INDIAN INSTITUTE OF TECHNOLOGY TIRUPATI
PROFORMA FOR NEW COURSE

1.	Title of the Course	Complex Analysis
2.	Course Number	MA6105
3.	Status of the Course	Core
4.	Structure of Credits	3-0-0-3
5.	Offered To	PG
6.	New Course/Modification to	New
7.	To be Offered by	Department of Mathematics
8.	To take effect from	July 2019
9.	Prerequisite	NIL
10.	Whether approved by the Department	Yes
11.	**Course Objective:** To explore the algebraic, geometric and topological structures of the complex number field. To introduce the concepts of analyticity, Cauchy-Riemann relations, harmonic functions, Complex integration and complex power series. To classify isolated singularities and examine residue theory. To illustrate the applications of residue theory in the evaluation of integrals.	
12.	**Course Content:** Complex numbers, geometric representation, stereographic projection, Sequences and series, Power series, Radius of convergence. Elementary functions. Limits, continuity and differentiability, Analytic functions, Cauchy Riemann equations, Taylor Series. Line integral, Cauchy's integral theorem, Cauchy's integral formula, Liouville's theorem, Fundamental Theorem of Algebra, Maximum Modulus Principle and Morera's theorem.Zeros and singularities, Laurent series, Residue theory and its application to integrals, Casorati Weierstrass theorem, Picard's Theorem (without proof), Argument principle, Rouche's theorem and Mobius transformation.	
13.	Text book(s): 1. T. W. Gamelin, *Complex Analysis,* Springer Verlag, (2001).	
14.	Reference(s): 1. E. M. Stein, R. Shakarchi, *Complex Analysis (Princeton Lectures in Analysis),* Princeton University Press, (2003). 2. J. B. Conway, *Functions of one Complex Variable I,* Springer, (1978). 3. L. Ahlfors, *Complex Analysis,* McGraw Hill, (1979). 4. S. Ponnusamy, H. Silverman, *Complex Variables with Applications,* Birkhauser, Boston, (2006). 5. J.W. Brown , R.V. Churchil, *Complex Variables and Applications,* McGraw Hill, (2008).	