

MHRD Scheme on Global Initiative on Academic Network (GIAN)

Course Title: Unified Biochemical Pollution and Hydrologic Modelling

Broad Area: Earth & Environment Sciences / Environmental and Ecosystem Modeling

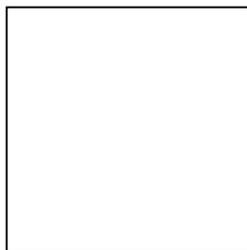
Overview

Water quality plays a fundamental role in the biosphere in general and water resources development and management in particular. Natural waters have a variety of contaminants that define water quality characteristics. These characteristics are dynamic variables and vary with space and time scales. They also interact with the components of the hydrologic cycle and are strongly influenced by human activities. Water quality usually implies the materials contained in the water, but may also include heat or nuclear radiation. The quality of water is affected by pollution which may be point or non-point. Pollution implies that water has degraded by human activities, although water quality degradation can be caused by natural events, such as heavy rainstorms, floods, droughts, fires, and volcanic eruptions. The movement of pollutants occurs in surface water, groundwater, and between the air-water, water-soil, and soil-air interfaces. There are important transformations that occur in the environment that affect the concentration and fate of pollutants therein. These transformations are exemplified by bacterial conversion, natural decay, hydrolysis reactions, photochemical reactions, and oxidation-reduction reactions. In this context, it is necessary to develop the pollutant transport models with the support of mathematical models based on the unification of pollution and hydrologic models. The development of a pollutant transport model depends on the governing equation, and initial and boundary conditions (ICs and BCs). The fundamental governing equation is the conservation of mass which states that the net rate of change of pollutant mass within an elemental volume is equal to the flux of pollutant out of the element minus the flux of pollutant into the element and the loss or gain of pollutant mass due to reactions. The physical processes that control the flux in and out of the elemental volume are advection due to flow and hydrodynamic dispersion due to mechanical mixing and molecular mixing. The loss or gain of pollutant mass is the result of chemical or biochemical reactions or radioactive decay. Mathematical expressions of mass conservation and ICs and BCs depend on the flow medium in which the pollutant moves. Therefore, it is more convenient to write them for the medium under consideration. For pollutant transport, mathematical models are based on the unification of pollution and hydrologic models. This will constitute the focus of this course.

This six-day lectures cum hands-on course is designed in three different modules viz. module A: Fundamentals and Theoretical Bases, module B: Development of Hydrologic Models, and module C: Unified Biochemical Pollution and Hydrologic Models. The module A mainly deals with the fundamentals of pollution modeling with an emphasis on water quality analysis, pollutant transport mechanisms and runoff characterization. The module B deals with the development of hydrologic models for pollution modeling and expose different techniques for flow routing in streams and surface runoff modeling. In module C, the unified pollution and hydrologic modeling techniques are presented. Pollutant transport in urban/rural watersheds (Instantaneous and Finite period mixing/mixing zones), pollutant transport in streams and with examples from vadose zone and groundwater pollution modeling will be discussed. This course will enhance the participants skills and also provide a comprehensive knowledge on unification of pollution and hydrologic models. During this course many case studies and assignments will be shared to stimulate research motivation in participants.

Modules	<p>A: Fundamentals and Theoretical Bases : April 9, 2018</p> <p>B: Development of Hydrologic Models : April 10 to 11, 2018</p> <p>C: Unified Biochemical Pollution and Hydrologic Models : April 12 to 13, 2018</p> <p><i>Number of participants for the course will be limited.</i></p>
Objectives	<p>The primary objectives of the course are as follows:</p> <ul style="list-style-type: none">) Exposing participants to the fundamentals of pollution modeling,) Providing essentials of hydrologic modeling for pollution modeling,) Providing techniques for pollution modeling,) Presenting unified pollution and hydrologic modeling, and) Providing hands-on experience for unified pollution and hydrologic modeling
Who can Attend ?	<ul style="list-style-type: none">) Students at all levels (BTech/MSc/MTech/PhD) or Faculty from reputed academic institutions and technical institutions.) Engineers/Consultants from Private/Government organizations, pollution control boards, and agricultural departments) Scientists/Researchers from government organizations, forest and environment departments
Fees	<p>The participation fees for taking the course is as follows:</p> <p>Participants from abroad: US \$500</p> <p>Industry/Govt. Dept. /Consultancy firms: Rs. 5000/-</p> <p>Academic/Research Organizations: Rs. 4000/-</p> <p>Students/Research Scholars: Rs. 1000/-</p> <p>The above fee include all instructional materials, computer use for tutorials and assignments, laboratory equipment usage charges, internet facility. The participants will be provided with accommodation on payment and availability basis.</p>
Course Duration	April 9 - 14, 2018

