GUJARAT TECHNOLOGICAL UNIVERSITY

MECHANICAL (PRODUCTION ENGINEERING) (28)

DECISION MODELLING

SUBJECT CODE: 2732805

M.E. SEM-III

Type of course: MAJOR ELECTIVE - IV

Prerequisite: NIL

Rationale: This course provides the knowledge and practice regarding different Develop quantitative models for unstructured decision problems by identifying controllable factors, uncontrollable factors, performance measures, and relationships also this practice gives Entrepreneur to take right decision at right time.

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	Develop quantitative models for unstructured decision problems by identifying controllable factors, uncontrollable factors, performance measures, and relationships.	**05**	**16**
2	Develop and analyze financial planning models and perform sensitivity analysis to identify critical factors.	**05**	**16**
3	Measure uncertainty using probability, and perform Monte Carlo simulation to gain insight into practical business problems.	**05**	**16**
4	Develop and analyze decision tree models for sequential decision problems and determine value of information.	**05**	**16**
5	Use descriptive statistics and charts to summarize cross-sectional and time series data.	**05**	**16**
6	Develop regression models to explain variation, measure relationships, and make predictions.	**05**	**15**
7	Identify patterns in time series data, develop appropriate models, and make forecasts.	**02**	**05**

Reference Books:

1. Hamburg, M., and P. Young. *Statistical Analysis for Decision Making*. Fort Worth, TX: Dryden Press,.

2. Bertsimas, Dimitris, and Robert Freund. *Data, Models, and Decisions: The Fundamentals of Management Science*. Charlestown, MA: Dynamic Ideas, 2004. ISBN: 9780975914601.

3. McClave, J., P. Benson, and T. Sincich. *A First Course in Business Statistics*. Upper Saddle River, NJ: Prentice Hall, 2000. ISBN: 9780130186799.

4. Hamburg, M., and P. Young. *Statistical Analysis for Decision Making*. Fort Worth, TX: Dryden Press

Course Outcome:

After learning the course the students should be able to: Learn how to structure decision problems. In industry many important decisions are made without clearly identifying the decision alternatives and relevant costs. In this class, you will learn how to add structure to a problem by clearly identifying relevant variables, parameters, and sources of uncertainty. Learn how to move from structuring a problem to actually building a mathematical model. Identifying the relevant variables, parameters, and sources of uncertainty is critical, but once this is done it is necessary to put this structure into an appropriate mathematical model. In this class, you will learn about optimization models, decision tree models, and simulation models. Learn how to incorporate uncertainty into the model. Virtually every decision problem involves uncertainty to some degree.

List of Experiments:

Set the experiments based on case study.

Design based Problems (DP)/Open Ended Problem:

1. Monte Carlo simulation for any given data
2. Compare different forecasting techniques
3. Develop decision tree models of given data

Major Equipments:

--NIL---

List of Open Source Software/learning website:

1) http://ocw.mit.edu/courses/sloan-school-of-management/15-060-data-models-and-decisions-fall-2007/download-course-materials/

2) http://msc.maths.ed.ac.uk/or/programme/optional-courses/optimization

3) Excel, LINGO, MiniTAB, R-Programming software

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.