

**SEMESTER 1<sup>st</sup>**

**MAJOR/MINOR COURSE**

**Subject: Water Management**

**Title: Introduction to Water**

**Code: BWM22C101**

Credit: (4+2) Theory: 04; Practical: 02

Contact Hours: 64 (T) + 64 L)

*Course objective: The objective of this course is to impart the knowledge of hydrology that deals with the occurrence, distribution, movement and properties of water on the earth.*

*Learning outcome: This paper is to offer better insights on basics of water ranging from importance, characteristics and distribution and consumption patterns.*

**Theory: 4 credits**

**Unit I: Properties of water**

**(16 hrs)**

Origin of water on earth, Unique properties of water (Polarity, Cohesion, Density, Surface Tension, Viscosity, Heat capacity, Boiling and freezing points, Temperature, Taste, Odour, Colour), Importance of water.

**Unit II: Water resources distribution**

**(16 hrs)**

Water as a resource, Concept of valuing water, Types of water resources, Inland water distribution and importance, Ground water distribution and importance, Cryosphere: Distribution and importance, Marine waters: Distribution and importance, Water resources of J&K (River systems and glaciers).

**Unit III: Water and human civilization**

**(16 hrs)**

Importance of water in human civilization (Mesopotamian and Indus), Water catastrophes: Historical perspective and consequences, Water infrastructure and tools (Ancient, Medieval and modern).

**Unit IV: Water use and availability**

**(16 hrs)**

Distribution of water, Availability and consumption patterns in domestic, industrial, and agricultural sectors, Concept of water stress and scarcity, Water footprint, Domestic water demand and consumption in urban and rural India, Sustainable Development Goal 6 (SDG)

**Laboratory course: 02 Credits**

1. Evaluation of per capita domestic water consumption pattern
2. Calculation of personal water footprint
3. Visit to any archaeological/relevant site for demonstration of water infrastructure
4. Determination of water quality on basis of odour and colour
5. Perception of stakeholders regarding drinking water quality available in the institution/College

6. Determination of water temperature of different water ecosystems.
7. Questionnaire survey on water demands by various sectors (Domestic, Agriculture, and Industry)
8. Visit to any nearby drinking water supply scheme/source

**Suggested readings:**

1. Bansil, P.C. 2004. Water Management in India. Concept Publishing Company, India.
2. Brebbia, C.A. 2013. Water Resources Management VII. WIT Press.
3. CEA. 2011. Water Resources and Power Maps of India. Central Board of Irrigation & Power.
4. Grumbine, R.E. and Pandit, M.K. 2013. Threats from India's Himalaya dams. Science 339: 36-37.
5. Loucks, D.P., Stedinger, J.R. & Haith, D. A. 1981. Water Resource Systems Planning and
6. Analysis. Englewood Cliffs, NJ, Prentice Hall.
7. Mays, L.W. 2006. Water Resources Sustainability. The McGraw-Hill Publications.
8. Schward and Zhang, 2003. Fundamentals of Groundwater. John Willey and Sons.
9. Souvorov, A.V. 1999. Marine Ecologonomics: The Ecology and Economics of Marine Natural
10. Resource Management. Elsevier Publications.
11. Vickers, A. 2001. Handbook of Water Use and Conservation. Water Plow Press.