



College of Arts,
Science &
Commerce (Autonomous)

RISE WITH EDUCATION

NAAC REACCREDITED - 'A' GRADE

**SIES College of Arts, Science and Commerce
(Autonomous)**

Affiliated to University of Mumbai

Syllabus under NEP - June 2023

with effect from the academic year 2023-24

Department of Mathematics

Open Elective Courses

Sem I: Business Mathematics and Statistics I

Sem II: Business Mathematics and Statistics II

offered to F.Y. B.Com.

Choice Based Credit System (CBCS)

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1. Course structure with minimum credits and Lectures/ Week

Type	Course Code	Sem	Course Name	Credits	L/P/T (per week)
OPEN ELECTIVE (OE)	SIUMTOE111	I	Business Mathematics and Statistics I	2+2	2L+2T
			Unit 1: Commission, Brokerage and Discount.		
			Unit 2: Shares and Mutual Funds		
			Unit 3: Measures of Central Tendencies and Measures of Dispersions		
			Unit 4: Decision Theory		
	SIUMTOE121	II	Business Mathematics and Statistics II	2+2	2L+2T
			Unit 1: Functions, Differentiation and Annuity		
			Unit 2: Bivariate Linear Correlation		
			Unit 3: Regression		
Unit 4: Time series and Index Numbers					
1L = 1 Hour per week, 1T= 1 Hour per week, 1P (Practical) = 2 Hours per week					

2. Syllabus for Semester I with Course Outcomes

Course Name: Business Mathematics and Statistics I Credits: 4 , 2L , 2 T

Expected Course Outcomes:

After completion of the course, students will be able to

1. understand concepts in commission brokerage and discount, shares and mutual funds, measures of central tendency such as Mean, Median, Mode, Quartiles, Deciles, Percentiles; measures of dispersion such as Quartile deviation, Mean deviation, Standard deviation and state the relevant definitions, decision theory
2. solve problems of shares and mutual funds, measures of central tendency, measures of dispersion, decision theory

Pre-requisites: Percentage, Ratio and Proportion, Basic Probability

Unit I: Commission, Brokerage and Discount.

- a) Simple examples on Commission and Brokerage
- b) Discounts: Trade discount, cash discount, profit and loss

Unit II: Shares and Mutual Funds

- a) **Shares:** Concept of share, face value, market value, dividend, equity shares, preferential shares, bonus shares. Simple examples
- b) **Mutual Funds:** Simple problems on calculation of Net income after considering entry load, dividend, change in Net Asset Value (N.A.V.) and exit load. Averaging of price under the Systematic Investment Plan (S.I.P.)

Unit II: Measures of Central Tendencies and Measures of Dispersion:

- a) **Graphs:** Drawing of Frequency Curves, Histogram and ogives.
- b) **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.
- c) **Measures of Dispersions:**
Concept and idea of dispersion. Various measures Range, Quartile Deviation, Mean Deviation, Standard Deviation, Variance, Combined Variance.

Unit IV: Decision Theory:

Decision making situation, Decision maker, Courses of Action, States of Nature, Pay-off and Pay-off matrix; Decision making under uncertainty, Maximin, Maximax, Minimax regret and Laplace criteria; simple examples to find optimum decision. Formulation of Payoff Matrix. Decision making under Risk, Expected Monetary Value (EMV); Expected Opportunity Loss(EOL), Decision Tree; Simple examples based on EMV. Expected Opportunity Loss (EOL), simple examples based on EOL.

Tutorials

Tut No	<u>Topic</u>
1	Commision and Brokerage
2	Discounts
3	Shares
4	Mutual Funds
5	Measures of central tendency- Graphical Methods and using formula
6	Measures of dispersion
7	Decision making under uncertainty
8	Decision making under risk

References:

- 1) Business Mathematics by D. C. Sancheti and V. K. Kapoor, Sultan Chand & Sons.
- 2) STATISTICS by Schaum Series.
- 3) Operations Research by Gupta and Kapoor.
- 4) Fundamentals of Statistics - D. N. Elhance.
- 5) Statistical Methods - S.G. Gupta, S. Chand & Co.
- 6) Business Mathematics & Statistics : B Aggarwal, Ane Book Pvt. Limited.
- 7) Business Mathematics : A P Verma, Asian Books Pvt. :Limited.
- 8) Mathematical And Statistical Techniques - I FYBcom Sem 2 Sheth Publication

Scheme of Evaluation:

I) Continuous Internal Evaluation (50 Marks)	
Class Test I (Objective type)	20 Marks
Class Test II (Descriptive type)	15 Marks
Tutorial Notebook	10 Marks
Class Participation/Attendance	5 marks
II) Theory Examination (50 Marks)	
Semester End Examination based on entire syllabus	50 Marks

3. Syllabus for Semester II with Course Outcomes

Course Name: Business Mathematics and Statistics II, Credits :4, 2L, 2T

Expected Course Outcomes:

After completion of the course, students will be able to

1. understand concepts in differentiation, annuity, bivariate linear correlation and regression, time series, index numbers
2. solve problems of applications of derivatives, annuity, bivariate linear correlation and regression, time series, index numbers.

Pre-requisites: Simple and compound interest, equations of lines in a plane

Unit I : Functions, Derivatives and Their Applications

a) **Concept of real functions:** constant function, linear function, a^x , a^{bx} , a^{x^2} , $\log x$.

Demand, Supply, Total Revenue, Average Revenue, Total cost, Average cost and Profit Function, Equilibrium Point, Break-even point.

b) **Derivative of functions:**

- i. Derivative as rate measure, Derivative of $x^a, x^b, x^c, \log x$.
- ii. Rules 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.

c) Annuity:

Annuity Immediate and its Present value, Future value. Equated Monthly Installments (EMI) using reducing balance method & amortization of loans. Stated Annual Rate & Effective Annual Rate Perpetuity and its present value. Simple problems involving up to 4 time periods.

Unit II: Bivariate Linear Correlation:

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.

Unit III: Regression:

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.

Unit IV: Time series and Index Numbers

a) **Time series:** Concepts and components of a time series. Representation of trend by Freehand Curve Method, Estimation of Trend using Moving Average Method and Least Squares Method (Linear Trend only). Estimation of Seasonal Component using Simple Arithmetic Mean for Additive Model only (For Trend free data only). Concept of Forecasting using Least Squares Method.

b) **Index Numbers:** Concept and usage of Index numbers, Types of Index numbers, Aggregate and Relative Index Numbers, Lasperye's, Paasche's, Dorbisch-Bowley's, Marshall-Edgeworth and Fisher's ideal index numbers, Test of Consistency: Time Reversal Test and Factor Reversal Test. Chain Base Index Nos. Shifting of Base year. Cost of Living Index Numbers, Concept of Real Income, Concept of Wholesale Price

Index Number.

Tutorials

Tut No	<u>Topic</u>
1	Differentiation and its applications
2	Annuity
3	Correlation Analysis 1
4	Correlation Analysis 2
5	Regression Analysis 1
6	Regression Analysis 2
7	Time Series
8	Index Numbers

References:

- 1) Business Mathematics by D. C. Sancheti and V. K. Kapoor, Sultan Chand & Sons.
- 2) STATISTICS by Schaum Series.
- 3) Operations Research by Gupta and Kapoor.
- 4) Fundamentals of Statistics - D. N. Elhance.
- 5) Statistical Methods - S.G. Gupta, S. Chand & Co.
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