

INDIAN INSTITUTE OF TECHNOLOGY TIRUPATI
PROFORMA FOR NEW COURSE

1.	Title of the Course	Statistical Mechanics
2.	Course Number	CY5022
3.	Status of the Course	Elective
4.	Structure of Credits	3-0-0-3
5.	Offered To	PG
6.	New Course/Modification to	New
7.	To be Offered by	Dr. Debasish Mondal and Dr. Rajib Biswas
8.	To take effect from	January 2019
9.	Prerequisite	Nil
10.	Whether approved by the Department	Yes
11.	Course Objective: This course will provide the basics of both equilibrium and non-equilibrium statistical mechanics pertaining to understand the underlying principles of several bio-physical processes related to molecules and materials. The recent cutting edge related research topics will also be discussed.	
12.	Course Content: Equilibrium Statistical Mechanics: Ensembles, Canonical ensemble, Grand canonical ensemble, partition function, Central limit theorem, Boltzmann statistics, Fermi-Dirac and Bose-Einstein statistics, Liouville theorem, Ideal mono-, di- and polyatomic gas, Lattice model, Distribution function theory of liquids. Non-equilibrium statistical Mechanics: Stochastic variables, Random events, Markov processes, Einstein relation, Langevin approach, Fluctuation-dissipation theorem, Fokker-Planck description, Kramers rate, Master equation, First passage time problems.	
13.	Text book(s): 1. Donald A. McQuarrie, <i>Statistical Mechanics</i> , Viva Books, (2011). 2. N.G. Van Kampen, <i>Stochastic Processes in Physics and Chemistry</i> , North Holland, (2007).	
14.	Reference(s): 1. Biman Bagchi, <i>Statistical Mechanics for Chemistry and Material Science</i> , CRC Press, (2018). 2. Robert Zwanzig, <i>Nonequilibrium Statistical Mechanics</i> , Oxford University Press, (2001).	