Training Program on
Urban Flood Assessment Using MIKE+
30 November – 11 December 2026

REGISTRATION FORM

Name (in Capital):_____

Designation_____

Date of Birth_____

Organization:_____

Responsibilities (in brief):_____

_____

Full Postal Address:_____

_____

Telephone No (with STD Code):_____

Fax No(with STD ode):_____

Mobile:_____

Email:_____

Date : **(Signature of the participant)**

SPONSORING AUTHORITY

Full Postal Address:_____

Telephone Nos:_____
(With STD Code)

Fax No.(with STD ode):_____

Mobile:_____

Email:_____

Date: **(Signature and Seal)**

_____

Completed Registration Form may be sent by email to:
E-mail:nwa.pune@gmail.com; directorrm-nwa@gov.in

Government of India
Ministry of Jal Shakti,
Department of Water Resources,
River Development & Ganga Rejuvenation
Central Water Commission

Training Program on
Urban Flood Assessment Using MIKE+
30 November – 11 December 2026



Organized by

National Water Academy, Pune

INTRODUCTION & PROGRAM OBJECTIVE

Significant advancements in preparedness for water-related disasters, viz., cyclones and riverine floods, have been made over the past few decades. Urban flooding, on the other hand, is a different story. Urban floods strike densely populated areas without much warning and have a devastating effect on industry, the service-based economy, and public health. For effective flood disaster management, the Sendai Framework for Disaster Risk Reduction (2015–30) places emphasis on lowering hazard exposure and vulnerability and strengthening disaster resilience.

This two-week intensive capacity-building program at NWA, Pune, in collaboration with DHI and GIZ, is designed to empower participants with the ability to: Develop a comprehensive understanding of urban flood dynamics, including hydrological, hydraulic, environmental, climate change and socio-economic dimensions; Strengthen capacity to plan, design, and implement efficient urban flood management strategies aligned with national and international frameworks; Enhance skills to integrate modern technologies, data-driven decision-making, and resilient infrastructure solutions for flood risk reduction; Foster collaboration among multiple stakeholders and institutions for sustainable, community-focused urban flood preparedness and response.

PROGRAM CONTENT

The Program will tentatively cover the following broad topics for 10 days

- Urban Flooding, Hydrology & Hydraulics
- Lumped Rainfall Runoff modeling theory
- Development of a Storm water and combined sewerage system model in Mike+
- Development of a 2D overland model in Mike+
- Coupling of different Urban models in Mike+
- Flood Hazard & Risk Modeling
- Modelling of future urban development scenarios
- Modelling of mitigation measures
- Assessment of Climate Change
- Application to to a practical case based on data from Thiruvananthapuram

METHODOLOGY

The above broad topics will be covered through lecture sessions, group discussions, and hans-on activities. The training program will include a variety of activities to improve the participants' learning, such as: Group discussions to promote knowledge and idea exchange; lectures given by domain experts; site visit to nearby dams for practical training, etc.

TARGET GROUP

Professionals working in Urban Local Bodies, State Urban Development Departments, Municipal Corporations, Central and State Water Resources Departments, Disaster Management Authorities, Academic & Research Institutions and other stakeholders.. Participants are advised to bring **their own laptops so that they can independently complete the hands-on sessions.**

FACULTY /RESOURCE PERSONS

The resource persons for the program would be domain experts from DHI.

PROGRAM FEE

There is no program fee for participants from Central and State Govt. departments.
Charges for participants from other categories are:

Category	Description	Fee in Rs. (per participant)
A.	Central/State/Local Government Depts.	Nil
B.	'Not for Profit' Central and State PSUs	Nil
C.	Recognized academic institutions, NGOs	3000/-
D.	Central and State Public Sector Undertakings	20,000/-
E.	Private Companies, individuals	30,000/-

- Discounts applicable : (a) 50% for PSUs of MoJS i.e. WAPCOS & NPCC (no group discount); (b) For others –20% discount for 3-4 participants; 30% discount for 5 or more participants from the same organization.

PAYMENT

Payment for the programme fee, if applicable, is to be deposited with NWA before the commencement of the program. Payment is accepted through **Online / Demand Draft <u>without deducting any TDS</u>. DD drawn in favour of PAO-Ministry of Water Resources payable at Pune** or through electronic transfer in the Account details given below:
Account holder name: PAO - Ministry of Water Resources, Account No: 11382328092; IFSC Code: SBIN0001904

PROGRAM DURATION

30 November to 11 December 2026. The participants should reach NWA by the evening of 29th November and plan their return journey after 1800 Hrs (from NWA) on 11th December 2026.

VENUE

National Water Academy, Khadakwasla, Sinhagad Road, Pune-411 024.

