With effect from: 2022-23 (R-21)

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

Accredited by NAAC with A++ Grade

9-5-81, Ibrahimbagh, Hyderbad-500031, Telangana State

DEPARTMENT OF MATHEMATICS

COMPLEX VARIABLES

(OPEN ELECTIVE-I for CSE,CSE-AIML & IT of 2/4 B.E III-Sem)

L:T:P (Hrs./week):2:0:0	SEE Marks :60	Course Code: **U220E320MA**
Credits : 2	CIE Marks: 40	Duration of SEE: 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the students to :	***At the end of the course students should be able to:***
1. **Understand** the Analytic functions, conditions and harmonic functions.	1. **Apply** the condition(s) for a complex variable function to be analytic and/or harmonic and to construct an Analytic function.
2. **Evaluate** a line integral of a function of a complex variable using Cauchy's integral formula, and how to	2. **Evaluate** complex integrals by Cauchy's theorem and Cauchy's Integral formula
3. **Evaluate** Taylor's and Laurent Series.	3. **Identify** the singularities of a function and to expand a given function as a Taylor's / Laurent's series.
4. **Understand** the Cauchy's residue theorem	4. **Evaluate** complex integrals by Cauchy's Residue theorem

UNIT – I (8 classes)

DIFFERENTIATION OF COMPLEX FUNCTION

Introduction to complex function-Limits and Continuity of function - Differentiability and Analyticity - Necessary & Sufficient Condition for a Function to be Analytic(Cartesian) - Milne-Thompson's method -Harmonic Functions.

UNIT – II (6 classes)

INTEGRATION OF COMPLEX FUNCTION

Complex Integration- Cauchy's Theorem (with proof) - Cauchy's Integral Formula (with proof) - Evaluation of integrals by Cauchy's Integral formula.

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UNIT – III (6 classes)
SERIES OF COMPLEX FUNCTIONS

Power series - Taylor's Series - Laurent's Series (without proofs) –Zero and singularities of complex function.

UNIT – IV (8 classes)
RESIDUES

Introduction to Residues- Residues at singularities-Cauchy's Residue theorem (without proof) – Evaluation of integrals by Cauchy's Residue theorem.

Learning Resources:

1 Advanced Engineering Mathematics 3rd Edition, R.K.Jain & S.R.K.Iyengar, Narosa Publishing House.
2 Higher Engineering Mathematics 40th Edition Dr. B.S Grewal, Khanna Publishers.
3 A Text book of Engineering Mathematics, N.P.Bali & Manish Goyal, Laxmi Publications.

Online Resources :

1 http://mathworld.wolfram.com/topics
2 http://www.nptel.ac.in/course.php;

The break-up of CIE : Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	2	Max. Marks for each Internal Tests	:	30
2	No. of Assignments	:	2	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	2	Max. Marks for each Quiz Test	:	5
	Duration of Internal Tests	:	90 Minutes			

(Dr. N Kishan) (OU Nominee)	(Prof.M A Srinivas) (Subject Expert -1) (JNTU-H)	(Prof.A.lakshmi Narayana) (Subject Expert-2) (IIT-H)	(Dr.T Sudhakar Rao) (Chairman, BOS)

12.10.22