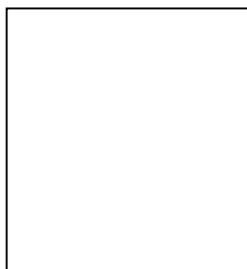
The Faculty



Professor Vijay P. Singh is a **University Distinguished Professor, a Regents Professor,** and the inaugural holder of the **Caroline and William N. Lehrer Distinguished Chair in Water Engineering** in the Department of Biological and Agricultural Engineering and Zachry Department of Civil Engineering at Texas

A&M University. He received his B.S., M.S., Ph.D. and D.Sc. degrees in engineering. He is a registered professional engineer, a registered professional hydrologist, and an Honorary Diplomate of American Academy of Water Resources Engineers. Professor Singh has extensively published the results of an extraordinary range of his scientific pursuits. He has published more than **900** journal articles; **25** textbooks; **60** edited reference books, including the massive **Encyclopaedia of Snow, Ice and Glaciers and Handbook of Applied Hydrology**; 104 book chapters; 314 conference papers; and **72** technical reports in the areas of hydrology, ground water, hydraulics, irrigation engineering, environmental engineering, and water resources.

For his scientific contributions to the development and management of water resources and promoting the cause of their conservation and sustainable use, he has received more than 80 national and international awards and numerous honours, including the **Arid Lands Hydraulic Engineering Award, Ven Te Chow Award, Richard R. Torrens Award, Norman Medal, and EWRI Lifetime Achievement Award**, all given by American Society of Civil Engineers; **Ray K. Linsley Award and Founder's Award**, given by American Institute of Hydrology; **Crystal Drop Award**, given by International Water Resources Association; and **Outstanding Distinguished Scientist Award** given by Sigma Xi, amongst others. He has received three honorary doctorates. He is a **Distinguished Member of ASCE**, an **Honorary Member of AWRA**, and a fellow **EWRI, ASCE, AWRA, IWRS, ISAE, IASWC** and **IE** and holds membership in 16 additional professional associations. He is a fellow/member of 10 international science/engineering academies. He has served as **President** and **Senior Vice President** of the **American Institute of Hydrology (AIH)**. Currently he editor-in-chief of two book series and three journals and serves on editorial boards of 20 other journals.



Dr. Chintalacheruvu Madhusudana Rao is an Assistant Professor of the Department of Civil Engineering of NIT Jamshedpur. He holds PhD degree in Hydrology from the Department of Hydrology, IIT Roorkee, a ME degree in Irrigation Water Management from Centre for Water Resources & Ocean Management of Anna University, Guindy, Chennai-25, a B.Tech degree in Civil Engineering from V.R. Siddhartha Engineering

Course Co-ordinators

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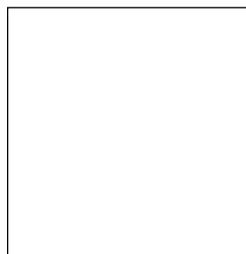
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College, Vijayawada affiliated to Nagarjuna University, Guntur. His research interest includes surface water and groundwater hydrology, rainfall-runoff modelling, climate change impact assessment, watershed modelling, river flood modelling, flood forecasting, river water quality modelling, open channel hydraulics and applications of optimization tools for water resources planning and management. He has 19 years of academic experience. He has published many research papers in peer reviewed journals and national and international conferences. He received best research paper award for the year 2013 with prize money of Rs. 5000/-, presented by Indian Water Resources Society (IWRS), Roorkee. Apart from the number of publications in reputed international and national journals, a part of his PhD thesis work has been kept as Chapter 52, "Reservoir and channel routing" in the prestigious Handbook of Applied Hydrology (Second edition), Chapter authored by his PhD supervisor Prof. M. Perumal, Dept. of Hydrology, IIT Roorkee along with Professor R.K. Price, Hydro Informatics, UNESCO-IHE, Institute for Water Education, 2601 DA Delft, The Netherlands, which was edited by Professor Vijay P. Singh, Department of Biological and Agricultural Engineering and Zachry Department of Civil Engineering at Texas A & M University, and it was published by McGraw Hill in November 2016. He is the founder and developer of PG programme in M.Tech (Water Resources Engineering) which was started in the academic year 2015-16 in the Department of Civil Engineering of NIT Jamshedpur. Presently, he is investigating the spatial distribution of Uranium in the selected districts of Jharkhand state under a sponsored research project sanctioned by the Board of Research in Nuclear Sciences (BRNS). He is very instrumental in providing testing and consultancy services to the Public/Private sector organizations. He has conducted one AICTE-ISTE sponsored national level workshop in the year 2004 and one TEQIP-II sponsored national workshop in the year 2017 as coordinator and also organized many national and international workshops/seminars. He also attended many international workshops, seminars and symposia's. Presently, he is representing as Expert/ Specialist Panel member in the State Executive Committee (SEC) for National Ganga River Basin (NGRB) project/ scheme in Government of Jharkhand Urban Development Department. He is the reviewer for Journal of Climate Change (Springer Series), Journal of Hydrologic Engineering and Book Projects (ASCE Publications), International Journal of Environmental Studies (Taylor & Francis Group), Current Science Journal (Indian academy of sciences) and Applied Water Science journal (Springer Series). He has guided more than 20 undergraduate and 8 graduate theses and presently guiding 2 PhD scholars.



