

## Finalized Comprehensive Training Calendar of NEHARI for FY 2024-25, Jointly Prepared by NWA, NIH, CWPRS, CSMRS, CGWB, NESAC & NEHARI for North Eastern Region of India

Period	Training Topic	Course Coordinators	Venue
25 – 29 June, 2024	Tools and Techniques for Springshed Management	NIH, CGWB & NEHARI	NEHARI
23-27 July, 2024	Hydraulic model study for river engineering works	CWPRS & NEHARI	NEHARI
20-24 August, 2024	Use of Geospatial Technologies in flood management and erosion control	NIH & NEHARI	NEHARI
24-28 September, 2024	Source Sustainability for Jal Jeevan Mission Schemes	NIH & NEHARI	NEHARI
22-26 October, 2024	Procurement through e-GeM, e-tendering and Procurement challenges	NWA & NEHARI	NEHARI
19-23 November, 2024	DPR Preparation for Flood Protection, Anti-Erosion & River Training Works	NWA-CWC & NEHARI	NEHARI
17-21 December, 2024	Soil investigation for river engineering works	CSMRS & NEHARI	NEHARI
21-25 January, 2025	Dam Safety aspects	NWA & NEHARI	NEHARI
18-22 February, 2025	Project Management - Project Supervision and Quality Control	NWA & NEHARI	NEHARI

## 1. Module for Training on “Tools and Techniques for Springshed Management”.

<b>S.No</b>	<b>MODULE</b>
1	Overview of Springs: Importance, Problems, Genesis, Type and methodology for development
2	Classification of Springs and its Recharge Methods.
3	Hydrogeology with special reference to Springs in NE States –State by States
4	Field instrumentation and water sampling for spring related investigation
5	Spring Vulnerability mapping
6	Spring data collection methodology & processing
7	Electronic data collection techniques using open source mobile application
8	Hands-on exercise on mobile app for creating spring inventory
9	Water Chemistry and Geo-chemical Analysis of spring water
10	Demonstration of Geotagging of springs, sample collection and in-situ analysis of spring water
11	Scientific techniques for Springshed mapping
12	Estimation of spring aquifer recharge & dynamic storage of springs
13	Introduction to GIS concepts
14	Digital data creation, handling, and processing using open source GIS software
15	Treatment measures for springshed management
16	Hydrological analysis of spring flow for sustainable management
17	Application of environmental isotopes in groundwater hydrology of springs

## 2. Module for Training on “Hydraulic Model Study for River Engineering Works”

S.No	MODULE
1	Hydraulic modeling for River Engineering
2	River behavior in response to development and encroachments
3	Processing and analysis of hydro meteorological data
4	Use of Hydro meteorological approach in flood estimation
5	Flood estimation using synthetic unit hydrograph method
6	Guidelines for preparing river morphological reports (based on CWC March 2009 report)
7	Hydraulic model studies for barrages
8	Overview on river training works
9	River bank protection works and River training structures
10	Bridges-Role of importance of hydraulic model studies
11	Location and hydraulic design of intakes
12	Application of geo-synthetics in flood protection measures
13	Application of geotechnical engineering for design of riverine structures
14	Geotechnical investigations for design of protection measures
15	Introduction to Numerical modeling
16	Hydraulics of bridges and application of HECRAS in bridge modelling
17	Inline and lateral structures in HEC-RAS
18	Demo of 1D Numerical Model
19	River Gauging
20	Measurement of sediment in River
21	Introduction to Unsteady modeling-theory
22	Developing an Unsteady modeling HEC- RAS
23	1D modeling for Dam break analysis in HEC-RAS
24	Demo of 1D Dam break
25	Introduction to Remote Sensing and GIS
26	Application of SAR images in flood mapping
27	Introduction to sediment modeling

28	Developing 1D sediment modeling in HEC-RAS
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### 3. Module for Training on “Use of Geospatial Technologies and its role in Flood Management and Erosion Control.

