



TWO- DAY CAPSULE COURSE

on

WATER RESOURCES DEVELOPMENT AND MANAGEMENT

**16th & 17th October, 2025
At NITS, BIS**



**BUREAU OF INDIAN STANDARDS
National Institute of Training for Standardization (NITS),
A 20 &21, Institutional Area, Sector 62, NOIDA - 201309**

1. What is Water Resources Development and Management?

It refers to the planning, development, utilization, and conservation of water resources (both surface and groundwater) to ensure sustainable and equitable supply for domestic, agricultural, industrial, and ecological needs.

It integrates infrastructure, technology, and policies for effective storage, distribution, and monitoring of water.

2. Why is it Important in Today's Context?

- ✓ Ensures reliable water supply for domestic, agricultural, and industrial use.
- ✓ Supports agriculture, particularly in arid regions, through irrigation that improves crop yields and food security.
- ✓ Drives economic growth by supporting industries, generating hydroelectric power, and enabling tourism and recreation.
- ✓ Mitigates climate change impacts by reducing risks from droughts and floods through measures like reservoirs, rainwater harvesting, and efficient distribution.
- ✓ Strengthens sustainability by conserving water resources for future generations.

3. Few Examples of Water Resources Development and Management

a) River Valley Projects (Dams & Reservoirs)

- ✓ Provide irrigation water, drinking water supply, and hydroelectric power.
- ✓ Help in flood control and regional economic transformation.
- ✓ Require safe design, geological surveys, and advanced engineering for long-term viability.
- ✓ Instrumentation (sensors, monitoring systems) helps track parameters like water pressure, stress, and seismic activity to prevent failures.

b) Groundwater Conservation

- ✓ Maintains balance of water supply during dry periods.
- ✓ Techniques include artificial recharge, regulated extraction, and pollution control.
- ✓ Ensures long-term water security and environmental sustainability.

c) Farm Drainage Systems

- ✓ Prevent waterlogging and improve soil health.
- ✓ Enhance agricultural productivity and crop yields.
- ✓ Reduce risks of crop damage and improve land usability.

d) Micro-Irrigation Systems (Drip & Sprinkler)

- ✓ Deliver water precisely to crops, reducing wastage.
- ✓ Conserve water and improve both quality and quantity of crops.
- ✓ Boost farmers' income by improving efficiency and reducing costs.

e) **Monitoring and Maintenance through Technology**

- ✓ Use of sensors, instrumentation, and data systems for early detection of risks.
- ✓ Enables timely maintenance of dams, reservoirs, and irrigation systems.
- ✓ Ensures resilience against climate variability.

4. **Important Indian Standards on Water Resources Development and Management:**

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

IS 9696:1990
IS 11493:1986
IS 11494:1986

Code of Practice for Installation of Farm Drainage Tile or Pipe System
Code for Construction and Maintenance of Surface Farm Drainage
Systems
Code for Construction and Maintenance of Surface Farm Drainage
Systems

COURSE OVERVIEW:

✚ Course Title:

Two-Day Capsule Course on Water Resources Development and Management

✚ Objective:

This course equips participants with the necessary knowledge and 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, 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., and any interested professional

✚ Course Duration:

2 Days | **Mode:** Offline

✚ Fees:

- The course fee is **Rs.1500 /- + 18% GST** per participant.
- Participants have to arrange transport and accommodation on their own.
- Accommodation and transportation charges have to be borne by the participants.
- No training fee for Government Officials (Central/States/UTs) officially nominated by their department heads.

✚ Venue:

- The course will be held at the training centre of BIS, **National Institute of Training for Standardization (NITS), situated at Noida.**
- **Address:** National Institute of Training for Standardization (NITS), A 20 &21, Institutional Area, Sector 62, NOIDA – 201309

✚ Certification:

- Certificate will be awarded to all participants on completion of course.

COURSE MODULE:

Day 1 :

Time	Topic/Activity
10:00 – 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 – 11:45 h	TEA BREAK
11:45 – 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 – 14:15 h	LUNCH BREAK
14:15 – 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 – 16:00 h	TEA BREAK
16:00 – 17:00 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

Day 2 :

Time	Topic/Activity
10:00 – 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 – 11:30 h	TEA BREAK
11:30 – 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 – 13:30 h	LUNCH BREAK
13:30 – 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 – 15:00 h	TEA BREAK
15:00 – 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 – 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

HOW TO APPLY?

<ul style="list-style-type: none">● VISIT the e-BIS Website: www.manakonline.in
<ul style="list-style-type: none">● CLICK on the "Training" Head
<ul style="list-style-type: none">● LOGIN by clicking on the blue "LOGIN" button on the top right corner
<ul style="list-style-type: none">● SIGNUP by clicking on "SIGNUP" on the Member Login Page if you are not a member otherwise "SIGN IN" using your credentials
<ul style="list-style-type: none">● FILL OUT all the fields and click on "REGISTER" and complete the registration process
<ul style="list-style-type: none">● CHOOSE the course you want to apply for, fill in the required information and "PAY" the requisite fee

In case you are unable to submit your nomination on the BIS Training Portal, the same may be done by emailing filled up nomination form to nits@bis.gov.in. In that case, payment of the requisite fee may be made via NEFT/UPI to the Bureau of Indian Standards Bank Account, details of which are mentioned in the nomination form.

Contact:

For any further queries, you may contact:

Ms. Ankita Neogi Bag
Scientist- C/Dy. Director and Course Coordinator,
Mobile – 8777529355
Email: nits@bis.gov.in

राष्ट्रीय मानकीकरण प्रशिक्षण संस्थान
National Institute of Training for Standardization



Reach Us

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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, hmits@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, hmits@bis.gov.in, Website: <http://www.bis.gov.in>

Important:

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