

Lecture Plan

Name of the College: Government College of Arts, Science and Commerce, Sanquelim-Goa

Name of Faculty: Minoshka D'Souza

Subject: Mathematics

Paper code: MAT-100

Program: BSc

Division: -

Academic year: 2026-27

Semester: I

Total Lectures: 60

Course Objectives: To develop logical reasoning among students in order to be able to organize all aspects of mathematics in such a way that at the base are the most fundamental concepts, assumptions and principles, and the other aspects depend on this base.

Student Learning Outcome: At the end of the course the student will be able to

1. **Recall and explain** the concepts of statements, sets, functions, relations, mathematical induction and linear systems.
2. **Apply** mathematical concepts and techniques to solve problems involving sets, functions, matrices and determinants.
3. **Analyse** mathematical statements and relationships to determine appropriate methods of solution.
4. **Construct** logical arguments and mathematical proofs using appropriate reasoning techniques.

Month	Lecture From	Lecture To	No. of lectures allotted	Topic, Subtopic to be covered	Exercise/ Assignment	ICT Tools	Reference books
June	22/06/2026	27/06/2026	3	Statements and Logic: Statements; Statements with quantifiers; Compound statements; Implications; Proofs in Mathematics.	Exercises on topics covered		Ajit Kumar, S. Kumaresan, and B. K. Sarma: A Foundation Course in Mathematics, Narosa Publishers, 2018.
June/July	29/06/2026	04/07/2026	3	Sets: Basic Terminologies; Operations on sets	Exercises on topics covered		Ajit Kumar, S. Kumaresan, and B. K. Sarma: A Foundation Course in Mathematics, Narosa Publishers, 2018.
July	06/07/2026	11/07/2026	3	Sets: Family of sets; Power sets; Cartesian product of sets.	Exercises on topics covered		Ajit Kumar, S. Kumaresan, and B. K. Sarma: A Foundation Course in Mathematics, Narosa Publishers, 2018.
July	13/07/2026	18/07/2026	3	Functions: Basic definitions: One-One, Onto functions and Bijections; Composition of functions; Inverse of a function;	Exercises on topics covered		Ajit Kumar, S. Kumaresan, and B. K. Sarma: A Foundation Course in Mathematics, Narosa Publishers, 2018.

July	20/07/2026	25/07/2026	3	Functions: Bijections; Composition of functions; Inverse of a function;	Exercises on topics covered	Ajit Kumar, S. Kumaresan, and B. K. Sarma: A Foundation Course in Mathematics, Narosa Publishers, 2018.
July/August	27/07/2026	01/08/2026	3	Functions: Image of subsets under functions; Inverse image of subsets under functions.	Exercises on topics covered	Ajit Kumar, S. Kumaresan, and B. K. Sarma: A Foundation Course in Mathematics, Narosa Publishers, 2018.
August	03/08/2026	08/08/2026	3	Functions: Image of subsets under functions; Inverse image of subsets under functions.	Exercises on topics covered	Ajit Kumar, S. Kumaresan, and B. K. Sarma: A Foundation Course in Mathematics, Narosa Publishers, 2018.
August	10/08/2026	15/08/2026	3	Relations: Relation on sets; Types of relations; Equivalence relations;	Exercises on topics covered	Ajit Kumar, S. Kumaresan, and B. K. Sarma: A Foundation Course in Mathematics, Narosa Publishers, 2018.
August	17/08/2026	22/08/2026	3	Relations: Equivalence classes and partitions of sets.	Exercises on topics covered	Ajit Kumar, S. Kumaresan, and B. K. Sarma: A Foundation Course in Mathematics, Narosa Publishers, 2018.
August	24/08/2026	29/08/2026	3	Induction Principles: The Induction Principle; The Strong Induction Principle;	Exercises on topics covered	Ajit Kumar, S. Kumaresan, and B. K. Sarma: A Foundation Course in Mathematics, Narosa Publishers, 2018.

August/ September	31/08/2026	05/09/2026	3	Induction Principles: The Well – Ordering Principle; Equivalence of the three principles.	Exercises on topics covered		Ajit Kumar, S. Kumaresan, and B. K. Sarma: A Foundation Course in Mathematics, Narosa Publishers, 2018.
September	07/09/2026	12/09/2026	3	Systems of Linear Equations: Solutions & Elementary Operations: Linear system of equations and their solutions; Equivalence of two systems; Elementary operations on equations; elementary row operations.	Exercises on topics covered		W. K. Nicholson: Linear Algebra with Applications, 4th Edition, McGraw – Hill Ryerson Limited, 2003.
September	14/09/2026	19/09/2026	0	Ganesh Chaturthi Break			
September	21/09/2026	26/09/2026	3	Systems of Linear Equations: Gaussian Elimination: Row reduced echelon forms; Gaussian algorithm; Rank.	Exercises on topics covered		W. K. Nicholson: Linear Algebra with Applications, 4th Edition, McGraw – Hill Ryerson Limited, 2003.
September/ October	28/09/2026	03/10/2026	3	Systems of Linear Equations: Homogeneous Equations: Sufficient condition for the existence of a non-trivial solution.	Exercises on topics covered		W. K. Nicholson: Linear Algebra with Applications, 4th Edition, McGraw – Hill Ryerson Limited, 2003.
October	05/10/2026	10/10/2026	3	Determinants: The Laplace Expansion: Determinants and their properties. Determinant & Matrix inverses:	Exercises on topics covered		W. K. Nicholson: Linear Algebra with Applications, 4th Edition, McGraw – Hill Ryerson Limited, 2003.

				Product theorem and other related theorems			
October	12/10/2026	14/10/2026	3	Determinants: Product theorem and other related theorems Adjoint formula for A^{-1} ; Cramer's rule.	Exercises on topics covered		W. K. Nicholson: Linear Algebra with Applications, 4th Edition, McGraw – Hill Ryerson Limited, 2003.

*** Assessment Rubrics**

Component	Max Marks
ISA 1	7.5
ISA 2	7.5
ISA 3	7.5
Semester End Exam	60