PARTICIPATION

The nomination of the officers may be sent to the Course Director latest by 23rd November 2026. The nominated officers are requested to start for the program only after confirmation of their nomination. The accepted nominations will be displayed on NWA's website on 25th November 2026.

LOCAL HOSPITALITY

NWA has a self-contained residential campus, and all out-station participants would be provided with lodging and boarding on payment basis as per government rates (about Rs.275/- per person per day). Working Lunch during the training program will be provided by NWA. Local pickup/drop will have to be arranged by the participants themselves.

WEATHER

During the month of December, the average temperature of Pune may be around 12°C to 27°C with pleasant climate with No rain.

CONTACT

For sending nominations or for any information of this program, please contact:

Shri Kumar Kushal, Director & Course Director
National Water Academy, CWC, Khadakwasla R S ,Pune – 411 024
Mobile: # 9102303213
Email: nwa.pune@gmail.com ; directorrm-nwa@gov.in
For more info visit our Website: www.nwapune.gov.in

Technical training on Urban Flood assessment at NWA Pune

Urban flooding has become a recurrent and increasingly severe challenge across Indian cities due to rapid urbanisation, inadequate drainage infrastructure, encroachment on natural waterways, and the growing impacts of climate change. High-intensity, short-duration rainfall events frequently overwhelm urban drainage systems, resulting in widespread inundation, disruption of essential services, economic losses, and risks to human safety.

Conventional stormwater planning approaches, which rely on static design standards and isolated infrastructure upgrades, are no longer sufficient to address the complex and interconnected nature of urban flood processes. Modern urban flood management requires an integrated assessment of rainfall–runoff processes, drainage system performance, surface inundation, river interactions, land use change, and climate change impacts. Such assessments must be supported by advanced numerical modelling tools, robust data frameworks, and institutions with the capacity to implement and sustain these approaches.

Under the India–EU Water Initiative (IEWI), the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH has funded a project aimed at building long term institutional capacity within national and state water organisations in India. The project combines European best practices with Indian planning and regulatory frameworks to support climate resilient urban development.

Central to the applied methodology is an integrated 1D/2D modelling framework used to assess flood hazards. The 1D component represents stormwater drainage networks, combined sewer systems, and relevant canals and rivers, while the 2D component simulates surface runoff, overland flow paths, and floodplain inundation. Model outputs are used to assess flood hazards which, when combined with exposure data, provide estimates of flood risk under existing conditions and form the baseline for comparison with future scenarios. The framework integrates hazard assessment, exposure analysis, and risk evaluation.

The training focuses on the technical aspects of this integrated approach and includes a comprehensive introduction to required data, data collection methods, quality assurance of collected data, model development, and the application of models for flood hazard assessment. It also introduces modelling of climate change impacts, simulation of future urban development scenarios, and the application of integrated modelling approaches to develop and test potential mitigation measures to reduce flood risks.

The software package MIKE+ is used in the training course. The topics covered in the programme will be introduced by experts from DHI, and the introductions will be complemented with hands on PC exercises that participants will complete in pairs.

Training topics

- The concept of integrated flood risk modelling
- Data requirements and data quality control
- Rainfall runoff modelling
- One-dimension hydraulic modelling
- Two-dimensional surface modelling
- Integrated flood hazard and risk assessment
- Climate change and future urban development scenarios
- Flood mitigation planning and evaluation

Target Group and prerequisites

Professionals who wish to enhance their skills in conducting flood hazard and risk assessments using integrated flood risk modelling.

Participants should hold a technical degree in urban hydrology or hydraulics and preferably have experience with hydraulic modelling software.

Training course outcome

Participants will be able to develop and apply integrated modelling tools for flood-hazard and risk assessment. By the end of the training, they will have a solid understanding of the required data, the capabilities and limitations of the models, and the implications for model reliability when data availability is limited.

Training program

The two-week training programme will combine introductory lectures, practical exercises, and group-based project work. The programme is designed to gradually move participants from understanding the basic principles of flood risk modelling to applying these principles to a realistic case based on data from Thiruvananthapuram.

Week 1 (30/11 2026 – 4/12 2026) – Introduction to Flood Risk Modelling

The first week will provide a basic introduction to flood risk modelling using synthetic data and relatively small demonstration models. General introductions to the main concepts and modelling approaches will be complemented by practical exercises, allowing participants to apply the methods themselves.

The exercises will be based on small and manageable models so that participants can focus on understanding the modelling principles, workflow, input data, model setup, simulation, and interpretation of results. Extensive step-by-step exercise guides will be provided to support participants throughout the practical work.

<u>Monday 30/11 2026, morning. Integrated flood risk modelling concept.</u>

- Introduction to Urban Flooding
- Introduction to Urban Hydrological and Hydraulic processes
- Introduction to Impacts of urbanisation
- Introduction to Climate change drivers
- Introduction to Institutional roles
- Introduction to Regulatory frameworks

<u>Monday 30/11 2026, afternoon. Introduction to Mike+</u>

- Data Collection
- Standards
- Quality control procedures

Hands-on exercise. Preparation of data that is ready to be imported in Mike+. Configuration and application of data import functions in Mike+.

