AG-402 Hydrology Credit Hours 2+1

Prerequisite: AG-306

Learning Objectives

This course is designed to acquire knowledge about the exploration of groundwater resources and their management. This will help the students to learn how to manage and conserve water resources, how to overcome the acute shortage of water supply and also how to maintain its purity for meeting the present demand as well as the demand of the future generation.

Course Contents

The hydrologic cycle. Formation of aquifer system and types. Occurrence and movement of groundwater. Hydrologic properties of rocks and their measurements. Fluctuation of groundwater levels and causes. Recharge and discharge of groundwater. Groundwater exploration by geological, hydrogeological and geophysical methods and remote sensing techniques. Well hydraulics, tube well drilling techniques, designing, development and pumping tests. Waterlogging and causes of water table declination. Groundwater chemistry, salinity, quality analysis and deterioration of water quality. Groundwater resources of Pakistan.

Lab.

Inventory and monitoring of groundwater. Preparation of water table and piezometric surface maps. Study and preparation of hydrogeologic maps. Graphical presentation of chemical analysis of groundwater. Field visits to drilling sites.

TEACHING – LEARNING STRATEGIES

- Lecture based examination
- Presentation/seminars
- Class discussion
- Quizzes

ASSIGNMENTS – TYPE AND NUMBER WITH CALENDAR

It is continuous assessment. The weightage of Assignments will be 25% before and after midterm assessment. It includes:

- classroom participation,
- attendance, assignments and presentation,
- homework
- attitude and behavior,
- hands-on-activities,
- short tests, quizzes etc.

ASSESSMENT AND EXAMINATIONS

Sr. No.	Elements	Weightage	Details
1.	Mid Term Assessment	35%	It takes place at the mid-point of the semester
2.	Formative Assessment	25%	It is continuous assessment. It includes: classroom participation, attendance, assignments and presentation, homework, attitude and behavior, hands-on-activities, short tests, quizzes etc.

3.	Final Assessment	40%	It takes place at the end of the semester. It is mostly in the form of a test, but owing to the nature of the course the teacher may assess their students based on term paper, research proposal development, field work and report writing etc.

Books Recommended

1. Field Hydrogeolgy by Brassington, R., 1988, John Wiley & Sons.
2. Groundwater Hydrology by Todd, D.K., 1995, John Wiley & Sons.
3. Groundwater Resource Evaluation by Walton, W.C., latest Ed., McGraw Hill.
4. Introduction to Groundwater by Michael P., 1985, George Allen & Unwin.
5. Applied Hydrogeology by Fetter, C.W., 1994, MacMillan Pub. Co.
6. Groundwater by Ragunath, H.M., 1992, Wiley Eastern Ltd.
7. Atlas of WAPDA
8. Groundwater Hydrology by Bouwer, H., 1988, McGraw Hill.
9. Hydrology and Groundwater Resources of NWFP by Kruseman, G.P., 1988, WAPDA