DEPARTMENT OF MANAGEMENT STUDIES

COURSE STRUCTURE & SYLLABI
(For the students admitted from year 2023-2024 onwards)

Programme: Certificate Course in Data Analytics

Since 1951

JAMAL MOHAMED COLLEGE (AUTONOMOUS)
Accredited with A++ Grade by NAAC (4th Cycle) with CGPA 3.69 out of 4.0
(Affiliated to Bharathidasan University)
TIRUCHIRAPPALLI – 620 020

CERTIFICATE COURSE IN DATA ANALYTICS

Course Code	Course	Course Title	Total Hours	Credit	Marks		Total
					CIA	ESE	
23MSCT1	Core - I	Fundamentals of Mathematics, Probability and Statistics	40	4	25	75	100
23MSCT2	Core - II	Primer on Inferential statistics and Sampling distributions	40	4	25	75	100
23MSCT3P	Core - III	Practical*	20	2	20	80	100
		Total	100	10			300

*Practical Examinations will be conducted at the end of the Course   Course Duration :10 Weeks

Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
I	23MSCT1	Core - I	4/10	4	25	75	100

Course Title	Fundamentals of Mathematics, Probability and Statistics

SYLLABUS		
Unit	Contents	Hours
I	Probability distribution function & cumulative distribution function. Conditional Probability, Baye's Theorem Problem solving for probability assignments Random Experiments, Mutually Exclusive Events, Joint Events, Dependent & Independent Events.	8
II	Matrices-Square Matrix, Triangular Matrix, Diagonal Matrix, Identity Matrix, Addition of Matrices, Scalar Multiplication, Matrix Multiplication, Matrix Transpose, Determinant, Trace.	8
III	Population vs Sample, Sample Size Simple Random Sampling, Systematic Sampling, Cluster Sampling, Stratified Sampling, Convenience Sampling, Quota Sampling, Snowball Sampling and Judgement Sampling	8
IV	Statistical Thinking-Variable and its types Quantitative, Categorical, Discrete, Continuous- Five Point Summary and Box Plot Outliers, Causes of Outliers, How to treat Outliers, I-QR Method and Z-Score Method.	8
V	Measures of Central Tendency – Mean, Median and Mode Measures of Dispersion – Standard Deviation, Variance, Range, IQR (Inter-Quartile Range) Measure of Symmetricity/ Shape – Skewness and Kurtosis	8

Text Book(s):
1. Gupta S.C., "Fundamentals of Statistics", Himalaya Publishing House, New Delhi. 7th ed 2016.   2.Hari Kishan, A Textbook of Matrices, Atlantic Publisher & Distributors (P) Ltd, New Delhi, 2023   3.Prem. S.Mann, Introductory Statistics, , Wiley India, 7th Edition 2020
Reference Book(s):
1. I. Levin Richard , H. Siddiqui Masood, S. Rubin David Statistics for Management, Pearson Paperback – Organizer, 8th Edition ,27 January 2017   2. Hilmer, C. E., Hilmer, M. J., & Sharma, C. Practical Econometrics, McGraw Hill (2020)   3.Vohra N.D. "Quantitative Techniques in Management", Tata McGraw Hill Education Private Ltd., New Delhi. 7th Edition 2017.
Web Resource(s):
1. https://www.udemy.com/course/master-the-fundamentals-of-probability-and-statistics/   2. https://www.khanacademy.org/math/statistics-probability

Course Outcomes		
Upon successful completion of this course, the student will be able to:		
CO No.	**CO Statement**	**Cognitive Level (K-Level)**
CO1	Remember and explain basic concepts of mathematics and statistics	**K1&K2**
CO2	Apply appropriate sampling techniques to select a sample from the population in real time problems	**K3**
CO3	Examine the application of Probability distribution practically and communicate effectively for decision making.	**K4**
CO4	Estimate the sample statistic and interpret the results in the context of business situations.	**K5**
CO5	Construct the future business scenarios by employing appropriate statistical technique.	**K6**

Relationship Matrix:

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	0	2	0	2	2	3	2	2	2	1	1.6
CO2	2	2	0	2	2	3	2	3	0	2	1.8
CO3	2	2	2	3	3	2	0	3	1	2	2
CO4	2	3	2	1	3	3	2	3	1	2	2.2
CO5	0	2	1	0	3	2	2	3	2	3	1.8
									Mean Overall Score		9.44/5 =1.88
									Correlation		**Medium**

Mean Overall Score	Correlation
< 1.5	Low
≥ 1.5 and < 2.5	Medium
≥ 2.5	High

Course Coordinator: Dr.G.S David Sam Jayakumar

Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
I	23MSCT2	Core - II	4/10	4	25	75	100

Course Title	Primer on Inferential statistics and Sampling distributions

SYLLABUS		
Unit	Contents	Hours
I	Central Limit Theorem -Point estimate and Interval estimate- Creating confidence interval for population parameter.	8
II	Type of test and rejection region. Type of errors in Hypothesis Testing Null and Alternative Hypothesis One-tailed and Two-tailed Tests, Critical Value, Rejection region, Inference based on Critical Value	8
III	Normal Distribution, Properties of Normal Distribution, Z table, Empirical Rule of Normal Distribution-Binomial Distribution-Characteristics of t, F, chi-square and Z Distribution	8
IV	T-Test, Analysis of variance (ANOVA), and Analysis of Covariance (ANCOVA) Regression analysis in ANOVA	8
V	What is Data Wrangling Data Pre-processing and cleaning? How to Restructure the data? What is Data Integration and Transformation? EDA Finding and Dealing with Missing Values. What are Outliers? Using Z-scores to Find Outliers. Bivariate Analysis, Scatter Plots and Heatmaps.	8

