



Shri Vile Parle Kelavani Mandal's  
**MITHIBAI COLLEGE OF ARTS, CHAUHAN INSTITUTE OF SCIENCE & AMRUTBE  
JIVANLAL COLLEGE OF COMMERCE AND ECONOMICS (AUTONOMOUS)**  
*NAAC Reaccredited 'A' grade, CGPA: 3.57 (February 2016),  
Granted under RUSA, FIST-DST & -Star College Scheme of DBT, Government of India,  
Best College (2016-17), University of Mumbai*

Affiliated to the  
**UNIVERSITY OF MUMBAI**

**Program: B.Com.**

**Course: Mathematical & Statistical Techniques**

**Semester I & II**

**Choice Based Credit System (CBCS) with effect from the  
Academic year 2020-**

**SVKM's Mithibai College of Arts, Chauhan Institute of Science & Amrutben  
Jivanlal College of Commerce & Economics (AUTONOMOUS)**

**DEPARTMENT OF MATHEMATICS**

**F.Y.B.Com. SYLLABUS**

**SEMESTER I**

**SVKM's Mithibai College of Arts, Chauhan Institute of Science & Amrutben  
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**Evaluation Pattern**

The performance of the learner will be evaluated in two components. The first component will be a Continuous Assessment with a weightage of 25% of total marks per course. The second component will be a Semester end Examination with a weightage of 75% of the total marks per course. The allocation of marks for the Continuous Assessment and Semester end Examinations is as shown below:

**a) Details of Continuous Assessment (CA)**

25% of the total marks per course:

<b>Continuous Assessment</b>	<b>Details</b>	<b>Marks</b>
<b>Component 1 (CA-1)</b>	Class Test	15 marks
<b>Component 2 (CA-2)</b>	Assignment	10 marks

**b) Details of Semester End Examination**

75% of the total marks per course. Duration of examination will be two and half hours.

<b>Question Number</b>	<b>Description</b>	<b>Marks</b>	<b>Total Marks</b>
1	Module I	15	15
2	Module II	15	15
3	Module III	15	15
4	Module IV	15	15
5	Module I,II,III,IV	15	15
<b>Total Marks</b>			<b>75</b>

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<b>Program: B.Com(2021-22)</b>				<b>Semester: I</b>	
<b>Course:</b>				<b>Course Code:</b>	
<b>Teaching Scheme</b>				<b>Evaluation Scheme</b>	
<b>Lecture (Hours per week)</b>	<b>Practical (Hours per week)</b>	<b>Tutorial (Hours per week)</b>	<b>Credit</b>	<b>Continuous Assessment (CA) (Marks - 25)</b>	<b>Semester End Examinations (SEE) (Marks- 75 in Question Paper)</b>
4	NA	1	5	25	75
<b>Learning Objectives:</b>					
<ul style="list-style-type: none"> <li>• To equip students with basic Mathematical and Statistical tools.</li> <li>• To make the students aware of applications of Mathematical and Statistical Techniques in Business &amp; Finance</li> </ul>					
<b>Course Outcomes:</b>					
After completion of the course, learners would be able to:					
<b>CO1:</b> Apply concept of Shares and Mutual funds to make wise investment.(Application)					
<b>CO2:</b> Analyse the optimization problems using LPP. (Application)					
<b>CO3:</b> Use decision theory to select best action.(Analysis)					
<b>CO4:</b> Find average of numbers and solve real life problems(Understanding, Application)					
<b>CO5:</b> Recall the definition of probability(Revision)					
<b>CO6:</b> Differentiate between probability and conditional probability and compute according to the requirement .(Analysis)					
<b>CO7:</b> Understand the definition of random variables, their types and related concepts(Understanding)					
<b>Outline of Syllabus: (per session plan)</b>					
<b>Module</b>	<b>Description</b>				<b>No of Hours</b>
<b>1</b>	<b>Shares, Mutual Funds Linear Programming Problem</b>				15
<b>2</b>	<b>Interpolation and Finite Difference, Basics of Decision Theory</b>				15
<b>3</b>	<b>Measures of Central Tendencies and Partitional values, Measures of Dispersions</b>				15
<b>4</b>	<b>Probability Theory, Random Variable</b>				15
	<b>Total</b>				<b>60</b>
<b>PRACTICALS</b>					

