MINOR BASKET II - QUANTITATIVE TECHNIQUES

SI.No.	Course Code	Course Name	Semester of Study
1	23MAL2MC	Matrix Algebra and Statistics	S3
2	23MAL2MD	Statistics for Management	S4
3	23MAL3MC	Advanced Statistics	S5
4	23MAL3MD	Quantitative Techniques for Decision Making	S6
5	23MAL4MC	Operations Research for Management	S7

Course Code	Course Name	Category	L	т	Ρ	J	Credit	Year of introduction
23MAL2MC	MATRIX ALGEBRA AND STATISTICS	MINOR	3	0	0	0	3	2023

i) COURSE OVERVIEW

The objective of the course is to equip the students with different statistical techniques to summarize, analyze and interpret data, which are essential for decision making. On completion of this course, students would acquire an understanding of descriptive statistical tools like measures of central tendency & measures of variation and apply these tools to real life situations. A brief course in Linear Algebra familiarizes students with some basic techniques in matrix theory which are essential for analyzing linear systems.

ii) COURSE OUTCOMES

After the completion of the course, the student will be able to:

CO1	Compute eigen values and eigen vectors and use them to diagonalize matrices and simplify representation of linear transformations	Apply
CO2	Apply the tools of vector spaces to decompose complex matrices into simpler components, find least square approximations, solution of systems of differential equations etc.	Apply
CO3	Apply different statistical techniques to summarize, analyse the interpret data, which are essential for decision making and hence solve statistical problems	Apply
CO4	Apply measures of dispersion in various fields including finance, economic, business analysis and forecasting.	Apply
CO5	Compute various coefficients to measure the extent of skewness in a distribution and the coefficient of kurtosis.	Apply

iii) SYLLABUS

System of Equations -Eigen values, eigenvectors -Diagonalization of matrices. Decomposition of matrices- solution of linear systems of differential equations by diagonalization. Introduction to Statistics- Measures of central tendency-Positional averages. Measures of dispersion- range, quartile deviation, mean deviation, standard deviation.Moments - skewness and kurtosis.

iv) a) TEXTBOOKS

- Gilbert Strang, Linear Algebra and It's Applications, 4th edition, Cengage Learning, 2006
- 2. Anderson, T.W. and Sclove, S. L. (1978). An introduction to statistical analysis of data. Houghton Miffin/co, USA.

b) **REFERENCES**

- 1. Seymour Lipschutz, Marc Lipson, Schaum's outline of linear algebra, 3rd Ed., Mc Graw Hill Edn.2017
- 2. David C Lay, Linear algebra and its applications, 3rd edition, Pearson
- 3. Saxena, H.C. (1983). Elementary Statistics. S. Chand & Co., New Delhi.
- 4. Gupta S.C. and Kapoor, V.K. (1984). Fundamentals of Mathematical Statistics. Sultan Chand & Co., 3rd Edn, New Delhi.

v) COURSE PLAN

Module	Contents			
I	System of Equations, Eigen values, eigenvectors and eigen spaces of linear transformation and matrices, Properties of eigen values and eigen vectors, Diagonalization of matrices, orthogonal diagonalization real symmetric matrices, Power method for finding dominant eigen value. Problems to management application.	9		
II	LU-decomposition of matrices, QR-decomposition, Singular value decomposition, solution of linear systems of differential equations by diagonalization. Problem solving with these concepts.	9		
111	Introduction to Statistics: Meaning and Definition, functions, scope and limitations. Collection and presentation of data: Methods of data collection, Data presentation using tables & charts, Frequency distribution. Measures of central tendency-arithmetic mean, weighted arithmetic mean, median, mode, geometric mean, harmonic mean. Properties of these averages. Positional averages – quartiles, deciles and percentiles.	9		
IV	Measures of dispersion- range, quartile deviation, mean deviation, standard deviation. Properties of these measures. Relative measures of dispersion – coefficient of variation.	9		
v	Moments - raw and central moments and their interrelationships, Sheppard's corrections for moments for grouped data. Definition and measures of skewness and kurtosis.	9		
	Total	45		

vi) ASSESSMENT PATTERN

Continuous Assessment: End Semester Examination - 40:60

Continuous Assessment						
Attendance	:	5 marks				
Assignments	:	15 marks				
Assessment through Tests	:	20 marks				
Total Continuous Assessment	:	40 marks				
End Semester Examination	:	60 marks				
TOTAL	:	100 marks				

