

# GUJARAT TECHNOLOGICAL UNIVERSITY

## MASTERS IN COMPUTER APPLICATION (Integrated MCA)

**Year – I (Semester – I) (W.E.F. JULY 2013)**

**Subject Name: Basic Mathematics for IT (4410604)**

### **1. Objectives:**

- The objective of this course is to enable students to obtain understanding of basic Mathematics concepts which can be applicable in various computer courses.

### **2. Prerequisites:**

- Knowledge of basic concepts on sets, differentiation, integration and geometry.

### **3. Course Contents:**

<b>Sr. No.</b>	<b>Course Content</b>	<b>No. of Sessions</b>
<b>1</b>	<b>Set theory and Function</b> Introduction to Set Theory, Methods of Representation of a Set, Operations on Set, Algebra of Sets, DeMorgan's Laws, Introduction to Function, Types of Function: One-to-One, Many-to-One, Onto, Into, Composition of a Function, Inverse of a Function. Relation, Unary, Binary, Ternary, N-ary Relations, Properties of Binary Relation: Reflexive, Irreflexive, Symmetric, Asymmetric, Transitive; and Complement of a Relation, Matrix Representation of a Relation and Its Properties, Graphical Representation of a Relation.	<b>10</b>
<b>2</b>	<b>Determinant and Matrices</b> Definition of a Determinant, Properties of a Determinants, Definition of a Matrix, Different Types of Matrices, Operation on Matrices (Addition, Subtraction and Multiplication), Inverse of a Matrix, Rank of a Matrix, Eigen Vectors of a Matrix, Linear System of Equations, Solution of Linear Equations using Matrix Inversion Method.	<b>10</b>
<b>3</b>	<b>Mathematical Logic</b> Introduction, Propositional Logic, Propositional Equivalences, Predicates and Quantifiers, Rules of Inference and Proof Methods	<b>8</b>
<b>4</b>	<b>Mathematical Induction, Counting and Recurrence Relations</b> Mathematical Induction Principle, Examples based on Mathematical Induction Principle, The Basics of Counting, The Inclusion-Exclusion Principle, The Pigeonhole Principle, Recurrence Relations, Modelling with Recurrence Relations.	<b>10</b>
<b>5</b>	<b>Coordinate Geometry</b>	<b>6</b>

	2D Coordinate Geometry: Quadrants and Lines, Distance between Two Points in $\mathbb{R}^2$ , Area of Triangle, Locus of a Point, Co-linearity of Points, Equations of Straight Line, Slope and Intercept Form, Concept of Circle, Equation of Circle. <i>(Only Concepts and Simple Examples are included. Theorems are not included).</i>	
6	<b>Vector Algebra</b> Definition of Scalar, Definition of Vector in 2 and 3 Dimensions, Dot Product and Cross Product between Two Vectors. <i>(Only Concepts and Simple Examples are included. Theorems are not included).</i>	4

#### 4. Main Reference Books:

1. **Qazi Zameeruddin, V.K.Khanna and S. K. Bhambri:** Business Mathematics, Vikas Publishing House Pvt Ltd, Second Edition.
2. **Kenneth H. Rosen:** Discrete Mathematics and Its Applications, 6<sup>th</sup> Edition, Tata McGraw-Hill.

#### 5. Additional Reference Books

1. **D. S. Malik & M. K. Sen,** “Discrete Mathematics”, Cengage Learning (2009), Rs. 350/-
2. **J. P Tremblay & R. Manohar,** “Discrete Mathematical Structures with Applications to Computer Science”, Tata McGraw-Hill (2010)
3. **Thomas Koshy:** Discrete Mathematics with Applications, Academic Press, 2006.
4. **D. C. Sancheti, V. K. Kapoor:** Business Mathematics, Sultan Chand & Sons.

#### 6. Chapter -wise coverage from the Text Books:

##### 1. From Book # 1

Unit-1: Chapter-2 (Articles 1-22)

Unit-2: Chapter-29 (Articles 1-7, 9-19, 21-24)

Unit-5: Chapter-21, Chapter-22 (Articles 1-6), Chapter-23 (Articles 1-4)

Unit-6: Chapter-30 (Articles 1-10, 12-14)

##### 2. From Book # 2

Unit-3: Chapter-1 (Sections 1.1 to 1.6)

Unit-4: Chapter-4 (Section 4.1), Chapter-5 (Sections 5.1-5.2), Chapter-6 (Section 6.1)