Hydrogeology

1.1. Course Number: GE 416

1.2. Contact Hours: 3-0-0 Credits: 9

1.3. Semester Offered: 4th Year-Even

1.4. Prerequisite: Basic knowledge of Geology, Mathematics, Physics and Chemistry

1.5. Syllabus Committee Members: Dr. Alok Kumar Singh & Dr. Hemant Kumar Singh

2. **Objective:** The course main aim is to provide a comprehensive understanding of groundwater occurrence, movement, distribution, and management that is a prime resource for development of a civilization.

3. **Course Content:** Unit-wise distribution of content and number of lectures

Unit	Topics	Sub-topics	Lectures
1	Introduction and basic concepts	Scope of hydrogeology; Groundwater quality and its societal relevance, Hydrologic cycle; Origin of groundwater, vertical distribution of subsurface water. Genetic classification of groundwater	10
2	Aquifers and Groundwater flow	Types of aquifers– unconfined, confined, semi-confined and leaky aquifers, Water table and piezometric surface, Darcy's law; Reynold's Number, Groundwater velocity, Intrinsic permeability and hydraulic conductivity, transmissivity, Drawdown, specific capacity etc.	8
3	Groundwater chemistry	Physical, chemical and bacteriological properties of water and water quality. Introduction to methods of interpreting groundwater quality data using standard graphical plots, Elementary concept on groundwater pollution: arsenic, fluoride and nitrate, sea water intrusion in coastal aquifers	10
4	Groundwater management	Surface and subsurface water interaction, Groundwater level fluctuations, Basic concepts of water balance studies, issues related to groundwater resources development and management, Rainwater harvesting and artificial recharge of groundwater.	8
5	Indian Provinces	Groundwater provinces in India	4
		Total	**40**

4. Readings:

4.1. Textbook:

- Todd, D. K. 2006. Groundwater hydrology, 2nd Ed., John Wiley & Sons, N.Y.
- Davis, S. N. and De Weist, R.J.M. 1966. Hydrogeology, John Wiley & Sons Inc., N.Y.
- Karanth K.R., 1987, Groundwater: Assessment, Development and management, Tata McGraw Hill Pub. Co. Ltd.

5. Outcome of the course:

Followings are the course outcomes:

- Understandings on occurrences of groundwater and its flow
- Students understand the structure and activities of various types of aquifers
- Development and management of presently available water resources for future
- Students know basic methods for measuring and analyzing hydrological parameters