CLUSTER UNIVERSITY SRINAGAR

SYLLABUS (FYUP UNDER NEP 2020)

Offered By Department Of WATER MANAGEMENT

Semester 2nd (Major Course)

Course Title: Fundamentals of Hydrology

Course Code: UGWMT22J201 **Max. Marks 100**
Credits: 4 (Theory: 3, Practical: 1) **Theory External: 60; Min Marks: 24**
Contact Hrs: 75 (Theory: 45, Practical: 30) **Theory Internal (Continuous Assessment): 15 Marks, Min Marks: 06**
Practical Experimental Basis= 15, Min. Marks: 06
Practical Experimental (Continuous assessment) = 10, Min. Marks: 04

Learning Objectives:
Students will be able -

1. To learn about the concepts of hydrology
2. To gain knowledge of evaporation, transpiration, condensation etc.
3. To become aware about hydrograph
4. To become aware about aquifers and types of aquifers

Learning Outcomes:
After the completion of the syllabus, the student will gain knowledge of

1. Hydrological cycle
2. Rainfall measurements
3. Runoff components
4. Sampling methods

Unit- I: Introduction to Hydrology **(15 Hrs)**

1.1 Hydrology - Historical development, concept and scope
1.2 Hydrological cycle: Evaporation: Process, factors affecting evaporation
1.3 Transpiration: process, factors affecting transpiration
1.4 Condensation: Process, factors affecting condensation
1.5 Precipitation: Process, types and forms

Unit- II: Runoff and ground water **(15 Hrs)**

2.1 Runoff – components of runoff
2.2 Characteristics of runoff, factors affecting runoff
2.3 Hydrograph: Components and types
2.4 Unit Hydrograph theory
2.5 Applications and limitations of unit hydrograph

Unit - III: Surface Water Hydrology **(15 Hrs)**

3.1 Introduction to surface water hydrology.
3.2 Important hydraulic properties of earth materials and groundwater
3.3 Ground water movement - Darcy's Law
3.4 Permeability, Hydraulic Potential and hydraulic conductivity
3.5 Aquifers: Types and geology.

Unit-IV: Laboratory Work **(30 Hrs)**

4.1. Sampling methods (Grab and Composite) for physicochemical analysis of water (Lake River, Groundwater, spring)
4.2. Measurement of precipitation and evaporation
4.3. Measurement of flow and discharge of stream/spring
4.4 Determination of pH of water sample
4.5. Determination of conductivity of different water samples
4.6. Determination of TSS and TDS of different water samples
4.7. Determination of Chloride in water sample

Suggested Readings

1. K. Subramanya, “Engineering Hydrology”, Tata McGraw – Hill publishers, New Delhi, 2008.
2. Duggel K. N., and J. P. Soni, “Elements of Water resources engineering”, New Age International Publishers, 2005.
3. CEA. 2011. *Water Resources and Power Maps of India*. Central Board of Irrigation & Power. Grumbine, R.E. and Pandit, M.K. 2013. Threats from India's Himalaya dams. *Science* 339: 36-37.
4. Loucks, D.P., Stedinger, J.R. & Haith, D. A. 1981. *Water Resource Systems Planning and Analysis*. Englewood Cliffs, NJ, Prentice Hall.
5. Mays, L.W. 2006. *Water Resources Sustainability*. The McGraw-Hill Publications. Schward and Zhang, 2003. *Fundamentals of Groundwater*. John Willey and Sons.
6. Souvorov, A.V. 1999. *Marine Ecologonomics: The Ecology and Economics of Marine Natural Resource Management*. Elsevier Publications.
7. APHA Standard Methods