



MHRD

Government of India
Ministry of Human Resource Development

Water Quality Regulations and Modeling Approaches

Overview

Climate change, industrialization and population growth significantly put pressure on available water resources in both quantity and quality aspects. Rivers and groundwater are valuable components of natural environment which are the most important resources of water for drinking, washing, animal life, irrigation of the crops, etc. and must be protected from all sources of pollution. Because our survival depends on their sustainable use. However, these valuable resources are affected by both point and diffuse sources of pollution from different anthropogenic activities such as mining, agriculture, forestry, cattle farming and urbanization water. Point sources of pollution include domestic or industrial discharges via pipe connections to the river system, oil pipeline leakages, landfills, whereas diffuse sources of pollution include runoff and infiltrated solutes from the agricultural land and mining sites.

For the sake of sustainable water use, human welfare and to tackle these water quality problems, ground water and surface water must be protected and restored. This needs a precise and appropriate environmental **regulations** and **assessment tools**. Different approaches may be used for developing regulations. For example, while the Environmental Quality Objectives/Standards (EQO/EQS) determines permissible values for concentration of different chemical species in water resources, the Uniform Emission Standard (UES) focuses on selecting allowed emission level for pollutants (e.g. effluent water quality). However, a combined method is considered as the most effective way for water resources protection, recently.

In the assessment tools (second wing towards water resources protection), both monitoring and modelling provide important tools for water quality evaluation. While good measurements and water quality indexes are important factors to evaluate water resources status, mathematical models are the only tools to predict the response of water resources to the pollution. For their predictive capabilities and cost-effectiveness, mathematical models are becoming increasingly important in water quality management. The transport of solutes in streams and ground water is affected by a suite of physical, chemical and biological processes, with the relative importance of each depending on the geo-environmental setting and properties of the solutes. Different studies have shown that sorption of pollutants to soil/sediments plays an important role in the transport and fate of pollutants in rivers, lakes, and ground waters. Therefore, information about sorption process, different approaches in sorption modeling and knowledge of adding sorption models in to the advection-dispersion equation would be necessary.

The course will give a detailed review on pollutions, their sources and their effects on environment through real examples. Then after reviewing different guidelines and water quality regulations the important water quality indexes for surface water and ground water will be discussed. Furthermore, through theoretical and practical sessions, the numerical modeling of important process (Advection, dispersion and sorption) will be taught.

Objectives

The primary objectives of the course are as follows:

1. Exposing participants to the ground water, surface water and environmental pollution concerns, their sources, Agricultural activities effects, Real examples of pollutant effects on soil and crops.
2. Exposing participants to different water quality guidelines and indexes which is necessary for water quality assessments.
3. Providing essential information regarding water quality monitoring, sampling and measurement techniques through theoretical discussion and laboratory visits.
4. Sorption importance in both water quality modelling and water treatment systems. Sorption studies: kinetic and equilibrium approaches
5. Building in confidence and capability amongst the participants to approach water quality modeling in both surface and ground water by exposing them to fundamentals of water quality modelling. This confident augmented by doing practical numerical modelling using MATLAB.

Internationally faculty **Dr. Ali Mahdavi Mazdeh** an academician, researcher and practitioner with proven knowledge, experience and demonstrable ability in teaching, consultancy, research and training will deliver lecture and discuss case studies in the course. The course will be planned and offered as per the norms set by the GIAN programme.

Course participants will learn these topics through lectures and hands-on experiments. Case studies and assignments will also be shared among all to stimulate research motivation of participants.

Course	<h1 style="margin: 0;">Water Quality Regulations and Modeling Approaches</h1> <p style="margin: 0; color: #1a3d4d;">September 04–08, 2018</p> <p style="margin: 0;">No of participants for the course will be limited to fifty.</p>
You Should Attend If...	Participants from Industry, Research Organisations, Faculty and Students from all over the world who are interested in the course are welcome to register for the course.
Fees	<p>The participation fees for attending the course are as follows:</p> <p>Participants from abroad : US \$100</p> <p>Industry participants: Rs. 5,000/-</p> <p>Faculty or Scientists of Institutions: Rs. 2,000/-</p> <p>Academic/Research Institutions-Students: Rs. 1,000/-</p> <p>The above participation fee includes soft copy of all instructional materials, computer use for tutorials and internet facility.</p> <p>The participants will also be provided with shared double occupancy accommodation at the university guest house and Indian vegetarian food free of charges for the Non-TEQIP institutes.</p> <p>For Others, the above facilities will be provided on payment at subsidized rates. Hotel accommodation will be arranged on payment basis at nearby places, if requested.</p> <p>For more details please visit http://www.gbpuat.ac.in/gian/index.html</p>



The Faculty

Dr Ali Mahdavi Mazdeh is currently a visiting professor at Ruhr University, Bochum, Germany and faculty of Water engineering department at Imam Khomeini International University (IKIU), Qazvin, Iran. He got his Ph D in Hydraulic Structures at the University of Tehran, Iran in 2009.

His research interests include Solute transport, water treatment, Kinetic and equilibrium sorption modeling, Effect of sorption process on pollutant transport in surface water and ground water, Ground water-surface water interactions, experimental investigation on capillary zone effects on solute transport, Hydraulics and open channel hydraulics.

He has good experiences in teaching in university and supervising different MSc and PhD thesis. He contributed to different water related research projects in pollutant transport, heavy metal removals, waste water effects on soil and crops etc. Moreover, He has several experiences in collaborating with water consulting companies.

Being the head of water engineering department, he increased industrial and international collaboration. He was the member of think tank for addressing water crisis in Qazvin, Iran and the member of the Qazvin water authority research committee. In organizing “Water Source of Life” conference and different workshops at IKIU, Qazvin, he collaborated with GIAN (German Iranian Alumni Network), DAAD, Gottingen University and University of Tehran. He also was the guest lecturer of the IGSH (International German Summer School) at Ruhr University for 2015, 2016 and 2017.

<http://ikiu.ac.ir/members/?id=194&lang=1>

<http://www.gmg.rub.de/hydrogeologie/mitarbeiter/mahdavi.html>



Dr H J Shiva Prasad has research, development and teaching experience of more than 30 years in the field of Hydrology and Water resources. He is a Professor in the Dept of Civil Engineering, College of Technology, G B Pant University of Agriculture and Technology, Pantnagar, Uttarakhand State. His research interests include Ground Water Hydrology, Water Resources Planning and Management, Application of Advanced Tools such as Artificial Neural Networks, Remote Sensing & GIS and water governance. He has organised twenty eight (28) training / workshop programmes for the faculty of engineering colleges, field engineers funded by GIAN, MHRD-GOI, DST, AICTE-ISTE, TEQIP WORLD BANK project etc and attended several training programmes organised by Science Academy, DST, DOE, AICTE, ISTE, ICH and NORAD.

http://www.gbpuat.ac.in/colleges/COT/D1/shiva_prasad_profile.html



Course Coordinator

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For registration visit

<http://www.gian.iitkgp.ac.in/GREGN>

For information visit

<http://www.gbpuat.ac.in/gian/index.html>

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Future GIAN programmes
<http://www.gbpuat.ac.in/gian/index.html>