

**M.Sc. GEOLOGY**  
**SEMESTER - IV**  
**COURSE - I - HYDROGEOLOGY AND ENVIRONMENTAL GEOLOGY**

Course Name	Teaching hours for week	Credits	Internal Assessment marks	SEM-END Assessment marks	Total marks
<b>HYDROGEOLOGY AND ENVIRONMENTAL GEOLOGY</b>	<b>4</b>	<b>4</b>	<b>25</b>	<b>75</b>	<b>100</b>

**Course Outcomes:** The student will:

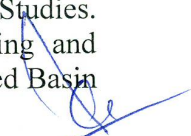
- Understand and gain knowledge on hydrological cycle, hydrological properties of rocks, occurrence of groundwater, drilling methods for wells, quality standards of groundwater, geo- environmental hazards
- Be able to assess the determine the hydraulic head and gradients, groundwater flow directions, major ions concentrations in water and classify its suitability for various purposes.
- Analyze and interpret the geo-electrical resistivity data for identification of suitable potential zone for groundwater extraction.
- Identify the groundwater pollution areas and its sources of pollution

**After completion of this course the student can be able to works as hydrologist in ground water development and management department.**

**UNIT-I:** Origin of Water - Hydrologic cycle; Hydrological properties of rocks, Porosity, Specific yield, Specific Retention, Hydraulic Conductivity, Storativity, and Transmissivity; Vertical Distribution of Ground Water - Types of Aquifers, Unconfined, Confined, Semi - Confined & Perched Springs; Hydrothermal phenomena; Water Table Contour maps; Water Table fluctuations and causative factors;

**UNIT-II:** Darcy's law and its Application; Determination of Permeability in laboratory and in field; Steady State, Unsteady State and Radial Flow equations; Tracer Studies; Pumping Tests- Methods, Estimation of T & S by Theis, Jacob and Theis Recovery Methods, Specific Capacity Method by Slither's Method; Groundwater exploration methods.

**UNIT-III:** Types of wells - Drilling Methods -Pumping equipment; Physical and Chemical properties of groundwater - Graphical presentation of Water quality data; Quality criteria for domestic, irrigation and industrial uses; Sources of pollution; Sea water intrusion and its controls; Problems of Arsenic, Fluoride and Nitrate; Radioisotopes for Ground Water Studies. Overexploitation and Ground Water Mining; Rain water Harvesting and artificial recharge methods; Groundwater provinces of India, Watershed Basin Management.

  
**Chairman**  
**Board of Studies in Geology**  
**Aditavi Nannaya University**  
**Rajamahendravaram - 533296**

**UNIT-IV:** Geo-environmental hazards, volcanoes, earthquakes, floods and coastal hazards; land desertification, degradation and management; soil erosion causes and management; impact of mining activities on the environment; global warming; water contamination- waste disposal and management.

**Suggested Books:**

1. Todd. (2006). *Groundwater hydrology*, 2nd ed. John Wiley & Sons.
2. Karanth, K. R. (1989). *Hydrogeology*. Tata McGraw-Hill Publ Co New Delhi.
3. Karanth, K. R. (1987). *Groundwater assessment: Development and management*. Tata McGraw- Hill Education.
4. Keller, E.a. (1978). *Environmental Geology*. Bell and Howell, USA.
5. Submanian, V. (2001). *Textbook in environmental Science*. Narosa Publication.

**Reference books**

1. Davis, S.N. and De Weist, R.J.M. (1966) *Hydrogeology*. John Wiley and Sons, New York.
2. Raghunath, H. M. (1987). *Groundwater: Hydrogeology, groundwater survey and pumping tests, rural water supply and irrigation systems*. New Age International.
3. Walton. W.C. (1970). *Groundwater Resources evaluation*. Mc Graw Hill Publ. Co.
4. Bouwer, H. (1978). *Groundwater hydrology*. McGraw-Hill College.

**M.Sc. GEOLOGY  
SEMESTER - IV  
COURSE - II - WELLSITE GEOLOGY**

Course Name	Teaching hours for week	Credits	Internal Assessment marks	SEM-END Assessment marks	Total marks
<b>WELLSITE GEOLOGY</b>	<b>4</b>	<b>4</b>	<b>25</b>	<b>75</b>	<b>100</b>

**Course Outcomes:** The student will:

- Gain knowledge on exploration strategies, role of wellsite geologist and preparation of geo- technical order, on-shore and off-shore drilling technologies for hydrocarbon exploration and development, analysis of core and well cutting samples and interpretation of lithology of the area
- Gain knowledge on casing and cementing techniques
- Be able to prepare the geotechnical order, prepare the lithologs from drilling time
- Analyze the well cutting samples or side wall or core samples
- Identify the pay horizons through well-site geological analysis
- Evaluate the formation characteristics like., the water saturation, HC saturation, water salinity, pay zone thickness

**After completion of this course the student can be able to works as geologist in oil industries like ONGC, GAIL, Reliance etc.**