

***Revised Syllabus of Courses of B.Com. Programme at Semester I
with Effect from the Academic Year 2016-2017***

Core Courses (CC)

7. Mathematical and Statistical Techniques I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Shares and Mutual Funds	15
2	Permutation, Combination and Linear Programming Problems	15
3	Summarization Measures	15
4	Elementary Probability Theory	15
5	Decision Theory	15
Total		75

Note:

*One tutorial per batch per week in addition to number of lectures stated above
(Batch size as per the University norms)*

Sr. No.	Modules / Units
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 up to 3 variables. Solution of Linear Programming Problems using graphical method up to two variables.
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.
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.

***Revised Syllabus of Courses of B.Com. Programme at Semester II
with Effect from the Academic Year 2016-2017***

Core Courses (CC)

7. Mathematical and Statistical Techniques II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Functions, Derivatives and Their Applications	15
2	Interest and Annuity	15
3	Bivariate Linear Correlation and Regression	15
4	Time series and Index Numbers	15
5	Elementary Probability Distributions	15
Total		75

Note:

*One tutorial per batch per week in addition to number of lectures stated above
(Batch size as per the University norms)*

Sr. No.	Modules / Units
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. <p>(Examination Questions on this unit should be application oriented only.)</p>
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 & Effective Annual Rate Perpetuity and its present value. Simple problems involving up to 4 time periods.</p>
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>
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> <p>Index Numbers: Concept and usage of Index numbers, Types of Index numbers, Aggregate and Relative Index Numbers, Laspeyres's, Paasche's, Dornbusch-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>

5	Elementary Probability Distributions
	<p>Probability Distributions:</p> <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)

Tutorial:

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