

INDIAN INSTITUTE OF TECHNOLOGY TIRUPATI
PROFORMA FOR NEW COURSE

1.	Title of the Course	Complex Variables
2.	Course Number	MA2022
3.	Status of the Course	Elective
4.	Structure of Credits	3-0-0-3
5.	Offered To	UG
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 introduce the basics concepts on complex valued functions like continuity, differentiability and analyticity. To introduce proof and theorems on complex integral, series of complex functions and analytic functions. To classify singularities of complex valued functions. Further, to introduce elementary properties of elementary functions.	
12.	Course Content: Analytic functions: Limits and continuity, differentiability and analyticity, analytic branches of inverse of functions, branches of logarithm, Cauchy-Riemann equations, harmonic conjugates. Complex integral: Cauchy's theorem and integral formula, series of complex functions and the Weierstrass M-test, Taylor series, identity theorem, isolation of zeros of an analytic function, statements of open mapping, inverse function, Liouville theorem, fundamental theorem of Algebra. Residue Calculus: Singularities and their classification, Laurent series, residue theorem and argument principle, computing real integrals using residues. Bilinear transformation, conformal mapping, elementary properties of the mapping of exponential, sine and cosine functions.	
13.	Text book(s): 1. E. Kreyzig, <i>Advanced Engineering Mathematics</i> , John Wiley & Sons, (2010).	
14.	Reference(s): 1. R. V. Churchill, J. W. Brown, <i>Complex Variables and Applications</i> , Mc-Graw Hill, (1990). 2. S. Ponnusamy, H. Silverman, <i>Complex Variables with Applications</i> , Birkhauser, (2006).	