Hindi Vidya Prachar Samiti's

Ramniranjan Jhunjhunwala College

of Arts, Science & Commerce

(Autonomous College)

Affiliated to

UNIVERSITY OF MUMBAI

Syllabus for the F.Y.B.Com.

Program: F.Y.B.Com. Mathematical & Statistical Techniques

Program Code: RJCUCOM

(CBCS 2021-2022)

F.Y.B.Com. Mathematical & Statistical Techniques
Syllabus Semester I & II

DISTRIBUTION OF TOPICS AND CREDITS

F.Y.B.Com. Mathematical and Statistical Techniques SEMESTER I

Course	Nomenclature	Credits	Topics
RJCUCOM106	Mathematical and Statistical Techniques-I	03	1. Shares and Mutual Funds 2. Permutation, Combination and Linear Programming Problems 3. Summarization Measures 4. Elementary Probability Theory 5. Decision Theory

F.Y.B.Com. Mathematical and Statistical Techniques SEMESTER II

Course	Nomenclature	Credits	Topics
RJCUCOM206	Mathematical and Statistical Techniques-II	03	1.Functions, Derivatives and their Applications. 2. Interest and Annuity. 3. Bivariate Linear Correlation and Regression. 4. Time Series and Index Numbers. 5. Elementary Probability Distributions.

SEMESTER I (THEORY)		L	Cr
Paper-VI: Mathematical and Statistical Techniques-I	**Paper Code: RJCUCOM106**	75	3
UNIT I		15	
SHARES AND MUTUAL FUND			
1	Shares: Concept of share, face value, market value, dividend, equity shares, preferential shares, bonus shares. Simple examples.		
2	Mutual Funds: Simple Problem 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		15	
PERMUTATION, COMBINATION AND LINEAR PROGRAMMING PROBLEMS			
1	Permutation and Combination: Factorial Notation, Fundamental principle of counting, Permutation as arrangement, Simple Examples, combination as selection, Simple examples, Relation between ${}^{n}C_{x}$ and ${}^{n}P_{x}$. Examples on commercial application of permutation and combination.		
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 methods up to two variables.		
UNIT III		15	
SUMMARIZATION MEASURES			

1	Measures of Central Tendency: 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.		
2	Measures of Dispersions: Concept and idea of dispersion. Various measures Range, Quartile Deviation, Mean Deviation, Standard Deviation, Variance, Combined Variance.		
UNIT IV		15	
ELEMENTARY PROBABILITY THEORY			
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.		
2	Random Variable: Probability distribution of a discrete random variable; Expectation and Variance of random variable, simple examples on probability distributions.		
UNIT V		15	
DECISION THEORY			
1	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.		
2	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.		

F.Y.B.Com	Semester I
RJCUCOM106 Paper VI Mathematical and Statistical Techniques-I	Course Outcomes1.1 : This course is designed to acquire 1. the concept of Shares & Mutual Funds. 2. the concept of Permutation & Combination and its problem solving. 3. the different Concept of central Tendency & Dispersions and its problem solving. 4. the different concepts in probability and its laws and problem solving. 5. the concept of decision theory and its problem solving. Learning outcomes: After this course students will be able to understand ➢ the different techniques of data collection and its presentation. ➢ the need for numerical summary measures for data analysis. ➢ the technique of data analysis.

SEMESTER II		L	Cr
Paper-VI: Mathematical and Statistical Techniques-II	**Paper Code: RJCUCOM206**	75	3
UNIT I		15	
FUNCTIONS, DERIVATIVES AND THEIR APPLICATIONS			
1	Concept of real functions: constant function, linear function, x ' , a^x , e^x, log x. Demand, Supply, Total Revenue, Average Revenue, Total Cost, Average cost and profit function. Equilibrium Point, Break-even point.		
2	Derivative of functions: i) Derivative as rate measure, Derivative of x , a^x , e^x, log x. ii) Rule 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. (Examination Questions on this unit should be application oriented only)		
UNIT II		15	
INTEREST AND ANNUITY			
1	Interest: Simple Interest, Compound Interest (Nominal & Effective Rate of Interest),. Calculations involving upto 4 time periods.		
2	Annuity: Annuity Immediate and its Present value, Future value. Equated Monthly Installments (EMI) using reducing balance method & amortization of loans. Stated Annual rate and effective Annual Rate, perpetuity and its present value. simple problems involving up to 4 time periods.		

