

INDIAN INSTITUTE OF TECHNOLOGY TIRUPATI
PROFORMA FOR NEW COURSE

1.	Title of the Course	Mathematical Methods for Basic Sciences I
2.	Course Number	ID5101
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	Faculties from Departments of Physics and Chemistry
8.	To take effect from	January 2018
9.	Prerequisite	Nil
10.	Whether approved by the Program	Yes
11.	Course Objective: To introduce mathematical techniques to post-graduate/PhD students in Basic Sciences to pose, and solve, problems in Physics and Chemistry.	
12.	<p>Course Content:</p> <p>Vectors and Tensors. Applications in condensed matter, electrodynamics and astrophysics.</p> <p>Linear vector spaces, Dirac notation. Basis sets, Inner Products. Orthonormality and completeness. Gram-Schmidt orthonormalization process. Linear operators, Matrix Representations, Diagonalization, Orthogonal, Hermitian and Unitary matrices. Transcendental and Special Functions. Ordinary Differential Equations of 2nd Order. Applications in Mechanics, Electrodynamics and Quantum Mechanics.</p> <p>Generalized functions, Dirac delta function – Normalization of continuum eigen states.</p> <p>Partial Differential Equations: Applications in Electrodynamics and Quantum Mechanics.</p>	
13.	<p>Text Book:</p> <ol style="list-style-type: none"> 1. G. Arfken and H. J. Weber, <i>Mathematical Methods for Physicists</i>, 7th Edition, Academic Press, Indian Edition (2012). 2. M. Boas, <i>Mathematical Methods in Physical Sciences</i>, 3rd Edition, John Wiley, International Edition (2006). 	
14.	<p>References:</p> <ol style="list-style-type: none"> 1. P. Dennerey and A. Kryzwicki, <i>Mathematics for Physicists</i>, Dover Publications (2005). 2. K. F. Riley, M. P. Hobson, <i>Foundation Mathematics for the Physical Sciences</i>, Cambridge University Press (2011). 	