

# Professional Certificate Course

(e-learning mode)

on

## Water Resources Planning and Management



### Centre for Continuing Education CEPT UNIVERSITY

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### COURSE OBJECTIVES

Though the overall fresh water availability at the macro level has remained the same, many regions, particularly in the developing world, today experience large imbalances between the demand and supply of water supply.

The growing population, the preference for water intensive agriculture and rapid urbanization & industrialization are putting enormous pressure on the freshwater resources, resulting into serious threat to ecosystem management, social sustainability and economic growth.

The emerging need for efficient water resources planning and management, has been expressed in several world fora in recent times. This course has been therefore designed to cover the methods, theories, and applications to current administrative, economic, engineering, planning, and social issues as they apply to water resources planning and management.

### WHO MAY BENEFIT

The course will be helpful to professionals working in public or private sector, environmental and water resources consultants, Self employed practitioners, NGO workers involved in water and environment sector, Government Employees, Academicians, Journalists, Lawyer, and Social Scientists.

### ELIGIBILITY

- Graduation in any discipline with minimum 50% marks
- Diploma (50% marks) and work experience (minimum 1year)
- Professional student appearing for final year examination.

### COURSE FEE

- For Professionals Rs. 15,000/- for the entire course
- For Students Rs. 10,000/- for the entire course

### ADMISSION

This e-course is offered twice every year (April & November). For details contact course director. Details of admission and application form can be downloaded from the website [www.cept.ac.in](http://www.cept.ac.in)

### COURSE DURATION & DELIVERY

This course is delivered based on concept of "any time any where", through the web based e- learning portal. The course consists of self-paced modules, readings, case studies, and assignments. The registered students have the freedom of studying at their convenient time with the free access to E-learning portal of the University. **Total duration of the course is 6 months.**

### CONTACT DETAILS

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### COURSE STRUCTURE

| Module    | Topics   |
|-----------|--|
| Module 1  | Challenges & Opportunities in Water Sector                             |
| Module 2  | Water & Environment : Legal & Institutional Aspects                    |
| Module 3  | Introduction to Water Resources Systems                                |
|           | Assignment-I   |
| Module 4  | Water Resources Planning & Decision Making                             |
| Module 5  | Watershed Management and Public Participation                          |
| Module 6  | Water Harvesting: Theory and Practice                                  |
|           | Assignment-II  |
| Module 7  | Ground Water Management & Artificial Recharge                          |
| Module 8  | Urban Flood Management   |
| Module 9  | Water Budgeting  |
| Module 10 | Waste water Treatment, Recycle and Reuse                               |
|           | Assignment-III   |
| Module 11 | Environmental and Social Impact Assessment of water resources projects |
| Module 12 | Sources of Funding and Project Proposal Writing                        |
|           | Individual Final Assignment  |

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### Detailed Course Outline

|          | Module   | Class    | Topic  |
|----------|--|----------|--|
| Module 1 | <b>Challenges and Opportunities in Water Sector</b>            | Class 1  | General overview of water sector   |
|          |  | Class 2  | Demand Vs. Availability  |
|          |  | Class 3  | Water Allocation; Sectoral Competition ; Water Conflict  |
|          |  | Class 4  | Climate Change and Water Resources   |
|          |  | Class 5  | Other emerging debates & Case Studies  |
| Module 2 | <b>Water and Environment : Legal and Institutional Aspects</b> | Class 6  | National water policy; State Water Policies  |
|          |  | Class 7  | Environment Protection Act; Water Act; Ground Water bill; Environmental standards  |
|          |  | Class 8  | National Lake Conservation Efforts: National River Action Plans  |
|          |  | Class 9  | Systems of (trans-boundary) water allocation and (customary) water rights; trans-boundary water quality management   |
|          |  | Class 10 | Institutional Structure for WRPM in India (National Level, State Level, Local) ; Non-Government Organizations and their role   |
| Module 3 | <b>Introduction to Water Resources System</b>                  | Class 11 | Introduction to Hydrology; Principles of hydrology of surface and groundwater; Hydrological cycle  |
|          |  | Class 12 | Precipitation: Types of precipitation; geographical distribution; time distribution; variability; measurement; average depth over area; depth area duration  |
|          |  | Class 13 | Evaporation and Transpiration: Factor affecting; measurement; evaporation in reservoirs; methods of prevention<br>Infiltration: Introduction; factor affecting; measurement                                      |
|          |  | Class 14 | Runoff : Runoff process; relation of storm period and rainfall; factors affecting runoff; methods of computation; gauging runoff of stream; stage discharge; relationships interpretation of stream flow records |
|          |  | Class 15 | Groundwater Hydrology: Occurrence and movement of groundwater; surface and subsurface; investigation of groundwater; flow through saturated porous medium  |