**SVKM's Mithibai College of Arts, Chauhan Institute of Science & Amrutben  
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Unit	Topic	No. of Hours/Credits
<b>Module 1</b>	<p><b>a)Shares :</b> Concept of share face value, market value, dividend, equity shares, preferential shares, bonus shares. Simple examples.</p> <p><b>b)Mutual Funds:</b> 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.)</p> <p><b>c) Linear Programming Problem:</b>            Sketching of graphs of            (i) linear equation <math>Ax + By + C = 0</math>            (ii) linear inequalities.            Mathematical Formulation of Linear Programming Problems upto 3 variables.            Solution of Linear Programming Problems using graphical method up to two variables.</p>	<b>15 hrs</b>
<b>Module 2</b>	<p><b>a) Interpolation and Finite Difference:</b>            Types of Operators and relation between them.            Construction of difference table: Gregory Newton forward/backward difference formula, Lagrange's interpolation formula.</p> <p><b>b) Basics of Decision Theory :</b>            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.</p> <p><b>c) Decision making under Risk :</b>            Expected Monetary Value (EMV);            Decision Tree; Simple Examples based on EMV.            Expected Opportunity Loss (EOL),            Simple examples based on EOL</p>	<b>15 hrs</b>
<b>Module 3</b>	<p><b>a) Measures of Central Tendencies and Partitional values</b>            Definition of Average,            Types of Averages: Arithmetic Mean, Median, Mode for grouped as well as ungrouped data.            Combined and Weighted mean.            Quartiles , Deciles and Percentiles</p>	<b>15 hrs</b>

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	<p><b>B) Measures of Dispersions:</b>          Concept and idea of dispersion.          Various measures such as Range, quartile deviation, Mean Deviation , Standard Deviation, Variance, Combined Variance.</p>	
<p><b>Module 4</b></p>	<p><b>a) Probability Theory:</b>          Concept of random experiment/trial and possible outcomes;          Sample Space and Discrete Sample Space;          Types of Events : Mutually Exclusive and Exhaustive Events, Complementary events.          Algebra of Events.          Classical definition of Probability,          Addition theorem (without proof),          conditional probability.          Independence of Events: <math>P(A \cap B) = P(A) P(B)</math>.          Simple examples.</p> <p><b>b) Random Variable :</b>          Probability distribution of a discrete random variable; Expectation and Variance of random variable,          simple examples on probability distributions.</p>	<p align="center">15 hrs</p>

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**DEPARTMENT OF MATHEMATICS**

**SYLLABUS**

**SEMESTER II**

**Evaluation Pattern**

The performance of the learner will be evaluated in two components. The first component will be a Continuous Assessment with a weightage of 25% of total marks per course. The second component will be a Semester end Examination with a weightage of 75% of the total marks per course. The allocation of marks for the Continuous Assessment and Semester end Examinations is as shown below:

**c) Details of Continuous Assessment (CA)**

25% of the total marks per course:

<b>Continuous Assessment</b>	<b>Details</b>	<b>Marks</b>
<b>Component 1 (CA-1)</b>	Class test	15 marks
<b>Component 2 (CA-2)</b>	Assignment	10 marks

**d) Details of Semester End Examination**

75% of the total marks per course. Duration of examination will be two and half hours.

<b>Question Number</b>	<b>Description</b>	<b>Marks</b>	<b>Total Marks</b>
1	On Module I Attempt any three out of four each of five marks	15	15
2	On Module II Attempt any three out of four each of five marks	15	15
3	On Module III Attempt any three out of four each of five marks	15	15
4	On Module IV Attempt any three out of four each of five marks	15	15
5	On Module I,II,III,IV Attempt any three out of four each of five marks	15	15
<b>Total Marks</b>			<b>75</b>



