

# SYLLABUS

**MATHEMATICS – I(A)**

**FIRST YEAR**

<b>S. No.</b>	<b>TOPIC</b>
<b>1.</b>	<b>Functions</b>
	Introduction
	1.0 Ordered Pairs
	1.1 Types of Function-Definitions
	1.2 Inverse Functions and Theorems
	1.3 Real valued functions (Domain, Range and Inverse)
<b>2.</b>	<b>Mathematical Induction</b>
	Introduction
	2.1 Principles of Mathematical Induction and Theorems
	2.2 Applications of Mathematical Induction
	2.3 Problems on divisibility
<b>3.</b>	<b>Matrices</b>
	Introduction
	3.1 Types of Matrices
	3.2 Scalar multiple of a matrix and multiplication of matrices
	3.3 Transpose of a matrix
	3.4 Determinants
	3.5 Adjoint and Inverse of a Matrix
	3.6 Consistency and Inconsistency of system of Simultaneous Equations- Rank of a Matrix
	3.7 Solution of Simultaneous Linear Equations
<b>4.</b>	<b>Addition of Vectors</b>
	Introduction
	4.1 Vectors as a triad of real numbers, some basic concepts
	4.2 Classification (Types) of Vectors
	4.3 Sum (Addition) of Vectors
	4.4 Scalar Multiplication of a vector
	4.5 Angle between two non- zero vectors
	4.6 Linear Combination of Vectors
	4.7 Components of a vectors in Three Dimensions
	4.8 Vector Equations of Line and Plane
<b>5.</b>	<b>Product of Vectors</b>

## Introduction

- 5.1 Scalar or dot product of two vectors-Geometrical interpretation  
Orthogonal Projections
- 5.2 Properties of dot product
- 5.3 Expression for Scalar(dot) product, Angle between two vectors
- 5.4 Geometrical Vector methods
- 5.5 Vector equation of a plane –normal form
- 5.6 Angle between two planes
- 5.7 Vector product (cross product) of two vectors and properties
- 5.8 Vector product in (i,j,k) system
- 5.9 Vector Areas
- 5.10 Scalar triple product
- 5.11 Vector equation of a plane-different forms, skew lines, shortest distance-  
plane, condition for coplanarity etc.
- 5.12 Vector triple product-results
- 5.13 Solved Problems

## **6. Trigonometric Ratios upto Transformations**

### Introduction

- 6.1 Trigonometric ratios –variation –Graphs and periodicity
- 6.2 Trigonometric ratios of compound angles
- 6.3 Trigonometric ratios of multiple and sub- multiple angles
- 6.4 Sum and product transformation

## **7. Trigonometric Equations**

### Introduction

- 7.1 General solutions of trigonometric equations
- 7.2 Simple trigonometric equations-solutions

## **8. Inverse Trigonometric Functions**

### Introduction

- 8.1 To reduce a trigonometric function into a bijective function
- 8.2 Graphs of Inverse trigonometric functions
- 8.3 Properties of inverse trigonometric functions

## **9. Hyperbolic Functions**

### Introduction

- 9.1 Definitions of Hyperbolic Functions, graphs
- 9.2 Definitions of inverse Hyperbolic Functions and graphs
- 9.3 Additions formula of Hyperbolic Functions

## **10. Properties of Triangles**

Introduction

10.1 Relation between the sides and angles of a triangle

10.2 Sine, cosine and Tangent Rules- Projection Rules

10.3 Half angle formulae and area of a triangle

10.4 Incircle and excircles of a triangle

### Appendix

(No Question is to be set in IPE, Mathematics-IA from the topics mentioned below)

#### 1. Sets

Introduction

1.1 Set

1.2 Examples

1.3 Representation of a Set

1.4 Classification (Types) of sets