Tuesday 1/12 2026, morning. Lumped rainfall runoff modelling.

- Lumped rainfall runoff modelling theory
- Setting up a rainfall runoff model
- Catchment delineation
- Model parameterisation
- Model calibration

Hands-on exercise. Setting up a rainfall runoff model in Mike+. Model input definitions. Running a rainfall runoff model. Visualize rainfall runoff model results.

Tuesday 1/12 2026, afternoon. Drainage Network Modelling (1D)

- Introduction to One-dimensional hydraulic theory
- Setting up a model of stormwater drains
- Setting up a model of canals and rivers
- Model parameterisation
- Model calibration

Hands-on exercise. Setting up a one-dimensional hydraulic model in Mike+. Model input definitions. Running a one-dimensional hydraulic model. Visualize model results.

Wednesday 2/12 2026, all days. Two-dimensional surface modelling

- Introduction to Two-dimensional hydraulic theory
- 2D mesh generation
- Setting up a model of 2D surface model
- Model parameterisation
- Model calibration

Hands-on exercise. Setting up a two-dimensional hydraulic model in Mike+. Model input definitions. Running a two-dimensional hydraulic model. Visualize model results.

Thursday 3/12 2026. Setting up an integrated 1D/2D model

- Introduction to integrated model theory
- Setting up an integrated 1D/2D model
- Model parameterisation

Hands-on exercise. Setting up an integrated 1D/2D hydraulic model in Mike+. Running an integrated model. Visualize model results.

Friday 4/12 2026, morning. Flood hazard and risk modelling

- Flood Hazard and Risk Assessment
- Simulation of multiple return periods
- Hazard classification
- Exposure integration
- Risk mapping

Hands-on exercise. Create hazards and risk maps.

Friday 4/12 2026, afternoon. Introduction to Climate Change, Future Urban Development and Flood Mitigation Solutions

- Climate scaling factors
- Future land-use scenarios
- Assessment of long-term flood risk
- Introduction to typical structural flood mitigation solutions

Hands-on exercise. Make simulation with climate change factors and set up a integrated model that include expected future land-use scenarios.

Week 2 (7/12 2026 – 11/12 2026) – Application to Thiruvananthapuram

During the second week, the training will move from synthetic examples to a practical case based on data from Thiruvananthapuram. Participants will work through the main elements of developing an integrated urban flood model, including:

- Collection, review, and preparation of relevant data;
- Setup of a 2D surface flood model;
- Development and design of a stormwater drainage system;
- Setup of an integrated 1D/2D model;
- Evaluation and interpretation of flood risk based on the model results.
- Simulation of multiple return periods
- Hazard classification
- Exposure integration
- Risk mapping

Throughout this work, Lars Yde and James E. Samuel will provide supervision and technical guidance, supporting the groups where needed while encouraging participants to develop their own solutions and gain practical experience with the complete modelling workflow.

Training Experts

The training and practical group work will be supervised by Lars Yde and James E. Samuel, combining extensive experience in urban flood modelling with strong experience in training and capacity building.

Lars Yde – Flood Modelling Expert

Lars Yde is a Senior Project Engineer at DHI and a highly experienced hydraulic and hydrological modelling expert. His career with DHI started in 1988, and he has worked extensively with the modelling, analysis, design and management of urban drainage systems, covering stormwater, sanitary sewer and combined sewer systems.

He has expertise in 1D drainage modelling, integrated 1D/2D urban flood modelling, hydraulic analysis, flood forecasting and real-time modelling and control. His experience includes the assessment of urban flood risk as well as the design and upgrading of drainage and sewer infrastructure in projects across Asia, Europe and North America.

Lars Yde also has extensive experience in training and capacity building in urban drainage and flood modelling, including training in MIKE Urban and MIKE+ and the application of 1D/2D hydraulic modelling.

James E. Samuel – Urban Flood Modelling and Water Resources Specialist

James E. Samuel is a water resources and urban flood management specialist at DHI with expertise in hydrology, hydraulics and urban water modelling. His main areas of experience include stormwater drainage, wastewater collection and urban flood mitigation.

He has extensive experience in training and capacity building in India, including courses and workshops on flood modelling, stormwater management and integrated urban water systems for professionals, academic institutions and government organisations. James E. Samuel is also pursuing a Ph.D. in Urban Hydrology at IIT Roorkee, focusing on real-time urban flood forecasting applications.

Closing Session

The second week will conclude with a closing session, during which the participants and trainers will review the work completed during the course, discuss the course content, and reflect on the main learning outcomes and experiences from the practical modelling activities.