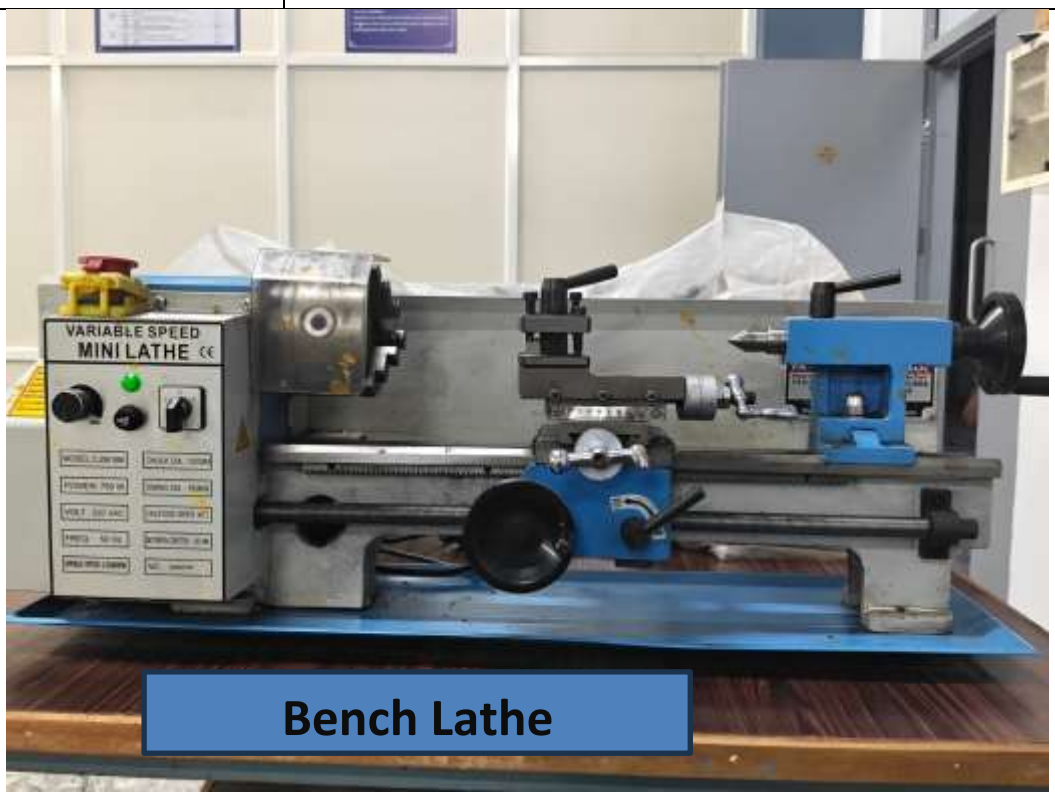
Machining Processes Lab

LIST OF THE EUIPMENTS

1) Bench Lathe
2) PL-4 Lathe
3) Capstan Lathe
4) Radial Drilling Machine
5) Shaper Machine.
6) Slotting Machine.
7) Milling Machine
8) Cylindrical surface Grinding Machine.
9) Tool and Cutter Grinding Machine.

Name of the Equipment:	Bench Lathe



Specifications:

1.	Swing over bed	180 mm
2.	Distance between centers	200 / 300 / 350 mm
3.	Hole through spindle	20 mm
4.	Cross slide travel	65 mm
5.	Compound travel	55 mm
6.	Spindle taper	MT3
7.	Tailstock taper	MT2
8.	Spindle speed – Low range	100–1100 ±10% RPM
9.	Spindle speed – High range	100–2500 ±10% RPM
10.	Motor output power	250 W
11.	Metric thread pitch range	0.4–2.0 mm (10 thread pitches)
12.	Imperial thread pitch range	12–52 TPI (18 thread pitches)
13.	Overall dimensions (L × W × H)	700 × 300 × 300 mm
14.	Net weight	40 kg
15.	Gross weight	42 kg
16.	Packing size (L × W × H)	790 × 360 × 390 mm

Experiments that can be conducted:

1) **Perform Facing, Plain Turning and Step Turning Operations on a Lathe**

Name of the Equipment:	PL-4 Lathe



Specifications:

1	Name of the machine	PL-4 Semi-Geared Engine Lathe
2	Make	Machine Tools Traders, Chennai
3	Size	4.5 ft
4	Length of bed	1390 mm
5	Width of bed	200 mm
6	Height of centre	165 mm
7	Distance between centres	700 mm
8	Hole through spindle	35 mm
9	Lead screw pitch	4 TPI
10	Power required	1 HP / 3-phase
11	Approximate weight	450 kg
12	True chuck (as stated on the machine board)	160 mm
13	Dog chuck	200 mm

Experiments that can be conducted:

1) **Perform Taper Turning by Compound Rest Method, External Thread Cutting and Knurling on Lathe.**
2) **Perform Boring Operation on Lathe.**

Name of the Equipment:	Capstan Lathe



Specifications:

1	Name of the machine	Capstan Lathe (TT 25G – Geared Head)
2	Make	Roman Machinery Corporation, Hyderabad
3	Spindle hollow	38 mm
4	Effective stroke of capstan slides	130 mm
5	Bore size of hexagonal turret	25 mm
6	Centre of holes above turret slide	50 mm
7	Maximum distance between spindle nose and turret face	375 mm
8	Cross-slide transverse travel	140 mm
9	Cross-slide longitudinal travel	200 mm
10	Width of bed	180 mm
11	Height of centre above bed	160 mm
12	Floor space required	1500 mm × 800 mm
13	Net weight of machine	900 kg

Experiments that can be conducted:

1) **Perform Facing, Plain Turning, drilling, reaming, and tapping to produce multiple identical components.**

Name of the Equipment:	Radial Drilling Machine



Specifications:

1	Name of the machine	Radial Drilling Machine (SMTR-II Model)
2	Make	Machine Tools Traders, Chennai
3	Drilling capacity in M.S.	38 mm
4	Drilling capacity in C.I.	45 mm
5	Spindle nose	MT-4
6	Spindle travel	220 mm
7	Number of spindle speeds	8 (Gear Drive)
8	Range of spindle speed	62–1980 rpm
9	Range of power feed	0.04–0.08 mm/rev
10	Main motor	2 HP
11	Elevating motor	0.5 HP
12	Size of working table	380 × 300 × 300 mm
13	Size of base plate	760 × 1250 × 150 mm

Experiments that can be conducted:

1) **Set up the Radial Drilling Machine and perform drilling, and tapping operations on a given workpiece**
2) **Perform Spot Facing Operation on Drilling Machine.**

Name of the Equipment:	Shaper Machine



Specifications:

1	Name of the machine	Shaper
2	Make	Machine Tools Traders, Chennai
3	Length of stroke	305 mm
4	Maximum table travel – horizontal	419 mm
5	Maximum table travel – vertical	140 mm
6	Maximum vertical travel of tool slide	140 mm
7	Maximum swivel of tool head	60° left, 60° right
8	Length and width of base	940 × 457 mm
9	Diameter of the clutch pulley	235 mm
10	Range of ram speeds	3
11	Stroke per minute	30 mm, 60 mm, 90 mm (as printed on the board)
12	Diameter of the motor pulley	76 mm
13	3-phase electric main drive motor	1.5 HP
14	Motor speed	910 rpm
15	V-belt section	B-39
16	Approximate weight	600 kg

Experiments that can be conducted:

1) **Machine a flat horizontal surface on the given workpiece using a Shaper Machine.**

Name of the Equipment:	Slotting Machine



Specifications:

1	Name of the machine	Slotter
2	Make	Machine Tools Traders, Chennai
3	Stroke	150 mm
4	Rotary table movement	275 mm
5	Longitudinal movement	200 mm
6	Cross movement	200 mm
7	Cutting speed of ram	64–90 m/min
8	Ram adjustment	150 mm
9	H.P. required	1 HP
10	Distance from the tool rest to the main column	325 mm
11	Weight	700 kg

Experiments that can be conducted:

1) **Cut an internal slot or keyway on the given workpiece using a Slotting Machine**

Name of the Equipment:	Milling Machine



Specifications:

1	Name of the machine	Milling Machine
2	Make	Machine Tool Traders, Chennai
3	Height	1320 mm
4	Floor surface	790 × 460 mm
5	Number of feeds	3
6	Surface of table	900 × 225 mm
7	Distance between T-slots	55 mm
8	Longitudinal travel of table	485 mm
9	Cross travel of table	150 mm
10	Vertical adjustment of table	275 mm
11	Diameter of milling arbor	25.4 mm
12	Range of spindle speeds	75, 140, 210, 275 rpm

Experiments that can be conducted:

1) **Cut spur gear teeth on the given workpiece using a Milling Machine with the indexing head.**

Name of the Equipment:	Cylindrical surface Grinding Machine



Specifications:

1	Working surface of the table	175 × 350 mm
2	Magnetic chuck size	150 × 300 mm
3	Maximum height from table to grinding wheel	250 mm
4	Vertical feed graduation	0.01 mm
5	Cross-feed graduation	0.05 mm
6	Size of grinding wheel	175 × 13 × 31.75 mm
7	Spindle speed	2800 rpm
8	Main motor power	0.75 HP

Experiments that can be conducted:

1) **Grind the external cylindrical surface of the given workpiece to the required dimension using a Cylindrical Grinding Machine.**

Name of the Equipment:	Tool and Cutter Grinding Machine



Tool and Cutter Grinding Machine

Specifications:

1	Type of grinding machine	Universal Grinding Machines
2	Automation grade	Automatic
3	Type of tool and cutter grinder	Universal
4	Grinding material	Steel

Experiments that can be conducted:

1) **Grind and sharpen a single-point cutting tool to the specified tool angles using a Tool and Cutter Grinding Machine.**