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<b>Program: B.Com(2021-22)</b>				<b>Semester: II</b>	
<b>Course: Mathematical &amp; Statistical Techniques-II</b>				<b>Course Code: USMAMT206</b>	
<b>Teaching Scheme</b>				<b>Evaluation Scheme</b>	
<b>Lecture (Hours per week)</b>	<b>Practical (Hours per week)</b>	<b>Tutori al (Hours per week)</b>	<b>Credit</b>	<b>Continuous Assessment (CA) (Marks - 25)</b>	<b>Semester End Examinations (SEE) (Marks- 75 in Question Paper)</b>
				25	75
<b>Learning Objectives:</b>					
<ul style="list-style-type: none"> <li>(1) To equip students with basic Mathematical and Statistical tools.</li> <li>(2) To make the students aware of applications of Mathematical and Statistical Techniques in Business &amp; Finance</li> <li>(3) Take appropriate decisions in industry, investment and business using topics like Interest and Annuity, Derivatives,</li> <li>(4) To estimate the future value using Regression.</li> <li>(5) To analyze the chronological data using Time Series</li> <li>(6) To find cost of living index or any such information using Index Numbers</li> </ul>					
<b>Course Outcomes:</b>					
After completion of the course, learners would be able to:					
<b>CO8:</b> Demonstrate the basic concepts of simple and compound interest(Understand)					
<b>CO9:</b> Recall the idea of derivative, rules of differentiation (Revision)					
<b>CO10:</b> Apply the analytical techniques to solve annuity problems(Analysis)					
<b>CO11:</b> Apply derivatives to solve optimization problems(Application)					
<b>CO12:</b> Understand that correlation coefficients independent of change of origin and scale(Understand )					
<b>CO13:</b> Apply concept of regression to estimate value (Application)					
<b>CO14:</b> _Analyze the behavior of stock market using time series (Analysis)					
<b>CO15:</b> Calculate cost of living index and price index (Computation)					
<b>CO16:</b> Detect the different probability distribution which are widely used(Analysis)					
<b>CO17:</b> Choose the suitable probability_ distribution corresponding to a given data (Evaluate)					
<b>Outline of Syllabus: (per session plan)</b>					
<b>Module</b>	<b>Description</b>				<b>No of Hours</b>
<b>1</b>	Functions, Derivatives and their Applications				15
<b>2</b>	Interest , Annuity and Index Numbers				15
<b>3</b>	Bivariate Linear Correlation , Regression and Time series				15
<b>4</b>	Elementary Probability Distribution				15
	<b>Total</b>				<b>60</b>
<b>PRACTICALS</b>					

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Unit	Topic	No. of Hours/Credits
<b>Module 1</b>	<p><b>a) Concept of real functions:</b> constant function, linear function, <math>x^n</math>, <math>e^x</math>, <math>a^x</math>, <math>\log x</math>. Demand, Supply, Total Revenue, Average Revenue, Total cost, Average cost and Profit function. Equilibrium Point, Break-even point.</p> <p><b>b) Derivative of functions:</b>            i). Derivative as rate measure, Derivative of <math>x^n</math>, <math>e^x</math>, <math>a^x</math>, <math>\log x</math>.            ii) Rules of derivatives: Scalar multiplication, sum, difference, product, quotient (Statements only), Simple problems. Second order derivatives.            iii) Applications: Increasing/decreasing function, 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.)</p>	<b>15 Hrs</b>
<b>Module 2</b>	<p><b>a) Correlation Analysis:</b> 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.</p> <p><b>b) Regression Analysis:</b> 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 Coefficient. Finding the equations of Regression lines by method of Least Squares.</p> <p><b>c) Time series:</b> 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</p>	<b>15 Hrs</b>
<b>Module 3</b>	<p><b>a) Correlation Analysis:</b> Meaning, Types of Correlation, Determination of Correlation:</p>	<b>15 Hrs</b>

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	<p>Scatter diagram, Karl Pearson's method of Correlation Coefficient (excluding Bivariate Frequency Distribution Table) and Spearman's Rank Correlation Coefficient.</p> <p><b>b) Regression Analysis:</b> 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 Coefficient. Finding the equations of Regression lines by method of Least Squares.</p> <p><b>c) Time series:</b> 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</p>	
<b>Module 4</b>	<p><b>a) Discrete Probability Distribution:</b> Binomial, Poisson (Properties and applications only, no derivations are expected)</p> <p><b>b) Continuous Probability distribution:</b> Normal Distribution. (Properties and applications only, no derivations are expected)</p>	<b>15 Hrs</b>