

Engineering Hydrology
BEG263CI

YEAR-II

SEMESTER-II

Teaching Schedule			Examination Scheme						Total Marks
			Final				Internal Assessments		
			Theory		Practical		Theory Marks	Practical Marks	
L	P	T	Duration	Marks	Duration	Marks			
3	2/2	2	3	80	-	-	20	25	125

Course Objective:

Course Contents:

1. Introduction(4hrs)

- 1.1 Hydrology as a Science of Water
- 1.2 Scope and Application of Hydrology in Civil Engineering
- 1.3 Hydrological Cycle and Water Balance Equation
- 1.4 Development of hydro-meteorological study in Nepal

2. Hydrological Processes (12 hrs)

- 2.1 Precipitation, its Causes, Classification and Measurement by Rain Gauges
- 2.2 Types of Rain gauges, Locations, Site Selection, Errors in Measurement
- 2.3 Double Mass Curve Method of Adjustment and hyetograph
- 2.4 Analysis of Point Rainfall by various Methods
- 2.5 Intensity Duration Frequency Curve, Depth -Area-Duration Curve
- 2.6 Snowfall and Introduction to Snowfall Measurement
- 2.7 Evaporation, types of Evaporimeter, Evapo-transpiration and factors Affecting Evapo-transpiration
- 2.8 Penman's Equation and its uses
- 2.9 Infiltration, factors affecting infiltration, Horton's Equation, Infiltration Indices (ϕ and W) and Infiltrimeters

3. Surface Runoff

(8 hrs)

- 3.1 Stream Gauging, Selection of Site, Types of Gauges and their Selection
- 3.2 Measurement of Velocity by Current Meter, by floats, by surface and sub Surface velocity Rods
- 3.3 Flow Measurement in River Cross-Section by velocity area Method and slope Area method

- 3.4 Rainfall Runoff Correlation and Rating Curves
- 3.5 Factors Affecting Runoff from a Catchment

4. Hydrographs(7hrs)

- 4.1 Hydrographs and their Analysis
- 4.2 Unit Hydrograph and its Limitation
- 4.3 Derivation of Unit Hydrographs from different Storms
- 4.4 Peak Flow Estimation using Empirical Methods
- 4.5 The Rational Method and its Limitation

5. Hydrology of Floods (3 hrs)

- 5.1 Definition. Causes and Effects of Floods
- 5.2 Hydro Geomorphologic Characteristics of Rivers
- 5.3 Flood Prediction and Design Flood
- 5.4 Methods of Mitigating Floods

6. Statistical Hydrology (6hrs)

- 6.1 Introduction to Frequency and Probability Concept
- 6.2 Frequency Analysis and Recurrence Interval
- 6.3 Gamma and Student's Distribution and their application in Hydrology
- 6.4 Gumbel's Method in Hydrology

7. Ground Water (5 hrs)

- 7.1 Occurrences and Distribution of Ground water, Aquifers, Aquicludes, Aquitards and Artesian Wells
- 7.2 Water Wells and Their Types
- 7.3 Wells and Their Classifications
- 7.4 Devices for Testing of Wells
- 7.5 Role of Ground Water for Irrigation Development
- 7.6 Well Hydraulics
- 7.7 Recharge of Ground Water
- 7.8 Introduction to the Pumps for the Water Well

Laboratories:

- (a) Use of Current meter in determining flow velocity in the field.
- (b) Discharge measurement in the field by float method.
- (c) Discharge measurement by velocity area method in the field.

References:

- K. Subramanya , Engineering Hydrology, Tata McGraw Hill Publication
- Venn Te Chow, Applied Hydrology
- FAO Irrigation & Drainage Engineering, Paper-24, (1972)
- R. S. Varshney, Engineering Hydrology, Nem Chand & Bros., Roorkee
- Linsley Kobler & Paulhus, Hydrology for Engineers, McGraw Hill Publishing Company