

ADVANCED MANUFACTURING PROCESSES

Course code	23ME2702B	Year	IV	Semester	I
Course category	Open Elective - IV	Branch	ME	CourseType	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	Manufacturing Processes
Continuous Internal Evaluation:	30	Semester End Evaluation:	70	Total Marks:	100

Course Outcomes: At the end of the course students will be able to

CO's	Statement	Blooms Level	Units
CO1	Apply and distinguish different coating techniques such as CVD,PVD, thermal spraying, and ion implantation for industrial surfaces	L2	1
CO2	Under stand and apply the manufacturing processes of ceramics and composite materials, including powder consolidation and reinforcement types	L2	2
CO3	Analyze and describe the manufacturing sequence of micro electronic devices Including lithography, PCB design, and surface mount technology.	L3	3
CO4	Understand various nano manufacturing techniques and evaluate their applications, advantages, and working principles.	L2	4
CO5	Provide knowledge of rapid prototyping techniques and their use in product development	L3	5

Contribution of Course outcome towards the achievement of program outcomes & Strength of correlations (High :3, Medium:2, Low:1)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2	2		3						1	3	2
CO2	3	3	2	1	2						1	3	2
CO3	3	2	3	2	3				1	1		3	2
CO4	2	2	2		2						3	2	3
CO5	2		3		3			1	1	2	2	2	3

Unit	Contents	CO
I	COATING TECHNIQUES: Scope, Cleaners, Methods of cleaning, Surface coating types, ceramic and organic methods of coating, and economics of coating. Electro forming, Chemical vapor deposition, Physical vapor deposition, thermal spraying, Ion implantation, diffusion coating, Diamond coating and cladding.	CO1
II	PROCESSING OF CERAMICS: Applications, characteristics, classification, Processing of particulate ceramics, Powder preparations, consolidation, hot compaction, drying, sintering, and finishing of ceramics, Areas of application. PROCESSING OF COMPOSITES: Composite Layers, Particulate and fiber reinforced composites, Elastomers, Reinforced plastics, MMC, CMC, Polymer matrix composites.	CO2
III	FABRICATION OF MICRO ELECTRONIC DEVICES: Crystal growth and wafer preparation, Film Deposition oxidation, lithography, bonding and packaging, reliability and yield, Printed Circuitboards, computeraided design in micro electronics, surface mount technology, Integrated circuit economics	CO3
IV	NANO MANUFACTURING: Nano tubes, Nano particles, nanowires, Lithography, Electro spinning, mechanical milling, Inert gas condensation, sputtering, laser ablation, Arc discharge, Sol-gel methods, working, applications, advantages	CO4
V	RAPID PROTOTYPING: Working Principles, Methods, Stereo Lithography, Laser Sintering, Fused Deposition Method, Applications and Limitations, Rapid tooling, Techniques of rapid manufacturing	CO5

Learning Resource
Textbooks:
TEXT BOOKS: 1. Manufacturing Engineering and Technology Kalpakjian / Adisson Wesley, 1995. 2. Process and Materials of Manufacturing /R. A. Lindburg / 1thedition, PHI 1990.
Referencebooks
1. Microelectronic packaging handbook / Rao. R. Thummala and Eugene, J. Rymaszewski / Van Nostrand Reinhold, 2. MEMS & Micro Systems Design and manufacture / Tai—Run Hsu / TMGH 3. Advanced Machining Processes / V.K. Jain / Allied Publications 4. Introduction to Manufacturing Processes / John A Schey / McGraw Hill.

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