vii) CONTINUOUS ASSESSMENT TEST

- No. of tests: 02
- Maximum Marks: 40
- Test Duration: 1 ½ hours
- Topics: 2 ½ modules

viii) END SEMESTER EXAMINATION

- Maximum Marks: 60
- Exam Duration: 3 hours

Course Code	Course Name	Category	L	т	Ρ	J	Credit	Year of introduction
23MAL2MD	STATISTICS FOR MANAGEMENT	MINOR	3	0	0	0	3	2023

i) COURSE OVERVIEW

The objective of the course is to familiarize the students with modern business & and apply statistical techniques for arriving at sound management decisions. Course also helps in identifying and establishing relationships between real life variables using tools like correlation, regression.

ii) COURSE OUTCOMES

After the completion of the course, the student will be able to:

CO1	Apply the theoretical probability distributions like binomial, Normal in the relevant application areas.	Apply
CO2	Determine the suitability of using correlation analysis in solving business problems	Apply
CO3	Determine the inter-relation between two or more phenomena with the help of curve fitting and regression analysis.	Apply
CO4	Find a best estimator with reference to the different criteria in case of real life application and questionnaires.	Apply
CO5	Apply various tools to examine the quality of a process and product.	Apply

iii) SYLLABUS

Probability mass functions and probability density functions, distribution functions, mean and variance. Binomial, Poisson, Exponential, Gamma, and Normal distribution – Mean and variance. Correlation-Karl Pearson's coefficient of correlation -Spearmen's rank correlation coefficient. Curve fitting and principle of least squares – Regression line -Method of Least Squares - Standard Error of estimate. Introduction to sampling distributions, sampling distribution of mean and proportion- Estimation-Point and Interval estimates for population parameters of large sample and small samples.Quality Control ;Chance causes and Assignable causes-Control charts for variables-Mean (X) - Range [®]-Attributes.

iv) a) TEXTBOOKS

- 1. Richard I. Levin, David S. Rubin, Statistics for Management, Pearson Education, New Delhi 7th Edition, 2011.
- 2. Srivastava, S.C. "Fundamentals of Statistics", Sangya Srivastava Anmol Publications Private Limited, New Delhi,2006.

b) **REFERENCES**

- 1. Gupta.S.P " Statistical Methods" Sultan Chand &Sons 38th Edition 2004
- 2. Grewal B.S., "Higher Engineering Mathematics"- 40th Edition, Khanna Publishers, Delhi 2007.
- 3. Ken Black, Applied Business Statistics, 7th Edition, Wiley India Edition, New Delhi, 2012.
- 4. C.R. Kothari, Quantitative Techniques, Vikas Publishing House Pvt. Ltd, 2013

v) COURSE PLAN

Module	Contents		
I	Probability mass functions and probability density functions, distribution functions, mean and variance. Binomial, Poisson, Exponential, Gamma, and Normal distribution – Mean and variance Fitting of distributions	9	
Π	Correlation- scatter diagram, Karl Pearson's coefficient of correlation and its properties, correlation ratio. Concept of rank correlation, Spearmen's rank correlation coefficient, repeated ranks, Association of attributes.	9	
Ш	Curve fitting and principle of least squares – fitting of first degree, second degree, power curves and exponential curves. Simple linear regression; Estimation of Regression line; Method of Least Squares; Standard Error of estimate; Applications in Management (Problems).	9	
IV	Introduction to sampling distributions, sampling distribution of mean and proportion, application of central limit theorem, sampling techniques. Estimation: Point and Interval estimates for population parameters of large sample and small samples, determining the sample size.	9	
v	Quality Control; Chance causes and Assignable causes; Control charts for variables ; Control chart for Mean (X^-) and Range (R); Control charts for Attributes; Proportion of defective (p chart); Number of defectives per unit (c chart).	9	
	Total	45	



vi) ASSESSMENT PATTERN

Continuous Assessment: End Semester Examination - 40:60

Continuous Assessment						
Attendance	:	5 marks				
Assignments	:	15 marks				
Assessment through Tests	:	20 marks				
Total Continuous Assessment	:	40 marks				
End Semester Examination	:	60 marks				
TOTAL	:	100 marks				

vii) CONTINUOUS ASSESSMENT TEST

- No. of tests: 02
- Maximum Marks: 40
- Test Duration: 1 ½ hours
- Topics: 2 ½ modules

viii) END SEMESTER EXAMINATION

- Maximum Marks: 60
- Exam Duration: 3 hours