

GOVT. POLYTECHNIC, NAYAGARH
6TH SEMESTER MECHANICAL ENGINEERING 2025-26
LESSON PLAN

Subject: Advance Manufacturing Processes (Th-4b)
Name Of Faculty: Santosh Kumar Patra (Lecturer Stage-I)

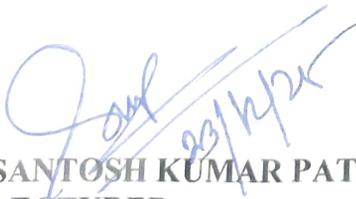
Periods: 4P/Week
Semester From: 22/12/2025 TO 18/04/2026
No. Of Weeks: 15

Sl. No.	Week	Period	Topics To Be Covered
1	1st	1 st	Unit-1: Modern Machining Processes: Introduction & Comparison with traditional machining.
		2 nd	Ultrasonic Machining: Principle and Description of equipment.
		3 rd	Ultrasonic Machining: Applications, advantages, and limitations.
		4 th	Electric Discharge Machining (EDM): Principle and Description of equipment.
2	2nd	1 st	EDM: Dielectric fluid, Tools (electrodes), and Process parameters.
		2 nd	EDM: Output characteristics and Applications.
		3 rd	Wire cut EDM: Principle and Description of equipment.
		4 th	Wire cut EDM: Controlling parameters and Applications.
3	3rd	1 st	Abrasive Jet Machining (AJM): Principle and Description of equipment.
		2 nd	AJM: Material removal rate and Applications.
		3 rd	Laser Beam Machining (LBM): Principle and Description of equipment.
		4 th	LBM: Material removal rate and Applications.
4	4th	1 st	Electro Chemical Machining (ECM): Principle and Description of equipment.
		2 nd	ECM: Material removal rate and Applications.
		3 rd	Plasma Arc Machining (PAM): Principle and Description of equipment.
		4 th	PAM: Process parameters, performance characterization, Applications.
5	5th	1 st	Electron Beam Machining (EBM): Principle and Description of equipment.
		2 nd	EBM: Process parameters, performance characterization, Applications.
		3 rd	Comparison of all non-traditional machining processes.
		4 th	Unit-1 Assessment / Class Test (End of 20 Periods).
6	6th	1 st	Unit-2: Plastic Processing: Introduction and Processing of plastics.
		2 nd	Moulding processes: Injection moulding (Working & Equipment).
		3 rd	Compression moulding (Working & Equipment).
		4 th	Transfer moulding (Working & Equipment).
7	7th	1 st	Extruding: Process and applications.
		2 nd	Casting and Calendering processes.
		3 rd	Fabrication methods: Sheet forming and Blow moulding.
		4 th	Laminating plastics (sheets, rods & tubes) and Reinforcing.
8	8th	1 st	Applications of Plastics in various industries.
		2 nd	Unit-2 Review / Quiz (End of 10 Periods).
		3 rd	Unit-3: Additive Manufacturing (AM): Introduction, Need for AM.
		4 th	Fundamentals of Additive Manufacturing, AM Process Chain.
9	9th	1 st	Advantages and Limitations of AM, Commonly used Terms.
		2 nd	Classification of AM process, Fundamental Automated Processes.
		3 rd	Distinction between AM and CNC, other related technologies.
		4 th	Concept of Flexible manufacturing process.

Sl. No.	Week	Period	Topics To Be Covered
10	10th	1 st	Concurrent engineering and Production tools (Capstan & Turret lathes).
		2 nd	Rapid prototyping processes (Overview).
		3 rd	Applications of AM: Design, Aerospace, and Automotive Industry.
		4 th	Applications of AM: Jewelry, Arts, Architecture.
Sl. No.	Week	Period	Topics To Be Covered
11	11th	1 st	RP Medical and Bioengineering Applications.
		2 nd	Web Based Rapid Prototyping Systems.
		3 rd	Unit-3 Review / Discussion (End of 15 Periods - IA Syllabus Complete).
		4 th	Unit-4: Special Purpose Machines (SPM): Concept of SPM.
Sl. No.	Week	Period	Topics To Be Covered
12	12th	1 st	General elements of SPM.
		2 nd	Productivity improvement by SPM.
		3 rd	Principles of SPM design (Part 1).
		4 th	Principles of SPM design (Part 2).
Sl. No.	Week	Period	Topics To Be Covered
13	13th	1 st	Case studies/Examples of SPM usage.
		2 nd	Unit-4 Review (End of 7 Periods).
		3 rd	Unit-5: Maintenance of Machine Tools: Types of maintenance.
		4 th	Repair cycle analysis and Repair complexity.
Sl. No.	Week	Period	Topics To Be Covered
14	14th	1 st	Maintenance manual and Maintenance records.
		2 nd	Housekeeping in manufacturing shops.
		3 rd	Total Productive Maintenance (TPM): Introduction and Pillars.
		4 th	TPM Implementation and benefits.
Sl. No.	Week	Period	Topics To Be Covered
15	15th	1 st	Revision: Unit 1 (Advanced Machining).
		2 nd	Revision: Unit 2 & 3 (Plastics & Additive Manufacturing).
		3 rd	Revision: Unit 4 & 5 (SPM & Maintenance).
		4 th	Final Semester Examination Discussion / Doubt Clearing.

REFERENCES:

1. Production Technology - Vol-II - O.P. Khanna, Dhanpat Rai Publication
2. Workshop Technology, Vol - II - B.S. Raghuwanshi, Dhanpat Rai Publication.
3. Production Technology - HMT, Bangalore, Tata Mc-Graw Hill.
4. Rapid prototyping: Principles and Applications - Chua C.K., Leong K.F. and LIM C.S, World Scientific Publication.
5. Exploring Advanced Manufacturing Technologies - Stephen F. Krar & Arthur Gil, Industrial Press.


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