

# **Manufacturing Processes Lab**

## **Subject overview:**

Manufacturing Process is a broad exploratory course that introduces students to the manufacturing industry. Through hands-on activities students will learn how manufacturers use technology to change raw materials into finished products. Students will identify the historical evolution and social impacts of Manufacturing Technology. They will be able to contrast the types of manufacturing production and apply the Technology Systems Model to manufacturing. They will use manufacturing processes to change raw materials into finished products and will demonstrate basic skills and safe use of manufacturing equipment and tools. Students will identify the educational pathways and career opportunities in the manufacturing industry.



## **Manual Metal Arc Welding machine**

In Manual Metal Arc welding, the heat for fusion is supplied by an electric arc. It is most widely used of all the arc welding processes. It uses AC/DC power source and consumable/non consumable Electrodes. MMAW is widely used for structural work and repair work.



## **TIG welding machine**



In the TIG (Tungsten Inert Gas) welding the arc is formed between a pointed tungsten electrode and the work piece in an inert atmosphere of argon or helium. It uses DC power source, non consumable tungsten electrode and shielding gas. It is widely used for high quality welds and for joining sheet metals.

## **MIG Welding Machine**

In the MIG (Metal Inert Gas) welding process the arc is formed between consumable electrode wire and the work piece in an inert atmosphere of argon or helium. It is a semi automatic welding process. It uses DC Power source, electrode wire feeder and shielding gas. MIG welding is widely used for sheets and heavy plates, production welding by robots for cars.



### **Oxy Acetylene Gas Welding Set up**



Oxy acetylene welding processes uses a flame produced by burning a mixture of fuel gas (mostly acetylene) and oxygen. Separate cylinders and a hose pipe from each cylinder transports the gases to a welding torch. This process uses filler rods, hose pipes for gas supply, welding nozzle, etc. This type of welding is suitable for the pre-fabrication of steel sheet, tubes and plates.

### **Horizontal Milling Machine**

Milling is the machining process of using rotary cutters to remove materials. A horizontal milling machine has the work piece mounting table and the cutters are mounted on a horizontal arbor across the table. It is used to mill grooves and slots on work pieces. Special cutters can also cut gears, grooves, bevels, radii, or indeed any section desired.





### **Vertical Milling cum Drilling Machine**



In the vertical milling machine the spindle axis is vertically oriented. A milling cum drilling machine is similar in basic configuration to a small drill press, but equipped with an horizontal X-Y table. It also uses more powerful motor than a comparably sized drill press. It is used to drill holes, bores, mill grooves and slots. Also, it is used to shape flat surfaces.

### **Shaper Machine**

A shaper is a type of machine tool that uses linear relative motion between the work piece and a single-point cutting tool to machine a linear tool path. The most common use is to machine straight, flat surfaces, but with some accessories a wide range of work can be done. Also, Keyway, spline, and gear tooth cutting can be carried out.



## **Radial Drilling Machine**



Drilling machines are used to create cylindrical holes in materials. Drills are commonly used in woodworking and metalworking. In a radial drilling machine, it is possible to swing the arm relative to the machine's base. A radial arm drill is able to operate over a large area without having to reposition the work piece.

## **Lathe Machine**

Lathe is machine tool which rotates the work piece on its axis to perform various operations such as turning, cutting, knurling, drilling to create an object which has symmetry about an axis of rotation. Lathe machines are mostly used in woodturning, metal working, metal spinning operations. They are used in a wide range of applications, and a broad range of materials.



## **Plastic Moulding Machine**



This machine is used for performing Injection moulding process for producing parts by injecting plastic, polymer materials into a mould. It is a manually operated machine mostly used for the parts made of polyethylene, polypropylene and polystyrene are thermoplastic. Plastic molding is used to create bottle caps, pocket combs, mechanical parts (including plastic gears) and most other plastic products available today.

## **Bench Grinding Machine**

Grinding machine is used for grinding process, which is a type of machining using an abrasive wheel. Grinding is used to finish work pieces that must show high surface quality and high accuracy of dimensions. The Bench grinder has two wheels of different grain sizes for roughing and finishing operations. It is manually operated and used for shaping tool bits or various tools that need to be made or repaired.



## **Tool and Cutter Grinding Machine**



A tool and cutter grinder is used to sharpen milling cutters and tool bits. It is an extremely versatile machine used to perform a variety of grinding operations: surface, cylindrical, or complex shapes. These usually can perform the minor function of the drill bit grinder, or other specialist tool room grinding operations.