Gujarat University

K. S. School of Business Management and Information Technology

[Five Years' (Full – Time) M.B.A. Integrated Degree Course]

First Year B.B.A. (Sem - II)

Code: KS-MBA-MDC-124 A

Basic Mathematics for Data Analytics

Course Credit: 4

Instructions: In today's world quantitative techniques are employed increasingly for decision making and solving complex real-life problems in various walks of life. Many complex problems can be solved by a system of mathematical tools. This course presents mathematical tools and techniques that are helpful in analyzing many theoretical and practical problems. It is a Multidisciplinary / Interdisciplinary Course requiring approximately 55 to 60 hours of direct teaching in the Second Semester. During the course minimum two assignments will be given.

Course Objective: Decision making, by business executives and managers, can be simplified and made faster using mathematics. The objective of this course is to explain the logical and simple way of structuring and analyzing many theoretical and practical problems through the basic mathematical concepts of functions, limits, differentiation and matrices.

Program Outcomes: The MBA program, offered by the institute, tries to develop analytical and strategic thinking, decision making ability and communication skills of the students. It tries to make them competent and responsible professionals to be able to become a part of the growing business and corporate sector of India. As India is slowly paving its way ahead and emerging as a global superpower, the young generation should be the agent of positive change and development of the country. The program provides knowledge, skills and proficiency to create well-read responsible graduates who are an asset for the society.

Course Outcomes: The course would help the students to appreciate logical understanding of mathematical concepts and facilitate them to apply them to comprehend real-life situations and provide a reasonable analysis and solution.

Detailed Syllabus:

Module 1: Functions, Limits and Continuity and their Business Applications [25%]

Functions:

Introduction

Concept and Definition of a Function: Its Domain, Co-Domain and Range

Different Types of Functions:

- Polynomial Function: Linear, Quadratic and Higher Degree Polynomials
- Absolute Value Function

- Rational Function
- Algebraic Function
- Transcendental Functions: Trigonometric Function, Exponential Function, Logarithmic Function, Incommensurable Power Function
- Even and Odd Functions
- Composite Function

Zeros (or Roots) of a Function: Relationship between the Roots and the Coefficients of a Linear Equation, and Relationship between the Roots and the Coefficients of a Quadratic Equation
Some Useful Functions in Business and Economics
Equilibrium of an Economic System
Break-Even Analysis

Limits:

Introduction
Limit of a Variable
Limit of a Function
Left-Hand and Right-Hand Limits
Important Results on Limit of Functions
Some Important Limits: Standard Formulas
Distinction between Limit and Value of a Function
Methods of Evaluation of Limits: Method of Substitution, Method of Factorization, Method of Rationalization and Use of Standard Formulas for Finding Limits

Continuity:

Continuity at a Point
Continuity on an Interval

Module 2: Differentiation [25%]

Introduction
Concept of Slope and Rate of Change
Concept of a Derivative
Some Standard Derivatives
General Rules of Differentiation
Derivative of Various Functions: Algebraic Function, Trigonometric Function (not Inverse Trigonometric Function), Logarithmic Function, Exponential Function

Module 3: Higher Order Differentiation, Maxima and Minima, and their Business Applications [25%]

Successive (or Repeated) Differentiation
The Sign and Magnitude of a Derivative
Maximum and Minimum Values of a Function
Concavity, Convexity and Point of Inflection

Business Applications: Examples Related to Cost, Revenue and Profit Functions

Module 4: Matrix and Determinant **[25%]**

Definition of a Matrix and its Notations
Types of Matrices
Algebra of Matrices: Addition, Subtraction and Multiplication of Matrices
Transpose of a Matrix
Determinants: Their Properties
Adjoint of a Square Matrix
Inverse of a Square Matrix
Methods of Computing the Inverse of a Matrix (of Order 2x2 and 3x3 only)

- Adjoint Matrix Method
- Row Transformation Method

Solution of Simultaneous Linear Equations (of 2 or 3 Unknowns and up to 3 Equations)

- Matrix Inverse Method
- Gauss Elimination Method
- Cramer's Rule

Business Applications

Note: All results will be given without proof.

Reference Books:

- Business Mathematics: Theory and Application: J. K. Sharma; Ane Books
- Business Mathematics: P. Mariappan; Pearson Education
- Business Mathematics: D. C. Sancheti and V. K. Kapoor; Sultan Chand
- A Textbook of Business Mathematics: Padmalochan Hazarika; S. Chand
- Business Mathematics: J. K. Singh; Himalaya Publishing House
- Mathematics for Management: M. Raghavachari; Tata Mc Graw Hill

Mode of Evaluation:

Continuous Evaluation: 30%
Mid-Semester Exam: 20%
End-Semester Exam: 50%

Assessment Tools: Test, Quiz, Assignment, Presentation, Project etc.