



सत्यमेव जयते

Government of India
Ministry of Human Resource
Development



Gian
GLOBAL INITIATIVE OF ACADEMIC NETWORKS



*One Week Short Term Course on
Geoinformatics and Geocomputational Modeling
for Water Resources Engineering and
Environmental Science*

JUNE 4 – 9, 2018 @ IIT(ISM), DHANBAD



Organized by



**Department of Civil Engineering
Indian Institute of Technology (Indian School of Mines), Dhanbad
Dhanbad-826004, Jharkhand, India
<http://www.iitism.ac.in>**

Overview

Geoinformatics and Geocomputational Modeling for Water Resources Engineering and Environmental Science course not only provides a comprehensive introduction to the fundamentals of geoinformatics but also demonstrates how GIS and mathematical models can be integrated to develop spatial decision support systems to support water resources and environmental planning, management and engineering. The course has been designed to enhance the technical skills of the faculty, engineers, scientists, scholars and students and make aware of the recent advances in GIS and Geocomputation methods. The benefits and challenges of integrating mathematical models within GIS in water resources and environmental fields will be dealt in this course, demonstrating how the conjunctive use of these technologies can be employed to harness increasingly available digital data and develop spatially-oriented sustainable solutions. More specifically, the course will introduce the participant to both geospatial and modeling methods and demonstrate how they both can be integrated to provide unified solutions. The course adopts a hands-on approach and emphasizes active learning by balancing theory and hands-on problem solving.

Course Schedule

June 4 - 9, 2018

Number of participants for the course will be limited to **fifty (50)**.

Who Should Attend

- Employees of Government, Public and Private sector having at least a graduate degree.
- Student at all levels (Senior B.Tech. /M.Sc. / M.Tech. /Ph.D.).
- Faculty from academic institutions and technical institutions.
- Researcher in industry.
- Scientist in research organization.

Fees

The participation fees for taking the course is as follows:

Participants from abroad	:	US\$ 300
Industry / Research Organization Officers	:	₹ 20,000
Government, Public and Private Sector Employees	:	₹ 15,000
Academic Institutions		
(a) Faculty	:	₹ 10,000
(b) Student/Scholar	:	₹ 5,000

The above fees include all instructional materials, computer use for tutorials and assignments. The participants will be provided with accommodation on payment basis subject to availability.

Course Objectives

The primary objectives of the course are as follows:

- Exposing participants to the fundamentals of GIS and Geocomputational modeling.
- Providing exposure to practical problems and their solutions through case studies.
- Enhancing the understanding and capability of the participants to GIS-enabled modeling aspects in water resources and environmental engineering problems using hands-on active learning concepts.



The Faculty



Prof. Venkatesh Uddameri, Ph.D., P.E. is currently Director of Water Resources Center and Professor of Civil, Environmental and Construction Engineering at **Texas Tech University, Lubbock, Texas, USA.** He currently is also the **Editor-in-Chief** of the Journal of American Water Resources Association and previously served as the guest editor for the Environmental Geology Journal and on the Editorial Board of the Clean Technologies and Environmental Policy Journal. Earlier he worked as Professor at Texas A&M University,

Kingsville and the Director, CREST-RESSACA, NSF funded center for research excellence at TAMUK and has received various Honors and Awards which include 2012 Outstanding Professor of the year at TAMUK, 2004 Presidential Distinguished Research Award, 1994 American Petroleum Institute / National Groundwater Association Student Scholarship (1 of 5 awards internationally). His research interests are in the broad area of water resources engineering with a special emphasis on mathematical modeling, geocomputational methods. He has published over 100 peer-reviewed journal articles, book chapters, technical reports, conference proceedings and abstracts. His research has been funded by various agencies including the National Science Foundation, US Department of Agriculture, National Oceanic and Atmospheric Administration, Department of Energy, U.S. Geological Survey as well as several other state and local agencies. He got 25 research grants totaling over 13 Million USD. He has established several international collaborations in various countries on groundwater and environmental related issues. Dr. Uddameri has published two books – GIS and Geocomputation in Water Resource Science and Engineering (co-authored with B. Dixon) published by John Wiley and Sons and AGU in 2016. He also co-edited a book – Hydraulic Fracturing Impacts and Technology – A Multidisciplinary Perspective, (Editors: V. Uddameri, A. Morse and K. Tindle) published by CRC Press in 2015.



