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: MTE 101 Foundations of Mathematics	**Program:** B.Sc. Mathematics	**Division: -**
Academic year: 2024-25	**Semester:** V	**Total Lectures:** 60

Course Objectives: This course helps in developing basic logic required for study of mathematics

Expected Course Outcome: On completion of this course the learner will be familiar with sets, functions, relations, induction principles, countability, order relations etc

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

1. Recall and explain concepts in logic, sets, functions, relations, induction principles, countability and order relations.
2. Prove important theorems in foundations of mathematics
3. Apply knowledge gained to solve basic problems in foundations of mathematics.
4. Analyze, compare and differentiate between various concepts in sets, functions, relations, induction and countability in order to solve problems

Month	Lecture From	Lecture To	No. of lectures allotted	Topic, Subtopic to be covered	Exercise/ Assignment	ICT Tools	Reference books
June	28/06/2024	29/06/2024	1	**Statements and Logic:** Statements, Statements with Quantifiers	Exercises on topics covered	Latex	A Foundation Course in Mathematics by Kumar and Kumaresan
July	01/07/2024	06/07/2024	3	**Statements and Logic:** Compound Statements, Implications, Proofs in Mathematics	Exercises on topics covered	Latex	A Foundation Course in Mathematics by Kumar and Kumaresan
	08/07/2024	13/07/2024	4	**Statements and Logic:** Proofs in Mathematics **Sets:** Basic Terminologies, Operations on Sets, Family of Sets	Exercises on topics covered	Latex	A Foundation Course in Mathematics by Kumar and Kumaresan
	15/07/2024	20/07/2024	4	**Sets:** Power Sets, Cartesian Product of Sets **Functions:** Basic Definitions	Exercises on topics covered	Latex	A Foundation Course in Mathematics by Kumar and Kumaresan
	22/07/2024	27/07/2024	4	**Functions:** Bijections	Exercises on topics covered	Latex	A Foundation Course in Mathematics by Kumar and Kumaresan
July August	29/07/2024	03/08/2024	4	**Functions:** Compositions, Inverse	Exercises on topics covered	Latex	A Foundation Course in Mathematics by Kumar and Kumaresan
August	05/08/2024	10/08/2024	4	**Functions:** Images of Subsets, Inverse Images of Subsets	Exercises on topics covered	Latex	A Foundation Course in Mathematics by Kumar and Kumaresan
	12/08/2024	17/08/2024	2	**Functions:** Images of Subsets, Inverse Images of Subsets	Exercises on topics covered	Latex	A Foundation Course in Mathematics by Kumar and Kumaresan

				Relations: Relations on Sets, Types of Relations			
	19/08/2024	24/08/2024	4	**Relations:** Equivalence Relations, Equivalence Classes	Exercises on topics covered	Latex	A Foundation Course in Mathematics by Kumar and Kumaresan
	26/08/2024	31/08/2024	4	**Relations:** Partitions of a Set, Significance of Equivalence Relation **Induction Principles:** The Induction Principle	Exercises on topics covered	Latex	A Foundation Course in Mathematics by Kumar and Kumaresan
September	02/09/2024	07/09/2024	4	**Induction Principles:** The Induction Principle, The Strong Induction Principle	Exercises on topics covered	Latex	A Foundation Course in Mathematics by Kumar and Kumaresan
	16/09/2024	21/09/2024	4	**Induction Principles:** The Strong Induction Principle, , The Well-Ordering Principle	Exercises on topics covered	Latex	A Foundation Course in Mathematics by Kumar and Kumaresan
	23/09/2024	28/09/2024	4	**Induction Principles:** Equivalence of the Three Principles **Countability of Sets:** Sets with Same Cardinality, Finite Sets	Exercises on topics covered	Latex	A Foundation Course in Mathematics by Kumar and Kumaresan
September October	30/09/2024	05/10/2024	4	**Countability of Sets:** Finite Sets, Countable Sets	Exercises on topics covered	Latex	A Foundation Course in Mathematics by Kumar and Kumaresan
October	07/10/2024	12/10/2024	4	**Countability of Sets:** Countable Sets, Comparing Cardinality **Order Relations:** Partial and Total Orders	Exercises on topics covered	Latex	A Foundation Course in Mathematics by Kumar and Kumaresan

	14/10/2024	19/10/2024	4	**Order Relations:** Partial and Total Orders, Chains, Bounds and Maximal Elements, Axiom of Choice and its Equivalents	Exercises on topics covered	Latex	A Foundation Course in Mathematics by Kumar and Kumaresan
	21/10/2024	23/10/2024	2	**Order Relations:** Axiom of Choice and its Equivalents	Exercises on topics covered	Latex	A Foundation Course in Mathematics by Kumar and Kumaresan

*** Assessment Rubrics**

Component	Max Marks
ISA 1	10
ISA 2	10
Semester End Exam	80