

GOVERNMENT POLYTECHNIC, MALKANGIRI
DEPARTMENT OF MECHANICAL ENGINEERING

LESSON PLAN

Discipline: Mechanical Engineering	Semester: 3rd	Name of the Teaching Faculty: SHARMILA SABAR
Subject: MANUFACTURING PROCESSES	No. of days/week class allotted 3	Semester From date: 14.07.2025 To date: 15.11.2025 No. of Week: 15
PRE-REQUISITE	MANUFACTURING PROCESSES	
Course Outcomes	<p>Illustrate the importance of cutting fluids & lubricants in machining.</p> <ul style="list-style-type: none"> ◆ Study various types of basic production processes. To select, operate and control the appropriate processes for specific applications. ◆ Define the concept of gear making and list various gear materials. ◆ Describe the importance of press tools and various die operations. ◆ Explain grinding and finishing processes 	
Week	Class Day	Theory/Practical Topics
1st	1st	Cutting Fluids & Lubricants: Introduction; Types of cutting fluids
	2nd	Fluids and coolants required in turning, drilling, shaping,
	3rd	Fluids and coolants required in sawing & broaching;
2nd	1st	Selection of cutting fluids, methods of application of cutting fluid;
	2nd	; Classification of lubricants(solid, liquid, gaseous), Properties and applications of lubricants
	3rd	Lathe Operations: Types of lathes – light duty, medium duty and heavy duty geared lathe
3rd	1st	CNC lathe; Specifications; Basic parts and their functions;
	2nd	Operations and tools – Turning, parting off, Knurling
	3rd	facing, Boring, drilling, threading, step turning, taper turning
4th	1st	Nomenclature of single point cutting tool of lathe.
	2nd	broaching Machines: Introduction to broaching; Types of broaching machines – Horizontal type (Single ram & duplex ram),
	3rd	Vertical type, pull up
5th	1st	pull down, and push down
	2nd	; Elements of broach tool; broach teeth details;
	3rd	omenclature; Tool materials
6th	1st	Drilling: Classification; Basic parts and their functions;
	2nd	Radial drilling machine; Types of operations
	3rd	Specifications of drilling machine
7th	1st	Types of drills and reamers.
	2nd	Welding: Classification; Gas welding techniques; Types of welding flames
	3rd	Arc Welding – Principle, Equipment, Applications;
8th	1st	; Shielded metal arc welding; Submerged arc welding; TIG / MIG welding;
	2nd	Resistance welding - Spot welding, Seam welding, Projection welding; Welding defects
	3rd	Brazing and soldering: Types, Principles, Applications
9th	1st	Milling: Introduction; Types of milling machines: plain, Universal, vertical; constructional details – specifications
	2nd	Milling operations: simple, compound and differential indexing;
	3rd	Milling cutters – types; Nomenclature of teeth; Teeth materials
10th	1st	ool signature of milling cutter; Tool & work holding devices.
	2nd	Gear Making: Manufacture of gears – by Casting, Moulding

	3rd	Stamping, Coining Extruding, Rolling, Machining;
11th	1st	Gear generating methods: Gear Shaping with pinion cutter & rack cutter; Gear hobbing; Description of gear hob
	2nd	; Operation of gear hobbing machine; Gear finishing processes;
	3rd	Gear materials and specification; Heat treatment processes applied to gears.
12th	1st	Press working: Types of presses and Specifications, Press working operations - Cutting, bending, Drawing
	2nd	punching, blanking, notching, lancing; Die set components- punch and die shoe, guide pin
	3rd	bolster plate, stripper, stock guide, feed stock, pilot;
13th	1st	Punch and die clearances for blanking and piercing, effect of clearance.
	2nd	Grinding and finishing processes: Principles of metal removal by Grinding; Abrasives – Natural & Artificial; Bonds and binding processes
	3rd	Vitrified, silicate, shellac, rubber, bakelite; Factors affecting the selection of grind wheels
14th	1st	size and shape of wheel, kind of abrasive, grain size, grade and strength of bond, structure of grain, spacing, kinds of bind material; Standard marking systems
	2nd	Meaning of letters & numbers sequence of marking, Grades of letters; Grinding machines classification:- Cylindrical, Surface
	3rd	Tool & Cutter grinding machines; Construction details; Principle of centreless grinding; Advantages & limitations of centreless grinding; Finishing by grinding
15th	1st	: Honing, Lapping, Super finishing; Electroplating: Basic principles, Plating metals, applications; Hot dipping: Galvanizing, TiN coating, Parkerizing, Anodizing;
	2nd	Metal spraying: wire process, powder process and applications; Organic coatings: Oil base Paint
	3rd	Lacquer base, Enamels, Bituminous paints, rubber base coating; Finishing specifications

Learning Resources:

1. Manufacturing technology – P N Rao, Tata McGraw-Hill Publications
2. Elements of workshop Technology (Volume I & II) – S. K. Hajra Chaudary, Bose & Roy, Media Promoters and Publishers Limited.
3. Production Technology (Volume I & II) – O. P. Khanna & Lal, Dhanpat Rai Publications.
4. Fundamental of metal cutting and machine tools– B. L. Juneja, New age international limited.
5. Manufacturing Technology, Metal Cutting & Machine tools– P. N. Rao, Tata McGraw-Hill Publications

Signature of Faculty

Signature of HOD/

Signature of Academic Coordinator

Signature of Principal