

with effect from: 2024-25(R-23)

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

Accredited by NAAC with A++ Grade
9-5-81, Ibrahimbagh, Hyderabad-500031, Telangana State

DEPARTMENT OF MATHEMATICS

COMPLEX VARIABLES

(Open Elective)

For B.E., III - Semester – CBCS

(For CIVIL, EEE, ECE & MECH only)

Instruction: 2 Hours per week	Sem. End Exam Marks: 60	Subject Reference Code: U23OE310MA
Credits: 2	Sessional Marks: 40	Duration of Semester End Exam: 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
<i>The course will enable the students to :</i>	<i>At the end of the course students should be able to:</i>
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.

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. https://onlinecourses.nptel.ac.in/noc24_ma03/preview

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		

Prof.N.Kishan
(OU Nominee)

Prof.M.A.Srinivas
(Subject Expert-JNTUH)

Dr.M.Raghavendra Sharma
(Subject Expert)

Dr.B.Srivastva
(Industry Expert)

Dr.T. Sudhakar Rao
(Chairman, BOS)