	Lecture Plan							
Name of the College: Government College of Arts, Science and Commerce, Sanquelim-Goa								
Name of Faculty: Aaron Al	me of Faculty: Aaron Alphonso Subject: Mathematics							
Paper code: MAT-602 - NU	IBER THEORY		Program: M.Sc. Mathematics		Division: -			
Academic year: 2024-25			Semester: VI		Total Lectures:	60		
Course Objectives: This co	rse will serve as	Prerequisite	s to an advanced Course in Anal	ytical Number Theo	ory			
Expected Course Outcome: On completion of the course the student will be familiar with the topics in Number Theory Student Learning Outcome: At the end of this course a student will be able to 1. Recollect and explain various concepts in Number Theory 2. Prove important theorems in the course 3. Apply various concepts of Number Theory to solve problems. 4. Correlate various concepts in Number Theory and use them to solve problems.								
Month Lecture From	Lecture To	No. of lectures allotted	Topic, Subtopic to be covered	Exercise/ Assignment	ICT Tools	Reference books		

December	4 Dec 2024	7 Dec 2024	1	Introduction to Number Theory	Problem Solving	Laptop, Smart Board and writing pad	Tom Apostol, Introduction to Analytic Number Theory
December	9 Dec 2024	14 Dec 2024	3	Derivative of Function of more than one Variable: Total derivative of a function of more than one Variable. Jacobian.	Problem Solving	Laptop, Smart Board and writing pad	Tom Apostol, Introduction to Analytic Number Theory
December	16 Dec 2024	21 Dec 2024	3	Derivative of Function of more than one Variable: Sufficient Condition for differentiability Mean Value Theorem. Higher-order derivatives.	Problem Solving	Laptop, Smart Board and writing pad	Tom Apostol, Introduction to Analytic Number Theory
January	2 Jan 2024	4 Jan 2025	1	Derivative of Function of more than one Variable: Condition for Equality of Mixed Partial Derivatives. Taylor's Theorem	Problem Solving	Laptop, Smart Board and writing pad	Tom Apostol, Introduction to Analytic Number Theory
January	6 Jan 2025	11 Jan 2025	4	Derivative of Function of more than one Variable: Problem Solving	Problem Solving	Laptop, Smart Board and writing pad	Tom Apostol, Introduction to Analytic Number Theory
January	13 Jan 2025	18 Jan 2025	4	Extreme Values: Critical Point, Maximum Minimum, Second	Problem Solving	Laptop, Smart Board and writing pad	Tom Apostol, Introduction to Analytic

				Derivative Condition for Maximum/minimu m			Number Theory
January	20 Jan 2025	25 Jan 2025	4	Fundamental Theorem of Arithmetic: Divisibility, Greatest common divisor, Prime numbers.	Problem Solving	Laptop, Smart Board and writing pad	Tom Apostol, Introduction to Analytic Number Theory
January - February	27 Jan 2025	1 Feb 2025	4	Fundamental Theorem of Arithmetic: The Fundamental Theorem of Arithmetic, The series of reciprocals of primes, The Euclidean algorithm.	Problem Solving	Laptop, Smart Board and writing pad	Tom Apostol, Introduction to Analytic Number Theory
February	3 Feb 2025	8 Feb 2025	4	Arithmetical functions and Dirichlet multiplication: IMobius function μ , Euler totient function φ , Relation connecting μ and φ , Product formula for φ (n).	Problem Solving	Laptop, Smart Board and writing pad	Tom Apostol, Introduction to Analytic Number Theory
February	10 Feb 2025	15 Feb 2025	4	Arithmetical functions and Dirichlet multiplication: Dirichlet product of arithmetical functions, Dirichlet inverse and Mobius	Problem Solving	Laptop, Smart Board and writing pad	Tom Apostol, Introduction to Analytic Number Theory

				inversion formula, Mangoldt function, Multiplicative functions.			
February	17 Feb 2025	22 Feb 2025	4	Arithmetical functions and Dirichlet multiplication: Liouville function, Divisor functions, Generalized convolutions, Formal power series, Bell series. Derivative of arithmetical functions.	Problem Solving	Laptop, Smart Board and writing pad	Tom Apostol, Introduction to Analytic Number Theory
February - March	24 Feb 2025	1 Mar 2025	4	Averages of arithmetical functions: Big oh notation. Euler summation formula.	Problem Solving	Laptop, Smart Board	Mathematical Analysis by Tom Apostol
March	3 Mar 2025	8 Mar 2025	4	Averages of arithmetical functions: Some elementary asymptotic formulas. Average order of d(n).	Problem Solving	Laptop, Smart Board	Mathematical Analysis by Tom Apostol
March	10 Mar 2025	15 Mar 2025	4	Averages of arithmetical functions: Average order of $\sigma\alpha(n)$, Average order of $\varphi(n)$, Average order of $\mu(n)$ and $\Lambda(n)$.	Problem Solving	Laptop, Smart Board	Mathematical Analysis by Tom Apostol
March	17 Mar 2025	22 Mar 2025	4	Some elementary theorems on distribution of prime	Problem Solving	Laptop, Smart Board	Mathematical Analysis by Tom Apostol

				numbers: Chebyshev's functions $P(x)$ and $f(x)$. Relations connecting functions $P(x)$ and $f(x)$			
				Characters of finite abelian groups: Characters of finite abelian groups, The character group, The orthogonality relations of characters, Dirichlet character.			
March	24 Mar 2025	29 Mar 2025	4	Partition Theory : Partitions of numbers, Generating function of p(n), Other generating functions, Theorems of Euler, Theorem of Jacobi, Special cases of Jacobi's identity.	Problem Solving	Laptop, Smart Board	Mathematical Analysis by Tom Apostol
March - April	31 Mar 2025	5 Apr 2025	4	Basic Cryptology: Caesar Cipher. Shift Cipher. Affine cipher. Hill cipher.	Problem Solving	Laptop, Smart Board	Mathematical Analysis by Tom Apostol

* Assessment Rubrics

Component	Max Marks
ISA 1	20
ISA 2	20
ISA 3	20
ISA 4	20
Semester End	
Exam	40