
Professional Certificate in Water Resource Modeling

Policy and Governance in Water Modeling

Abstracted Model refers to a concept in water modeling where complex systems are represented in a simplified way, focusing on essential characteristics and behaviors, while ignoring less important details, to facilitate analysis and prediction. Related terms include conceptual model, empirical model, and physical model.

Adaptive Management is an approach to managing water resources that involves continuous monitoring and assessment of the system, as well as periodic revision of management strategies based on new information and changing conditions. Related terms include adaptive governance, collaborative management, and resilience thinking.

Aquifer Characterization is the process of determining the physical and hydraulic properties of an aquifer system, including its geology, water table depth, and transmissivity. Related terms include aquifer testing, groundwater modeling, and parameter estimation.

Artificial Recharge is a technique used to augment groundwater resources by injecting surface water or treated wastewater into an aquifer system. Related terms include managed aquifer recharge, artificial replenishment, and groundwater banking.

Base Flow is the minimum flow of a stream or river that occurs during dry periods, typically supported by groundwater discharge. Related terms include low flow, dry-weather flow, and groundwater contribution.

Best Management Practice (BMP) refers to a technique or method used to mitigate the impact of human activities on water quality and quantity. Related terms include water conservation, pollution prevention, and sustainable practices.

Catchment Management is an integrated approach to managing water resources at the catchment scale, considering hydrological, ecological, and socioeconomic factors. Related terms include watershed management, basin management, and integrated water resources management.

Climate Change Impacts refer to the effects of global climate change on water resources, including changes in precipitation, temperature, and sea level. Related terms include climate variability, extreme weather events, and vulnerability assessment.

Conceptual Model is a simplified representation of a complex system, used to identify key components, processes, and relationships. Related terms include abstracted model, empirical model, and physical model.

Continuous Simulation is a type of modeling approach that simulates the behavior of a system over a continuous period of time, often used in water resources planning and management. Related terms include transient simulation, steady-state simulation, and dynamic simulation.

Decision Support System (DSS) is a computer-based tool used to support decision-making in water resources management, often integrating multiple models and data sources. Related terms include expert system, knowledge-based system, and geographic information system.

Demand Management is a strategy used to manage water demand, including conservation measures, pricing mechanisms, and education and outreach programs. Related terms include water conservation, water efficiency, and demand reduction.

Discrete Simulation is a type of modeling approach that simulates the behavior of a system at discrete points in time, often used in water resources planning and management. Related terms include continuous simulation, event-based simulation, and state transition simulation.

Distributed Model is a type of model that represents a system as a network of discrete elements, often used in water resources modeling to simulate spatially variable processes. Related terms include lumped model, semi-distributed model, and grid-based model.

Dynamic Simulation is a type of modeling approach that simulates the behavior of a system over time, taking into account time-varying inputs and processes. Related terms include static simulation, steady-state simulation, and transient simulation.

Ecosystem Services refer to the benefits provided by natural ecosystems, including water filtration, carbon sequestration, and biodiversity conservation. Related terms include environmental services, ecosystem function, and ecosystem health.

Embedded Systems refer to computer-based systems that are integrated into larger systems, often used in water resources management to monitor and control water infrastructure. Related terms include real-time systems, sensor networks, and automation systems.

Event-Based Simulation is a type of modeling approach that simulates the behavior of a system in response to specific events, such as floods or droughts. Related terms include continuous simulation, discrete simulation, and scenario-based simulation.

Floodplain Management is an integrated approach to managing floodplains, including flood control, wetland conservation, and land-use planning. Related terms include flood mitigation, flood adaptation, and resilience building.

Geographic Information System (GIS) is a computer-based tool used to capture, store, and analyze spatial data, often used in water resources management to map and model water systems. Related terms include remote sensing, spatial analysis, and cartography.

Groundwater Flow Model is a type of model used to simulate the flow of groundwater through aquifers, often used in water resources planning and management. Related terms include surface water model, integrated water model, and coupled model.

Hydrodynamic Model is a type of model used to simulate the movement of water in rivers, lakes, and

reservoirs, often used in water resources planning and management. Related terms include hydrologic model, water quality model, and sediment transport model.

Hydrologic Cycle refers to the continuous process by which water is cycled between the atmosphere, land, and oceans, including evaporation, condensation, and precipitation. Related terms include water balance, hydrologic budget, and water accounting.

Hydrologic Modeling is the process of using mathematical models to simulate the behavior of hydrologic systems, including rainfall-runoff modeling, groundwater flow modeling, and water quality modeling. Related terms include hydrodynamic modeling, hydraulic modeling, and water resources modeling.

Institutional Framework refers to the organizational and legal structure within which water resources are managed, including governance arrangements, policy frameworks, and regulatory mechanisms. Related terms include institutional capacity, governance structure, and policy framework.

