Lecture Plan

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

Name of Faculty: Prajyot Maruti Patil	**Subject:** Mathematics	
Paper code: MTE 102, Combinatorics	**Program:** T.Y.B.Sc.	**Division: -**
Academic year: 2024-25	**Semester:** I	**Total Lectures:** 60

Course Objectives:

1. To provide basic knowledge of various concepts in combinatorics.

Expected Course Outcome:

1) Prove generalised pigeon hole principle.
2) Apply binomial and multinomial theorem.
3) Solve problems on partitions and cycles in permutations.
4) Use ordinary and exponential generating functions to solve problems.

Student Learning Outcome: Student will be able to

1) Student will be able to prove pigeon hole principle, apply binomial and multinomial theorem and use ordinary and exponential generating functions 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	Introduction to Combinatorics		Smart Board PDF	A Walk Through Combinatorics - An Introduction to Enumeration and Graph Theory by Miklos Bona
July	01/07/2024	06/07/2024	4	generalized Pigeon-hole principle		Smart Board PDF	A Walk Through Combinatorics - An Introduction to Enumeration and Graph Theory by Miklos Bona
	08/07/2024	13/07/2024	3	methods of mathematical induction – weak induction			A Walk Through Combinatorics - An Introduction to Enumeration and Graph Theory by Miklos Bona
	15/07/2024	20/07/2024	4	methods of mathematical induction - strong induction, methods of mathematical induction – strong induction.		Data projector	A Walk Through Combinatorics - An Introduction to Enumeration and Graph Theory by Miklos Bona
	22/07/2024	27/07/2024	4	Strings over finite alphabet, Choice problems. Permutations			A Walk Through Combinatorics - An Introduction to Enumeration and Graph Theory by Miklos Bona

July August	29/07/2024	03/08/2024	4	Choice problems			A Walk Through Combinatorics - An Introduction to Enumeration and Graph Theory by Miklos Bona
August	05/08/2024	10/08/2024	3	Binomial theorem		Smart Board	A Walk Through Combinatorics - An Introduction to Enumeration and Graph Theory by Miklos Bona
	12/08/2024	17/08/2024	4	Multinomial theorem			A Walk Through Combinatorics - An Introduction to Enumeration and Graph Theory by Miklos Bona
	19/08/2024	24/08/2024	4	Compositions,		Smart Board PDF	A Walk Through Combinatorics - An Introduction to Enumeration and Graph Theory by Miklos Bona
	26/08/2024	31/08/2024	3	Set partitions			A Walk Through Combinatorics - An Introduction to Enumeration and Graph Theory by Miklos Bona

September	02/09/2024	07/09/2024	2	Integer partitions		Smart Board	A Walk Through Combinatorics - An Introduction to Enumeration and Graph Theory by Miklos Bona
	09/09/2024	14/09/2024	2	Cycles in permutations			A Walk Through Combinatorics - An Introduction to Enumeration and Graph Theory by Miklos Bona
	16/09/2024	21/09/2024	4	Permutations with restricted cycle structure		Smart Board	A Walk Through Combinatorics - An Introduction to Enumeration and Graph Theory by Miklos Bona
	23/09/2024	28/09/2024	4	Enumerating the elements of intersecting sets		Smart Board	A Walk Through Combinatorics - An Introduction to Enumeration and Graph Theory by Miklos Bona
September October	30/09/2024	05/10/2024	4	applications of the sieve formula.			A Walk Through Combinatorics - An Introduction to Enumeration and Graph Theory by Miklos Bona
October	07/10/2024	12/10/2024	4	Ordinary generating functions – Recurrence relations and generating			A Walk Through Combinatorics - An Introduction to

				functions Products of generating functions,			Enumeration and Graph Theory by Miklos Bona
	14/10/2024	19/10/2024	4	Compositions of generating functions. Exponential generating functions – Recurrence relations and exponential generating functions,			A Walk Through Combinatorics - An Introduction to Enumeration and Graph Theory by Miklos Bona
	21/10/2024	22/10/2024	2	Products of exponential generating functions, Compositions of exponential generating functions.			A Walk Through Combinatorics - An Introduction to Enumeration and Graph Theory by Miklos Bona

*** Assessment Rubrics**

Component	Max Marks
ISA 1	10
ISA 2	10
Practical	Nil
Project	Nil
Semester End Exam	80