

**The Kelkar Education Trust's
V G Vaze College of Arts, Science and Commerce
(Autonomous)**



**The Kelkar Education Trust's
V G Vaze College of Arts, Science and Commerce
(Autonomous)**

Syllabus for F.Y.B.COM

(June 2020 Onwards)

Program: B.Com

Semester 1

Course: Mathematical and Statistical Techniques I

Course Code	Paper Title	Credit
CM1MST	Mathematical and Statistical Techniques I	03



The Kelkar Education Trust's
V G Vaze College of Arts, Science and Commerce
(Autonomous)

1. Syllabus as per **Choice Based Credit System**

- i) Name of the Programme : F.Y.B.COM
- ii) Course Code : **CM1MST**
- iii) Course Title : **Semester I**
Mathematical and Statistical
Techniques-I
- iv) Semester wise Course Contents : Copy of the syllabus Enclosed
- v) References and additional references : Enclosed in the Syllabus
- vi) Credit structure :
- No. of Credits per Semester : 03
- vii) No. of lectures per Unit : 15
- viii) No. of lectures per week : 05
- ix) No. of Tutorials per week : 01
(Tutorial batch size : 25 Students)
- 2 Scheme of Examination : **Semester End Exam:60 marks**
(5 Questions of 12 marks)
Internal Assessment: 40 marks
Test 15 marks,
Project/ Assignment 15 marks,
Class Participation 10 marks
- 3 Special notes, if any : No
- 4 Eligibility, if any : As laid down in the College
Admission brochure / website
- 5 Fee Structure : As per College Fee Structure
specifications
- 6 Special Ordinances / Resolutions, if
any : No



The Kelkar Education Trust's
V G Vaze College of Arts, Science and Commerce
(Autonomous)

Programme: FYBCOM

Semester: I

Course : Mathematical and Statistical Techniques-I

Course Code : CM1MST

Teaching Scheme (Hrs/Week)				Continuous Internal Assessment (CIA) 40 marks					Semester End Examination	Total
L	T	P	C	CIA-1	CIA-2	CIA-3	CIA-4	Lab	Written	
5	1	-	-	15	15	10		-	60	100
Max. Time, End Semester Exam (Theory) -2Hrs.										

Why Revision?

There is a Rapid expansion of knowledge in subject matter areas and improved instructional method during last decade. There are considerable curricular revisions happening at the high school level. Application of Mathematics and Statistics are widely used in industry and business. Keeping this in mind, a revision of syllabus required in accordance with the growth of subject of at the high school level and emerging needs of industry and its application.

Course Objectives

The main objective of this course is to introduce mathematics and statistics to undergraduate students of commerce, so that they can use them in the field of commerce and Industry to solve the real life problems.

Modules at a Glance

Sr. No.	Modules	No. of Lectures
A) Mathematics: (30 Lectures)		
1	Shares and Mutual Funds	15
2	Permutation, Combination and Linear Programming Problems	15
B) Statistics: (45 Lectures)		
3	Summarization Measures	15
4	Elementary Probability Theory	15
5	Decision Theory	15
TOTAL		75



The Kelkar Education Trust's
V G Vaze College of Arts, Science and Commerce
(Autonomous)

Sr. No.	Modules / Units
A) Mathematics: (24 Marks)	
1	Shares and Mutual Funds
	<ul style="list-style-type: none"> • Shares: Concept of share, face value, market value, dividend, equity shares, preferential shares, bonus shares. Simple examples. • 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.)
2	Permutation, Combination and Linear Programming Problems
	<ul style="list-style-type: none"> • Permutation and Combination: Factorial Notation, Fundamental principle of counting, Permutation as arrangement, Simple examples, combination as selection, Simple examples, Relation between ${}^n C_r$ and ${}^n P_r$ Examples on commercial application of permutation and combination • Linear Programming Problem: Sketching of graphs of (i) linear equation $Ax + By + C = 0$ (ii) linear inequalities. Mathematical Formulation of Linear Programming Problems upto 3 variables. Solution of Linear Programming Problems using graphical method up to two variables.
B) Statistics: (36 Marks)	
3	Summarization Measures
	<ul style="list-style-type: none"> • 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 locate median and Quartiles. Using Histogram locate mode. Combined and Weighted mean. • Measures of Dispersions: Concept and idea of dispersion. Various measures Range, Quartile Deviation, Mean Deviation, Standard Deviation, Variance, Combined Variance.
4	Elementary Probability Theory
	<ul style="list-style-type: none"> • Probability Theory: Concept of random experiment/trial and possible outcomes; Sample Space and Discrete Sample Space; Events their types, Algebra of Events, Mutually Exclusive and Exhaustive Events, Complimentary events. Classical definition of Probability, Addition theorem (without proof), conditional probability. Independence of Events: $P(A \cap B) = P(A)P(B)$. Simple examples. • Random Variable: Probability distribution of a discrete random variable; Expectation and Variance of random variable, simple examples on probability distributions.



