



Two-Day Capsule Course on
Water Resources Development
and Management

29-30 January 2025



NATIONAL INSTITUTE OF TRAINING FOR STANDARDIZATION

BUREAU OF INDIAN STANDARDS

Ministry of Consumer Affairs, Food & Public Distribution
Government of India

Water resources development and management are crucial for sustainable growth, ensuring a reliable supply of water for domestic, agricultural, and industrial purposes. Efficient management supports agricultural productivity by facilitating irrigation, especially in arid regions, enhancing crop yields and ensuring food security. Additionally, well-managed water resources underpin economic development by providing essential inputs for industries, generating hydroelectric power, and supporting recreational activities and tourism. Effective water management also plays a crucial role in mitigating the impacts of climate change, such as droughts and floods, by implementing measures like rainwater harvesting, reservoir construction, and improved water distribution systems.

River valley projects and groundwater conservation are integral components of comprehensive water management strategies. River valley projects, including dams and reservoirs, help in flood control, hydroelectric power generation, and irrigation, transforming regional economies by providing water for drinking, agriculture, and industry. However, designing safe and stable river valley projects is essential to prevent catastrophic failures and ensure their long-term viability. This requires rigorous planning, geological surveys, and the application of advanced engineering principles. Understanding the behaviour of these structures through instrumentation is critical; it involves the use of sensors and monitoring systems to track parameters like water pressure, structural stress, and seismic activity. This data helps in the early detection of potential issues, allowing for timely maintenance and mitigation measures.

Groundwater conservation is equally critical, as it maintains the natural balance of water resources and ensures the sustainability of the water supply during dry periods. Techniques like artificial recharge, regulated extraction, and pollution control are essential for preserving groundwater. Together, these efforts contribute to long-term water security, environmental sustainability, and socio-economic stability, ensuring that water resources are available for future generations. By integrating the development and management of surface and groundwater resources and leveraging modern technology for monitoring and maintenance, we can achieve a more resilient and sustainable water management system that meets current needs and anticipates future challenges. A series of Indian Standards have been formulated by the Water Resources Department of the Bureau of Indian Standards (BIS) in the field of water resources development and management including their monitoring and maintenance.

Further, efficient design, construction, and maintenance of farm drainage and micro-irrigation systems are vital for sustainable agriculture. Proper drainage prevents waterlogging, improves soil conditions, and enhances crop yields. Micro-irrigation, such as drip and sprinkler systems, ensures precise water delivery, reducing waste and conserving water. These systems improve crop quality and quantity, boosting farmers' financial returns. Regular maintenance ensures system longevity and performance, preventing costly repairs. Overall, well-maintained drainage and irrigation systems maximize productivity, promote sustainable water use, and support farmers' livelihoods.

The Capsule Course on Water Resources Development & Management gives an insight into all of the above-mentioned aspects covered in various Indian Standards published by Bureau of Indian Standards including the following:

IS 4410 (Part 11/Sec 1 to 7)	Glossary of Terms Relating to River Valley Projects: Part 11 Hydrology
IS 5477 (Parts 1 to 3)	Fixing the Capacities of Reservoirs – Methods
IS 5497: 2008	Guide to Topographical Surveys for River Valley Projects

