Royal College of Arts Science andCommerce (Autonomous)

Affiliated to University of Mumbai

OPEN ELECTIVE

Course: DESCRIPTIVE STATISTICS

Syllabus for Semester: I and II

Syllabus for Undergraduate Programme as per National Education Policy (NEP-2020)

with effect from the academic year

2024-2025

Course/ Paper Title	Descriptive Statistics – I
Course offered as	Open elective (OE)
Course Code	RUSMAOE101
Semester	I
No. of Credits	2
No. of lecture Hours/week	2

Sr No.	Course Learning Objectives:
CLO1	to give deep understanding of fundamental statistical concepts and apply this knowledge to real-world scenarios.
CLO2	to develop practical skills of analyzing data and graphical representation using softwares like spreadsheets
CLO3	to enhance critical thinking skills by analyzing and interpreting statistical findings.
CLO4	to learn to apply statistical concepts creatively to solve real-world problems, demonstrating adaptability and innovation in different professional contexts

Course Outcome

	On completing the course, the student will be able to:
CO1	remember and recall key statistical terminologies and concepts
CO2	understand the foundational principles of statistics and data representation.
CO3	apply statistical concepts and evaluate statistical measures to real-world datasets.
CO4	analyze data patterns, relationships and frequency distributions using statistical tools
CO5	develop the ability to create various graphical representations for qualitative and quantitative data.

Detailed Syllabus:

Module	Title with content	No. of lectures
I	**Introduction to Statistics:** Statistics: Definition and scope. Concepts of statistical population and sample, drawing samples using: Simple random sampling, Stratified, Systematic and Cluster sampling methods (concepts only). **Data:** Quantitative and qualitative, discrete and continuous. Scales of measurement: nominal, ordinal, interval and ratio. Collection of data, Presentation of data: tabular, Frequency distributions, cumulative frequency distributions. **Graphs:** Drawing of Frequency Curves, Histogram and ogives. Use of software (SPREADSHEET) for data visualization.	15 Hours
II	**Univariate data analysis:** **Measures of Central Tendencies:** Definition of Average, Types of Averages, Arithmetic Mean, Median, and Mode for grouped as well as ungrouped data. Quartiles, Deciles and Percentiles. Using Ogive to locate median and Quartiles. Using Histogram to locate mode. Combined and Weighted mean. **Measures of Dispersion:** Concept and idea of dispersion. Various measures Range, Quartile Deviation, Mean Deviation, Standard Deviation, Variance, Combined Variance. Use of SPREADSHEET for data analysis.	15 Hours

References:

1. Statistics for Management - Levin R., Rubin D.S. (Prentice Hall of India)
2. Statistics - Theory, Method & Applications D. S. Sancheti & V. K. Kapoor.
3. Mathematics for Economics and Finance Methods and Modelling by Martin Anthony and Norman Biggs, Cambridge University Press, Cambridge low-priced edition, 2000
4. STATISTICS by Schaum Series

Course/ Paper Title	Descriptive Statistics – II
Course offered as	Open elective (OE)
Course Code	RUSMAOE201
Semester	II
No. of Credits	2
No. of lecture Hours/week	2

Sr No.	Course Learning Objectives:
CLO1	to define and explain fundamental statistical concepts, including scatter diagrams, correlation, regression and probability.
CLO2	to apply the Method of Least Squares for curve fitting and regression analysis to analyze real-world datasets.
CLO3	to interpret the results of correlation coefficients and regression analysis by considering their implications for decision-making
CLO4	to evaluate the strengths and limitations of statistical techniques such as correlation, regression and probability and use statistical analysis to make informed decisions and recommendations in various professional settings.

Course Outcome:

	On completing the course, the student will be able to:
CO1	recall fundamental concepts related to data analysis, including scatter diagrams, correlation and regression and memorize key principles and methods involved in curve fitting and probability theory
CO2	comprehend the relationship between scattered data and the need for curve fitting and understand the different types of correlation coefficients and their interpretations.
CO3	apply the method of Least Squares to fit curves and regression lines to the given datasets and use regression techniques to obtain meaningful results from real-world data. Also implement probability concepts to analyze and solve practical problems.
CO4	analyze and evaluate the impact of outliers on correlation coefficients and regression lines and also analyze algebraic operations of events and their implications in probability.
CO5	synthesize information to choose appropriate regression models based on data characteristics and evaluate the strengths and limitations of correlation and regression techniques in various scenarios.
CO6	formulate strategies for finding expectation and variance of a given random variable and also create real-world scenarios that demonstrate the relationship between statistical concepts and practical decision-making.