The Kelkar Education Trust's
V G Vaze College of Arts, Science and Commerce
(Autonomous)

5	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); Decision Tree; Simple Examples based on EMV. Expected Opportunity Loss (EOL), simple examples based on EOL.

Course Learning Outcomes:

This course will enable the students to:

1. Understand the characteristics of different financial assets such as money market instruments, bonds, and stocks, and how to buy and sell these assets in financial markets.
2. Define combinations and permutations.
3. Apply the concept of combinations to problem solving.
4. Understand the basic concepts of optimization, modelling and linear modelling (LP).
5. Understand the operations research methodology and the problem solving approach.
6. Understand what are Mean, Median and Mode and how to calculate it.
7. Understand how all of alternative measures differ and why.
8. Understand the concept of probability and its features.
9. Understand the decision-making processes.

Reference Books

Mathematical and Statistical Techniques

- *Mathematics for Economics and Finance Methods and Modelling* by Martin Anthony and Norman Biggs, Cambridge University Press, Cambridge low-priced edition, 2000, Chapters 1, 2, 4, 6 to 9 & 10.
- *Applied Calculus: By Stephen Waner and Steven Constenoble*, Brooks/Cole Thomson Learning, second edition, Chapter 1 to 5.
- *Business Mathematics* By D. C. Sancheti and V. K. Kapoor, Sultan Chand & Sons, 2006, Chapter 1, 5, 7, 9 & 10.
- *Mathematics for Business Economics: By J. D. Gupta, P. K. Gupta and Man Mohan*, Tata Mc-Graw Hill Publishing Co. Ltd., 1987, Chapters 9 to 11 & 16.
- *Quantitative Methods-Part-I* By S. Saha and S. Mukerji, New Central Book Agency, 1996, Chapters 7 & 12.



**The Kelkar Education Trust's
V G Vaze College of Arts, Science and Commerce
(Autonomous)**

- *Mathematical Basis of Life Insurance By S.P. Dixit, C.S. Modi and R.V. Joshi, Insurance Institute of India, Chapters 2: units 2.6, 2.9, 2.20 & 2.21.*
- *Securities Laws & Regulation of Financial Market : Intermediate Course Paper 8, Institute of Company Secretaries of India, Chapter 11.*
- *Investments By J.C. Francis & R.W. Taylor, Schaum's Outlines, Tata Mc-Graw Hill Edition 2000, Chapters 2,4 & section 25.1.*
- *Operations Research by Gupta and Kapoor □ Operations Research by Schaum Series*
- *Fundamentals of Statistics - D. N. Elhance.*
- *Statistical Methods - S.G. Gupta (S. Chand & Co.*
- *Statistics for Management - Lovin R. Rubin D.S. (Prentice Hall of India)*
- *Statistics - Theory, Method & Applications D.S.Sancheti & V. K. Kapoor.*

THEORY EXAMINATION PATTERN

Que.1	Attempt Any Two:	(12 Marks)
	i) Question based on Unit-I (Mathematics)	
	ii) Question based on Unit-I (Mathematics)	
	iii) Question based on Unit-I (Mathematics)	
Que.2	Attempt Any Two:	(12 Marks)
	i) Question based on Unit-II (Mathematics)	
	ii) Question based on Unit-II (Mathematics)	
	iii) Question based on Unit-II (Mathematics)	
Que.3	Attempt Any Two:	(12 Marks)
	i) Question based on Unit-III (Statistics)	
	ii) Question based on Unit-III (Statistics)	
	iii) Question based on Unit-III (Statistics)	
Que.4	Attempt Any Two:	(12 Marks)
	i) Question based on Unit-IV (Statistics)	
	ii) Question based on Unit-IV (Statistics)	
	iii) Question based on Unit-IV (Statistics)	
Que.5	Attempt Any Two:	(12 Marks)
	i) Question based on Unit-V (Statistics)	
	ii) Question based on Unit-V (Statistics)	
	iii) Question based on Unit-V (Statistics)	



**The Kelkar Education Trust's
V G Vaze College of Arts, Science and Commerce
(Autonomous)**



**The Kelkar Education Trust's
V G Vaze College of Arts, Science and Commerce
(Autonomous)**

Syllabus for F.Y.B.COM

(June 2020 Onwards)

