GUJARAT TECHNOLOGICAL UNIVERSITY

PRODUCTION ENGINEERING(25)

PROBABILITY AND INTRODUCTION TO STATISTICS

SUBJECT CODE: 2142505

B.E. 4th SEMESTER

Type of course: Under Graduate

Prerequisite: None**.**

Rationale: The course aims to impart basic managerial skills for collection & analysis of statistical data & taking prompt decision.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
L	T	P	C	Theory Marks			Practical Marks			
				ESE (E)	PA (M)		PA (V)		PA (I)	
					PA	ALA	ESE	OEP		
3	2	0	5	70	20	10	30	0	20	150

L- Lectures; T- Tutorial/Teacher Guided Student Activity; P- Practical; C- Credit; ESE- End Semester Examination; PA- Progressive Assessment; OEP-Open Ended problem; AL-Active learning;

Content:

Sr. No.	Content	Total Hrs	% Weightage
1	**Introduction to Statistical Methods** Statistics & Managerial Decisions, Statistical Data, Operation Research Techniques.	**6**	**15**
2	**Data Collection And Analysis** Collection and presentation of data in terms of tables, graphs, raw data, frequency distributions, histogram etc. Cumulative frequency curve. Measures of central tendency and location, Partition values. Comparison of various measures of central tendencies. Measures of dispersion, skewness & kurtosis, comparison of various measures of dispersion, Moments as measures of Statistical properties, measures of skewness & kurtosis based on moments	**10**	**20**
3	**Probability Distribution & Statistics** Introduction of Probability, sample, space & events, Basic rules of probability, permutation & combinations, conditional probability, Baye's theorem, distributions: Binomial, Poisson, Exponential and Normal distribution with their properties and application. Random variables - discrete and continuous probability distribution functions, probability density functions, mean medium, moment and moment generating functions of Binomial, Poisson, geometric & hyper geometric. Concept of joint probability distribution.	**12**	**25**
4	**Correlation And Regression Analysis** Curve fitting, correlation and regression analysis, Autocorrelation, Multiple regression, statistical Inference & estimation applied to Industrial problems	**8**	**15**

5	**Statistical Tests and Testing of Hypothesis** Elementary theory and practice of sampling, standard error or means and variance, tests of significance, T test, F test, Z test and chi-square test along with their applications, Goodness of fit, testing of hypotheses and decision making, analysis of variance (ANOVA).	**12**	**25**

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks				
R Level	U Level	A Level	N Level	E Level
7	21	14	14	14

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate 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

Reference Books:

1. Quantitative Techniques for Managerial Decision by Srivastava, New Age
2. Probability & Statistics for Engineers by Rao, SCITECH
3. Statistics for Management by Lewis, Pearson
4. Quantitative Techniques in Management by Vohra, TMH
5. Applied Statistics & Probability for Engineers by Sharma, Willey
6. Introduction to Probability & Statistical Application by P.A. Meyer

Course Outcome:

After learning the course the students should be able to:

1. Identify Objectives of Statistical Analysis.
2. Apply Methods of Data collection & Analysis.
3. Use probability as a tool for Statistical Analysis.
4. Use Correlation And Regression Analysis.
5. Apply Statistical Tests.

List of Tutorials:

Should be designed to include followings:

1. Problems related to various types of Data Collection and Analysis.
2. Problems related to Probability Distribution.
3. Problems related to Correlation And Regression Analysis.
4. Problems related to Statistical Tests and Testing of Hypothesis
5. Problems related to Testing of Hypothesis.
6. Case study.

Major Equipment:

1. Computational facility.

2. SPSS Software.

List of Open Source Software/learning website:

1. Minitab software
2. http://nptel.ac.in

ACTIVE LEARNING ASSIGNMENTS: Preparation of power-point slides, which include videos, animations, pictures, graphics for better understanding theory and practical work – The faculty will allocate chapters/ parts of chapters to groups of students so that the entire syllabus to be covered. The power-point slides should be put up on the web-site of the College/ Institute, along with the names of the students of the group, the name of the faculty, Department and College on the first slide. The best three works should submit to GTU.