S.N o	MODULE
1	Introduction to Geospatial Technologies and its role in Flood Management
2	Introduction to QGIS and DEM processing for hydrological analysis
3	Spatial data availability including free data of remote sensing satellite
4	Catchment delineation using DEM
5	GIS for estimation of physiography parameters for SUH
6	LULC mapping using remote sensing
7	Flood Inundation mapping using RS & GIS
8	Integration of space technology with ground-based data for flood analysis and response planning
9	Basics of Drone surveying and applications
10	Capturing drone images and sensor data. Processing data using photogrammetry software.
11	Creating topographic maps and volume calculations of drone survey
12	Hands-on exercises for simulated surveys and data analysis.
13	Remote Sensing and Hydro dynamic modelling for flood plain zoning
14	Case studies and real-world examples of the application of HEC-HMS, HEC-RAS and space technology for flood management
15	Future trends and innovations in space technology for flood management and disaster response
16	Erosion Control methods
17	Google Earth Engine
18	Flood forecasting and inundation modelling

#### 4. Module for Training on “Source Sustainability for Jal Jeevan Mission Schemes”

S.No	MODULE
1	Overview of hydrological processes involved in various sources [springs / small streams (Gadheras/Khads etc.) / large streams / rivers or the groundwater]
2	Delineation of source catchment, its drainage pattern and morphometry
3	Delineation of springshed
4	Water budgeting of the source
5	Quantification of various components of hydrological cycle
6	Quantification of water availability varying in time and space
7	Quantification of drinking water demands for the planned scheme
8	Quantification of other water demands
9	Water quality assessment of the source
10	Feasibility assessment of source augmentation / diversion from other nearby alternate sources
11	Development of Land and Water Management Plan for source sustainability
12	Development of Springshed Development for source sustainability
13	Aquifer recharge
14	Rrain water harvesting
15	Increased storage capacity of water bodies, reservoirs, de-silting, etc.
16	Potential of water generated from wastewater recycling / reuse
17	Development of Water Quality Management Plan for the source water

## 5. Module for Training on “Procurement through e-GeM, e-Tendering and Procurement Challenges”.

Sr No.	Module
1.	Technical sanction, Administrative Approval and Expenditure Sanction, Delegation of Financial (work) Powers to Officers of Brahmaputra Board, Contingent Powers.
2.	Procurement procedure for Goods, Works, and Services in Brahmaputra Board
3.	Rules at Glance for e-procurement through e-GeM and CPPP, Live Demonstration of broad features of GeM, Procurement of goods through Direct Purchase/BID/RA
4.	Procurement of services through e-GeM, Custom Bid
5.	Hands on exercise on Procurement of goods through Direct purchase, L1 Purchase
6.	Hands on Exercise on Procurement through BID/RA, BOQ Bidding, Procurement of Services
7.	Technical & financial Evaluation, contract generation
8.	Generation of availability Report & Past Transaction Summary (GeMAR&PTS) for procurement outside GeM
9.	Processing bills, blocking funds, unblocking funds, Integration of PFMS for payment
10.	Procurement challenges through e-GeM and their resolution through case studies
11.	Provisions of CPWD works manual in the context of procurement in Brahmaputra Board
12.	Provisions of GFR-2017 for the procurement of goods, services and works.
13.	e-Tendering through CPPP, DSC set up, organization set up, creation of BOQ, creation & publishing of tender
14.	Hands on exercise on creation of BoQ
15.	Technical Evaluation and Financial Evaluation of tenders

## 6. Module for Training on “DPR Preparation for Flood Protection, Anti Erosion and River Training Works”.

Sr No.	Module
1	Introduction to Flood Protection, Anti Erosion and River Training Works
2	Legal Aspects of Flood Protection Works
3	Overview of guidelines for the preparation of DPRs for Flood protection and management works.
4	Case Studies on Flood Management Schemes
5	Survey, Investigation, Topographical and Allied Surveys for feasibility study and DPR,
6	Introduction to latest technologies; Post Processing of Topographical Survey data by latest techniques including survey equipment and instruments and technologies
7	Non-Structural Measures for Flood Management
8	Flood forecasting aspects
9	Design of Flood Embankment, Design of bank revetment, Design of Spurs / Groynes
10	Design of RCC, Porcupines-Screens / Spurs / Dampeners - Design of Drainage Improvement Works
11	Cost Estimate of Flood Management Works
12	Unit Rate Analysis for Flood Management Works
13	Design of embankments and critical aspects
14	Planning and design of canals, canal alignment, & canal structures
15	Hydrological, hydraulic and sediment transport modelling for planning and design of river works for flood and erosion risk management
16	HEC-RAS hands-on session
17	Introduction to GIS
18	Working with Vector and RASTER Data DEM – hands-on sessions
19	Contour map generation and catchment delineation – hands-on sessions