Detailed Syllabus:

Module	Title with content	No. of lectures
I	**Bivariate Linear correlation and Regression:** Meaning, Types of Correlation, Determination of Correlation: Scatter diagram, Karl Pearson's method of Correlation Coefficient (excluding Bivariate Frequency Distribution Table) and Spearman's Rank Correlation Coefficient. Meaning, Concept of Regression equations, Slope of the Regression Line and its interpretation. Regression Coefficients (excluding Bivariate Frequency Distribution Table), Relationship between Coefficient of Correlation and Regression Coefficients, Finding the equations of Regression lines by method of Least Squares. Use of software (SPREADSHEET) for data analysis.	15 Hours
II	**Probability distribution:** Concept of probability, introduction and basics, counting principle, permutations, combinations, conditional probability, Multiplication theorem for two events, Independence of events: Pairwise and Mutual Independence of events. Bayes' theorem (statement only). Random variables, probability mass function, probability density function, expectation, variance, random variables, Normal distribution.	15 Hours

References:

1. Statistics for Management - Levin R., Rubin D.S. (Prentice Hall of India)
2. Statistics - Theory, Method & Applications D. S. Sancheti & V. K. Kapoor.
3. Mathematics for Economics and Finance Methods and Modelling by Martin Anthony and Norman Biggs, Cambridge University Press, Cambridge low-priced edition, 2000
4. STATISTICS by Schaum Series

Royal College of Arts, Science and Commerce

(Autonomous)

Evaluation Pattern for Open Elective

	Continuous Internal Assessment	
A	One class test	25 marks
B	Assignments/Presentations/Projects	20 marks
C	Attendance	05 marks
	Total	50 marks

Question Paper Pattern (Class test):

Objective (MCQ – 10)	10 Marks (1 Mark each)
Short answer questions (5)	10 Marks (2 Marks each)
Attempt any 1 out of 2 descriptive questions	5 Marks (5 Marks each)
Total	25 Marks
Duration	45 minutes

Board of studies in Mathematics

	Category	Name and Designation	Affiliation
1	Chairperson (Head of Department)	Mrs Komal Pravin Wategaonkar, Assistant Professor.	University of Mumbai
2	Full time teacher of the Department	Mrs Rugma Pramod Nair, Assistant Professor.	University of Mumbai
3	Two subject experts from outside the Parent University nominated by the Academic Council.	Dr Ananthnarayan Hariharan, Associate Professor.	I.I.T., Bombay
		Dr. Amiya Bhowmick, Assistant Professor.	ICT Mumbai
4	One expert nominated by the Vice-Chancellor from a panel of six recommended by the College Principal.	Dr. Rajesh Raut Assistant Professor, R. D. National college.	University of Mumbai
5	One expert nominated by the college Principal	Mr. Subhash Krishnan Associate Professor, Vice Principal, K J Somaiya college of Science and Commerce.	University of Mumbai
6	One representative from industry/corporate sector/allied area relating to placement.	Mr. Arbaz Sayed Data Scientist	Reliance Corporate Park, Ghansoli, Navi Mumbai
7	One postgraduate meritorious alumnus nominated by the Principal.	Ms. Harshita Rathore, Team Lead, Inventory Management	Cisco, Atlanta, USA

Board of studies in Mathematics

	Category	Name and Designation	Affiliation	Signature
1	Chairperson (Head of Department)	Mrs Komal Pravin Wategaonkar Assistant Professor	University of Mumbai	Wategaonkar 22/6/24
2	Full time teachers of the Department	Mrs Rugma Pramod Nair Assistant Professor	University of Mumbai	22/6/24
3	Two subject experts from outside the Parent University nominated by the Academic Council.	Dr Ananthnarayan Hariharan Associate Professor	I.I.T., Bombay	FEEDBACK SENT ON OFFICIAL EMAIL
		Dr. Amiya Bowmick Assistant Professor	ICT Mumbai	online
4	One expert nominated by the Vice-Chancellor	Dr. Rajesh Raut Assistant Professor RD National College	University of Mumbai	R.B.Raut 22/06/2024
	One expert nominated by the College Principal.	Mr. Subhash Krishnan Associate Professor, Vice Principal, KJ Somaiya college of Science and Commerce	University of Mumbai	22/6/24
5	One representative from industry/corporate sector/allied area relating to placement.	Mr. Arbaz Sayed Data Scientist	Reliance Corporate Park, Ghansoli, Navi Mumbai	22/6/24
6	One postgraduate meritorious alumnus nominated by the Principal.	Ms Harshita Rathore Team Lead, Inventory Management,	Cisco, Atlanta, USA	online

ROYAL COLLEGE OF ARTS SCIENCE & COMMERCE DIST. THANE

Principal
ROYAL COLLEGE OF ARTS
SCIENCE & COMMERCE
PENKAR PADA, MIRA ROAD,
DIST : THANE. PIN : 401107.