



GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Master of Engineering

Level: PG

Subject Code: ME03065041

Subject Name: Applied Statistics

w. e. f. Academic Year:	2024-2025
Semester:	III
Category of the Course:	Open Elective

Prerequisite:	Engineering Mathematics and Basic Statistics
Rationale:	In civil engineering field engineer are supposed to process large quantity of data. In transportation, water resources and environmental section of civil engineering are concern with such numerical data. It is very much essential for civil engineer to process such data with applied statistical methods.

Course Outcome:

After Completion of the Course, Student will able to:

No	Course Outcomes	RBT Level
01	Apply various probabilistic distribution to the given data.	A, R
02	Carry out linear and multiple regression analysis.	N, C
03	Calculate confidence interval and test the goodness of fit of the given distribution.	N, U
04	Apply various sampling techniques to engineering problems.	A, E

**Revised Bloom's Taxonomy (RBT)*

Teaching and Examination Scheme:

Teaching Scheme (in Hours)			Total Credits L+T+ (PR/2)	Assessment Pattern and Marks				Total Marks
L	T	PR		C	Theory		Tutorial / Practical	
			ESE (E)		PA / CA (M)	PA/CA (I)	ESE (V)	
2	0	2	3	70	30	20	30	150

Course Content:

Unit No.	Content	No. of Hours	% of Weightage



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1	Probability Distributions: Probability mass functions and probability density function, mean and variance. Binomial, Poisson, Exponential, Gamma, Lognormal and normal distribution: Fitting of the distributions	5	15
2	Sampling techniques: Simple random sampling, stratified sampling, systematic sampling, sample size determination- application in Environmental Engineering.	5	15
3	Regression and correlation: Linear Regression and correlation, multiple correlation coefficient, standard error of estimate, curvilinear regression- Applications.	5	20
4	Statistical inference: Intervals estimation, Confidence interval for mean, variances and regression coefficients. Sampling Distribution, Test of significance of (i) Means (ii) Mean of two samples (iii) Proportions (iv) Variance (v) Two variances (vi) Two observed correlation coefficients (Fishers' z-transformation), (vii) Paired T-test (viii) Regression coefficients (ix) Chi-square test of goodness of fit, Skewness and Kurtosis tests.	7	30
5	Applications: Analysis of variance (i) Completely randomized designs (ii) Randomized block designs. Latin squares. Grecco Latin square design. Factorial experiments. Graphical presentation techniques. Scilab software	6	20
TOTAL		28	100

Suggested Specification Table with Marks (Theory):

Distribution of Theory Marks (in %)					
R Level	U Level	A Level	N Level	E Level	C Level
20	15	20	20	20	5

Where R: Remember; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create (as per Revised Bloom's Taxonomy)

Reference Books:

1. Gupta.S.C. and Kapoor.V.K, Fundamentals of Mathematical Statistics, Sultan Chand and Sons, 1978.
2. Benjamin, Jack.R and Come11.C, Allin, Probability, Statistics and Decision for Civil Engineers, Mc-Graw Hill.
3. Wohl, Martin and Martin, Brian.V, Traffic Systems analysis for Engineers and Planners, Mc-Graw Hill.
4. Richard.A. Johnson: Miller and Freunds, Probability and Statistics for Engineers (6th edition)Pearson.
5. Elhance: fundamentals of Statistics.



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List of Practical/Tutorials based on:

1. Problems on Probability Distribution Binomial and poisson
2. Problems on Simple random sampling
3. Problem on regression and correlation
4. Problem on Test of significance
5. Problem on Analysis of Variance

Open source software and website:

www.scilab.org<http://nptel.ac.in>

<https://nptel.ac.in/courses/109104182>

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