

GUJARAT TECHNOLOGICAL UNIVERSITY

BRANCH NAME: Civil (Water Resources Engineering) (33)
SUBJECT NAME: HYDROLOGY AND WATERSHED MANAGEMENT
SUBJECT CODE: 3713302
1st Semester

Type of course: Core I

Prerequisite: Knowledge elementary hydrology, rainfall-runoff relationship, hydrograph analysis, probability distribution, regression analysis, Stochastic and deterministic models

Rationale: The students will get equipped with understanding of various topics viz; stream gauging, flood routing, watershed management. Students are introduced with calculation of stochastic hydrology and various models in rainfall-runoff.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P		Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
3	0	2	4	70	30	30	20	150

Content:

Sr. No.	Name of Topic	Teaching Hours	% Weightage
1	Engineering Hydrology Hydrological cycle, precipitation, forms, measurement, distribution, storm pattern and analysis, Catchment characteristics for producing run-off, infiltration, rainfall-runoff relation etc, Hydrograph analysis, transportation of streams, stream gauging, measurement of stage, discharge, relationship, most probable flood standard project flood, Synthetic hydrograph, Flood routing	14	35
2	Watershed Management Watershed, Small Watershed, Characteristics of WatershedsSize, Elevation & Slope, Aspect & Orientation, Watershed shape, Drainage Network; Watershed Equilibrium, Watershed improvement, method for reducing flood peaks, Soil conservation, Afforestation, channel improvement, detention basins, Water Harvesting	10	25
3	Stochastic Hydrology: Probability, Distribution of random variation, probability fitting, correlation and regression analysis, stochastic process, Time series analysis, Synthetic flow generation model	8	15

4	Catchments Models Stochastic and deterministic models, Conceptual and Empirical models, Dynamic and Numerical models, Single Event Rainfall-Runoff Models, Continuous Simulation Models, Model Calibration & Validation	10	25
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Reference Books:

1. Hydrology & Soil Conservation Engineering – Ghansyamdas
2. Stochastic Water Resources Technology – N.T. Kottegoda
3. Applied Hydrology – Mutreja
4. Engineering Hydrology – K. Subramanya
5. Hydrology – Raghunath
6. Engineering Hydrology – J. Rami Reddy
7. Stochastic Hydrology – J. Rami Reddy
8. Applied Hydrology – Maidment & V. T. Chow
9. Introduction to Hydrology – Warren Viessman, Jr. & Garry L. Lewis, Pearson Education

Course Outcome:

After learning the course the students should be able to: understand the basic principles of hydrology. Hydrograph analysis. Water shed analysis and management. Simulation and modeling of surface water hydrology.

List of Experiments/Tutorials:

1. Use of automatic weather station
2. Measurement & analysis of Rainfall
3. Calculation of runoff
4. Measurement & analysis of Temperature
5. Measurement & analysis of Wind Velocity
6. Measurement and analysis of Moisture Content
7. Hydrograph analysis

Major Equipments:

1. Rain gauges
2. Weather station
3. Rainfall simulator
4. Infiltrimeters

List of Open Source Software/learning website:

http://www.academia.edu/1468483/Hydrological_open_source_experiences_using_SWAT_and_OpenMI