GUJARAT TECHNOLOGICAL UNIVERSITY

CIVIL (WATER RESOURCES ENGINEERING) (33)
STOCHASTIC MODEL IN WATER RESOURCES
SUBJECT CODE: 2733302
M.E. 3rd SEMESTER

Type of course: Stochastic hydrology

Prerequisite: Knowledge of statistics, probabilities and modeling

Rationale: Students will be able to understand probability distribution, structure of hydrological time series, trend and seasonality and various models utilized in stochastic hydrology.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
				Theory Marks		Practical Marks				
L	T	P	C	ESE (E)	PA (M)	ESE (V)		PA (I)		
						ESE	OEP	PA	RP	
3	2#	2	5	70	30	20	10	10	10	150

Content:

Sr. No.	Content	Total Hrs	% Weightage
1	Concept of Probability, Distribution Function, Parameter Estimation, Method of Moments.	**4**	**10**
2	Maximum Likelihood, Least square, Probability Distribution, Structure of hydrological time series, trend and seasonality	**10**	**25**
3	Auto covariance and correlation function, Spectral analysis, data generation techniques.	**10**	**25**
4	Linear stochastic models, stochastic optimization Techniques, AR models, MA models, ARMA models, Modelling of non-stationery time series, Seasonal series, Thomas-Fiering Model, ARIMA Models, Periodic Models, Multi-Site Modelling	**18**	**40**

Reference Books:

1. Jayarami Reddy P., Stochastic Hydrology, Laxmi Publication, 2003.
2. Hippel K.W., McLeod A.I., Panu U.S., Singh V.P., Fang L., Stochastic and Statistical Methods in Hydrology and Environmental Engineering, Springer, 1994.
3. Marco J.B., Harboe R., and Salas J.D., Stochastic Hydrology and Its Use in Water Resources Systems Simulation and Optimization, NATO Advanced Study Institute, Peniscola, Spain, September 18-29, 1989.
4. McCueen, R.H. and Snyder, W.M., Hydrological Modeling - Statistical Methods, and applications, Prentice Hall, 1998

Course Outcome:
After learning the course the students should be able:

Students will be able to perform trend analysis in flood forecasting. They will be able to perform spectral analysis and data generation from the available random data of precipitation, floods etc.

List of Experiments: Nil

Design based Problems (DP)/Open Ended Problem:

1. Problem based on mean model
2. Mediation and standard deviation
3. Probability distribution
4. Auto covariance and correlation function
5. Spectral analysis
6. Problem on data generation techniques
7. Trend analysis of flood data

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.