Course Code	MTH341/541
Course Name	Complex Analysis
Credits	4
Course Offered to	UG, PG
Course Description	This course gives students an introduction to the theory of functions of complex variables. A function of a complex variable has some remarkable properties which do not hold true necessarily for a function of a real variable. In this course, we discuss many such properties. We do so by studying complex numbers and their properties; analytic functions and their derivatives, integrals and power series expansions; singularities and zeros of a complex function. The course also covers applications to physics and engineering.

Pre-requisites		
Pre-requisite (Mandatory)	Pre-requisite (Desirable)	Pre-requisite(other)
Real Analysis - I; Multivariable Calculus		
*Please insert more rows if required		

Post Conditions*(For suggestions on verbs please refer the second sheet)				
CO1	CO2	CO3	CO4	CO5
Understanding of geometry of complex plane and complex numbers.	Understanding of functions of a complex variable, the meaning of their derivative and integral.	Understanding of singularities and zeroes of a function of a complex variable.	Evaluation of complicated real integrals using residue calculus.	Some applications of the theory to problems of interest in physics and engineering.

Weekly Lecture Plan			
Week Number	Lecture Topic	COs Met	Assignment/Labs/Tutorial
1 and 2	Review of Complex variables and Analytic functions	CO1	HW 1
3 and 4	hyperbolic	CO2	HW 2
5 and 6	Contour Integrals, Branch cuts, Antiderivatives, Cauchy-Goursat theorem, Cauchy Integral formula, Liouville's theorem, Maximum modulus principle	CO2	HW 3
7 and 8	Convergence of sequences and series, Taylor's theorem, Laurent's theorem, Absolute and uniform convergence, integration and differentiation of power series.	CO2	HW 4
9 and 10	Residues, Singularities, Cauchy's Residue theorem, zeros and poles	CO3	HW 5
11 and 12	Applications of residues, Jordan's Lemma, Argument principle, Rouchés theorem	CO4	HW 6
13	Conformal Mapping	CO5	HW 7
*Please insert more rows if required			

Weekly Lab Plan			
Week Number	Laboratory Exercise	COs Met	Platform (Hardware/Software)
*Please insert more rows if required			

Assessment Plan	
Type of Evaluation	% Contribution in Grade
Homework	30
Mid-sem	20
Tutorials/Viva/Presentation	10
End-sem	40
*Please insert more row for other type of Evaluation	

Resource Material	
Type	Title
Textbook	Complex Variables, 2nd ed -- Stephen D Fisher
Reference Books	Complex Variables & Applications – Churchill and Brown
	Complex Analysis -- Theodore W Gamelin
	Functions of one complex variable I -- John B Conway
	Fundamentals of Complex Analysis with Applications to Engineering, Science, and Mathematics (3rd Edition) -- Edward B. Saff and A.D. Snider