**Class XI Mathematics Syllabus covering towards Discrete structures Syllabus:**

**SETS AND FUNCTIONS**

1. Sets (Periods 12) Sets and their representations. Empty set. Finite and Infinite sets. Equal sets. Subsets. Subsets of the set of real numbers especially intervals (with notations). Power set. Universal set. Venn diagrams. Union and intersection of sets. Difference of sets. Complement of a set, Properties of Complement sets.

2. Relations and Functions (Periods 14) Ordered pairs, Cartesian product of sets. Number of elements in the Cartesian product of two finite sets. Cartesian product of the reals with itself (upto R × R × R). Definition of relation, pictorial diagrams, domain, co-domain and range of a relation. Function as a special kind of relation from one set to another. Pictorial representation of a function, domain, co-domain and range of a function. Real valued function of the real variable, domain and range of these functions, constant, identity, polynomial, rational, modulus, signum and greatest integer functions with their graphs. Sum, difference, product and quotients of functions.

**1 Functions :**

1.1 Types of functions – Definitions.

1.2 Inverse functions and Theorems.

1.3 Domain, Range, Inverse of real valued functions.

**2 Mathematical Induction**

2.1 Principle of Mathematical Induction & Theorems.

2.2 Applications of Mathematical Induction.

2.3 Problems on divisibility.

**3. Algebra**

The same syllabus can also be found from official Indian government websites:

<http://www.ncert.nic.in/rightside/links/pdf/syllabus/syllabus/desm_s_mathematics.pdf>

<http://bieap.gov.in/Pdf/mathsafirstyrsyllabusnew.pdf>

**Undergraduate Data Structures course covering towards Discrete structures Syllabus:**

I have done this course during my undergraduation. Its available on my transcripts.

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| 1. Introduction to Data Structures      • Arrays and Strings |
| 2. Introduction to Algorithms                           • Algorithm Development      • Complexity analysis      • Recursion |
| 3. Linear Data Structures                                 • Stacks: Operations and Applications      • Queues: Operations and Applications     • Circular Queues: Operations and Applications |
| 4. Links Lists                                                  • Operation – Creations, insertion, Deletion      • Circular Lists      • Doubly Linked List |
| 5. Sorting                                                    • Insertion Sort     • Merge Sort      • Quick Sort |
| 6. Searching                                                  • Binary Search      • Selection |
| 7. Graphs I: Representation and Traversal         • Representation: Matrix, Adjacency list      • Traversal: Depth First Search, Breadth First Search |
| 8. Graphs II: Basic Algorithms                          • Minimum Spanning Tree      • Shortest Path      • All pairs Shortest Path, Transitive Closer |
| 9. Binary Trees • Representation                      • Operations: Insert, Delete      • Traversal: Preorder, Inorder, Postorder |
| 10. Heap Sort                                                  • Method and Complexity      • Priority Queue |
| 11. Search Trees                                            • AVI-trees      • B-tree      • External Search |