Program: B.Com

Semester 2

Course: Mathematical and Statistical Techniques II

Course Code	Paper Title	Credit
CM1MST	Mathematical and Statistical Techniques II	03



The Kelkar Education Trust's
V G Vaze College of Arts, Science and Commerce
(Autonomous)

2. Syllabus as per **Choice Based Credit System**

- i) Name of the Programme : F.Y.B.COM
- ii) Course Code : **CM2MST**
- iii) Course Title : **Semester II**
Mathematical and Statistical
Techniques-II
- iv) Semester wise Course Contents : Copy of the syllabus Enclosed
- v) References and additional references : Enclosed in the Syllabus
- vi) Credit structure :
- No. of Credits per Semester : 03
- vii) No. of lectures per Unit : 15
- viii) No. of lectures per week : 05
- ix) No. of Tutorial per week : 01
(Tutorial batch size : 25 Students)
- 2 Scheme of Examination : **Semester End Exam:60 marks**
(5 Questions of 12 marks)
Internal Assessment: 40 marks
Test 15 marks,
Project/ Assignment 15 marks,
Class Participation 10 marks
- 3 Special notes, if any : No
- 4 Eligibility, if any : As laid down in the College
Admission brochure / website
- 5 Fee Structure : As per College Fee Structure
specifications
- 6 Special Ordinances / Resolutions, if any : No



The Kelkar Education Trust's
V G Vaze College of Arts, Science and Commerce
(Autonomous)

Programme: FYBCOM

Course : Mathematical and Statistical Techniques-II

Semester: II

Course Code : CM2MST

Teaching Scheme (Hrs/Week)				Continuous Internal Assessment (CIA) 40 marks					Semester End Examination	Total
L	T	P	C	CIA-1	CIA-2	CIA-3	CIA-4	Lab	Written	
5	1	-	-	15	15	10		-	60	100
Max. Time, End Semester Exam (Theory) -2Hrs.										

Why Revision?

There is a Rapid expansion of knowledge in subject matter areas and improved instructional method during last decade. There are considerable curricular revisions happening at the high school level. Application of Mathematics and Statistics are widely used in industry and business. Keeping this in mind, a revision of syllabus required in accordance with the growth of subject of at the high school level and emerging needs of industry and its application.

Course Objectives

The main objective of this course is to introduce mathematics and statistics to undergraduate students of commerce, so that they can use them in the field of commerce and Industry to solve the real life problems.

Modules at a Glance

Sr. No.	Modules	No. of Lectures
A) Mathematics: (30 Lectures)		
1	Functions, Derivatives and Their Applications	15
2	Interest and Annuity	15
B) Statistics: (45 Lectures)		
3	Bivariate Linear Correlation and Regression	15
4	Time series and Index Numbers	15
5	Elementary Probability Distributions	15
Total		75



The Kelkar Education Trust's
V G Vaze College of Arts, Science and Commerce
(Autonomous)

Sr. No.	Modules / Units
A) Mathematics: (24 Marks)	
1	Functions, Derivatives and Their Applications
	<p>Concept of real functions: Constant function, linear function x^n, e^x, a^x, $\log x$. Demand, Supply, Total Revenue, Average Revenue, Total cost, Average cost and Profit function. Equilibrium Point, Break-even point.</p> <p>Derivative of functions:</p> <ul style="list-style-type: none"> ▪ Derivative as rate measure, Derivative of x^n, e^x, a^x, $\log x$ ▪ Rules of derivatives: Scalar multiplication, sum, difference, product, quotient (Statements only), Simple problems. Second order derivatives. ▪ 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.)
2	Interest and Annuity
	<p>Interest: Simple Interest, Compound Interest (Nominal & Effective Rate of Interest), Calculations involving upto 4 time periods.</p> <p>Annuity: Annuity Immediate and its Present value, Future value. Equated Monthly Installments (EMI) using reducing balance method & amortization of loans. Stated Annual Rate & Affective Annual Rate Perpetuity and its present value. Simple problems involving up to 4 time periods.</p>
B) Statistics: (36 Marks)	
3	Bivariate Linear Correlation and Regression
	<p>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.</p> <p>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.</p>
Sr. No.	Modules / Units
4	Time series and Index Numbers
	<p>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.</p>



The Kelkar Education Trust's
V G Vaze College of Arts, Science and Commerce
(Autonomous)

	Index Numbers: Concept and usage of Index numbers, Types of Index numbers, Aggregate and Relative Index Numbers, Lasperye's, Paasche's, Dorbish 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. (Examples on missing values should not be taken)
5	Elementary Probability Distributions
	Probability Distributions: <ul style="list-style-type: none">▪ Discrete Probability Distribution: Binomial, Poisson (Properties and applications only, no derivations are expected)▪ Continuous Probability distribution: Normal Distribution. (Properties and applications only, no derivations are expected)

