



GUJARAT TECHNOLOGICAL UNIVERSITY

CIVIL (WATER RESOURCES ENGINEERING) (33)

Master of Engineering

Subject Code: 3723306

Semester – II

Subject Name: HYDROLOGICAL MODELLING

Type of course: Program Elective IV

Prerequisite: Fundamental knowledge of numerical methods, numerical modeling and statistics.

Rationale:

Students will be able to understand various simulation models applicable in hydrology.

Teaching and Examination Scheme:

Teaching Scheme			Credits C	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.	Content	Total Hrs
1	Modelling for Surface and groundwater systems	12
2	Definitions of Modeling and Simulation, Terminology & Components, History, Applications, Simulation packages ARS-SWAT, HEC-HMS, MODFLOW etc., Selection process, Statistical models, Input Modeling, Collecting Data, Identifying Distribution, Histograms, Goodness-of-Fit, Calibration and Validation of Simulation Models, Output Analysis, Measures of Performance, visualization.	34

Reference Books:

1. GIS and environmental modeling by Keith C. Clarke, Bradley O. Parks, Michael P. Crane - PHI
2. Integrated Watershed Management through Simulation Modeling by Lodha P P and Gosain A K - Lambert Academic Publishing
3. Introduction to Hydrology by Warren Viessman, Jr and Gary L Lewis - Pearson education

Course Outcomes: At the end of the course, Student will be able to

Sr. No.	CO statement	Marks % weightage
CO-1	Understand hydrology vis-a- vis modelling	10



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CO-2	Conceptualise hydrological parameters for simulation	10
CO-3	Perform simulations on various stated models	10
CO-4	Analyse and evaluate the outcomes of simulation runs	10
CO-5	Visualise the simulated outputs	10

Suggested Specification table with Marks (Theory): (For ME only)

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
10%	20%	25%	25%	10%	10%

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

List of Tutorial/ lab Project work:

1. Data processing
2. Input data and development of model
3. Calibration and validation of the model
4. Output and visualization

Major equipments: Map digitizer

List of Open Source Software/learning website:

1. http://en.wikipedia.org/wiki/Category:Hydraulic_engineering