Dr. Srinivas Pasupuleti is presently serving the Department of Civil Engineering at Indian Institute of Technology (Indian School of Mines), Dhanbad as one of the founder faculty members in the capacity as an Assistant Professor. He is specialized in Hydrology and Water Resources Engineering. His areas of research interest are: Remote Sensing and GIS applications in Water Resources and Environmental Engineering, Integrated watershed management and Flow through porous media. He is executing a research project funded by DST in the area of Groundwater

quality and Watershed management. He was instrumental in establishing international collaboration of ISM Dhanbad with TTU Texas, USA. He also co-edited a book entitled “Water and its Sustainability in Mining and other Environment: Vision 2050 ” (Editors: Sarkar B.C., Srinivas P., Sreevalsa K.) published by ISM in association with Ministry of Earth Sciences, Govt. of India in 2014.



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Course Coordinator

Dr. Srinivas Pasupuleti

Department of Civil Engineering

Indian Institute of Technology (ISM), Dhanbad

Jharkhand - 826004

Phone: +91-326-2235100, Cell: +91-9471192234

E-mail: srinivas@iitism.ac.in | vasu77.p@gmail.com

<http://www.iitism.ac.in>

Tentative topics of the Course

Day 1: Overview of Technologies

1. Introduction to GIS and Geocomputation
2. Data models for representing Geographies – Vector, Raster and other types
3. Relational database model
4. Software for GIS – Open Source, Commercial
5. Obtaining spatial data - Global positioning systems and Remote sensing
6. Projections and cartography

Day 2: Geospatial Datasets and Analysis

1. Global geospatial datasets
2. Geospatial datasets pertaining to India
3. Geospatial analysis
4. Watershed delineation using GIS
5. Landuse Land Cover (LULC) Applications

Day 3: Decision-Theoretic and Statistical Modeling Techniques

1. Introduction to R programming environment
2. Multi-criteria decision making models – Weighting, Distance, Outranking and Pair-wise comparison methods
3. Statistical models – linear, nonlinear, logistic models
4. Introduction to Geostatistics
5. Integrating MCDM and statistical models within GIS

Day 4: Information-Theoretic Modeling

1. Artificial neural networks (ANN) and its variants
2. Deep learning algorithms
3. Unsupervised learning and clustering
4. Space-time interpolation of water resources and environmental datasets
5. Introduction to fuzzy set theory

Day 5: Conceptual and Physics-Based Modeling

1. Conservation principles and constitutive relationships
2. Illustrative analytical and numerical solutions
3. Loose-coupling of GIS and Physics-based models
4. Tight-coupling of GIS and Physics-based models
5. Wrap up

Date of Examination: June 9, 2018

Registration Process

Stage-1: WEB Registration:

Please visit :

<http://www.gian.iitkgp.ac.in/GREGN/index> and create login User ID and Password. Fill up blank registration form and do web registration by paying Rs.500/- on line through Net Banking/Debit/Credit Card. Those who have already been paid, need not pay again. Registration to the portal is one time affair and will be valid for lifetime of GIAN. Once registered in the portal, an applicant will be able to apply for any number of GIAN courses as and when necessary.

Stage-2: COURSE Registration:

Log in to the GIAN portal with the User ID and Password created. Click on “Course Registration” option given at the top of the registration form. Select the course titled **“Geoinformatics and Geocomputational Modeling for Water Resources Engineering and Environmental Science”** from the list and click on “Save” option. Confirm your registration by Clicking on “Confirm Course”.

OR

Fill the Registration cum Accommodation request form and send to the address provided.

The last date of registration : May 15, 2018



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Registration cum Accommodation Request Form

Name (Capital Letters):Gender (M/F) :.....

Qualification:.....Designation:.....

Category (Faculty/Scientist/Engineer/Officer/Industry Executive/Scholar/Student):

Organisation:

Mailing Address with PIN Code:

.....

Contact Details: Off :..... Res :.....

Mobile : Email:.....

Payment :DD No. : Date :.....

DD in favour of “**Registrar, Indian Institute of Technology (ISM), Dhanbad**” payable at CANARA BANK, Saraidhela Branch, Dhanbad. (IFSC:CNRB0000986). **SB Account No: 0986101009746** **OR** **NEFT/RTGS** (Please furnish the full details if NEFT/RTGS like Name of Account Holder, UTR No./Transaction ID, Name of Bank and Branch, Date and Amount of payment).

IIT (ISM) Guest House / Hostel accommodation required: YES / NO (on payment basis)

Accommodation Charges on Sharing Basis (Exclusive of Food) :

- ₹ 300/- per day in IIT(ISM) Guest House
- ₹ 50/- per day in Hostel .



Place :

Date :

(Signature of Applicant)

Send filled form to :

Dr. Srinivas Pasupuleti, Dept. of Civil Engg., 3rd Floor, Academic Complex, IIT(ISM), Dhanbad, Jharkhand-826004
e -mail scanned copy of filled form to: srinivas@iitism.ac.in | vasu77.p@gmail.com

Last Date of Registration : May 15, 2018