

Nagindas Khandwala College

(AUTONOMOUS)



Syllabus and Question Paper Pattern

Of

**Courses of Bachelor of Commerce (B. COM.) Programme**

**First Year**

**Semester I**

**MATHEMATICAL AND STATISTICAL TECHNIQUES – I**

Under Academic Autonomy and Credit, Grading and Semester System

With effect from Academic Year 2018-19

Syllabus of Course of B. Com. Program at Semester I

**Core Course**

**MATHEMATICAL AND STATISTICAL TECHNIQUES – I**

**Modules at a Glance**

Sr. No.	Modules	No. of lectures
Module 1	Interest, Annuity, Matrices and Determinants	15
Module 2	Linear Programming Problems and Assignment problems	15
Module 3	Summarization Measures	15
Module 4	Elementary Probability Theory	15
Module 5	Decision Theory	15
Total		75

### Detailed Syllabus

Module	Topics	No. of Lectures
<b>1</b>	<b>Interest, Annuity, Matrices and Determinants</b>	15
(a)	<b>Interest:</b> Simple interest and Compound interest. Annuity: Annuity immediate and its present value, Future value. Equated monthly installment (EMI) using reducing balance method and amortization of loans.	
(b)	<b>Matrices and Determinants:</b> Types of matrices. Elementary row operations. Inverse of matrix (adjoint method). Determinant of non-singular matrix. Solution of system of linear equations by Cramer's rule (upto 3 variables and 3 equations).	
<b>2</b>	<b>Linear Programming Problems and Assignment problems:</b>	15
(a)	<b>Linear Programming Problems:</b> 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)	<b>Assignment problems:</b> Introduction to assignment problems. Optimal solution to the assignment problems by Hungarian assignment method.	
<b>3</b>	<b>Summarization Measures</b>	15
(a)	<b>Measures of Central Tendencies:</b> 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.	
(b)	<b>Measures of Dispersions:</b> Concept and idea of dispersion. Various measures: Range, Quartile Deviation, Mean Deviation, Standard Deviation, Variance, Combined Variance.	

<b>4</b>	<b>Elementary Probability Theory</b>	15
(a)	<b>Probability Theory:</b> Introduction to Permutation as arrangement and Combination as selection of objects. 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.	
(b)	<b>Random Variable:</b> Probability distribution of a discrete random variable; Expectation and Variance of random variable, simple examples on probability distributions.	
<b>5.</b>	<b>Decision Theory</b>	15
(a)	<b>Decision making under uncertainty:</b> Pay-off matrix, Formulation of Payoff Matrix. Maximin, Maximax, Minimax regret and Laplace criteria; simple examples to find optimum decision.	
(b)	<b>Decision making under Risk:</b> Expected Monetary Value (EMV); Decision Tree; Simple Examples based on EMV. Expected Opportunity Loss (EOL), simple examples based on EOL.	

### Reference Books

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. Business Mathematics By D. C. Sancheti and V. K. Kapoor, Sultan Chand & Sons, 2006, Chapter 1,5, 7, 9 & 10.
3. 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.
4. Quantitative Methods-Part-I By S. Saha and S. Mukerji, New Central Book Agency, 1996, Chapters 7 & 12.

5. Investments By J.C. Francis & R.W. Taylor, Schaum's Outlines, Tata Mc-Graw Hill Edition 2000, Chapters 2,4 & section 25.1.
6. Indian Mutual Funds Handbook: By Sundar Shankaran, Vision Books, 2006, Sections 1.7, 1.8.1, 6.5 & Annexures 1.1 to 1.3.
7. Operations Research by Gupta and Kapoor, Sultan Chand and Sons pvt. Ltd. Fourth ed., 1991
8. Statistics for Management - Lovin R. Rubin D.S. (Prentice Hall of India), 7 th ed. 1998.
9. Statistics - Theory, Method & Applications D.S. Sancheti & V. K. Kapoor., 2005. Sultan Chand and Sons pvt. Ltd.
10. Introduction of Mathematical Economics – Edward T. Dowling, third edition, 2012 .

**Examination:**

**Internal Assessment 25% (25 marks) :**

1. One midterm class test of 20 marks ( scaling down to 10 marks)
2. One assignment of 10 marks.
3. Overall participation 5 marks.

**Semester End Examination 75% (75 marks)**

At the end of each semester, there will be a Semester End Examination of **75**marks, 2.5 hrs. duration and question paper pattern as shown below.

**Question Paper Pattern:**

**In Section I (based on Mathematics),**

A. Attempt any five questions out of eight questions. Each question carries 6 marks.

**In Section II (based on Statistics),**

B. Attempt any three questions out of five questions. Each question carries 7 marks.

C. Attempt any three questions out of five questions. Each question carries 8 marks.