Integrated Water Resources Management (IWRM) is an approach to managing water resources that considers the social, economic, and environmental dimensions of water use, often involving stakeholder participation and collaborative governance. Related terms include sustainable water management, water security, and resilience building.

Lumped Model is a type of model that represents a system as a single, lumped element, often used in water resources modeling to simplify complex systems. Related terms include distributed model, semi-distributed model, and grid-based model.

Model Calibration is the process of adjusting the parameters of a model to match observed data, often used in water resources modeling to improve model accuracy and reliability. Related terms include model validation, parameter estimation, and sensitivity analysis.

Model Validation is the process of evaluating the performance of a model using independent data, often used in water resources modeling to assess model accuracy and reliability. Related terms include model calibration, parameter estimation, and sensitivity analysis.

Non-Point Source Pollution refers to pollution that originates from diffuse sources, such as agricultural runoff, urban runoff, and atmospheric deposition. Related terms include point source pollution, water quality modeling, and pollution control.

Parameter Estimation is the process of determining the values of parameters in a model, often used in water resources modeling to improve model accuracy and reliability. Related terms include model calibration, model validation, and sensitivity analysis.

Policy Framework refers to the set of laws, regulations, and policies that govern the management of water resources, including water allocation, water quality, and environmental protection. Related terms include institutional framework, governance structure, and regulatory mechanism.

Rainfall-Runoff Modeling is a type of modeling approach that simulates the relationship between rainfall

and runoff, often used in water resources planning and management. Related terms include hydrologic modeling, hydrodynamic modeling, and water balance modeling.

Reservoir Management is the process of managing reservoirs to optimize water storage, flood control, and water quality, often involving operation of dams, gates, and outlet works. Related terms include water supply management, irrigation management, and hydroelectric power management.

Risk Analysis is the process of identifying, assessing, and mitigating risks associated with water resources, including floods, droughts, and water pollution. Related terms include vulnerability assessment, resilience building, and adaptation planning.

Sediment Transport Modeling is a type of modeling approach that simulates the movement of sediment in rivers, lakes, and reservoirs, often used in water resources planning and management. Related terms include hydrodynamic modeling, water quality modeling, and geomorphic modeling.

Semi-Distributed Model is a type of model that represents a system as a combination of lumped and distributed elements, often used in water resources modeling to capture spatial variability in hydrologic processes. Related terms include distributed model, lumped model, and grid-based model.

Spatial Analysis is the process of analyzing and interpreting spatial data, often used in water resources management to identify patterns, trends, and relationships in hydrologic and water quality data. Related terms include geographic information system, remote sensing, and cartography.

Stakeholder Engagement refers to the process of involving and consulting with stakeholders in water resources management, including communities, industries, and governments. Related terms include public participation, collaborative governance, and participatory management.

Surface Water Model is a type of model used to simulate the behavior of surface water systems, including rivers, lakes, and wetlands. Related terms include groundwater model, integrated water model, and coupled model.

Sustainable Development refers to the principle of managing resources in a way that meets the needs of the present without compromising the ability of future generations to meet their own needs. Related terms include water security, resilience building, and environmental sustainability.

System Dynamics is a methodology used to analyze and model complex systems, including water resources systems, often involving the use of stocks, flows, and feedback loops. Related terms include system thinking, dynamic modeling, and complexity science.

Transboundary Water Management refers to the management of water resources that cross national or regional boundaries, often involving international cooperation and agreements. Related terms include water diplomacy, conflict resolution, and cooperative management.

Uncertainty Analysis is the process of quantifying and managing uncertainty in water resources modeling, including parameter uncertainty, model uncertainty, and scenario uncertainty. Related terms include

sensitivity analysis, risk analysis, and robustness analysis.

Vulnerability Assessment refers to the process of identifying and assessing the vulnerability of water resources to climate change, floods, droughts, and other hazards. Related terms include risk analysis, resilience building, and adaptation planning.

Water Accounting refers to the process of measuring and accounting for water use and management, often used to track water balances and identify areas for improvement. Related terms include water budgeting, water auditing, and water footprint analysis.

Water Governance refers to the system of institutions, policies, and practices that regulate the use of water resources, including water allocation, water quality, and environmental protection. Related terms include institutional framework, policy framework, and regulatory mechanism.

Water Quality Modeling is a type of modeling approach that simulates the behavior of water quality parameters, including nutrients, sediment, and pollutants. Related terms include hydrodynamic modeling, hydrologic modeling, and ecological modeling.

Water Security refers to the condition of having access to sufficient, safe, and affordable water to meet human and environmental needs. Related terms include sustainable development, resilience building, and environmental sustainability.

Watershed Management is an integrated approach to managing water resources at the watershed scale, considering hydrological, ecological, and socioeconomic factors. Related terms include catchment management, basin management, and integrated water resources management.