GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. Advance Manufacturing System (Branch Code - 50)

Year – II (Semester – III) (W.E.F. Jane 2013)

Subject: Simulation Modeling of Manufacturing System (735001)

Sr. No.	Course Content	hours
1	**Introduction: System** - Ways to analyze the system - Model - Types of models - Simulation - Definition - Types of simulation models - Steps involved in simulation - Advantages & Disadvantages. **Parameter estimation:** Estimator – Properties – Estimate - Point estimate - Confidence interval estimates - Independent - dependent — Hypothesis - Types of hypothesis – Steps in Hypothesis – Type I & II errors - Strong law of large numbers.	4
2	**Building of Simulation model validation:** Verification – Credibility - their timing - Principles of valid simulation modeling - Techniques for verification - Statistical procedures for developing credible model - Modeling of stochastic input elements – Importance - Various procedures - Theoretical distribution - continuous - Discrete their suitability in modeling.	6
3	**Generation of random variates:** Factors for selection - Methods - Inverse transform - Composition - Convolution - Acceptance Rejection - Generation of random variables - Exponential - Uniform - Weibull – Normal - Bernoullie - Binomial - Uniform - Poisson **Simulation languages:** Comparison of simulation languages with general purpose languages Simulation languages vs Simulators - Software features - Statistical capabilities - G P S S - SIMAN - SIMSCRIPT —Simulation of WMJI queue — Comparison of simulation languages.	8
4	**Output data analysis:** Types of Simulation w.r.t output data analysis — Warmup period- Welch algorithm — Approaches for Steady State Analysis — Replication & Batch means methods.	5
5	**Applications of Simulation:** Flow shop system — Job shop system — M/M/1 queues with infinite and finite capacities — Simple fixed period inventory system — Newboy paper problem.	5

Text books:

1. Simulation Modelling and Analysis / Law, A.M.& Kelton / McGraw Hill, Edition, New York,1991.
2. Discrete Event System Simulation / Banks J. & Carson J.S., PH/Englewood Cliffs, NJ, 1984.
3. Simulation of Manufacturing Systems/Carrie A. /Wiley, NY, 1990.
4. A Course in Simulation /Ross, S.M., McMillan, NY, 1990.
5. Simulation Modelling and SlMNET/TahaHA./PH,Englewood Cliffs, NJ, 1987

Reference books:

1. John H.Mize and J.Grady Cox, “Essentials of simulation” – Prentice hall 1989.
2. Jeffrey L.Written, Lonnie D, Bentley and V.M. Barice, “System analysis and Design Methods”, Galgotia publication, 1995
3. Shannon R.E., “System simulation”, Prentice Hall 1993.