

INDIAN INSTITUTE OF TECHNOLOGY TIRUPATI

PROFORMA FOR NEW COURSE

1.	Title of the Course	Additive Manufacturing
2.	Course Number	ME5111
3.	Status of the Course	Elective
4.	Structure of Credits	3-0-0-3
5.	Offered to	PG
6.	New Course/ Modification to	New Course
7.	To be offered by	Dr. N. Venkaiah & Dr. D. V. Kiran
8.	To take effect from	July 2018
9.	Prerequisite	CoT
10.	Whether approved by the Program	Yes
11.	<p>Course Objective (Max 70 words): Additive Manufacturing (AM) is an economically viable alternative to conventional manufacturing technologies for producing highly complex parts. The main objective of this course is to acquaint students with the concept of AM, various AM technologies, selection of materials for AM, modeling of AM processes, and their applications in various fields. The course will also cover AM process plan including building strategies and post-processing.</p>	
12.	<p>Course Content (Max 100 words): Introduction to Additive Manufacturing (AM) - Reverse engineering, Different AM processes and relevant process physics, AM process chain, Application level: Direct processes – Rapid Prototyping, Rapid Tooling. Rapid Manufacturing; Indirect Processes - Indirect Prototyping. Indirect Tooling, Indirect Manufacturing, Materials science for AM - multifunctional and graded materials in AM, Role of solidification rate, Evolution of non-equilibrium structure, microstructural studies, Structure property relationship, AM technologies - Powder-based, droplet based, extrusion based, object stereolithography, Micro- and nano-additive processes, Mathematical models for AM, Selection of AM technologies using decision methods, AM process plan, Monitoring and control of defects, transformation.</p>	
13.	<p>Text Book(s):</p> <ol style="list-style-type: none"> 1. Ian Gibson, David W. Rosen and Brent Stucker, Additive manufacturing technologies: rapid prototyping to direct digital manufacturing, Springer, 2010. 2. C.K. Chua, K.F. Leong and C.S. Lim, Rapid prototyping: Principles and applications, 3rd Edition, World Scientific, 2010. 	
14.	<p>Reference(s):</p> <ol style="list-style-type: none"> 1. Andreas Gebhardt, Understanding additive manufacturing: rapid prototyping, rapid tooling, rapid manufacturing, Hanser Publishers, 2011. 2. J.D. Majumdar and I. Manna, Laser-assisted fabrication of materials, Springer Series in Material Science, 2013. 3. L. Lu, J. Fuh and Y. S. Wong, Laser-induced materials and processes for rapid prototyping, Kluwer Academic Press, 2001. 4. Zhiqiang Fan and Frank Liou, Numerical modeling of the additive manufacturing (AM) processes of titanium alloy, InTech, 2012. 	