Semester	Subject Code	Category	Lect	ure	The	ory	Practical	Credits
VI	21CMA6C	Core	Hrs/week	Hrs/Sem	Hrs/week	Hrs/Sem	0	4
		paper – XIII	5	75	5	75		

CORE PAPER – XIII-COMPLEX ANALYSIS

COURSE OBJECTIVES:

The students will be able to

- Learn Complex number System, Complex function and Complex integration.
- Gain knowledge about the Origin, properties and application of Complex numbers and Complex functions.

COURSE OUTCOMES:

On the successful completion of the course, the students will be able to

CO Number	CO Statement	Knowledge Level (K1-K4)
CO1	Compute sums, products, quotients, conjugate, modulus and argument of complex numbers.	К2
CO2	Conceive the concepts of analytic functions and will be familiar with the elementary complex functions and their properties.	K3
CO3	Evaluate complex contour integrals by the fundamental theorems and apply the Cauchy integral formula.	К3
CO4	Apply the theory into application of the power series expansion of analytic functions.	К3
CO5	Evaluate and analyze complex integrals using the residue theorem.	K4

Knowledge Level: K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze.

MAPPING WITH PROGRAMME OUTCOMES

COS	PO1	PO2	PO3	PO4	PO5	PO6
CO1	S	S	М	М	S	S
CO2	S	М	S	S	М	S
CO3	S	S	М	М	S	S
CO4	S	S	S	S	S	S
CO5	S	М	М	М	М	S

S- Strong M – Medium L – Low

UNIT – I COMPLEX NUMBERS ANDANALYTIC FUNCTIONS

Definition of Function of a Complex Variable – Mappings – Limits, Continuity – Derivatives and Differentiation Formula – Cauchy – Riemann Equations – Properties of Analytic Functions – Necessary and Sufficient Conditions for Analytic Functions – Harmonic Functions – Determination of Harmonic Conjugate and Analytic Function. (Text Book 1: Chapter 1: Sections :1.0- 1.5 ,1.8 and 1.9 Chapter 2: Sections: 2.0 -2.9)

UNIT – II MAPPING

Bilinear Transformation and Some Special Bilinear Transformation -Conformal Mapping -

The transformations w = az+b, w=1/z, $w=z^2$, $w=\sqrt{z}$, $w=e^z$.

(Text Book 1: Chapter 3: Sections: 3.0 - 3.5

Chapter 5: Sections: 5.0 - 5.3)

UNIT – III INTEGRALS

Contours – Line Integrals – Cauchy – Goursat's Theorem (without proof) Cauchy's Integral Formula – Derivatives of Analytic Functions – Maximum Modulus Theorem. (Text Book 1: Chapter 6: Sections :6.0 - 6.4)

UNIT – IV POWER SERIES

Taylor's and Laurent's Theorem – Singularities and Classification – Problems. (Text Book 2: Complex Variables and Applications Chapter 5: Sections : 51 – 56)

UNIT – V RESIDUES AND POLES

Residues – Cauchy's residue theorem – Simple problems. Evaluation of real integrals, Improper integrals involving sine & cosine functions. (Text Book 1: Chapter 8: Sections: 8.0 - 8.3)

DISTRIBUTION OF MARKS - THEORY 40% AND PROBLEMS 60%

TEXT	AUTHORS	TITLE	PUBLISHERS	YEAR OF
BOOKS				PUBLICATION
S.NO				
1.	S.Arumugam, A.	Complex	Scitech	2015
	Thangapandi Isaac,	Analysis	Publications	
	A. Somasundaram			
2.	R.V. Churchill and	Complex	McGraw Hill	1984
	J.W. Brown	Variables and	International Book	
		Applications	Co., Singapore.	

15 Hours

15 Hours

15 Hours

15 Hours

15 Hours

REFERENCE BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF
				PUBLICATION
1.	P.Duraipandian and	Complex	Emerald	1976
	LaxmiDuraipandian	Analysis.	Publishers, Chennai.	
2.	S.Ponnusamy	Foundations of	Narosha Publishing	2000
		Complex Analysis	House, New Delhi.	
3.	Murray R.Spiegel	Theory and	Tata McGraw Hill	2005
		Problems of	Edition, New	
		Complex Variable	Delhi.	

TEACHING METHODOLOGY

- 1. Class room teaching
- 2. Giving Assignments for all the units
- 3. Discussions
- 4. Home test

WEB SOURCES

- 1. http://www.freebookcentre.net/Mathematics/Complex-Analysis-Books.html
- 2. http://www.math.ku.dk/noter/filer/koman-12.pdf

SYLLABUS DESIGNER

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