

Course Title	Complex Variables & Transforms	Course Code	MT2003
Department	Department of Electrical Engineering (DEE)	Campus	Lahore
Knowledge Profile	Mathematics & Computing (WK2)	Credit Hrs.	3
Knowledge Area	Mathematics (KA10)	Grading Scheme	Relative
HEC Knowledge Area	Natural Sciences	Applicable From	Spring 2023
SDG	4 Quality Education		
Pre-requisite(s)	MT1006 Differential Equations		

Course Objective	To acquaint the students with the complex analysis, Fourier series and transforms and their applications in engineering.
-------------------------	--

No.	Assigned Program Learning Outcome (PLO)
2	An ability to identify, formulate, research literature and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.

I = Introduction, R = Reinforcement

E = Evaluation, A = Assignment, Q = Quiz, M = Midterm, F=Final, L = Lab, P = Project, W = Written Report.

No.	Course Learning Outcome (CLO) Statements	Assessment Tools	Taxonomy Levels	PLO
1	Compute basic arithmetic of complex numbers.	Q1, A1, M1	C3	2
2	Develop the harmonic conjugate function.	M1, F	C5	2
3	Evaluate contour and Improper integrals.	Q2, M2, A2, F	C6	2
4	Compute the Fourier series and transforms of functions.	Q3, A3, F	C3	2

Text Books	Title	Advanced Engineering Mathematics
	Author	Kreyszig E.
	Publisher	
Reference Books	Title	Complex Variables and Applications
	Author	Brown J. W. and Churchill R. V.
	Publisher	

Week	Course Contents/Topics	Chapter*	CLO*
1	Complex Numbers and their geometric representation, Polar Form of Complex Numbers, Powers and Roots.	13	1
2	Derivative, Analytic Function Cauchy-Riemann Equations, Laplace's Equation.	13	2
3	Exponential function Trigonometric and Hyperbolic Functions. Euler's formula	13	1
4	Logarithm. General power. Principal value	13	1
5	Line Integral in Complex Plane	14	3
6	Cauchy Integral Theorem Cauchy Integral Formula	14	3
7	Singularities and Zeros. Infinity Residue Integration Method	16	3
8	Residue Integration of Real Integrals.	16	3
9	Fourier Series, Arbitrary period. Even and Odd function. Half Range Expansions	11	4
10	Fourier Integral	11	4
11	Fourier Cosine and Sine Transforms	11	4
12	Fourier Transform. Discrete and Fast Fourier Transforms	11	4
13	Beta and Gamma Function	Reference Book	3

*Reference book chapters are given in brackets

Assessment Tools	Weightage
Quizzes, Assignments	20.0%
Midterms (I+II)	30.0%
Final Exam	50.0%