BBA Program

Year: II, Semester III

Business Mathematics

Subject Code - NMA 209 **L T P C 3 1 0 4**

Course Objectives: The course aims to develop basic skills for Mathematical application used in business situations.

SYLLABUS

Unit I: Summation of sets, Arithmetical Progression- Sum of a series in A. P. Arithmetic Mean, Geometric Progression, Sum of a series in G.P. Geometrical Mean, Sum of an infinite geometric series, Permutation and combination, Fundamental rules of counting, Permutation of n different things, Permutation of thing not all different, Circular permutation, Combination of n different things at a time, Simple problems.

Unit II: Matrix Algebra: Definition, Matrix Operations- Addition, Subtraction and Multiplication of matrices, Types of matrices- Square, Diagonal, null. Transpose of a matrix, Determinant of a Square matrix. Singular and non-singular matrix, Cofactor matrix, adjoint of a matrix. Inverse of a matrix, Solution of simultaneous equations by using matrices.

Unit III: Differential Calculus : Differentiation, Differentiation of a product of two functions, Differentiation of a quotient of two functions, Differentiation of a function of a function, Differentiation of a logarithmic and exponential functions, Differentiation of implicit function, Maxima and Minima, Simple problems (Trigonometric functions are excluded).

Unit IV: Integral Calculus: Fundamental rules of integration, Integration by substitution, integration by parts, Integration by decomposition into a sum using partial fractions (Simple Problems), Simple business applications (Trigonometric functions are excluded).

Suggested Readings

- Mongia -Mathematics for Business and Economics
- Zamiruddin- Business Mathematics
- Sunderasam and Jayseelam - An Introduction to Business Mathematics
- Raghavachari - Mathematics for Management
- Sancheti & Kapoor - Business Mathematics
- Ayres, Frank Jr. Theory and Problems of Mathematics of Finance. Schaum's Outlines Series.
- Ranganath: Business Mathematics, GK Publications, Mumbai.
- Dr. R.G. Saha & Others – Methods & Techniques for Business Decisions, VBH Selvaraj, Quantitative Methods in Management, Excel Books

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Course Outcomes:

CO1. To disseminate knowledge in various quantitative tools and techniques & understand basic concepts of statistics.
CO2. To understand matrix algebra and its applications in business.
CO3. To develop understanding of differential calculus and simple problems related to it.
CO4. To understand fundamentals of integral calculus.

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Year: II, Semester IV

OPERATIONS RESEARCH

Subject Code- NMA 210 **L T P C 3 1 0 4**

Course Objectives:

To acquaint students with the construction of mathematical models for managerial decision situations. The emphasis is on understanding the concepts, formulation and interpretation.

SYLLABUS

Unit I: Linear Programming- Formulation of L.P. Problems, Graphical Solutions (Special Cases: Multiple optimal solutions, infeasibility, unbounded solution), Simplex Method (Special Cases: Multiple optimal solutions, infeasibility, unbounded solution).

Unit II: Formulation of Transportation problem- Solution by N.W.Corner Rule, Least Cost Method, Vogel's Approximation Method (VAM), Modified Distribution Method (Special cases: Multiple solutions, Maximization Case, Unbalanced case, prohibited routes), Elementary assignment- Hungarian Method (Special cases: Multiple solutions, Maximization Case, Unbalanced case, Restrictions on assignment).

Unit III: Construction of the network diagram- Critical Path- float and slack analysis (Total float, free float, independent float), PERT, Project Time Crashing.

Unit IV: Decision Theory-Pay Off Table – Opportunity Loss Table- Expected Monetary Value – Expected Opportunity Loss, Expected Value of Perfect Information and Sample Information – Markov Chains, Predicting Future Market Shares, Equilibrium Conditions (Questions based on Markov analysis) limiting Probabilities, Chapman Kolmogorov equation.

Suggested Readings:

1. Vohra, N.D. Quantitative Techniques in Management, Tata McGraw- Hill, New Delhi
2. Kanti Swarup, Man Mohan, Gupta P.K, Operations Research, Sultan Chand & Sons, New Delhi
3. Kapoor, V.K (2014). Operations Research, Sultan Chand & Sons, New Delhi.
4. Sharma, J.K. Operations Research Theory & Applications, Macmillan India Limited.
5. Gupta S P & Gupta P K, Business Statistics and Operations Research, Sultan Chand and Sons, New Delhi.

Course Outcomes:

CO1: To formulate linear programming problem and to find optimal solution by graphical and simplex method.
CO2: Be able to build and solve Transportation Models and Assignment Models.
CO3: To implement replacement of equipments at right time and able to implement project

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management concepts like CPM, PERT to reduce cost and time.
CO4: To assign optimal sequence of different jobs on different machines and develop understanding of queuing theory concepts.

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