

University of Engineering and Technology, Taxila
Department of Civil Engineering

Course Title:	Hydrology and Water Resources (CE-305)
Pre-requisite(s):	Fluid Mechanics, Calculus and Physics, Survey
Credit Hours:	2 + 1
Contact Hours:	2 + 3
Text Book(s):	<ol style="list-style-type: none">1. Engineering Hydrology An Introduction by Dr. Abdul Razzak Ghumman2. Introduction to Hydrology by Warren Viessman, Jr. Gary L. Lewis3. Concise Hydrology by Dawei Han
Reference Book(s):	<ol style="list-style-type: none">1. Fundamentals of Hydrology by Tim Davie2. Applied Hydrology by Ven Tee Chow, David Maidment and Larry W. Mays

Catalog Data:

Course Objectives:

The course will help the students to understand the basic principles of surface and ground water hydrology and application of these principles to solve hydrological problems

Course Learning Outcomes:

At the end of this course, the student will:

CLO 1: Solve and demonstrate the basic problems and principles of hydrology

CLO 2: Communicate the concepts of hydrology both in technical as well as non-technical language to convey the knowledge to the general public

CLO 3: Measure different hydrological quantities/components such as stream flows, relative humidity, temperatures and using the modern tools as well

Course Contents:

Introduction:

Water resources in Pakistan, Hydrologic cycle and equation of continuity, Water budget, Assessment of groundwater resources. Introduction of dams and barrages

Precipitation

Types of precipitation, Factors necessary for the formation of precipitation, Measurement of precipitation, Interpretation of precipitation data

Evaporation and Transpiration

Factors affecting evaporation, Measurement of Evaporation, Potential evapotranspiration

Stream Flow

Water stage and its measurement, Selection of site for stage record, Selection of control and metering section, Methods of measurement of stream flow, Interpretation of stream flow data

Runoff

Factors affecting runoff, estimating volume of storm runoff

Hydrographs

Characteristics of hydrographs, Components of a hydro graph, Hydrograph separation, estimating the volume of direct run off, Introduction to unit hydro graph concept

Stream flow Routing

Introduction to flood, frequency and duration analysis

Introduction to Ground Water Flow

Sources and discharge of ground water, Water table and artesian aquifer, The Thiem formula and its application to aquifer tests

Introduction to modeling: Physical models, Analogue models, Numerical models

Grading Policy:

Sr. No.	Grading	% of Total Marks
1	Assignments	10
2	Quizzes	10
3	Midterm Exam	20
4	Final Exam	40
5	Laboratory	20

Student Learning Outcomes:

On successful completion of the course a student may be able to apply concepts of hydrological engineering and principles in the field of Irrigation, Water Management, Watershed Management etc.

Course Professional Outcome/Industrial Usage:

The students will prove themselves as potential asset to the related industry like Irrigation and Watershed Management and will deliver their best in the industry.

CLO's	CLO 1	CLO 2	CLO 3
PLO 1 (Engineering Knowledge)	✓		
PLO 2 (Problem Analysis)	✓		
PLO 3 (Design/Development of Solutions)			
PLO 4 (Investigation)			
PLO 5 (Modern Tool Usage)			✓
PLO 6 (The Engineer and Society)			
PLO 7 (Environment and Sustainability)			
PLO 8 (Ethics)			
PLO 9 (Individual and Team work)			
PLO 10 (Communication)		✓	
PLO 11 (Project Management)			
PLO 12 (Lifelong Learning)			

CLOs	CLO 1	CLO 2	CLO 3
Assessment Modules			
Assignments	✓	✓	✓
Quizzes	✓	✓	✓
Midterm Exam	✓	✓	✓
Final Exam	✓	✓	✓