	UNIT III	15	
	BIVARIATE LINEAR CORRELATION AND REGRESSION		
1	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.		
2	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.		
	UNIT IV	15	
	TIME SERIES AND INDEX NUMBERS		
1	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.		
2	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. (Examples on missing values should not be taken).		

	UNIT V	15	
	ELEMENTARY PROBABILITY DISTRIBUTIONS		
1	Probability Distributions: i) Discrete Probability Distribution: Binomial, Poisson (Properties and applications only, no derivations are expected). ii) Continuous Probability distribution: Normal Distribution. (Properties and applications only, no derivations are expected).		

F.Y.B.Com	Semester II : Mathematical and Statistical Techniques-II
RJCUCOM206 Mathematical and Statistical Techniques-II	Course Outcomes 2.1 : This course is designed to acquire 1. the concept of Functions & Derivatives and its problem solving. 2. the concept of Interest & Annuity and its problem solving. 3. the Time Series Data and different concepts of it. 4. the different Index Number and different concepts of it. 5. different probability distribution functions. Learning outcomes: After this course student will be able to understand ➢ the basics as well as a comprehensive background of probability theory and statistical methods to the beginners in a simple and interesting manner.

References

1. Mathematics for Economics and Finance Method and Modeling by Martin Anthony and Norman Biggs Cambridge University press, Cambridge low-price edition, 2000, chapters 1,2,4,6,to 9 & 10.
2. Applied Calculus : By Stephrn 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, Soltan 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, Chapter 9 to 11 & 16.
5. Quantitative Method- Part- I By Saha and S. Mukerji, New Central Book Agency,1996 Chapter 7& 12
6. Mathematical Basis of Life Insurance By S.P.Dixit, C.S. Modi and R.V. Joshi, Insurance Institute of India Chapter 2 ; unit 2.6, 2.9, 2.20 & 2.21
7. Securities Law & 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, Chapter 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 1.1 to 1.3 1
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.

F.Y.B.Com. Mathematical & Statistical Techniques
Syllabus Semester I & II

Scheme of Examinations

1. Two Internals of 20 marks each. Duration 30 min for each.
2. One External (Semester End Examination) of 60 marks. Duration: 2 hours.
3. Students must appear for at least one of the two Internal Tests to be eligible for the Semester End Examination.
4. For any KT examinations, there shall be ODD-ODD/EVEN-EVEN pattern followed.
5. HOD's decision, in consultation with the Principal, shall remain final and abiding to all.

Evaluation and Assessment

Evaluation (Theory): Total marks per course - 100.

CIA- 40 marks
CIA 1: Written test -20 marks
CIA 2: Written Test / Assignment -20 marks
Semester End Examination – 60 marks
Question paper covering all units

Course Semester End Examination in Semester I and II
(RJCUCOM106 & RJCUCOM206)

Question	KNOWLEDGE	UNDERSTANDING	APPLICATION and ANALYSES	TOTAL MARKS- Per unit
Unit 1	06	03	03	12
Unit 2	06	03	03	12
Unit 3	06	03	03	12
Unit 4	06	03	03	12
Unit 5	06	03	03	12
-TOTAL- Per objective	30	15	15	**60**
% WEIGHTAGE	50	25	25	**100%**

F.Y.B.Com. Mathematical & Statistical Techniques
Syllabus Semester I & II

Mapping of the course to employability/ Entrepreneurship/skill development

Class	Course Name	Course Code	Topic focusing on Employability/ Entrepreneurship/skill development	Employability/Entrepreneurship/Skill development	Specific activity
F.Y.B. Com Sem I	Mathematical and Statistical Techniques- I	RJCUCOM106	Unit I: Shares and Mutual Funds Unit II: Permutation, Combination and Linear Programming Problems Unit III: Summarization Measures Unit IV: Elementary Probability Theory Unit V: Decision Theory	1. Employability in Insurance sector and Banking sector 2. Data collection and presentation skills 3. Employability in the field of Data Science 4. Employability in the field of sports, weather reports etc. 5. Problem solving abilities 6. Decision making skill	
F.Y.B. Com Sem II	Mathematical and Statistical Techniques-II	RJCUCOM206	Unit I: Functions, Derivatives and Their Applications Unit II: Interest and Annuity Unit III: Bivariate Linear Correlation and Regression Unit IV: Time series and Index Numbers Unit V: Elementary Probability Distribution	1. The profit and loss in business using graphs. 2. Employability in Insurance sector and Banking sector 3. Data Analysis skills 4. Employability in the field of Stock Market/ BSE	