Overview of the Course

Hydrologic extremes refer to extreme variations in water availability, which can manifest as devastating floods or prolonged droughts. It is utmost important to understand the causative factors for the hydrologic extremes and subsequent disasters and their impact on agriculture, water supply and water resources management for resilience assessment. Latest advances in computational and geospatial technologies are helping in analyzing modelling the hydrologic extremes. AI and machine learning algorithms paving the new way of understanding the climate extremes.

This course will review major hydrologic extremes such as floods and droughts by providing the basic concepts, ongoing modelling developments with examples from around the world. Uncertainty in modelling the hydrologic extremes will be presented. Hands on sessions will be arranged on widely used models such as HEC-HMS, HEC-RAS and SWAT along with data analysis methodologies with R and Python programming techniques.

At the end of the course, the participants will:

- Understand the causative factors for hydrologic extremes.
- Understand the various modelling mechanisms available for analyzing the hydrologic extremes.
- Become familiar with some of the widely used models such HEC-HMS, HEC-RAS and SWAT.
- Become familiar with R, Python, Google Earth Engine and Machine Learning Algorithms and their role in hydrologic extremes studies

Course contents

Day 1 (28th July, 2025):
Hydrologic extremes (Global Trends and Patterns) and data sources for hydrologic extremes studies.

Day 2 (29th July, 2025):
Hydrologic extremes and climate change connections, rainfall and temperature indices for analyzing the hydrologic extremes.

Day 3 (30th July, 2025):
Basin/Watershed Scale Analysis and Modelling of Floods, Modelling methods for event based runoff forecast.

Day 4 (31st July, 2025):
Basin/Watershed Scale Analysis and Modelling of Drought and Heatwave; climate change impact on hydrologic extremes

Day 5 (August 01, 2025)
Visit to NRSC and INCOIS to know the mechanism used by scientific organizations for handling the hydrological extremes

Day 6 (August 02, 2025)
Uncertainty assessment in modelling the hydrologic extremes; Understanding the compound hydrologic extremes

Day 7 (August 03, 2025)
Visit to Nearest Gauge stations and dam sites.

Day 8 (August 04, 2025)
Modelling and Analysis of Urban Floods; Machine learning algorithms for analyzing the floods. Latest advancements in handling the floods and droughts

Day 9 (August 05, 2025)
Adaptation and Resilience Strategies for integrated watershed and water resources management and Instrumentation in Watersheds for Monitoring the hydrologic extremes.

Day 10 (August 06, 2025)
Analyzing the extreme events through social media markers; Research problem formulation in the field of modelling and management of floods under changing climate. Research Ideation to publication.

About tutorial sessions

This course is being offered with tutorials in the afternoon sessions, where participants will be trained in HEC-HMS, HEC-RAS, SWAT, R and Python programming aspects, GEE platform.

Who can attend?

Scientists and Researchers from Government Research Organizations
Faculty from Academic Institutes
Engineers from industry
Students at all levels (B.Tech/ M.Tech/ PhD)

How to reach NITW?

Nearby airport: Rajiv Gandhi International airport (3 hours journey from NIT Warangal)
Nearby railway station:

Kazipet (KZJ)	3 km from NIT, Warangal
Warangal (WL)	12 km from NIT, Warangal

10-Day GIAN Course on

शिक्षा मंत्रालय
MINISTRY OF EDUCATION
सत्यमेव जयते

GIAN
GLOBAL INITIATIVE OF ACADEMIC NETWORKS

ADVANCES IN ANALYSIS AND MODELING OF HYDROLOGIC EXTREMES

(Course ID: 2412047)

28th July -06th August, 2025

International Faculty

Prof. Venkataramana Sridhar

Department of Biological Systems Engineering
Virginia Tech, Blacksburg,
USA

Coordinator

Prof. Venkata Reddy Keesara

Organized by
Department of Civil Engineering
National Institute of Technology Warangal
(An Institute of National Importance)
Warangal-506 004, Telangana State, India

About the Institute

National Institute of Technology Warangal, formerly known as Regional Engineering College was established in 1959. Over the years it has developed into a premier institute of higher learning and is ranked among the top technical education institutions in India. There are 14 Departments offering eight undergraduate and 31 post- graduate programmes besides doctoral programmes. About 5000 students across the country and about 500 international students' study in the campus. It is a fully residential campus sprawling over 250 acres with excellent infrastructure.

