

GOVT. POLYTECHNIC KANDHAMAL, PHULBANI
At- Salunki, PO- Phulbani, Pin- 762001, website- gpkandhmal.org

DEPARTMENT OF MECHANICAL ENGINEERING
LESSON PLAN

Discipline: Mechanical	Semester: 3rd	Name of the Teaching faculty: Manas Kumar Mishra
Subject: Manufacturing Processes (TH 1)	No of Days/Week class allotted: 3	Semester from Date: 01/07/26 To date: 05/11/26 No of weeks: 15
Week	Class Day	Topics
1st	1st	Syllabus, Lesson plan, Course outcomes, Exams. Cutting Fluids & Lubricants: Introduction; Types of cutting fluids, Fluids and coolants required in turning, drilling, shaping, sawing & broaching
	2nd	Selection of cutting fluids, methods of application of cutting fluid
	3rd	Classification of lubricants(solid, liquid, gaseous)
2nd	1st	Properties and applications of lubricants
	2nd	Lathe Operations: Types of lathes – light duty, medium duty and heavy duty geared lathe, CNC lathe.
	3rd	Specifications of lathe; Basic parts and their functions.
3rd	1st	Operations and tools – Turning, parting off, Knurling, facing
	2nd	Boring, drilling, threading operations.
	3rd	Step turning, taper turning, Methods of taper turning.
4th	1st	Nomenclature of single point cutting tool of lathe.
	2nd	Broaching Machines: Introduction to broaching; Types of broaching machines.
	3rd	Horizontal type (Single ram & duplex ram), Vertical type,
5th	1st	Pull up, pull down, and push down. Elements of broach tool.
	2nd	Broach teeth details; Nomenclature, Tool materials.
	3rd	Drilling: Classification; Basic parts and their functions.
6th	1st	Radial drilling machine.
	2nd	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; Shielded metal arc welding
8th	1st	Submerged arc welding; TIG / MIG welding; Resistance welding
	2nd	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.
	1st	Tool signature of milling cutter; Tool & work holding devices.

10th	2nd	Gear Making: Manufacture of gears – by Casting, Moulding, Stamping, Coining Extruding
	3rd	Rolling, Machining; Gear generating methods: Gear Shaping with pinion cutter & rack cutter
11th	1st	Gear hobbing; Description of gear hob; Operation of gear hobbing machine; Gear finishing
	2nd	Gear materials and specification; Heat treatment processes applied to gears.
	3rd	Press working: Types of presses and Specifications, Press working operations
12th	1st	Cutting, bending, Drawing, punching.
	2nd	Blanking, notching, lancing; Die set components.
	3rd	Punch and die, shoe, guide pin, bolster plate, stripper, stock guide, feed stock, pilo.
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;
	3rd	Bonds and binding processes: Vitrified, silicate, shellac, rubber, Bakelite; Factors affecting the selection of grind wheels: size and shape of wheel.
14th	1st	kind of abrasive, grain size, grade and strength of bond, structure of grain, spacing, kinds of bind material.
	2nd	Standard marking systems: Meaning of letters & numbers sequence of marking, Grades of letters; Grinding machines classification:- Cylindrical, Surface.
	3rd	Tool & Cutter grinding machines; Construction details; Principle of centerless grinding, Advantages & limitations of centerless grinding.
15th	1st	Finishing by grinding: Honing, Lapping, Super finishing; Electroplating: Basic principles, Plating metals, applications.
	2nd	Hot dipping: Galvanizing, Tin coating, Parkerizing, Anodizing; Metal spraying: wire process, powder process and applications.
	3rd	Organic coatings: Oil base Paint, Lacquer base, Enamels, Bituminous paints, rubber base coating; Finishing specifications.

COURSE OUTCOMES:

After completion of the course, the students will be able to

CO 1	Illustrate the importance of cutting fluids & lubricants in machining.
CO 2	Study various types of basic production processes. To select, operate and control the appropriate processes for specific applications.
CO 3	Define the concept of gear making and list various gear materials.
CO 4	Describe the importance of presstools and various die operations.
CO 5	Explain grinding and finishing processes.

M.K. Mishra
25/06/26
M.K. Mishra
Sign of Faculty