

## **MACHINE TOOLS LAB**

### **Description of the Laboratory:**

Machining is one of the processes of manufacturing in which the specified shape to the work piece is imparted by removing surplus material. Conventionally this surplus material from the work piece is removed in the form of chips by interacting the work piece with an appropriate tool. This mechanical generation of chips can be carried out by single point or multi point tools or by abrasive operations.

Machining operations are among the most versatile and accurate manufacturing processes in terms of their capability to produce diverse and complex geometric features. The machine tools are discussed and categorized based on the employed cutting tools: single-point cutting tools, multipoint cutting tools, or grinding wheels. Drives and controls are responsible to provide and regulate the motions of the machine tool components.

Machine Tools Laboratory is aimed at providing an introduction to the Know-how of common processes used in industries for manufacturing parts by removal of material in a controlled manner. Auxiliary methods for machining to desired accuracy is covered. The importance throughout the laboratory course will be on understanding the basic features of the processes rather than details of constructions of machine, or common practices in manufacturing or acquiring skills in the operation of machines. Evidently, acquaintance with the machine is desirable and the laboratory sessions will provide adequate opportunity for this.

The Machine Tool Lab is equipped with state of the art conventional machines such as Lathes, Milling Machines, Grinding, Drilling machine, Shaping etc.,

Machining and Machine tool will always be key components of a manufacturing system. Thus, research and development in this area will remain relevant and impactful to improve the efficiency, improve the reliability, and reduce the cost of machine tools and machining processes.

### **List of Experiments:**

#### **1. TRADE: LATHE**

- Study of a centre lathe and turret lathe
- Straight turning, Facing and chamfering operation
- Step turning, chamfering and knurling operation
- Taper turning, grooving operation
- Thread cutting (RH -V-Thread) and grooving operation

- Thread cutting (LH - V-Thread) and grooving operation
- Drilling and boring operation

## **2. TRADE: SPECIAL MACHINE**

- Study of special machines
- Drilling, tapping and reaming using radial drilling machine
- V - Block shaping using shaping machine
- 4 Internal splines cutting using slotting machine
- Single point cutting tool Grinding using tool and cutter grinder
- Profile cutting using vertical milling machine
- Spur gear cutting using horizontal milling machine
- Surface grinding operation using surface grinder
- Cylindrical grinding machine using cylindrical grinder
- 10. Gear Hobbing using gear Hobbing machine

### **List of Equipment:**

- Universal Cylindrical Grinder
- Horizontal Surface Grinder
- Universal Horizontal Milling Machine
- Universal Vertical Milling Machine
- Tool & Cutter Grinder
- Slotting Machine
- Horizontal Shaper
- Radial Drilling Machine
- Geared Head Medium Duty Lathe
- Geared Head Light Duty Lathe
- Capstan Lathe
- Metal Cutting Machine

**Photographs of the Lab/Equipment:**



**Lathe Machines**



**Special Machines**



**Universal Cylindrical Grinder**



**Horizontal Surface Grinder**



**Horizontal Milling Machine**



**End Milling Machine**



**Tool and Cutter Grinder**



**Slotting Machine**



**Shaping Machine**



**Radial Drilling Machine**



**Capstan and Turret Lathe**



**Lathe Machine**