<i>IS 6512: 2019</i>	<i>Criteria for Design of Solid Gravity Dams</i>
<i>IS 6934: 2024</i>	<i>Hydraulic Design of Ogee Overflow and Orifice Spillways — Recommendations</i>
<i>IS 7436 (Parts 1 and 2)</i>	<i>Guide for Types of Measurements for Structures in River Valley Projects and Criteria for Choice and Location of Measuring Instruments</i>
<i>IS 7894: 1975</i>	<i>Code of practice for Stability Analysis of Earth Dams</i>
<i>IS 8226: 2017</i>	<i>Installation and Observation of Base Plate Apparatus for Measurement of Foundation Settlement in Embankments — Code of Practice</i>
<i>IS 8826: 1978</i>	<i>Guidelines for Design of Large Earth and Rockfill Dams</i>
<i>IS 10137: 2015</i>	<i>Guidelines for Selection of Spillways and Energy Dissipators</i>
<i>IS 11155: 2019</i>	<i>Construction of Spillways and Similar Overflow Structures — Code of Practice</i>
<i>IS 13073 (Parts 1 and 2)</i>	<i>Installation, Maintenance and Observation of Displacement Measuring Devices in Concrete and Masonry Dams — Code of Practice</i>
<i>IS 13232: 1992</i>	<i>Installation, Maintenance and Observation of Electrical Strain Measuring Devices in Concrete Dams — Code of Practice</i>
<i>IS 13578: 2008</i>	<i>Subsurface Exploration for Barrages and Weirs — Code of Practice</i>
<i>IS 14278: 1995</i>	<i>Stress Measuring Devices in Concrete and masonry Dams — Installation, Commissioning and Observations — Code of Practice</i>
<i>IS 14330: 1996</i>	<i>Ground Water Investigation for Hydraulic Structures — Guidelines</i>
<i>IS 14476 (Part 1 to 9)</i>	<i>Test Pumping of Water Wells — Code of Practice</i>
<i>IS 14591: 1999</i>	<i>Temperature Control of Mass Concrete for Dams — Guidelines</i>
<i>IS 14690: 1999</i>	<i>Quality Control During Construction of Earth and Rockfill Dams — Recommendations</i>
<i>IS 15662: 2006</i>	<i>Geological Exploration for Gravity Dams and overflow Structures — Code of Practice</i>
<i>IS 15681: 2006</i>	<i>Geological Exploration by Geophysical Method (Seismic Refraction) — Code of Practice</i>
<i>IS 15736: 2007</i>	<i>Geological Exploration by Geophysical Method (Electrical Resistivity) — Code of Practice</i>
<i>IS 15792: 2008</i>	<i>Artificial Recharge to Ground Water — Guidelines</i>
<i>IS 15797: 2008</i>	<i>Roof Top Rainwater Harvesting — Guidelines</i>
<i>IS 15897: 2011</i>	<i>Surface Geophysical Surveys for Hydro Geological Studies</i>
<i>IS 10317:2024</i>	<i>Evaluation of Soil Properties Relevant to Irrigation - Guide</i>
<i>IS 10799:1999</i>	<i>Irrigation Equipment - Design Installation and Field Evaluation of Micro Irrigation Systems - Code of Practice</i>
<i>IS 9696:1990</i>	<i>Code of Practice for Installation of Farm Drainage Tile or Pipe System</i>
<i>IS 11493:1986</i>	<i>Code for Construction and Maintenance of Surface Farm Drainage Systems</i>
<i>IS 11494:1986</i>	<i>Code for Construction and Maintenance of Surface Farm Drainage Systems</i>

Learning Objectives

- Making participants skilled enough to be achieving proficiency in the various aspects of Water Resources Development and Management, Dams, Reservoirs and Appurtenant structures, Ground Water and Related Structures, Instrumentation in the Water Resources Projects, Geological Investigations in Water Resources Projects, and other aspects of irrigation works covered by Food and Agriculture Department of BIS.

Who should attend?

- Engineers of Minor Irrigation Works Departments of States, Engineers from National Highways, Railways, Water Resources Departments of States, Central Water Commission, Central Ground Water Board, Central Board for Irrigation and Power, NHPC, Organizations and Agencies managing River Valley Projects and Farm Drainage and Irrigation Systems, etc.

Course Schedule & Duration

- The Workshop is of 2 days duration scheduled on **29-30 January, 2025 at NITS, Noida.**

Fees

- Rs. 1,500/- plus applicable GST (for two-day course).
* No training fees for Government officials (Central/States/UTs) officially nominated by the Head of their Department/Organization.

How to Apply?

