Lecture Plan

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

Name of Faculty: Aaron Alphonso	**Subject:** Mathematics	
Paper code: MAT 506 - Several Variable Calculus	**Program:** M.Sc. Mathematics	**Division: -**
Academic year: 2024-25	**Semester:** II	**Total Lectures:** 60

Course Objectives: The student will learn the basics of Differentiation and Integration of Several variable functions.

Expected Course Outcome: On completion of the course the student will be familiar with the topics in Differentiation and Integration of Several variable functions.

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

1. **Recollect and explain various concepts in Several Variable Calculus**
2. **Prove important theorems in the course**
3. **Apply various concepts of SVC to solve problems.**
4. **Correlate various concepts in SVC 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	**Derivative of Function of more than one Variable:** Partial Derivative.	Problem Solving	Laptop, Smart Board and writing pad	Mathematical Analysis by Tom Apostol
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	Mathematical Analysis by Tom Apostol
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	Mathematical Analysis by Tom Apostol
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	Mathematical Analysis by Tom Apostol
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	Mathematical Analysis by Tom Apostol

January	13 Jan 2025	18 Jan 2025	4	**Extreme Values:** Critical Point, Maximum Minimum, Second Derivative Condition for Maximum/minimu m	Problem Solving	Laptop, Smart Board and writing pad	Mathematical Analysis by Tom Apostol
January	20 Jan 2025	25 Jan 2025	4	**Extreme Values:** Conditional Optimum, and Lagrange Multipliers	Problem Solving	Laptop, Smart Board and writing pad	Mathematical Analysis by Tom Apostol
January - February	27 Jan 2025	1 Feb 2025	4	**Inverse Function Theorem:** Regular and Singular Points, Open Mapping Theorem	Problem Solving	Laptop, Smart Board and writing pad	Mathematical Analysis by Tom Apostol
February	3 Feb 2025	8 Feb 2025	4	**Inverse Function Theorem:** Inverse Function Theorem, Implicit Function Theorem.	Problem Solving	Laptop, Smart Board and writing pad	Mathematical Analysis by Tom Apostol
February	10 Feb 2025	15 Feb 2025	4	**Inverse Function Theorem:** Problem Solving	Problem Solving	Laptop, Smart Board and writing pad	Mathematical Analysis by Tom Apostol
February	17 Feb 2025	22 Feb 2025	4	**Multiple Integrals:** Rectangles in IRn and Riemann sums over Rectangles. Upper and Lower Riemann Sums.	Problem Solving	Laptop, Smart Board and writing pad	Mathematical Analysis by Tom Apostol

				Riemann Integral of a bounded Function.			
February - March	24 Feb 2025	1 Mar 2025	4	**Multiple Integrals:** Riemann Integral of a bounded Function. Algebra of Riemann Integrals.	Problem Solving	Laptop, Smart Board and writing pad	Mathematical Analysis by Tom Apostol
March	3 Mar 2025	8 Mar 2025	4	Multiple Integrals: Sets of Jordan Measure Zero.	Problem Solving	Laptop, Smart Board and writing pad	Mathematical Analysis by Tom Apostol
March	10 Mar 2025	15 Mar 2025	4	**Multiple Integrals:** Oscillation of a Function at a point, Integrability versus points of discontinuity of a Function	Problem Solving	Laptop, Smart Board and writing pad	Mathematical Analysis by Tom Apostol
March	17 Mar 2025	22 Mar 2025	4	**Multiple Integrals:** Fubini's Theorem. Mean value theorem for multiple integrals.	Problem Solving	Laptop, Smart Board and writing pad	Mathematical Analysis by Tom Apostol
March	24 Mar 2025	29 Mar 2025	4	**Multiple Integrals:** Partitions of unity (Statement only). Change of variable formula	Problem Solving	Laptop, Smart Board and writing pad	Mathematical Analysis by Tom Apostol
March - April	31 Mar 2025	5 Apr 2025	4	**Multiple Integrals:** Problem Solving	Problem Solving	Laptop, Smart Board and writing pad	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