

Name of Faculty	:	Faculty of Computer Science & Applications
Name of Program	:	Master of Computer Application in Data Science
Course Code	:	1MDS01
Course Title	:	Statistical Methods in Decision Making
Type of Course	:	Professional core
Year of Introduction	:	2023-24

Prerequisite	:	--
Course Objective	1	The knowledge to understand sampling, normal distributions, hypothesis testing, and its different types,
	2	The knowledge to understand type 1 and type 2 errors, chi-square testing, and ANOVA.
Course Outcomes	:	At the end of the course the student will be in a position to -
	CO1	To understand the knowledge of random variables on different distribution function.
	CO2	To understand the distribution function in hypothesis testing and critical value decision
	CO3	To understand the importance of estimators in estimating the parameters of regression equation
	CO4	To understand sampling procedure and its applications.
	CO5	To understand the importance of statistical quality control in flawless engineering production
	CO6	To understand the importance of ANOVA techniques in more than two sample means

Teaching and Examination Scheme

Teaching Scheme (Contact Hours)			Credits	Examination Marks				
				Theory Marks		Practical Marks		Total Marks
L	T	P	C	SEE	CIA	SEE	CIA	
3	2	0	4	70	30	0	0	100

Legends: L-Lecture; T-Tutorial/Teacher Guided Theory Practice; P- Practical, C - Credit, SEE - Semester End Examination, CIA - Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations /MCQ Tests, etc.)

Course Content

Unit No.	Topics	Teaching Hours	Weightage	Mapping with CO
1	Special Random Variables: Bernoulli and binomial random variables, computing Binomial distribution function, Poisson random variables, computing Poisson distribution function, hyper geometric random variables, the uniform random variables, exponential random variables - Poisson process, gamma distribution, normal distribution, standard normal form of the normal distribution, distribution arising from normal distribution - Chi Square distribution, t- distribution, F-distribution, logistic distribution.	07	20%	CO1
2	Parameter Estimation: Introduction to estimation theory, maximum likelihood estimation, estimating mean and variance of the normal distribution, moment estimation, interval estimators - confidence interval for a normal mean when the variance is unknown, confidence interval for the variance of a normal distribution, estimating the difference in means of two normal distribution, confidence interval of the mean of the exponential distribution, ordinary least square estimator, properties of ordinary least square estimator, importance of ordinary least square estimator in regression analysis.	07	20%	CO2 CO3
3	Correlation and Regression: Introduction to correlation analysis, properties of correlation coefficients, significance of single correlation coefficient, significance of multiple correlation coefficients, concepts of multiple correlation and partial correlation, concepts of factor, effect, residuals, dependency, independency, assumptions of linear model, difference between linear and nonlinear model, estimation of parameters of regression coefficients using OLS methods, properties of regression coefficients, advantages of OLS, Spurious regression concepts, significance of regression coefficients using t test and F test, relationship between t and F test.	07	20%	CO1 CO4

4	Sampling Methods: Introduction to Sampling, Sampling distribution, concepts of sample, population and universe, probability sampling: Simple Random Sampling with and without replacement, stratified sampling, cluster sampling and systematic sampling, application of probability sampling, statistical properties of probability sampling, concepts and application of non-probability sampling: Convenient sampling, quota sampling, judgmental sampling and snow ball sampling.	08	20%	CO4
5	Multivariate Statistics: Introduction to multivariate statistics, concepts on multinormal distribution, properties of multinormal distribution, concepts of cluster analysis, post cluster analysis on finding the optimal number of clusters from the dataset, Concepts on discriminant analysis, concepts on canonical correlation, Concepts of MANOVA, importance of Hotelling T Square Statistics.	07	20%	CO5 CO6

Suggested Distribution of Theory Marks Using Bloom's Taxonomy

Level	Remembrance	Understanding	Application	Analyse	Evaluate	Create
Weightage	20	30	30	20	0	0

NOTE: This specification table shall be treated as a general guideline for the students and the teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Suggested Learning Websites

Sr. No.	Name of Website
1	https://www.mygreatlearning.com/academy/learn-for-free/courses/statistical-methods-for-decision-making
2	https://www.simplilearn.com/what-is-statistical-analysis-article

Reference Books

Sr. No.	Name of Reference Books
1	Introduction to probability Models, Ninth Edition - Sheldon M. Ross, Elsevier Publication, Academic Press, UK
2	An Introduction to Multivariate Statistical Analysis , Third Edition- T W Anderson, A JOHN WILEY & SONS, INC., PUBLICATION, Hoboken, New Jersey
3	Design and Analysis of Experiments, 8th edition - Douglas C. Montgomery, JOHN WILEY & SONS, INC., PUBLICATION, Hoboken, New Jersey