INDIAN INSTITUTE OF TECHNOLOGY TIRUPATI
PROFORMA FOR NEW COURSE

1.	Title of the Course	MOS Device Modeling and Characterisation
2.	Course Number	EE5023
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. N. N. Murty
8.	To take effect from	July 2018
9.	Prerequisite	Solid state devices / semiconductor devices / Electronic devices
10.	Whether approved by the Department	Yes
11.	**Course Objective:** The main objective of the course is to provide a sound understanding of operation, modelling and characterisation of MOS devices, that are inherent to all VLSI circuits.	
12.	**Course Content:** MOS capacitor: C-V characteristics; Effect of metal work function, oxide and interface trapped charges. Threshold voltage. Tunnelling current. MOSFET: Threshold based models of static I-V characteristics: Channel length modulation, field dependent mobility, short channel and narrow width effects; Subthreshold current. Quantum mechanical effects Capacitances, concept of non-reciprocal capacitances. Dynamic behaviour under small and large signals. Surface potential and charge based models. Model parameters and their extraction. SOI MOSFETs, Double Gate MOSFETs and FinFETs.	
13.	Text book(s): 1. B. G. Streetman, S. K. Banerjee, *Solid State Electronic Devices,* Pearson, (2016). 2. Y. Taur , T. H. Ning , *Fundamentals of Modern VLSI devices,* Cambridge, (2013). 3. M. S. Tyagi , *Introduction to Semiconductor Materials and Devices,* John Wiley & Sons, (2012).	
14.	Reference(s): 1. N. Arora, *MOSFET modeling for VLSI Simulation: Theory and Practice,* World Scientific, (2007).	