Course Learning Outcomes:

This course will enable the students to:

10. Understand and work with derivatives as rates of change in mathematical models.
11. Calculate simple and compound interest.
12. Calculate and interpret the correlation between two variables.
13. Determine whether the correlation is significant.
14. Calculate the simple linear regression equation for a set of data and know the basic assumptions behind regression analysis.
15. Determine whether a regression model is significant.
16. Differentiate among simple index numbers, unweighted aggregate price index numbers, weighted aggregate price index numbers, Laspeyres price index numbers, and Paasche price index numbers by defining and calculating each.



The Kelkar Education Trust's
V G Vaze College of Arts, Science and Commerce
(Autonomous)
Reference Books

Mathematical and Statistical Techniques

- *Mathematics for Economics and Finance Methods and Modelling* by Martin Anthony and Norman Biggs, Cambridge University Press, Cambridge low-priced edition, 2000, Chapters 1, 2, 4, 6 to 9 & 10.
- *Applied Calculus: By Stephen Waner and Steven Constenoble, Brooks/Cole Thomson Learning, second edition, Chapter 1 to 5.*
- *Business Mathematics* By D. C. Sancheti and V. K. Kapoor, Sultan Chand & Sons, 2006, Chapter 1, 5, 7, 9 & 10.
- *Mathematics for Business Economics: By J. D. Gupta, P. K. Gupta and Man Mohan, Tata Mc-Graw Hill Publishing Co. Ltd., 1987, Chapters 9 to 11 & 16.*
- *Quantitative Methods-Part-I* By S. Saha and S. Mukerji, New Central Book Agency, 1996, Chapters 7 & 12.
- *Mathematical Basis of Life Insurance* By S.P. Dixit, C.S. Modi and R.V. Joshi, Insurance Institute of India, Chapters 2: units 2.6, 2.9, 2.20 & 2.21.
- *Securities Laws & Regulation of Financial Market : Intermediate Course Paper 8, Institute of Company Secretaries of India, Chapter 11.*
- *Investments* By J.C. Francis & R.W. Taylor, Schaum's Outlines, Tata Mc-Graw Hill Edition 2000, Chapters 2,4 & section 25.1.
- *Indian Mutual Funds Handbook : By Sundar Shankaran, Vision Books, 2006, Sections 1.7,1.8.1, 6.5 & Annexures 1.1to 1.3.*
- *STATISTICS* by Schaum Series.
- *Operations Research* by Gupta and Kapoor □ *Operations Research* by Schaum Series
- *Fundamentals of Statistics - D. N. Elhance.*
- *Statistical Methods - S.G. Gupta (S. Chand & Co.*
- *Statistics for Management - Lovin R. Rubin D.S. (Prentice Hall of India)*
- *Statistics - Theory, Method & Applications D.S.Sancheti & V. K. Kapoor.*
- *Modern Business Statistics - (Revised)-B. Pearles & C. Sullivan –Prentice Hall of India.*
- *Business Mathematics & Statistics: B Aggarwal, Ane Book Pvt. Limited* □ *Business Mathematics: D C Sancheti & V K Kapoor, Sultan Chand & Sons* □ *Business Mathematics: A P Verma, Asian Books Pvt. :Limited.*



**The Kelkar Education Trust's
V G Vaze College of Arts, Science and Commerce
(Autonomous)**

THEORY EXAMINATION PATTERN

Que.1	Attempt Any Two:	(12 Marks)
	i) Question based on Unit-I (Mathematics)	
	ii) Question based on Unit-I (Mathematics)	
	iii) Question based on Unit-I (Mathematics)	
Que.2	Attempt Any Two:	(12 Marks)
	i) Question based on Unit-II (Mathematics)	
	ii) Question based on Unit-II (Mathematics)	
	iii) Question based on Unit-II (Mathematics)	
Que.3	Attempt Any Two:	(12 Marks)
	i) Question based on Unit-III (Statistics)	
	ii) Question based on Unit-III (Statistics)	
	iii) Question based on Unit-III (Statistics)	
Que.4	Attempt Any Two:	(12 Marks)
	i) Question based on Unit-IV (Statistics)	
	ii) Question based on Unit-IV (Statistics)	
	iii) Question based on Unit-IV (Statistics)	
Que.5	Attempt Any Two:	(12 Marks)
	i) Question based on Unit-V (Statistics)	
	ii) Question based on Unit-V (Statistics)	
	iii) Question based on Unit-V (Statistics)	

SSGharge

