

University of Mumbai



Syllabus for Basket of OE	
Board of Studies in Statistics	
UG First Year Programme	
Semester - II	
Title of Paper	Credits 2
I) Buisness Mathematics and Statistics-II	2 credit
From the Academic Year	2024-25

Semester-II Open Elective-II

Name of the Course: Business Mathematics and Statistics -II

Sr.No.	Heading	Particulars
1	Description the course: Including but not limited to: Introduction: Business Mathematics and Statistics explore the practical applications and significance of mathematical and statistical techniques in various fields, focusing on functions, derivatives, and their applications, as well as bivariate linear correlation and regression. It discusses how these techniques are employed to analyze and interpret data, make predictions, and solve real-world problems. Relevance and Usefulness: • Business Mathematics and Statistics equips learner with the skills to extract meaningful information from data, helping businesses to optimize their strategies and operations. • Business Mathematics and Statistics explains how derivatives are used to calculate rates of change, optimize functions, and solve problems in various disciplines. • Business Mathematics and Statistics can be used to analyze the rate of change and optimize functions. • It highlight how a deep understanding of functions, derivatives, and bivariate linear correlation and regression can lead to better decision-making, improved predictions, and enhanced problem-solving capabilities. • It helps learn to Illustrate how bivariate linear correlation and regression are applied in fields like social sciences, finance, healthcare, and environmental studies to identify patterns, make predictions. Application, and Demand: • Business Mathematics and Statistics help to discuss how functions help in analyzing and predicting business trends, consumer behavior, and market dynamics. • It explains how derivatives are applied in risk management, particularly in determining the risk exposure of financial instruments and portfolios. • Business Mathematics and Statistics highlight the importance of correlation and regression analysis in commerce for studying relationships between variables like sales and advertising expenditure, or stock prices and market indices. • Discuss how proficiency in these techniques can enhance employability and career prospects in areas like financial analysis, market research, and business consulting. • Understanding statistical techniques enables students to analyze market trends and predict future movements, which is valuable for making investment recommendations. Job Prospects: Business Mathematics and Statistics are in high demand across various job roles such as Data Analyst, Business Analyst, Market Research Analyst, Financial	

	Analyst, Operations Manager, Risk Analyst, Statistician, Management Consultant Connection with Other Courses: Business Mathematics and Statistics relates to other courses like Economics, Mathematics, Computer Science, Business Management, medical science and technology. Additional Areas : Business Mathematics and Statistics plays a crucial role in Analyzing environmental data, monitor pollution levels, assess climate change impacts, and develop sustainable practices. In sports, statistics are employed for performance analysis, player evaluation and game strategy optimization,	
2	Vertical:	Open Elective
3	Type:	Theory
4	Credits:	2 credits
5	Hours Allotted:	30 Hours
6	Marks Allotted:	50 Marks
7	Theory (2 Credit) Total No of Theory Hours: 30 Total Marks : 50 Course Objectives (CO): (List the course objectives) 1. Understand the concept of functions and their representations. 2. Apply derivatives to analyze the behaviour of functions, including finding extreme, inflection points, and graphing. 3. Use derivatives in optimization problems, such as maximizing profit or minimizing cost. 4. Understanding of correlation and regression analysis for analyzing the relationship between two variables. 5. Learn how to calculate and interpret correlation coefficients to measure the strength and direction of linear relationships. 6. Develop the ability to perform linear regression analysis to model and predict the value of one variable based on another. 7. Apply regression analysis to make data-driven decisions and predictions in fields such as business, social sciences, and healthcare.	

8	Course Outcomes (OC): (List the course outcomes) 1. Understand the concept of functions and their representations. 2. Apply derivatives to analyze the behavior of functions, including finding extrema, inflection points, and graphing. 3. Use derivatives in optimization problems, such as maximizing profit or minimizing cost. 4. Understand the concept of correlation and regression in analyzing relationships between two variables. 5. Calculate and interpret correlation coefficients to measure the strength and direction of linear relationships. 6. Perform linear regression analysis to model and predict the value of one variable based on another. 7. Capacity to interpret statistical results and make informed business decisions based on data. 8. Competence in applying statistical methods to solve real-world business problems.
----------	--

Open Elective (Business Mathematics and Statistics -II)

Module 1:	Functions, Derivatives and their applications	15 hrs
1.1	Concept of real functions: constant function, linear function, x^a , ax , e^x , $\log x$. Demand, Supply, Total Revenue, Average Revenue, Total Cost, Average cost and profit function. Equilibrium Point, Break-even point.	8
1.2	Derivative of functions: i) Derivative as rate measure, Derivative of x^a , ax , e^x , $\log x$. ii) Rule of derivatives: Scalar multiplication, sum, difference, product, quotient (Statements only), Simple problems. Second order derivatives. iii) Applications: Marginal Cost, Marginal Revenue, Elasticity of Demand. Maxima and Minima for functions in Economics and Commerce. (Examination Questions on this unit should be application oriented only)	7
Module 2:	Bivariate Linear Correlation and Regression	15 hrs
2.1	Correlation Analysis: 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.	7
2.2	Regression Analysis: 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.	8

9	Reference Books 1. Mathematics for Economics and Finance Method and Modeling by Martin
----------	---

	Anthony and Norman Biggs Cambridge University press, Cambridge low-price edition, 2000, chapters 1,2,4,6,to 9 & 10. 2. Applied Calculus : By Stephrn Waner and Steven Constenoble, Brooks/ Cole Thomson Learning second edition, chapter 1 to 5 3. Business Mathematics by D. C. Sancheti and V. K. Kapoor, Soltan Chand & Sons, 2006, chapter 1,5,7,9& 10 4. Mathematics for Business Economics: By J.D. Gupta, P.K Gupta And Man Mohan, Tata Mc-Graw Hill Publishing Co. Ltd., 1987, Chapter 9 to 11 & 16. 5. Quantitative Method- Part- I By Saha and S. Mukerji, New Central Book Agency,1996 Chapter 7& 12 6. Mathematical Basis of Life Insurance By S.P.Dixit, C.S. Modi and R.V. Joshi, Insurance Institute of India Chapter 2 ; unit 2.6, 2.9, 2.20 & 2.21 7. Securities Law & regulation of Financial Market : Intermediate Course Paper 8, Institute of Company Secretaries of India, chapter 11. 8. Investments by J.C. Francis & R.w. Taylor, Schaum's Outlines, Tata Mc-Graw Hill Edition 2000, Chapter 2, 4& section 25.1 . 9. Indian Mutual Funds Handbook :by Sundar Shankaran, Vision Books, 2006, Sections 1.7, 1.8.1,6.5 & Annexures 1.1 to 1.3 1
--	--

Format of Question Paper:

Internal Continuous Assessment: (20 marks)

Assignment/viva Quizzes, Class Tests, presentation, project, assignment etc	Class Test	Total
05	15	20

Semester End Examination: (30 marks)

Semester End Examination will be of 30 marks of 01 hour duration covering entire syllabus of the semester. Examiners should frame sub questions for Q.1, Q2 and Q3. Each question carrying 15 marks. Attempt any two out of three questions.

Theory Question Paper Pattern:

Q 1	Max. marks: 15	Attempts any two questions out of Three.
Q 2	Max. marks: 15	
Q 3	Max. marks: 15	

**Sign of the BOS
Chairman
Dr. Santosh Gite
Board of Studies in
Statistics**

**Sign of the
Offg. Associate Dean
Dr. Madhav R. Rajwade
Faculty of Science &
Technology**

**Sign of the
Offg. Dean
Prof. Shivram S. Garje
Faculty of Science &
Technology**