

**BCLE216L                      Water Resources Management                      (3-0-0-3)**

Water, A Multi-Dimensional Resource - Multi-dimensional management, Climate change; Surface Water and Groundwater Global and Indian Scenario – Water quality, Water footprint; Water Resources Assessment - Network design, Stream flow gauging, Geophysical exploration; Water in Agricultural systems - Water for food production, Water pollution from agricultural production; Water economics – Distinction between values and charges, Private Sector involvement; Water legal and regulatory settings - Water policy for Irrigation, Groundwater laws and rain water harvesting; Demand Management – Crisis management, Cost of water, Future trends.

Course Code	Course Title	L	T	P	C
BCLE216L	Water Resource Management	3	0	0	3
Pre-requisite	NIL	Syllabus version			
		1.0			
Course Objectives					
The objectives of this course is to : 1. Acquire the basic principles of water resources and its planning and management. 2. Enhance the knowledge on recent technologies in assessing the water resources. 3. Identify the challenges facing water management in varied climate types around the world.					
Course Outcomes					
Upon completion of this course, the student will be able to : 1. Understand the planning of water resources and need for water resource management. 2. Understand the water resource potential in global, India scenario and explore the water resources using different technologies. 3. Acquire a knowledge international and national water law and its policy. 4. Explain the concept of water in agricultural and economic aspects. 5. Predict the future trends of water demand and its management during crisis.					
Module:1	Water, A Multi-Dimensional Resource	5 hours			
Water resources planning-Multi-dimensional management-Water withdrawal and consumption by sector-Stress, international policy-Climate change, oceans, challenges and need for water resource management.					
Module:2	Global and Indian Scenario for Water Resources	4 hours			
Surface Water and Groundwater Global and Indian Scenario-Quality of water resources-Water use and sustainable reuse methods-Usable water resources by continent and country-Water footprint.					
Module:3	Water Resources Assessment	5 hours			
Network design-Stream flow gauging-Weir design-Gauges-Current gauging-Salt dilution-Geophysical exploration-Test drilling-Application of remote sensing techniques.					
Module:4	Water in Agricultural Systems	7 hours			
Water for food production, virtual water trade for achieving global water security, irrigation efficiencies, irrigation methods and current water pricing, water for livestock and processing, water pollution from agricultural production					
Module:5	Water Economics	8 hours			
Economic characteristics of water good and services-Nonmarket monetary valuation methods-Water economic instruments-Policy options for water conservation and sustainable use, pricing, distinction between values and charges-Private sector involvement in water resources management.					
Module:6	Water Legal and Regulatory Settings	8 hours			
National and International Framework for Water Law; Basic structure of water law- An overview of water law in India -Evolution of water law, key features of water law, evolving water law and policy-Water policy for Irrigation, decentralization and participation in irrigation management, and the policy measures proposed to establish water user associations. National level initiatives for regulation of groundwater, State groundwater laws and rainwater harvesting.					

<b>Module:7</b>	<b>Demand Management</b>	<b>6 hours</b>
Balancing supply and demand-Economic theory of supply and demand-management by use of tariffs-Timing, long-term, operational time-frame-Crisis management-Cost of water-Future trends-Economic value of water-Loss control-Water harvesting.		
<b>Module:8</b>	<b>Contemporary issues</b>	<b>2 hours</b>
<b>Total Lecture Hours</b>		<b>45 hours</b>
<b>Text Book(s)</b>		
1. David Stephenson, Water Resources Management, 2004, A. A. Balkema Publishers, Netherlands.		
<b>Reference Books</b>		
1. Louis Theodore, Ryan Dupont R., Water Resource Management Issues, Basic Principles and Applications, 2020, CRC Press, Taylor & Francis Group, New York. 2. Philippe Cullet and Sujith Koonan, Water Law in India- An Introduction to Legal Instruments, 2017. Second Edition, Oxford University Press, New Delhi. 3. Subramanya. K., Engineering Hydrology, 2020, Fifth Edition, McGraw Hill Education Pvt. Ltd., New Delhi.		
<b>Mode of Evaluation:</b> CAT, Assignment, Quiz, FAT.		
<b>Recommended by Board of Studies</b>	24.02.2022	
<b>Approved by Academic Council</b>	No. 66	<b>Date</b> 16-06-2022