

# Spatial Analysis for Water Resource Modelling and Management

## Overview

After Bangladesh, India is one of the most severe flood-affected countries in the world and recorded for 1/5<sup>th</sup> of worldwide death count due to floods. August 2018 Kerala Flood: Following high rain in late July 2018 and heavy Monsoon rainfall from August 8, 2018, severe flooding affected the Indian state of Kerala resulting in over 445 deaths. 2017 Gujarat flood: Following heavy rain in July 2017, the Gujarat state of India was affected by the severe flood resulting in more than 200 deaths. 2016 Assam floods: Heavy rains in July–August resulted in floods affecting 1.8 million people and flooding the Kaziranga National Park killing around 200 wild animals. Recent extreme events have exposed the vulnerability of our society to cope with such situations. The development of a specialized workshop (online mode) on spatial analysis tools that will greatly aid hydrological modelling efforts undertaken at the university will benefit water management agencies to address flooding issues. The workshop will aid in capacity building, technology transfer and knowledge building.

### Objectives:

The primary objectives of the course are as follows:

- i. Promote understanding of spatial hydrological modelling related to flood analysis, and how this complex interaction between different components of water resource systems that can also have social, economic, political and environmental implications.
- ii. Develop education materials and train students and researchers to improve understanding of the effects of climate variability and human activities on water resources availability and spatial hydrological modelling. A critical need is to educate researchers and graduate students with emerging tools and approaches for high resolution spatial hydrologic variable estimations and observations to support hydrological modelling and water resources management.
- iii. Develop and document region-specific strategies for the management of the current and future water resources through hydrological modelling to avoid chances of forthcoming drought and flood. Also, understanding of long-term climate change scenarios and their impact on water resources in the region.

<b>Course Information</b>	<b>Duration: June 13 – June 17, 2022 (05 days)</b> <b>Total Contact Hours:</b> 10 hours of lectures and 10 hours hands-on in 05 days <b>The number of participants for the course will be limited.</b>
<b>Modules</b>	<b>Module 1.</b> Spatial hydrology and analysis of hydro-climatic data, Extreme Precipitation and Floods <b>Module 2.</b> Spatial and statistical analysis of Floods, Hydrologic design under changing climate <b>Module 3.</b> Climate change and variability influences on hydrologic extremes, Flood forecasting approaches for Real-time applications <b>Module 4.</b> Modelling and managing water in the future, Flood warning systems and forecasting model. <b>Module 5.</b> Ensemble Streamflow Forecasting, Flood Warning Systems
<b>You Should Attend If...</b>	<ul style="list-style-type: none"> <li>▪ You are a professional working in the field of Water Resources Dept., Civil Engineering, and government organizations including R&amp;D laboratories.</li> <li>▪ You are a student (B. Tech /M. Sc /M. Tech/PhD) or faculty in the field of Water Resources Engineering, Civil Engineering and Environmental Engineering.</li> </ul>
<b>Fees &amp; Accommodation</b>	The participation fees for taking the course is as follows: <b>Participants from abroad: US \$250</b> <b>Industry/ Research Organizations: Rs 5000</b> <b>Academic Institutions: Rs 2500 (Faculty) and Rs 1000 (Student)</b> The above fee includes all instructional materials, computer use for tutorials and assignments. The participants will be provided with accommodation on payment basis(subject to the availability in the hostels/guest house at SVNIT Surat)
<b>Mode of Registration</b>	All prospective participants need to do web registration for the course on GIAN ( <a href="http://www.gian.iitkgp.ac.in/GREGN">http://www.gian.iitkgp.ac.in/GREGN</a> ) portal. After the mandatory web registration, participants should share the registration details with the course coordinator by email (shivnam27@gmail.com). The shortlisted participants will be informed by email to register for the course by making full payment of the course registration fee.

## The Faculty



Dr. Ramesh Teegavarapu (Dr. T.) is a professor and graduate program director in the Department of CEGE and founder and leader of the Hydro systems Research Laboratory (HRL) at FAU. His main research interests are in the areas of climate change and variability, hydro climatic extremes, water, and environmental systems management, spatial hydrology and hydrometeorology. Before his tenure at FAU, he was a research engineer at the University of California, Davis and a faculty member and Assistant Director of a United States Geological Survey (USGS) Water Institute at the University of Kentucky. He is a recipient of several national and international awards including Fulbright Scholar (2016-2018), Fulbright Specialist (2019-2022) and awards from the American Society of Civil Engineers (ASCE), British Hydrologic Society (BHS), NSERC Canada, Brain Korea 21 Program and several national awards from ASCE. He has received Scholar of the year award (2017) and two-times (2009, 2018) Excellence and Innovation in Teaching award and COECS senior Teaching and Research Awards (2018,2019) in the last two years and was one of the eight finalists selected to Distinguished Teacher of the Year award. Dr. T. has completed three international visiting professorships at Kobe University, Japan University of Brescia and Politecnico Di Torino, Italy in the last four years and lectured in workshops/conferences, gave invited talks and keynote lectures in eighteen countries. Dr. T. has published over 120 technical articles in high impact journals and conference proceedings and authored 25 book chapters, 5 mini-chapters and is an author, co-editor, sole-editor of five books from multiple reputed international publishers. He is currently writing two books. He has authored more than 50 technical reports. He has secured research funding as PI and Co-PI totaling over 5 million from state and federal agencies such as NSF, USGS, USDOT, and USACE. Two of the most recent NSF grants were aimed at developing virtual reality and simulation approaches for disaster management and understanding climate extremes. Dr. T. has presented over 125 talks and more than 45 research posters including several invited and session keynote lectures in over fifteen countries. He has organized, chaired, convened and moderated over 70 technical sessions at national and international conferences and served on advisory committees of conferences and as general and technical co-chair of two international conferences. He is a contributing member and lead member of several international technical committees and served as a thesis committee member for over a dozen international doctoral dissertations. Dr. T. has developed several innovative simulation and modeling environments/tools for understanding hydrological processes, hydro meteorological observations, climate change, and variability. Personal Web Sites: <http://faculty.eng.fau.edu/ramesh>; Lab Web Site: <http://hrl.fau.edu>



Dr. S M Yadav is a Professor, at the Department of Civil Engineering of Sardar Vallabhbhai National Institute of Technology, India. He is having a teaching experience of more than thirty years. His research interests are Flood Modelling, Flood Risk Assessment and Management, Real-time Flood Forecasting, Climate Change, Remote Sensing and Geographic Information System, Fluvial Hydraulics and Application of Soft Computing Techniques in WRE. He has completed nearly 50 consultancy projects. Dr. Yadav has been working as an expert for ongoing dredging work in the Rivers of central India like Ghaghara, Ganga, Gandak and Rapti as a flood mitigation measures. Dr. Yadav has conducted several training programs on flood modelling and analysis. He has received the prestigious Hariom Asharam Prerit award for his outstanding research contribution. He has received several best paper awards at national and international conferences. He has been the recipient of AuSAID funding thrice for presenting his research work at the International River Symposium. He has presented his research work for ten international conferences held at various locations of the world. He has authored one book. He has guided four doctoral scholars. Eight scholars are perusing their research under his guidance. He has guided around fifty postgraduate dissertation work. Delivered more than fifty expert lecture in International and National Institutes/ Colleges/ Industries. Published more than a hundred papers in an international/national journals and conferences. He is a contributing member and lead member of several technical committees and served as a thesis committee member for several national doctoral dissertations. He is Charter Civil Engineer, IE, India. He is a Fellow of Institute of Engineers India and Indian Society of Hydraulics, Pune.

## Course

## Coordinator

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