- Application has to be made through BIS Training Portal through the following link www.manakonline.in or by emailing filled-up application form to nits@bis.gov.in. (please see the details given after the Training Module).

Criteria for Selection and Batch Size

- Batch size – 40
- Selection on First come First serve basis

Certification

- Certificate of participation on completion of the course.

Venue

- The course will be run by NITS, Noida at its campus at:
**National Institute of Training for Standardization
A-20&21, Institutional Area
Sector 62, Noida
Pin 201301
(Uttar Pradesh)**
- Hostel facilities at NITS, Noida can be availed on payment basis.

Training Module

MODULE FOR CAPSULE COURSE ON WATER RESOURCES DEVELOPMENT AND MANAGEMENT

29-30 January 2025

Day 1 – 29 January 2025 (Wednesday)

Time	Topic
10:00 h - 11:30 h	Standardization in Water Resources Sector <ul style="list-style-type: none">• Need for Standardization• Scope of Water Resources Department of BIS• Existing standards and work in hand• SNAP• New initiatives for stakeholders•
11:30 h - 11:45 h	Tea Break
11:45 h - 13:15 h	Design of Dams and Appurtenant Structures <ul style="list-style-type: none">• Important terminologies• Design of solid gravity dams and large earth and rockfill dams (IS 6512, IS 8826, IS 12169)• Stability Analysis of Earth Dams (IS 7894)• Criteria for design of silting basin; chute and side channels, spillway, energy dissipators, etc.• Freeboard requirements in dams
13:15 h - 14:15 h	Lunch Break
14:15 h - 15:45 h	Operation and Maintenance of Dams and Appurtenant Structures <ul style="list-style-type: none">• Quality control during construction of dams• Inspection and maintenance of dams• Construction of masonry dams, mass concreting• Remedial measures in earth and rockfill dams• Provisions for facilities outside dams• Ventilation and drainage system for dams
15:45 h - 16:00 h	Tea Break
16:00 h - 17:30 h	Sedimentation Control in Lakes and Reservoirs <ul style="list-style-type: none">• Important terminologies• Methods for fixing capacity of reservoirs• Methods for assessment and control of sediments• Evaporation control and measures• Operation of reservoirs

MODULE FOR CAPSULE COURSE ON WATER RESOURCES DEVELOPMENT AND MANAGEMENT

29-30 January 2025

Day 2 – 30 January 2025 (Thursday)

Time	Topic
10:00 h - 11:15 h	Instrumentation in Hydraulic Structures <ul style="list-style-type: none"> • Types of instrumentation required in water resources • Choice and location of measuring instruments • Installation, observation and maintenance of temperature • Installation, observation and maintenance of uplift and pore pressure • Installation, observation and maintenance of displacement (stress and strain) • Choice and location of measuring instruments
11:15 h - 11:30 h	Tea Break
11:30 h - 12:45 h	Canals and Cross-Drainage Works <ul style="list-style-type: none"> • Terminologies • Design of canals and cross-regulators • Operation and maintenance of canals • Types of lining in canals and their selection
12:45 h - 13:30 h	Lunch Break
13:30 h - 14:45 h	Geological Investigations <ul style="list-style-type: none"> • Terminologies in geology • Sub-surface explorations for hydraulic structures • Core drilling- Methods, observations and storage • Geological and geophysical explorations guidelines • Geological maps; symbols and role of GIS and remote sensing
14:45 h - 15:00 h	Tea Break
15:00 h - 16:15 h	Groundwater and related Investigations and Recharging of Groundwater <ul style="list-style-type: none"> • Terminologies • Hydrometry related to groundwater measurements • Rain water harvesting • Artificial recharge to groundwater
16:15 h - 17:30 h	Micro-Irrigation Works <ul style="list-style-type: none"> • Evaluation of soil properties relevant to irrigation • Design, Construction and maintenance of farm drainage system • Design, installation and field evaluation of micro irrigation • Irrigation equipment and systems