Text Book(s):

1. Gupta S.C., "Fundamentals of Statistics", Himalaya Publishing House, New Delhi. 7th ed 2016.
2. Hari Kishan, A Textbook of Matrices, Atlantic Publisher & Distributors (P) Ltd, New Delhi, 2023
3. Prem. S.Mann, Introductory Statistics, , Wiley India, 7th Edition 2020

Reference Book(s):

1. I. Levin Richard , H. Siddiqui Masood, S. Rubin David Statistics for Management,
   Pearson Paperback – Organizer, 8th Edition ,27 January 2017
2. Hilmer, C. E., Hilmer, M. J., & Sharma, C. Practical Econometrics, McGraw Hill (2020)
3. Vohra N.D. "Quantitative Techniques in Management", Tata McGraw Hill Education Private Ltd., New Delhi. 7th Edition 2017.

Web Resource(s):

1. https://www.udemy.com/course/master-the-fundamentals-of-probability-and-statistics/
2. https://www.khanacademy.org/math/statistics-probability

Course Outcomes
Upon successful completion of this course, the student will be able to:

CO No.	CO Statement	Cognitive Level (K-Level)
CO1	Remember and explain the basic concepts of statistical estimation	K1&K2
CO2	Apply appropriate test statistic and to conduct hypothesis testing procedures	K3
CO3	Examine the application of Probability distribution and statistical tests in decision making.	K4
CO4	Estimate the sample statistic and interpret the results in the context of business situations.	K5
CO5	Construct a data matrix	K6

Relationship Matrix:

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	2	2	0	2	2	3	2	3	0	2	1.8
CO2	2	2	2	3	3	2	0	3	1	2	2
CO3	2	2	3	2	3	2	3	0	1	2	2
CO4	1	2	0	2	2	3	2	2	2	1	1.7
CO5	1	2	0	2	2	3	2	2	2	1	1.7
Mean Overall Score											9.2/5
Correlation											1.84

Mean Overall Score	Correlation
< 1.5	Low
≥ 1.5 and < 2.5	Medium
≥ 2.5	High

Course Coordinator: Dr.G.S David Sam Jayakumar

Semester	Course Code	Course Category	Hours/Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
I	23MSCT3P	Core - III	2/10	2	20	80	100

Course Title	Practical

SYLLABUS		
Unit	Contents	Hours
I	SPSS Overview- data matrix -Types of Data- Variable Classification	4
II	Data visualization – Definition, Visualization techniques – Tables, cross tabulation, charts	4
III	Descriptive statistics-Measures of Central Tendency-Dispersion-testing Normality	4
IV	Hypothesis testing-student's t test-F-test-chi-square test	4
V	Simple Correlation and Regression analysis	4

Text Book(s):

1.Jeffrey D.Camm/ James J.Cochran/ Michael J. Fry/ Jeffrey W.Ohlmann/ David R.Anderson/ Dennis J.Sweeney/ Thomas A.Williams - Essentials of Business analytics, Cengage Learning, Second edition, 2017.
2. James Evans, Business Analytics, Pearson Education, Second Edition, 2017
3. Ott, R. Lyman, and Micheal T. Longnecker. An Introduction to statistical methods and data analysis. Nelson Education, 2015

Reference Book(s):

1.Ian H. Witten, Eibe Frank,Mark A. Hall .Data Mining: Practical Machine Learning Tools and Techniques (Morgan Kaufmann Series in Data Management Systems), 4th Edition,20162.
2.Albright Winston, Data Analysis and Decision making,Cengage Learning, Reprint 2016

Web Resource(s):

1. https://www.ibm.com/spss
2. https://www.spss-tutorials.com/spss-what-is-it/
3. https://researchcommons.library.ubc.ca/introduction-to-spss-for-statistical-analysis/

Course Outcomes

Upon successful completion of this course, the student will be able to:

CO No.	CO Statement	Cognitive Level (K-Level)
CO1	Remember and explain the basic concepts of data matrix and classification	K1&K2
CO2	Apply appropriate visualisation techniques to extract meaningful information.	K3
CO3	Examine the normality of the data.	K4
CO4	Estimate the sample statistic and interpret the results in the context of business situations.	K5
CO5	Employ appropriate statistical technique to predict the future business scenario.	K6

Relationship Matrix:

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	0	2	0	2	2	3	2	2	2	1	1.6
CO2	2	2	0	2	2	3	2	3	0	2	1.8
CO3	2	2	2	3	3	2	0	3	1	2	2
CO4	2	3	2	1	3	3	2	3	1	2	2.2
CO5	0	2	1	0	3	2	2	3	2	3	1.8
										Mean Overall Score	9.44/5 =1.88
										Correlation	**Medium**

Mean Overall Score	Correlation
< 1.5	Low
≥ 1.5 and < 2.5	Medium
≥ 2.5	High

Course Coordinator: Dr.G.S David Sam Jayakumar