

**B. Tech 7<sup>th</sup> Semester (Robotics & Artificial Intelligent)**

**LESSON PLAN: ADDITIVE MANUFACTURING (PCC-RAI-701/21)**  
**(Jul- Dec 2025)**

SN.	Topic	LN
	<b>Unit1: Introduction to Additive Manufacturing (AM):</b>	
1	Introduction to AM	1
2	Traditional manufacturing	2
3	AM Computer aided design (CAD)	3
4	AM process chain Application level	4
5	Direct processes – Rapid Prototyping, Rapid Tooling	5
6	Rapid Manufacturing;	6
7	Indirect Processes - Indirect Prototyping.	7
8	Indirect Tooling, Indirect Manufacturing	8
9	Application of AM	9
10	Reverse & Forward Engineering	10
	<b>Unit 2 Materials Science for AM:</b>	
11	Introduction of materials	11
12	Discussion on different materials	12
13	graded materials in AM	13
14	Role of solidification rate	14
15	Evolution of nonequilibrium structure	15
16	structure property	16
17	Concept of grain structure	17
18	Grain structure and microstructure	18
	<b>Unit 3 AM Technologies:</b>	
19	Introduction to Powder-based AM processes	19
20	melting (selective laser sintering,	20
21	shaping, electron beam melting. involvement	21

22	Printing processes (droplet based 3D Solid-based AM processes	22
23	extrusion based fused deposition modelling object	23
24	Stereolithography	24
25	Residual stress, Micro- and nano-additive, Nano Additive	25
	<b>Unit 4 Mathematical Models for AM:</b>	
26	Introduction to the mathematical model	26
27	cost, optimal orientation	27
28	Defect in AM and role of transport Simulation	28
29	optimal s (choice of parameter, Model validation	29
30	Transport phenomena models	30
31	: temperature, fluid flow and composition,	31
32	buoyancy driven tension	32
33	driven free surface flow pool) Case studies: Numerical Modelling of AM process	33
	<b>Unit 5 Process Selection Planning</b>	
34	part fabrication time,	34
35	Control for AM:	35
36	decision methods Additive	36
37	Additive manufacturing process plan	37
38	strategies and post processing	38
39	Monitoring	39
40	control of Defects	40
41	Transformation	41
42	Case Study	42
43	Revision Ch1	43
44	Sessional 2	44