Lecture Plan

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

Name of Faculty: Rohit R. Redkar	**Subject:** Mathematics	
Paper code: MAT-305 Complex Analysis	**Program:** B.Sc.	**Division: -**
Academic year: 2025-26	**Semester: VI**	**Total Lectures:** 60

Course Objectives: To provide an introduction to the theory of functions of complex variables, analytic functions, contour integrations and to furnish an introduction to their applications.

Expected Course Outcome:

1. Build the theory of limits, continuity, and differentiation to a function of a complex variable.
2. Prove several results and assess suitable techniques of complex integration.
3. Evaluate integrals of a complex valued function over contours.
4. Apply the theory of residues, and theorems of Taylor and Laurent to solve complex integrals.

Student Learning Outcome: Student will be able to

1. Build the theory of limits, continuity, and differentiation to a function of a complex variable.
2. Prove several results and assess suitable techniques of complex integration.
3. Evaluate integrals of a complex valued function over contours.
4. Apply the theory of residues, and theorems of Taylor and Laurent to solve complex integrals.

Month	Lecture From	Lecture To	No. of lectures allotted	Topic, Subtopic to be covered	Exercise/ Assignment	ICT Tools	Reference books
December	01/12/2025	06/12/2025	St. Francis Xavier's Feast 02	Sums and products of complex numbers, Algebraic properties		Typed notes	Complex Variables and Applications by James Brown and Ruel Churchill
	08/12/2025	13/12/2025	04	Vectors and moduli, Complex conjugates		Typed notes and Geogebra	Complex Variables and Applications by James Brown and Ruel Churchill
	15/12/2025	20/12/2025	Liberation Day 01	Exponential form		Typed notes and Geogebra	Complex Variables and Applications by James Brown and Ruel Churchill
	22/12/2025	23/12/2025	01	Exponential form		Typed notes and Geogebra	Complex Variables and Applications by James Brown and Ruel Churchill
January	02/01/2026	03/01/2026	02	Arguments of products and quotients		Typed notes and Geogebra	Complex Variables and Applications by James Brown and Ruel Churchill
	05/01/2026	10/01/2026	04	Roots of complex numbers, Regions in the complex plane. Functions of		Typed notes and	Complex Variables and Applications by

				complex variables		Geogebra	James Brown and Ruel Churchill
	12/01/2026	17/01/2026	04	Limits, Theorems on limits, Continuity, Differentiability		Typed notes and Geogebra	Complex Variables and Applications by James Brown and Ruel Churchill
	19/01/2026	24/01/2026	04	Differentiation formulas, Cauchy-Riemann equations, Sufficient condition for Differentiability, Polar coordinates		Typed notes	Complex Variables and Applications by James Brown and Ruel Churchill
	26/01/2026	31/01/2026	04 Republic Holiday	Analytic functions, Harmonic functions. Exponential function, Logarithmic function		Typed notes and Geogebra	Complex Variables and Applications by James Brown and Ruel Churchill
February	02/02/2026	07/02/2026	04	Branches and Derivatives of Logarithms, Identities involving logarithms, Complex exponents, Trigonometric functions		Typed notes and Geogebra	Complex Variables and Applications by James Brown and Ruel Churchill
	09/02/2026	14/02/2026	04	Hyperbolic functions, Inverse trigonometric and hyperbolic functions.		Typed notes and Geogebra	Complex Variables and Applications by James Brown and Ruel Churchill
	16/02/2026	21/02/2026	04	Derivatives of functions, Definite		Typed	Complex Variables

				integrals of functions, Contours, Contour integrals		notes	and Applications by James Brown and Ruel Churchill
	23/02/2026	28/02/2026	04	Contour integrals of functions with branch cuts, Upper bounds for moduli of contour integrals, Antiderivatives, Cauchy-Goursat theorem (without proof)		Typed notes	Complex Variables and Applications by James Brown and Ruel Churchill
March	02/03/2026	07/03/2026	03 Holi	Simply and Multiply connected domains, Cauchy integral formula and extension of Cauchy integral formula, Liouville's theorem		Typed notes	Complex Variables and Applications by James Brown and Ruel Churchill
	09/03/2026	14/03/2026	04	Fundamental theorem of algebra, Maximum modulus principle. Convergence of sequences and series, Taylor's theorem		Typed notes and Geogebra	Complex Variables and Applications by James Brown and Ruel Churchill
	16/03/2026	21/03/2026	02 Gudi Padva / Id-Ul Fitr	Laurent's theorem. Isolated singular points, Residues		Typed notes	Complex Variables and Applications by James Brown and Ruel Churchill
	23/03/2026	28/03/2026	03 Ram Navami	Cauchy Residue theorem, Residue at infinity, The three types of Isolated singular points, Residues at poles		Typed notes	Complex Variables and Applications by James Brown and Ruel Churchill
	30/03/2026	31/03/2026	01	Revision			Complex Variables and Applications by James Brown and

							Ruel Churchill

*** Assessment Rubrics**

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