

1.	Title of the course	Additive Manufacturing
2.	Course number	ME504L
3.	Structure of credits	3-0-0-3
4.	Offered to	PG
5.	New course/modification to	Modification To ME5111/3
6.	To be offered by	Department of Mechanical Engineering
7.	To take effect from	July 2022
8.	Prerequisite	CoT
9.	<p><b>Course Objective(s):</b> 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>	
10.	<p><b>Course Content:</b> 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>	
11.	<p><b>Textbook(s):</b></p> <ol style="list-style-type: none"> <li>1. Ian Gibson, David W. Rosen and Brent Stucker, Additive manufacturing technologies: rapid prototyping to direct digital manufacturing, Springer (2010).</li> <li>2. Chua C K, Leong K F and Lim C S, <i>Rapid prototyping: Principles and applications</i>, 3rd Edition, World Scientific (2010).</li> </ol>	
12.	<p><b>Reference(s):</b></p> <ol style="list-style-type: none"> <li>1. Andreas Gebhardt, <i>Understanding additive manufacturing: rapid prototyping, rapid tooling, rapid manufacturing</i>, Hanser Publishers (2011).</li> <li>2. Majumdar J D and I Manna, <i>Laser-assisted fabrication of materials</i>, Springer Series in Material Science (2013).</li> <li>3. Lu L, Fuh J and Wong Y S, <i>Laser-induced materials and processes for rapid prototyping</i>, Kluwer Academic Press (2001).</li> <li>4. Zhiqiang Fan and Frank Liou, <i>Numerical modeling of the additive manufacturing (AM) processes of titanium alloy</i>, InTech (2012).</li> </ol>	