INTEGRATED WATER RESOURCES MANAGEMENT

(Professional Elective-4)

II Semester

Course Code: 19CE2163

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Prerequisites: Water Resources Engineering

Course Outcomes:

At the end of the course, the student will be able to:

CO1 Illustrate the concepts of Integrated Water Resource Management.
CO2 Describe about the surface water works.
CO3 Discuss about Steady Ground Water Flow.
CO4 Explain the concepts of Unsteady and Non-Equilibrium Equations for GroundWater.
CO5 Discuss about Conjunctive Use Models .

UNIT-I: (10 Lectures)

INTRODUCTION: Definition, concepts of IWRM, approaches to iwrm, components, importance. Surface water: Evapotranspiration – Runoff – Hydrographs – Methods of discharge measurement – Estimation of flood – Flood disaster mitigation measures and damage estimation, rainfall-runoff models.

Learning outcomes:

1. Illustrate Concepts, Approaches and Components of IWRM (L4)
2. Explain about Runoff, Hydrographs and Methods of discharge Measurement (L2)
3. Discuss about rainfall-runoff models (L2)

UNIT-II: (10 Lectures)

SURFACE WATER: River engineering and river training works – Hydrologic routing – Hydraulic routing –Hydrology of basin management.

Learning outcomes:

1. Illustrate River Engineering and River Training Works (L4)
2. Discuss about Hydrologic and Hydraulic Routing (L2)
3. Explain the Hydrology of basin management (L2)

UNIT-III: (10 Lectures)

GROUNDWATER: Steady groundwater flow towards a well in confined and unconfined aquifers – Dupit's and Theim's equations, Assumptions, Formation constants, yield of an open well interface and well tests.

Learning outcomes:

1. Illustrate Concepts of Confined and Unconfined Aquifers (L4)
2. Explain about yield of an open well interface (L2)
3. Discuss the Dupit's and Theim's equations (L2)

UNIT-IV: (10 Lectures)

GROUNDWATER: Unsteady flow towards a well – Non equilibrium equations – Theis solution – Jocob and Chow's simplifications, Leaky aquifers, Groundwater basin management.

Learning outcomes:

1. Illustrate the Unsteady flow towards well (L4)
2. Discuss about Leaky Aquifer and Ground Water Basin Management (L2)
3. Explain about Theis solution (L2)

UNIT-V: (10 Lectures)

CONJUNCTIVE USE: Concepts of conjunctive use Models, Case studies for IWRM.

SALINE WATER INTRUSION: Occurrence of saline water intrusion, Ghyben-Herzberg relation, Shape of the interface, Control of salt water intrusion

Learning outcomes:

1. Illustrate the Concepts of Conjunctive Use Models (L4)
2. Explain the Concepts of Saline water intrusion (L2)
3. Discuss about control of salt water intrusion (L2)

Text Books:

1. David Keith Todd, Ground water Hydrology John Wiley & Son, New York.

References:

1. Fetta,C., W., Applied Hydrogeology CBS Publishers & Distributers.
2. Madan mohan das & Mimi Das Hydrology Saikia PHI Learning Private Limited
3. Raghunath,H.,M., Groundwater Wiley Eastern Ltd.
4. Subramanya,K., Engineering Hydrology TMH Publishing Company limited,
5. Willes,R., Yeh,W.,W.,G., Groundwater System Planning & Management –Prentice Hall.