Semester IV	
Course name: BUSINESS MATHEMATICS AND STATISTICS - 2	
Course code: M2BC230411T	
Course Credits: 4	
Pedagogy: The lecture series will adopt a blended approach, combining traditional "chalk and talk" methods with multimedia-enhanced presentations using PowerPoint. This dual approach aims to cater to diverse learning styles, providing clarity through traditional explanations while utilizing visual aids to enhance comprehension. Class discussions, problem-solving exercises, and Q&A sessions will be incorporated to engage students in the learning process. The chalk and talk method will allow for immediate clarification of doubts and personalized attention. This pedagogical approach aims to create an engaging and supportive learning environment, ensuring that students acquire a solid foundation in business mathematics and statistics through a combination of traditional teaching methods and modern technological aids.	
Course Description: This course serves as a seamless integration of statistics and mathematics, building upon the material covered in Semester-III. The statistical component delves into the Mathematics of Finance, Index Numbers, Time Series Analysis, Continuous Probability Distribution, and foundational aspects of Sampling Theory. In the mathematical realm, the course commences with Calculus, encompassing Partial Derivatives and Integration, while also introducing the Linear Programming Problem.	
Learning Objectives: LO1. The objective of this course is to familiarize the students with the basic mathematical tools, with an emphasis on applications to business and economic situations.	
Course Outcomes: CO1. Ability to summarize and present data to a diverse audience. CO2. Understand and use sampling and inferential statistics. CO3. Ability to use spreadsheet software for data analysis and statistical model building. CO4. Learn management science tools, linear and integer programming. CO5. Identify opportunities for application of management science tools. CO6. Ability to build and solve linear programming models using spreadsheet software. CO7. Develop critical thinking and problem-solving skills.	

Unit No.	Unit Name	Topics	Nos. of lectures
1	**Calculus II**	**Partial Differentiation:** ● Partial derivatives up to second order. ● Homogeneity of functions and Euler's theorem. ● Total differentials. ● Differentiation of implicit functions with the help of total differentials. ● Maxima and Minima: cases of two variables involving not more than one constraint. **Integration:** ● Standard forms. ● Methods of integration by substitution, by parts, and by use of partial fractions. ● Definite integration. ● Finding areas in simple cases.	14

2	**Mathematics of Finance**	- Rates of interest-nominal, effective- and their inter-relationships in different compounding situations. - Compounding and discounting of a sum using different types of rates. - Types of annuities, like ordinary, due, deferred, continuous, perpetual, and their future and present values using different types of rates of interest. Depreciation of Assets.	5
3	**Linear Programming Problem**	- Formulation of linear programming problem (LPP). - Graphical solution to LPP. - Cases of unique and multiple optimal solutions. - Unbounded solutions, infeasibility, and redundant constraints.	5
4	**Index Numbers**	- Meaning and uses of index numbers. - Construction of index numbers: fixed and chain base: univariate and composite. Aggregative and average of relatives- simple and weighted. - Tests of adequacy of index numbers. - Problems in the construction of index numbers. - Construction of consumer price indices: Important share price indices, including BSE SENSEX and NSE NIFTY.	6
5	**Time Value of Money**	- Components of time series. - Additive and multiplicative models. - Trend analysis: fitting of trend line using principle of least squares – linear and parabolic; moving averages method. - Seasonal variations: calculation of seasonal indices using simple averages.	4
6	**Continuous Probability Distribution**	- Probability density function (pdf). - Idea of cumulative distribution function (cdf) with application. - Normal distribution and its application.	8
7	**Sampling Theory and Inferential Statistics**	- Sampling: Populations and samples, Parameters and Statistics, Descriptive and inferential statistics; Sampling methods (including Simple Random sampling, Stratified sampling, Systematic sampling, Judgement sampling, and Convenience sampling). - Concept of Sampling distributions and Theory of Estimation: Point and Interval estimation of means (large samples) and proportions. - Testing of Hypothesis: z-test, Chi-square test (goodness of fit).	10

SUGGESTED TEXT BOOKS/ READING MATERIALS:

- J. Chakrabarti. Business Mathematics and Statistics- II. Dey Book Concern.
- J. K. Das. Statistics for Business Decisions. Academic Publishers.
- Mizrahi and Sullivan. Mathematics for Business and Social Sciences. Wiley and Sons.
- Goon, Gupta and Dasgupta, Fundamentals of Statistics, Vol. II. World Press Private Limited.
- G. V. Shenoy and M. Pant. Statistical Methods in Business and Social Science. Macmillan.
- Budnick, P. Applied Mathematics. McGraw Hill Education.
- R.G.D. Allen, Mathematical Analysis for Economists.
- Ayres, Frank Jr. Schaum's Outlines Series: Theory and Problems of Mathematics of Finance. McGraw Hill Education.
- Dowling, E.T., Mathematics for Economics, Schaum's Outlines Series. McGraw Hill Education.
- Wikes, F.M., Mathematics for Business, Finance and Economics. Thomson Learning.
- D. George and P. Mallary. SPSS for Windows: step by Step. Pearson Education.
- S. L. Gupta. & Gupta Hitesh. SPSS 17.0 for Researchers. International Book House Pvt. Ltd.