About the Department

The Department of Civil Engineering offers B. Tech in Civil Engineering, Seven M. Tech programs including Water Resources Engineering and Remote Sensing and GIS and offers PhD in all civil engineering domains.It has well established and well-equipped state of the art laboratories with experienced faculty engaged in teaching, research, capacity building activities and industry extension services. Water Resources Engineering and Remote Sensing group Faculty are carrying out research in the field of climate change impact studies. Faculty members represent several policy making and professional bodies. The Department has liaison with reputed industries and R&D organizations.

About Warangal

Warangal is about 135km from Hyderabad, the capital of Telangana. It is well connected by rail and road. It is well known as an educational centre. Once, the capital of the great Kakatiya Kingdom and earlier known as Orugallu or Ekasilanagaram, Warangal still retains its importance as the cultural centre of the Telangana. It finds an important place in the tourist map of Telangana with sites of archaeological significance like the Warangal fort, Thousand Pillars temple, Bhadrakali templeand Ramappa temple. The three lakes namely Ramappa, Pakhal and Laknavaram and the wild life sanctuaries at Tadwai and Pakhal are famous for sightseeing.

About GIAN

About GIAN Course: Ministry of Human Resource Development (MHRD), Government of India (GoI) has launched an innovative program titled "Global Initiative of Academic Networks (GIAN)" in higher Education, in order to garner the best international experience. As part of this, internationally renowned Academicians and Scientists are invited to augment the Country's academic resources, accelerate the pace of quality reforms and elevate India's scientific and technological capacity to global excellence.

How to register for the course?

Fill the google form using the following link to complete the registration process. **https://forms.gle/UkNGTh34WqRzj4KdA** Candidates registering early will be given preference in short listing process.

Registration charges

Industry/ Research Organizations	**Rs. 6,000/-**
Faculty	**Rs. 4,000/-**
Students & Research Scholars	**Rs. 2,000/-**
Faculty/Scientists/Industry Participants from abroad	**USD 300**

The above fees include all instructional materials, computer use for tutorials, free internet facility, tea and snacks. The course fee is inclusive of 18% GST as per institute norm. The participants may avail single bedded shared accommodation and food (breakfast, lunch and dinner) if requested on an additional payment basis.

Details for Online Payment

Account Name	Director Research Account
Account No.	62266262236
Bank	State Bank of India
Branch	NIT Branch, Warangal
Branch Code	20149
IFSC	SBIN0020149
MICR Code	506002030
SWIFT Code	SBININBBH14

Note: For confirmation of registration, the proof of payment (a screen shot of the transaction details) along with the registration form are to be e-mailed to **kvreddy@nitw.ac.in**; Candidates registering early will be given preference in short listing process; For any queries regarding registration of the course, please contact the course coordinator

Accommodation

The participants will be provided boarding and lodging on payment basis. In view of limited availability of rooms, accommodation will be provided on first come first serve basis. Participants will not be entitled for payment of any TA/DA.

Foreign Faculty

Prof. Venkataramana Sridhar is the faculty in the Department of Biological Systems Engineering at Virginia Tech, Blacksburg, USA. Prof. Sridhar is a hydrologist and conducts modeling research to understand the impact of climate change on hydrology and water resources, water management, drought and flood modeling. Prof. Sridhar's research group designed, developed, and refined a suite of computational hydrological models to generate datasets that were translated into an operational decision support system for many river basins in the conterminous U.S., India and Southeast Asia.

Indian Faculty

Prof. Venkata Reddy Keesara, is the faculty in Civil Engineering Department at the National Institute of Technology, Warangal with 20 years' experience in the field of water resources and geospatial systems. He carries out research on watershed modelling, climate change impacts, real time forecast of floods, geospatial applications on water resource systems. He teaches the geospatial data processing, programing methods for geospatial systems to Post Graduate students

For any queries, please contact

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Course Coordinator
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Mobile: **+91-9441666379**

Last Date for Registration: June 30th, 2025