



**JAI HIND COLLEGE
BASANTSING INSTITUTE OF SCIENCE
&
J.T.LALVANICOLLEGE OF COMMERCE
(AUTONOMOUS)**

"A" Road, Churchgate, Mumbai - 400 020, India.

**Affiliated to
University of Mumbai**

Program :F.Y.B.Com.

Proposed Course: Mathematical and Statistical Techniques

**Credit Based Semester and Grading System (CBCS) with effect from the
academic year 2019-20**

F.Y.B.Com. Mathematics and Statistical Techniques Syllabus

Academic year 2019-2020

Semester I			
Course Code	Course Title	Credits	Lectures /Week
CMAT101	Mathematical and Statistical Techniques-I	03	05



Semester I – Theory

COURSE DESCRIPTION:

In Mathematical Techniques, the Course covers mathematical applications in respect of Shares, Mutual Funds, Linear Programming Problems and Permutations and Combinations.


In Statistical Techniques, the Course covers Summarization Measures, Elementary Probability Theory and Decision Theory

Course: CMAT101	MATHEMATICAL AND STATISTICAL TECHNIQUES- I (Credits :03, Lectures/Week:05)	
	<p>Objectives:</p> <ul style="list-style-type: none"> ➤ Give the students a sufficient knowledge of fundamental principles, methods and a clear perception of in-numerous power of mathematical ideas and tools and know how to use them by modelling, solving and interpreting. ➤ Reflecting the broad nature of the subject and developing mathematical tools for continuing further study in various fields of science. ➤ Enhancing student's overall development and to equip them with mathematical modelling abilities, problem solving skills, creative talent and power of communication necessary for various kinds of employment. ➤ A student should get adequate exposure to global and local concerns that explore them many aspects of mathematical Sciences. ➤ 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. <p>Outcomes:</p> <ul style="list-style-type: none"> ➤ Student's Knowledge skills and concept will get enhanced and they will get confidence and interest in mathematics. ➤ Student's thinking abilities and positive attitudes will increase towards learning mathematics and tutorials will improve their logical and analytical meaning through their lifetime. 	
	[A] MATHEMATICS- (24 marks):	
Unit I	<p><u>Shares and Mutual Funds:</u></p> <ol style="list-style-type: none"> 1. Shares: Concept of share, face value, market value, dividend, equity shares, preferential shares, bonus shares. Simple examples. 2. Mutual Funds: Simple problems on calculation of Net income after considering entry load, dividend, change in Net Asset 	15L

	Value (N.A.V.) and exit load. Averaging of price under the Systematic Investment Plan (S.I.P.)	
Unit II	<p><u>Permutation, Combination and Linear Programming Problems:</u></p> <p>1. Permutation and Combination: Factorial Notation, Fundamental principle of counting, Permutation as arrangement, Simple examples, combination as selection, Simple examples, Relation between and Examples on commercial application of permutation and combination.</p> <p>2. 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.</p>	15L
	<u>[B] Statistics - (36 marks):-</u>	
Unit III	<p><u>Summarization Measures:</u></p> <p>1. 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.</p> <p>2. Measures of Dispersions: Concept and idea of dispersion. Various measures Range, Quartile Deviation, Mean Deviation, Standard Deviation, Variance, Combined Variance.</p>	15L
Unit IV	<p><u>Elementary Probability Theory:</u></p> <p>1. 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.</p> <p>2. Random Variable: Probability distribution of a discrete random variable; Expectation and Variance of random variable, simple examples on probability distributions.</p>	15L

Unit V	<p><u>Decision Theory:</u></p> <p>1. 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.</p>	15L
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References:

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1. 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.
 2. Applied Calculus: By Stephen 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, Sultan 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, Chapters 9 to 11 & 16.
 5. Quantitative Methods-Part-I By S. Saha and S. Mukerji, New Central Book Agency, 1996, Chapters 7 & 12.
 6. 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.
 7. Securities Laws & 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, Chapters 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 1.1to 1.3.
 10. STATISTICS by Schaum Series.
 11. Operations Research by Gupta and Kapoor
 12. Operations Research by Schaum Series
 13. Fundamentals of Statistics - D. N. Elhance.
 14. Statistical Methods - S.G. Gupta (S. Chand & Co.
 15. Statistics for Management - Lovin R. Rubin D.S. (Prentice Hall of India)
 16. Statistics - Theory, Method & Applications D.S.Sancheti& V. K. Kapoor.
 17. Modern Business Statistics - (Revised)-B. Pearles& C. Sullivan -Prentice Hall of India.

18. Business Mathematics & Statistics : B Aggarwal, Ane Book Pvt. Limited
19. Business Mathematics : D C Sancheti & V K Kapoor, Sultan Chand & Sons
20. Business Mathematics : A P Verma, Asian Books Pvt. : Limited.

Tutorials:

Two tutorials to be conducted on each unit i.e. 10 tutorials per semester. At the end of each semester one Tutorial assignment of 20 marks should be given.

[A] Evaluation scheme for Theory courses

I. Continuous Assessment (C.A.) - 40 Marks

- (i) C.A.-I : Test – 20 Marks of 40 mins. duration
- (ii) C.A.-II : Assignment containing 5 problems.

II. Semester End Examination (SEE)- 60 Marks

- (a) In Section I (based on Mathematics), Two questions carrying 12 marks each. First question should be on Unit I and Second question should be from Unit II.
- (b) In each question there should be three sub-questions carrying 6 marks each. Students should be asked to answer any 2 sub questions from each question.
- (c) In Section II (based on Statistics), Three questions carrying 12 marks each. First question should be on Unit III, Second question should be from Unit IV and third question should be from Unit V.
- (d) In each question there should be three sub-questions carrying 6 marks each. Students should be asked to answer any 2 sub questions from each question.