

GUJARAT TECHNOLOGICAL UNIVERSITY

CIVIL (WATER RESOURCES ENGINEERING) (33)

HYDROLOGICAL MODELING

SUBJECT CODE: 2723306

SEMESTER: II

Type of course: Mathematical modeling

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)	PA (V)		PA (I)			
ESE	OEP	PA			RP					
3	2#	0	4	70	30	30	0	10	10	150

Content:

Sr.No	Topics	Teaching Hrs.	Module Weightage
1.	Modelling for Surface and groundwater systems:	8	20
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	80

Reference Book:

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

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

Course Outcome:

After learning the course the students should be able to: understand conceptual, statistical, mathematical and simulation models of surface and ground water flow.

Open Ended Projects:GIS based simulation project**Major Equipments: Map Digitizer**

List of Open Source Software/learning website:ARC-GIS ARS-SWAT, HEC-HMS,

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

Review Presentation (RP): The concerned faculty member shall provide the list of peer reviewed Journals and Tier-I and Tier-II Conferences relating to the subject (or relating to the area of thesis for seminar) to the students in the beginning of the semester. The same list will be uploaded on GTU website during the first two weeks of the start of the semester. Every student or a group of students shall critically study 2 papers, integrate the details and make presentation in the last two weeks of the semester. The GTU marks entry portal will allow entry of marks only after uploading of the best 3 presentations. A unique id number will be generated only after uploading the presentations. Thereafter the entry of marks will be allowed. The best 3 presentations of each college will be uploaded on GTU website.