Lecture Plan

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

Name of Faculty: Mr. Vishal Vinayak Gawas	**Subject:** Complex Analysis	
Paper code: MTC 109	**Program:** TYBSc	**Division:**
Academic year: 2024 - 2025	**Semester:** VI	**Total Lectures:** 90

Course Objectives: This course helps in understanding basic concepts of Complex Analysis

Expected Course Outcome: Understand the basic concepts of complex analysis and apply them.

Student Learning Outcome:

1. Understand the basics of Complex analysis.
2. Understand the concept of Analytic functions.
3. Understand the contour integrals and related applications.
4. Understand the Taylor's and Laurent's Series.
5. Understand the concepts of residues and poles.
6. Understand Mobius transformations.

Month	Lecture From	Lecture To	No. of lectures allotted	Topic, Subtopic to be covered	Exercise/ Assignment	ICT Tools	Reference books

Month	Week	Start Date	End Date	Hours	Topics		Teaching Aid	Reference
December	**Week 1** **04/12/24**	**07/12/24**		**6**	Sums and products, Algebraic properties, Vectors and moduli, Complex conjugates, Exponential form, Arguments of products and quotients		Chalk and Board	Complex Variables and Applications by James Brown and Ruel Churchill
December	**Week 2** **09/12/24**	**14/12/24**		**6**	Roots of complex numbers, Regions in the complex plane. Functions of complex variables, Limits, Theorems on limits, Continuity		Chalk and Board	Complex Variables and Applications by James Brown and Ruel Churchill
December	**Week 3** **16/12/24**	**21/12/24**		**6**	Derivatives, Differentiation formulas, Cauchy-Riemann equations, Sufficient condition for Differentiability, Polar coordinates		Chalk and Board	Complex Variables and Applications by James Brown and Ruel Churchill
January	**Week 4** **02/01/25**	**04/01/25**		**6**	Analytic functions, Harmonic functions. Exponential function, Logarithmic function, Branches and Derivatives of Logarithms		Chalk and Board	Complex Variables and Applications by James Brown and Ruel Churchill
January	**Week 5** **06/01/25**	**11/01/25**		**6**	Identities involving logarithms, Complex exponents, Trigonometric functions, Hyperbolic		Chalk and Board	Complex Variables and Applications by James

				functions, Inverse trigonometric and hyperbolic functions.			Brown and Ruel Churchill
January	**Week 6** 13/01/25	**18/01/25**	**6**	Derivatives of functions, Definite integrals of functions, Contours, Contour integrals, Contour integrals of functions with branch cuts		Chalk and Board	Complex Variables and Applications by James Brown and Ruel Churchill
January	**Week 7** 20/01/25	**25/01/25**	**6**	Upper bounds for moduli of contour integrals, Antiderivatives, Cauchy-Goursat theorem (without proof), Simply and Multiply connected domains		Chalk and Board	Complex Variables and Applications by James Brown and Ruel Churchill
January-February	**Week 8** 27/01/25	**01/02/25**	**6**	Cauchy integral formula and extension of Cauchy integral formula, Liouville's theorem, Fundamental theorem of algebra, Maximum modulus principle.		Chalk and Board	Complex Variables and Applications by James Brown and Ruel Churchill
February	**Week 9** 03/02/25	**08/02/25**	**6**	Convergence of sequences and series, Taylor's theorem,		Chalk and Board	Complex Variables and Applications by James Brown and Ruel Churchill

February	**Week 10** 10/02/25	15/02/25		Laurent series, Laurent's theorem [statements only and applications]			Chalk and Board	Complex Variables and Applications by James Brown and Ruel Churchill
			6					
February	**Week 11** 17/02/25	22/02/25		Isolated singular points, Residues, Cauchy Residue theorem			Chalk and Board	Complex Variables and Applications by James Brown and Ruel Churchill
			6					
February -March	**Week 12** 24/02/25	01/03/25		Residue at infinity, The three types of Isolated singular points, Residues at poles			Chalk and Board	Complex Variables and Applications by James Brown and Ruel Churchill
			6					
March	**Week 13** 03/03/25	08/03/25		Zeros of analytic functions, Zeros and Poles.			Chalk and Board	Complex Variables and Applications by James Brown and Ruel Churchill
			6					
March	**Week 14** 10/03/25	15/03/25		Zeros of analytic functions, Zeros and Poles.			Chalk and Board	Complex Variables and Applications by James Brown and Ruel
			6					

March	**Week 15** **17/03/25**	**22/03/25**		Fractional Linear transformations, Transformation w=1/z		Chalk and Board	Complex Variables and Applications by James Brown and Ruel
March	**Week 16** **24/03/25**	**29/03/25**	**6** **6**	Mappings by 1/z, Mobius transformation.			Complex Variables and Applications by James Brown and Ruel Churchill
March-April	**Week 17** **31/03/25**	**05/04/25**	**6** **Gudi Padva, Id**	Revision		Chalk and Board	Complex Variables and Applications by James Brown and Ruel
April	**Week 18** **07/04/25**	**11/04/25**	**4**	Revision			

* Assessment Rubrics

Component	Max Marks
ISA 1	15
ISA 2	15
Practical	-
Project	-
Semester End Exam	120