|          | Module   | Class    | Topic   |
|----------|--|----------|---|
| Module 4 | <b>Water Resources Planning &amp; Decision Making</b>    | Class 16 | Framework for Analysis (FFA): Principles of processes of water resources planning at national and river basin level; Water sector analysis; Situation and function analysis; Planning objectives and criteria |
|          |  | Class 17 | Plan formulation, evaluation, and implementation; Stakeholder involvement in planning processes; Analytical tools; Case studies   |
|          |  | Class 18 | Multi-criteria Analysis (MCA): Preference elicitation, ranking of water-related projects, multi-actor decision-making.  |
|          |  | Class 19 | Cost-benefit Analysis (CBA): Water project economics.   |
|          |  | Class 20 | Case Studies of Dam Project, Irrigation Projects, Water Supply Projects   |
| Module 5 | <b>Watershed Management and Public Participation</b>     | Class 21 | Introduction to Watershed; Characteristics of Watersheds-Size; Elevation & Slope, Aspect & Orientation, Watershed shape   |
|          |  | Class 22 | Drainage Network; Watershed Equilibrium, Watershed improvement  |
|          |  | Class 23 | Method for reducing flood peaks; Soil conservation; Afforestation; Channel improvement; Detention basins  |
|          |  | Class 24 | Participatory Water Resources Planning  |
|          |  | Class 25 | Case Studies  |
| Module 6 | <b>Water Harvesting: Theory and Practices</b>            | Class 26 | Introduction to Rain Water Harvesting; Historical Overview  |
|          |  | Class 27 | Present Practices in Rain Water Harvesting  |
|          |  | Class 28 | Water Harvesting Structures; Planning, Design and Construction of harvesting structures; Case Studies   |
|          |  | Class 29 | Agro-climatic Zone wise Harvesting Techniques; Case Studies   |
|          |  | Class 30 | Due Harvesting Techniques   |
| Module 7 | <b>Ground Water Management &amp; Artificial Recharge</b> | Class 31 | Availability of ground water; types of aquifers; ground water investigation methods; aquifer parameters and their determination; development of ground water  |
|          |  | Class 32 | Well hydraulics; types of wells; multiple well system; well design criteria; construction and maintenance   |
|          |  | Class 33 | Groundwater basin management and conjunctive use; artificial recharge of aquifers; methods of artificial recharge   |
|          |  | Class 34 | Sea Water intrusion in coastal aquifers; methods of its prevention and control; Groundwater pollution remediation and legislation   |
|          |  | Class 35 | Case Studies  |

|           | Module  | Class    | Topic  |
|-----------|---|----------|--|
| Module 8  | <b>Urban Flood Management</b>                     | Class 36 | Hydrological impacts of urbanisation; Principles of Flood Management; Flood Management Planning; Flood Mitigation    |
|           |   | Class 37 | Structural and non-structural measures   |
|           |   | Class 38 | Flood forecasting and warning system   |
|           |   | Class 39 | Flood Damage Assessment; Flood Proofing; Public Involvement  |
|           |   | Class 40 | Environmental Impact of Flood  |
| Module 9  | <b>Water Budgeting</b>                            | Class 41 | Introduction to Water Budgeting  |
|           |   | Class 42 | Accounting for water usage in Industries   |
|           |   | Class 43 | Accounting for water usage in corporate buildings and dwellings  |
|           |   | Class 44 | Designing conservation plan  |
|           |   | Class 45 | Case Studies   |
| Module 10 | <b>Waste water Treatment, Recycle and Reuse</b>   | Class 46 | Introduction to different types of waste water   |
|           |   | Class 47 | Characteristics of domestic and Industrial waste water   |
|           |   | Class 48 | Treatment processes & Purification Techniques  |
|           |   | Class 49 | Centralised Vs Decentralized Treatment Options   |
|           |   | Class 50 | Recycle and Reuse practices  |
| Module 11 | <b>Environmental and Social Impact Assessment</b> | Class 51 | Introduction to Environmental Impact Assessment (EIA)  |
|           |   | Class 52 | EIA of Water Resources Development Projects  |
|           |   | Class 53 | Strategic Impact Assessment (SIA) for Water Sector Improvement Projects  |
|           |   | Class 54 | Environmental & Social Management Framework (ESMF) for Water Resources Development Projects                          |
|           |   | Class 55 | Case Studies   |
| Module 12 | <b>Sources of Funding and Proposal Writing</b>    | Class 56 | National and International Institutions ; UN Organizations; Multilateral and Bilateral Funding Agencies; NGOs / CBOs |
|           |   | Class 57 | Source of funding for community and private projects, approaching funding agencies                                   |
|           |   | Class 58 | Project Proposal Writing   |
|           |   | Class 59 | Project Report Writing   |
|           |   | Class 60 | Referencing Style  |

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