National Institute of Training for Standardization (NITS)
Bureau of Indian Standards

CAPSULE COURSE ON NBC 2016 –
WATER RESOURCES DEVELOPMENT AND MANAGEMENT
29 – 30 January 2025 AT NITS, NOIDA

PROCEDURE

The Application has to be made through BIS "Training Portal" as explained below

VISIT the **E-BIS Website:** www.manakonline.in

CLICK on the "**Training**" Head

LOGIN by clicking on the blue "**LOGIN**" button on the top right corner

SIGNUP by clicking on "**SIGNUP**" on the Member Login Page if you are not a member otherwise "**SIGN IN**" using your credentials

FILL OUT all the fields and click on "**REGISTER**" and complete the registration process.

CHOOSE the course you want to apply for, fill in the required information and "**PAY**" the requisite fee.

For any further queries, you may contact:

Smt. Madhurima Madhav
Scientist-E/Director (NITS)

madhurima@bis.gov.in

Mobile: 9560886417

Shri Rishabh Sharma
Course Coordinator

nits@bis.gov.in

Mobile. 8196040400



राष्ट्रीय मानकीकरण प्रशिक्षण संस्थान, नोएडा
NATIONAL INSTITUTE OF TRAINING FOR STANDARDIZATION, NOIDA
भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS

Nomination Form

Name of the Programme			
Date of the Programme			Venue:
Sponsoring Organization (OR In Individual Capacity) with complete Address			
Telephone /Mobile Number			
Organization/Firm GST No.			
Email ID			

Participants Details

Sl. No.	Name (IN CAPITAL LETTERS)	Designation	Contact No.	Email
1.				
2.				
3.				
4.				
5.				

Will you stay in Hostel?		If Yes, Please mention the date and time					
Yes	No	Arrival	Date	Time	Departure	Date	Time

Details of Payment (in Rupees)

Training Fees *	Hostel Charges *	GST **	Discount, if any	Total amount

Mode of Payment

Name of Bank	UTR No. & Date of transaction # (for NEFT/Net banking/ IMPS/UPI payment)	Amount (in Rs.)

* For Training/hostel fees, see NITS Training Calendar at BIS website www.bis.gov.in. (Stay in hostel is charged on Night stay basis).

For payments by NEFT, Payment should be made to Bureau of Indian Standards, Savings A/c No. 712210100000650, Bank of India, Sec-62 Noida, Branch Code 7122, IFSC Code BKID0007122.

NITS GST No. 09AAATB0431G2Z8, SAC Code: 999294 Applicable GST@ 18% on Training fee and Hostel fee.

Date: _____

Signature and Seal _____

The nomination form should preferably be scanned and e-mailed to nits@bis.gov.in, hnits@bis.gov.in, and reach NITS at least one week before the programme date. For sending hard copy may be addressed to:

Head, National Institute of Training for Standardization (NITS), Bureau of Indian Standards,

A - 20 & 21, Institutional Area, Sector - 62, NOIDA - 201309, U.P.

Phones: 0120 - 4670227, 4670232, Email: nits@bis.gov.in, hnits@bis.gov.in, Website: <http://www.bis.gov.in>

Important:

1. Participants are requested to get the confirmation from NITS, whether, nomination has been accepted or not before attending the programme.

2. Rules for Refund of Training & Hostel Fees:

- A refund of full fees shall be made when cancellation/withdrawal of nomination is made at least 15 days in advance of the date of the training.
- Cancellation/withdrawal of nomination is made less than 15 days in advance of the date of the training programme or is not informed, a cancellation charge of 25% of the training fees would be levied. The balance amount after deducting the cancellation charges would be returned.
- Hostel fees if any, paid in advance shall be returned in full.



Reach Us

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 Sector 62, NOIDA 201309, UP
 Phone: +91 120 4670227 / 232
 Email: nits@bis.gov.in, hnits@bis.gov.in



bis.gov.in

