



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: B.Sc. Mathematics and Statistics
Program Code: RJCUCOM

Choice based Credit System (CBCS)
With effect from the academic year 2018-19

F.Y.B.Com. Mathematics & Statistics Syllabus
Credit Based and Grading System

To be implemented from the Academic year 2018-2019

SEMESTER I

Theory

Learning Objectives:

- To orient students about the technique of data analysis.
- To introduce the techniques of data collection and its presentation.
- To emphasize the need for numerical summary measures for data analysis.

Course Code	Title	Credits
RJCUCOM106	Mathematical and Statistical Techniques-I	3 Credits (75 lectures)
<u>Unit I : Shares and Mutual Funds</u>		15 Lectures
<p>a) Shares : Concept of share, face value, market value, dividend, equity shares, preferential shares, bonus shares . Simple examples.</p> <p>b) 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)</p>		
<u>Unit II : Permutation, Combination and Linear Programming Problems</u>		15 Lectures
<p>a) 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</p> <p>b) 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>		
<u>Unit III: Summarization Measures</u>		15 Lectures
<p>a) 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.</p>		

<p>Using Histogram locate mode. Combined and Weighted mean.</p> <p>b) Measures of Dispersions: Concept and idea of dispersion. Various measures Range, Quartile Deviation, Mean Deviation, Standard Deviation, Variance, Combined Variance.</p>	
<p><u>Unit IV: Elementary Probability Theory:</u></p> <p>a) 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>b) Random Variable: Probability distribution of a discrete random variable; Expectation and Variance of random variable, simple examples on probability distributions.</p>	<p>15 Lectures</p>
<p><u>Unit V: Decision Theory:</u></p> <p>a) 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.</p> <p>b) 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>	<p>15 Lectures</p>

SEMESTER II

Theory

Learning Objective:

To give the basics as well as comprehensive background of probability theory and statistical methods to the beginners in simple and interesting manner.

Course Code	Title	Credits
RJCUCOM206	Mathematical and Statistical Techniques-II	3 Credits (75 lectures)
<u>Unit I : Functions, Derivatives and Their Applications</u>		15 Lectures
<p>a) 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>b) Derivative of functions: i) Derivative as rate measure, Derivative of x^n, e^x, a^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)</p>		
<u>Unit II : Interest and Annuity</u>		15 Lectures
<p>a) Interest : Simple Interest, Compound Interest (Nominal & Effective Rate of Interest), Calculations involving upto 4 time periods.</p> <p>b) 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.</p>		
<u>Unit III: Bivariate Linear Correlation and Regression</u>		15 Lectures
<p>a) 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>b) 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</p>		

lines by method of Least Squares.	
<p><u>Unit IV : Time series and Index Numbers</u></p> <p>a) <u>Time series</u>: 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> <p>b) <u>Index Numbers</u>: 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)</p>	15 Lectures
<p><u>Unit V: Elementary Probability Distributions</u></p> <p>a) Probability Distributions: i. Discrete Probability Distribution: Binomial, Poisson (Properties and applications only, no derivations are expected)</p> <p>b) Continuous Probability distribution: Normal Distribution. (Properties and applications only, no derivations are expected)</p>	15 Lectures

REFERENCES:

1. Mathematics for Economics and Finance Method and Modeling 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 Stephrn Waner and Steven Constenoble, Books/ 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
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.

Internal Assessment of Theory Core Courses Per Semester Per Course

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|-------------------|----------------|
| 1. One Class Test | 20 Marks |
| 2. One Class Test | 20 Marks |

Semester End Examination

Theory: At the end of the semester, examination of two (2) hours duration and sixty (60) marks based on the five units shall be held for each course.

Pattern of **Theory question** paper at the end of the semester for **each course** will be as follows:

There shall be **Five** compulsory Questions of **Twelve** marks each with internal option.
Question 1 based on Unit I, Question 2 based on Unit II, Question 3 based on Unit III, Question 4 based on Unit IV and Question 5 based on Units V.