# IPE-432

## MACHINE TOOLS SESSONAL

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# Contents



# 1 Experiment 03: Study of Engine Lathe (New Sir)

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**Power**

- Spindle speed → Primary motion speed
- 3 phase induction motor → V-belt pullet → Headstock (S.G.B.)
- Feed rod/ Lead screw → Feed movement
- Rest all → auxiliary move.
- S.G.B. → spindle → Jaw → Job
- F.G.B. (below S.G.B.) → Lead screw / Feed rod → Motion in carriage.

**Headstock:**

Housing of SGB, and rotation transfer to the spindle.

**Change Gear Box**

Precision threading (non-standard thread)
F.G.B. → speed transfer

**Why change gear?** → We can easily change the gears of CGB

Normally, 4 gears with different combination and their transmission ratio is high.

**Stepped drive system:**

We can not get continuous speed but discrete speed is possible only.

**Important Points:**

- Lead screw/feed rod → automatic feed is given
- In lathe machine, almost all operations can be done except - gear cutting.
- Difference between turning and threading:
  Threading → high feed rate,
  Turning → low feed rate (also known as micro threading)
- 2 output shaft:
  High feed (threading) → Lead screw
  Low feed (turning) → Feed rod
- Torsional Deformation happens if high & low feed are given one after another. Thats why different feed for different rod/shaft.
- Apron (cover) → can convert roational motion to feed motion. Contains carriage.
- Saddle : H-shaped
- Cross slide [cross movement] : half nut mechanism
- Swivle Plate [angular movement]
- Top slide
- Tail stock : Support long workpiece and attach cutting tool. Can not move cross, only horizontal. But offsetting very small angle around 4° is possible.
- Guideway : Guide the movement of tailstock & carriage. [V-shaped guideway]
- topslide → manual movement in cutting tool.
- half nut mechanism → 2 position. cross slide and lead screw motion.

**Taper Turning**

1. Setting over tail stock [offsetting tail]
2. 2 feed method: simultaneous longitudial (carriage) and cross slide (cross) motion.
3. With swivle plate angle.
4. With taper turning attachment.

How rotary motion converted to linear motion (lead screw/ feed rod)
Key slot and spur gear in apron. The key sets on key slot and feed rod will move with spur gear. Rack and pinion are present (Bevel gear).

**Accesories:**

- Live center → headstock
- Dead center → tailstock
- Mandle → Holds the internal hollow workpiece
- 3 jaw self centered chuck [auto center]
- 4 jaw independent chuck [manually centering]

**Follow Lab sheet also.**

- Faceplate → holds the irregular shape workpiece.

- Rest → Support the small diameter workpiece, in order to prevent buckling.
  Two types:
  a)Steady rest : fixed, doesn't move. (in bed)
  Follower rest: mounted on saddle. Follow the cutting tool.