



# Ground water Hydrology and Contamination Topics



# Ground water Hydrology and Contamination-Topics

- Basics of ground water
  - Hydrological cycle
    - Aquifers
      - Confined and unconfined aquifers
      - Groundwater in soils and rocks etc
  - Hydrological properties of water bearing strata
    - Different type of soils and geological formations, Water holding capacity of soils, Porosity, Bulk density specific yield, specific retention etc
- Ground water Hydraulics
  - Basics
    - Darcy's law its validity
    - Dupit forchheimer assumptions
    - Solutions for simple flow conditions
    - Aquifer parameters like T and S
  - Advanced topics
    - Differential equations for confined and unconfined condition
    - Steady and unsteady flow solutions for fully penetrating and partially penetrating wells
    - Pumping test analysis and estimation of aquifer parameters
- Well design and construction



# Ground water Hydrology and Contamination-Topics (.cont)

- Modelling techniques for groundwater flow
  - Statistical applications in ground water/Excel & SPSS
  - Computer applications in groundwater
  - Numerical techniques
  - Groundwater modelling and GIS
- Groundwater conservation
  - Groundwater budget
  - Seepage from surface water
  - Artificial recharge
- Ground water quality
  - Indian and international standards, Sodium Absorption Ratio (SAR), Wilcox Classification, Pipers' Diagram etc
- Ground water monitoring
- Ground water pollution and contamination
  - Sources, remedial and preventive measures
  - Contamination studies
    - Transport mechanism
    - Modelling advective-dispersive transport,
    - Adsorption and chemical reaction
    - Biodegradation kinetics,
    - Numerical flow and transport modelling
    - Waste site characterization / investigation
    - Groundwater remediation, legal issues in groundwater contamination
- **Reference Books:**
  1. Groundwater Hydrology by Todd
  2. Groundwater Hydrology by Herman Bouwer
  3. Groundwater Resources Evaluation by Walton
  4. Groundwater by HM Raghunath
  5. Groundwater and wells – by Johnson