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 204 Basic Number Theory	**Program:** B.Sc. Mathematics	**Division: -**
Academic year: 2024-25	**Semester:** IV	**Total Lectures:** 60

Course Objectives: This course helps in understanding basic concepts of number theory

Expected Course Outcome: On completion of this course the learner will be familiar with divisibility theory in integers, theory of congruences, number-theoretic functions and some non-linear diophantine equations

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

1. Recall and explain concepts in divisibility, theory of congruences, number-theoretic functions and certain non-linear diophantine equations.
2. Prove important theorems in number theory
3. Apply knowledge gained to solve basic problems in number theory.
4. Analyze, compare and differentiate between various concepts in divisibility, theory of congruences, number-theoretic functions and certain non-linear diophantine equations.

Month	Lecture From	Lecture To	No. of lectures allotted	Topic, Subtopic to be covered	Exercise/ Assignment	ICT Tools	Reference books
December	9 Dec 2024	14 Dec 2024	4	**Divisibility Theory in Integers:** The Division Algorithm	Exercises on topics covered	Latex	Elementary Number Theory (7th Edition) by David M. Burton
December	16 Dec 2024	21 Dec 2024	3	**Divisibility Theory in Integers:** The Greatest Common Divisor and its Properties	Exercises on topics covered	Latex	Elementary Number Theory (7th Edition) by David M. Burton
January	2 Jan 2024	4 Jan 2025	1	**Divisibility Theory in Integers:** The Euclidean Algorithm	Exercises on topics covered	Latex	Elementary Number Theory (7th Edition) by David M. Burton
January	6 Jan 2025	11 Jan 2025	4	**Divisibility Theory in Integers:** The Diophantine Equation ax+by=c	Exercises on topics covered	Latex	Elementary Number Theory (7th Edition) by David M. Burton
January	13 Jan 2025	18 Jan 2025	4	**Primes and Their Distribution:** The Fundamental Theorem of Arithmetic, The Sieve of Eratosthenes, the Goldbach Conjecture	Exercises on topics covered	Latex	Elementary Number Theory (7th Edition) by David M. Burton
January	20 Jan 2025	25 Jan 2025	4	**The Theory of Congruences:** Definition and Properties	Exercises on topics covered	Latex	Elementary Number Theory (7th Edition) by David M. Burton
January - February	27 Jan 2025	1 Feb 2025	4	**The Theory of Congruences:** Linear Congruences and the Chinese Remainder Theorem	Exercises on topics covered	Latex	Elementary Number Theory (7th Edition) by David M. Burton
February	3 Feb 2025	8 Feb 2025	4	**Fermat's Theorem:** Fermat's Little Theorem and Pseudoprimes, Wilson's Theorem	Exercises on topics covered	Latex	Elementary Number Theory (7th Edition) by David M. Burton

February	10 Feb 2025	15 Feb 2025	4	**Number-Theoretic Functions:** The Sum and Number of Divisors	Exercises on topics covered	Latex	Elementary Number Theory (7th Edition) by David M. Burton
February	17 Feb 2025	22 Feb 2025	4	**Number-Theoretic Functions:** The Sum and Number of Divisors, The Mobius Inversion Formula	Exercises on topics covered	Latex	Elementary Number Theory (7th Edition) by David M. Burton
February - March	24 Feb 2025	1 Mar 2025	4	**Number-Theoretic Functions:** The Mobius Inversion Formula, The Greatest Integer Function	Exercises on topics covered	Latex	Elementary Number Theory (7th Edition) by David M. Burton
March	3 Mar 2025	8 Mar 2025	4	**Number-Theoretic Functions:** The Greatest Integer Function **Euler's Generalization of Fermat's Theorem:** Euler's Phi Function	Exercises on topics covered	Latex	Elementary Number Theory (7th Edition) by David M. Burton
March	10 Mar 2025	15 Mar 2025	3	**Fermat's Theorem:** Euler's Phi Function, Euler's Theorem, Properties of Phi-Function	Exercises on topics covered	Latex	Elementary Number Theory (7th Edition) by David M. Burton
March	17 Mar 2025	22 Mar 2025	4	**Fermat's Theorem:** Properties of Phi-Function **Certain Nonlinear Diophantine Equations:** The Equation x^2+y^2=z^2	Exercises on topics covered	Latex	Elementary Number Theory (7th Edition) by David M. Burton
March	24 Mar 2025	29 Mar 2025	4	**Certain Nonlinear Diophantine Equations:** The Equation x^2+y^2=z^2	Exercises on topics covered	Latex	Elementary Number Theory (7th Edition) by David M. Burton
March - April	31 Mar 2025	5 Apr 2025	2	**Certain Nonlinear Diophantine Equations:** Insolvability of the Diophantine Equations x^4+y^4=z^2 and x^4-y^4=z^2	Exercises on topics covered	Latex	Elementary Number Theory (7th Edition) by David M. Burton

April	7 Apr 2025	12 Apr 2025	3	**Certain Nonlinear Diophantine Equations:** Proof that the area of a Pythagorean triangle can never be equal to a perfect square **Revision**	Exercises on topics covered	Latex	Elementary Number Theory (7th Edition) by David M. Burton

*** Assessment Rubrics**

Component	Max Marks
ISA 1	10
ISA 2	10
ISA 3	10
Semester End Exam	80