AC – 20/04/2024
Item No. – 6.7 Sem. II (3b)

As Per NEP 2020

University of Mumbai

Syllabus for Basket of Minor	
Board of Studies in Data Science	
UG First Year Programme	
Semester	**II**
Title of Paper	**Credits 2/ 4**
I. DS_Descriptive Statistics (Minor)	**2**
From the Academic Year	**2024-2025**

Name of the Course: DS_Descriptive Statistics

Sr.No.	Heading	Particulars
1	**Description of the course:**	Descriptive Statistics serves as a foundational element in the vast landscape of Data Science, providing essential tools and techniques for understanding, summarizing, and visualizing data. In this course, students delve into the fundamental principles and methodologies of Descriptive Statistics, which form the bedrock upon which more advanced statistical analyses are built. Through a combination of theoretical concepts and practical applications, students gain a comprehensive understanding of how to effectively analyze and interpret data. Descriptive statistics plays a pivotal role in various industries due to its versatile applications in data analysis, decision-making, and problem-solving. **Application**: Market Research and Consumer Behaviour Analysis, Financial Analysis and Risk Management, Healthcare and Epidemiology, Quality Control and Process Improvement, Education and Academic Research, Social Sciences and Public Policy, Sports Analytics and Performance Analysis, Environmental Science and Climate Research
2	**Vertical**	**Minor**
3	**Type**	Theory
4	**Credits**	2 credits (1 credit = 15 Hours for Theory)
5	**Hours Allotted**	30 Hours
6	**Marks Allotted**	50 Marks
7	**Course Objectives (CO):** **CO 1:** To understand different types of Data, and to analyze and present the data. **CO 2**: To compute various Measures of Central Tendencies. **CO 3**: To compute various Measures of Dispersion. **CO 4**: To understand the concept of Skewness and Kurtosis. **CO 5**: To compute the Correlation Coefficient for bivariate data and further apply the regression analysis.	
8	**Course Outcomes (OC):** **CO 1.** Able to organize, manage, and present the data.	

	CO 2. To understand the use of Measures of Central Tendencies and Dispersion. **CO 3.** Able to understand and compute the consistent and inconsistent data **CO 4.** Able to identify the association between variables **CO 5.** Able to understand forecasting techniques and to find cause and effect relationship between variable through regression analysis.
9	**Modules: -** **Module 1:**
	1. **Introduction of Statistics**: Meaning of Statistics as a Science, Importance of Statistics. Statistical organizations in India and their functions: CSO, ISI, NSS, IIPS (Devnar, Mumbai), Bureau of Economics and statistics. Concept of population and sample. Finite, Infinite population ,Notion of SRS,SRSWOR and SRSWR I b) Types of Characteristics, Different types of scales: nominal, 12 ordinal, interval and ratio scale. Linear and circular scale. Univariate frequency distribution of discrete and continuous variables and Cumulative frequency distribution. Data Presentation: Frequency Distribution, Histogram and Ogives Curves. 2. **Measures of Central Tendencies**: Concept of Central Tendency, characteristics of good measures of Central Tendency, Positional Averages: Median, Mode, Partition values: Quartiles, Deciles and Percentiles -examples of ungrouped and grouped data 3. **Measures of Dispersion:** Concept of Dispersion, Requirements of good measures of Dispersion, Absolute and Relative measures of Dispersion: Range, Quartile Deviation, Mean Absolute Deviation, Standard Deviation, Combined Standard Deviation-examples of ungrouped and grouped data **4. Raw and Central Moments**: relation between Raw and Central moments, concept of Skewness and Kurtosis.
	Module 2:
	1. Concept of Correlation, types and interpretation, Scatter Diagram, Product Moment Correlation Coefficient, and its properties **2.** Spearman' s Rank Correlation (with and without ties) **3.** Concept of Linear Regression, Principle of Least Square, Fitting a straight line by method of least square. **4.** Difference between Correlation and Regression, relation between Correlation and Regression **5.** Concept of multiple correlation **6.** Concept of multiple regression and logistics regression
10	**Text Books** **1.** Sarma, K. V. S. (2001). Statistics Made it Simple: Do it yourself on PC. Prentce Hall of India, NewDelhi. **2.** Agarwal, B. L. (2003). Programmed Statistics, Second Edition, New Age International Publishers, NewDelhi. **3.** Purohit, S. G., Gore S. D., Deshmukh S. R. (2008). Statistics Using R, Narosa Publishing House, NewDelhi.

	4. Schaum"s Outline Of Theory And Problems Of Beginning Statistics, Larry J. Stephens, Schaum"s Outline Series Mcgraw-Hill **5.** Gupta, S.C. and Kapoor, V.K. (1987): Fundamentals of Mathematical Statistics, S. Chand and Sons, New Delhi	
11	**Reference Books** **1.** Goon AM,Gupta MK, Das Gupta B: Fundamentals of Statistics, Vol-I, the World Press Pt. Ltd, Kolkata **2.** Shah R.J: Descriptive Statistics: Seth Publication, Eight Edition **3.** Spiegel M.R: Theory and Problems of Statistics, Schaum's Publishing Series, Tata McGraw-Hill, First Edition **4.** Basic Statistics: Agarwal B.L: New Age International Ltd	
12	**Internal Continuous Assessment: 40%**	**Semester End Examination: 60%**
13	**Continuous Evaluation through:** Class test of 1 of 15 marks Class test of 2 of 15 marks Average of the two: 15 marks Quizzes/ Presentations/ Assignments: 5 marks Total: 20 marks	
14	**Format of Question Paper:** Q1: Attempt any two (out of four) from Module 1 (15 marks) Q2: Attempt any two (out of four) from Module 2 (15 marks)	

Sign of Chairperson
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