**7. Module for Training on “Soil Investigation for river Engineering Works”**

<b>S.No</b>	<b>MODULE</b>
1	Overview and importance of soil investigation in river engineering works
2	Soil properties & classification and their significance in river engineering works
3	Demonstration of sample collection and in-situ analysis of river soil
4	Importance of proctor compaction test in river engineering works
5	Hands-on exercise on proctor compaction test
6	Importance of shear test in river engineering works
7	Hands-on exercise on triaxial test
8	Hands-on exercise on direct shear test
9	Discussion on analysing and interpretation of test results, preparation of reports.



## 8. Module for Training on “Dam Safety Aspects”

Serial No	MODULE
1.	An Overview of Dam Safety Management – Overview, need of Dam Safety Act, Dam Safety Act, 2021 provisions. Duties of SDSO and Dam owners.
2.	Best practices in Dam Safety Management: A risk management approach to Dam Safety , Overview of Risk Analysis, Risk Assessment and Risk Control, Hazard Classification
3.	Causes of dam failures and incidents; Dam inspections- Inspection types, what to look for, Inspection format
4.	Introduction to DRIP Scheme and similarities between the activities being undertaken in DRIP & provisions of DSA,2021
5.	An overview of Emergency Action Plan
6.	Design Flood Review of existing dams and various rehabilitation measures for hydrological safety
7.	Inflow Forecasting of Reservoirs
8.	Operational aspects of Reservoirs- Rule Curve, Gate Operation etc
9.	Structural Health Monitoring through Instrumentation of Dams (Hydrometeorological, Geotechnical, Geodetic and Seismic Instruments): Need, Types, installation testing and commissioning, Data Acquisition and Dissemination, result interpretation and analysis etc.
10.	O&M manual related aspects
11.	Investigation for seepage issues: Geophysical Investigation methods, applications, limitations, Result interpretation etc.
12.	Geotechnical issues and stability analysis in Earthen, Concrete and Masonry Dams along with remedial measures
13.	Under water inspection through state of art ROVs: Equipment, methods, reports, advantages and Limitations etc.
14.	Geophysical Investigations including case study
15.	Gates related inspection, maintenance, strengthening & restoration  Gates design related aspects, Case studies etc.
16.	Road map & way ahead in Dam Safety
17.	Grout Mix design for earthen dams
18.	Properties of material and their testing, New materials for dam safety Grouting , Epoxy Geosynthetics, High strength concrete material for underwater works etc
19.	Reservoir Sedimentation: Bathymetry Survey (Remote Sensing and Hydrographic) with a Case Study; Reservoir Sedimentation Studies under DRIP: Methods, Codal provisions and Case Studies
20.	Geotechnical issues- A Case Study , Past Rehabilitation, Problems, Investigation, Current Status and Way Forward.
21.	Seismic Safety Evaluation of existing Dams
22.	Karam dam – A case study

**9. Project Management - Project Supervision and Quality Control.**

<b>Serial No.</b>	<b>Module</b>
1.	Introduction to project planning and scheduling techniques
2.	Overview of Total Quality Management principles and practices
3.	Construction planning methodologies for underground works, concrete dams, and earth & rockfill dams
4.	Case studies highlighting construction planning, equipment, and methods
5.	Utilization of PRIMAVERA & MS PROJECT for project management
6.	Practical session on computerized project management
7.	Site visit to nearby construction project for real-time observation and learning
8.	Importance of safety in construction management
9.	Implementation of safety measures in project supervision
10.	Hands-on session on computerized project management using PRIMAVERA & MS PROJECT
11.	Rollar Compact Concrete Technology for dam construction and Control Blast techniques
12.	Latest techniques in underground excavation