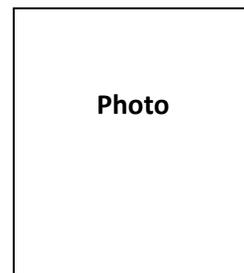
Dr. Balram Ambade is currently a Assistant Professor in the Department of Chemistry at NIT Jamshedpur-831014, Jharkhand State. His area of interest is Environmental Chemistry & Atmospheric Chemistry with specialization in characterization of Water quality, Air quality. He did his B. Sc., M. Sc., and PhD degrees in 2002, 2004 and 2010 respectively from Pt. Ravishankar Shukla University, Raipur (C.G.) India.

As a faculty, he worked as Lecturer at Government Engineering College Raipur from 2005 - 2009 and Assistant Professor at VITS Raipur & SSEC Bhilai (C.G.) from 2010-2011. Furthermore, he joined as Post- doctoral Research Associate at Earth and Environmental

Sciences, IISER Bhopal (M.P.) India. Moreover, In April 2012 he joined to NIT Jamshedpur as Assistant Professor. He has more than ten years of teaching and research experience at premier institutions/universities. He has more than 27 publications of National and International Journals and participated more than twenty conferences. He has recipient full travel awards to attend conference/training/workshops organized by various countries like **France, Italy, Netherland, Finland, Bangladesh and China** for his research activities. He has published two books in international publications and many book chapters in reputed international series. He is currently guided 1 Ph.D., 05 M.Tech. (Surface Science & Engineering) and 04 M.Sc. (Chemistry) students for their dissertation work. He has received 03 R & D projects sponsored by government funding agencies such as, DST-SERB and BRNS etc. He is a recipient of CIIE, NIT Jamshedpur seed grant to conduct experimental research at the Department of Chemistry, NIT Jamshedpur. He is appointed as Editor and Associate Editor for International journal of Advancements in Research & Technology, International Journal of Scientific and Engineering Research and International Journal of Renewable Energy Technology Research.

REGISTRATION AND ACCOMODATION REQUEST FORM
Unified Biochemical Pollution and Hydrologic Modelling
Training workshop
April 9 – 14, 2018
Department of Civil Engineering, NIT Jamshedpur

1. Name of applicant (in block letters): Ms./Mr/Dr.
2. Designation:
3. Residential address with pin code:
.....
Mobile:
4. Institute where employed with address:
.....
Phone:, Email:
5. Highest academic qualification:, Specialization:
6. Do you need accommodation for your stay during course: Yes / No. (on payment basis)
7. Registration fee details (Payment may be made either online fund transfer or DD):
(i) Amount: Rs.
(ii) Transaction ID: (if paid online fund transfer)
(iii) DD No., Issuing Bank:, Date of Payment: (If paid DD)



Date:

Signature of Applicant

Note:

- (i) A scanned copy of application may be sent by e-mail.
- (ii) Participation in the workshop, only if you have received confirmation of admission.
- (iii) Registration fee for participation may be paid through Demand Draft in favour of "Director, NIT Jamshedpur, payable at Jamshedpur.

(OR) Payment may be paid through online fund transfer using the account details: A/c No.: 10678396019; Account holder name: NIT Jamshedpur; Bank: State Bank of India, Branch: NIT Jamshedpur, NIT Campus Adityapur, Jamshedpur-831013; IFSC Code: SBIN0001882.

After Completion, Please mail to anyone of the Course Coordinators:

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