav

Associate Professor

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MODELLING**

June 24 (Monday) - 28 (Friday), 2019

Department of Hydrology, IIT Roorkee, Roorkee – 247667 (Uttarakhand)

APPLICATION FORM

(Scanned copy of completed form may please be e-mailed to:

brijkfhy@iitr.ac.in brijeshy@gmail.com

or sent by post to the mailing address latest by May 31, 2019)

1. Name: Ms./Mr./Dr.
2. Designation:
3. Age (Years):
4. Official mailing address: (Including name of the department, institute, state and pin code)

5. (a) E-mail: (b) Mobile No.:
6. Academic Qualification (degree onwards):
7. Teaching/ working Experience in Years:
8. Subjects teaching/taught related to this Course:

Date: Signature of applicant

SPONSORSHIP CERTIFICATE

The applicant will be permitted to participate in the above program, if selected. Further, I have personally talked to the applicant and he/she seemed to be sure to attend the course, in case the admission is offered to him/her.

This is to certify that this university/institute/college is participating in TEQIP-III programme.

Date: Signature (Principal/Director/Head)
Seal of the Univ./Institute/Dept./Organization