



## Haryana Vishwakarma Skill University, Dudhola, Palwal

B.Voc. in Tool & Die Manufacturing

Sem.: First Course:

Subject: Workshop Technology

Subject code: CBME-101

### **Unit-1: Introduction to Manufacturing and Metal cutting**

**Introduction to Manufacturing:** Definition of manufacturing process, its classification types, primary and secondary manufacturing processes, selection of a manufacturing process, types of production. Machine Tools; Definition, its functions and classification, introduction to machining operations and common features of metal cutting.

**Metal Cutting:** Definition and working principle of single point cutting tool, geometry of single point cutting tool, tool signature, orthogonal and oblique cutting, chips formation, types of chips, Cutting parameters-Cutting speed, feed and depth of cut.

### **Unit-2: Cutting Tool Materials and Introduction to welding processes**

**Cutting Tool Materials:** Properties and uses of cutting tool material viz; High-speed steel, tungsten carbide, cobalt steel cemented carbides, ceramics and diamond.

*Cutting Fluids:* Introduction, Function and its types, Specification and selection of cutting fluid.

**Welding Processes:** Electric arc welding: working principle, use of AC and DC current in welding, TIG welding, MIG welding, Introduction to gas welding.

### **Unit-3: Lathe and Grinding machines**

**Lathe Machine;** Introduction, working principle, its construction and specifications.

*Lathe classification;* Bench, Tool room, Capstan and Turret, Automatic and Special purpose lathes.

*Lathe Operations:* Plain and step turning, Taper turning; taper calculations, methods of taper turning, parting off, drilling, boring, knurling. Screw cutting on lathe-introduction to right and left threads, lathe setting for screw cutting-simple and compound gear trains. Cutting parameters - Speed, feed and depth of cut, machining time.

*Lathe Accessories:* Centres; live and dead centre, Chucks; three jaw universal chuck, four jaw independent chuck, magnetic chuck, air or hydraulic chuck, Lathe carriers or dogs, Driving plate, Face plate, angle plate, mandrels, rests; steady and follower.



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*Lathe Attachments*; Grinding attachment, Milling attachment, Taper turning attachment

**Grinding Machine:** Introduction- Abrasive tools, stones and sticks, grinding wheels– materials, specifications, selection of grinding wheels, Truing and dressing of grinding wheels, abrasives-natural and artificial, speed, feed and depth of cut, use of coolants.

*Types of grinding machines*; cylindrical grinders, surface grinders, centreless grinders, special grinding machines

### **Unit-4: Drilling, Reaming and Boring machines**

**Drilling Machine;** Introduction, tools for drilling, its classification, twist drills, twist drill parts and terminology, some important drill dimensions and important angles of drill, drill size and specifications, straight flute drills,

*Drilling machine types*; Portable, Bench, Radial, Universal, Multiple spindle, Gange, Horizontal and automatic drilling machines.

*Drilling machine operation*; Drilling, Spot facing, Reaming, Boring, Counter boring, Counter Sinking, tap drill size

**Reaming Machine;** Introduction, Reamer terminology, Types of reamers-hand reamers, machine reamers, adjustable and taper reamers.

**Boring Machines:** Introduction, Horizontal boring machines, Vertical boring machines

### **Unit-5: Milling machines and Introduction to Jigs & Fixtures**

**Milling machines;** Introduction, working principle, principal parts, Size and specification, up milling and down milling,

*Milling machine types*: Column and Knee type-hand, plain or horizontal, vertical, universal, Universal milling machine, Planer type milling machine or plan mill.

*Milling cutters*: Plain, Side, End, Face, Metal slitting, Angle milling, Form milling, Woodruff-Key and T-slot milling cutters, Materials for milling cutters, cutting speed and feed.



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Milling operations; Plain or Slab, Face, Angle, Form, Straddle and Gang, Slot and Groove, Keyway, Side, End, Profile, Gear milling operations.

**Introduction to Jigs and Fixtures;** Importance and use of jigs and fixtures, types of jigs, principle of location, locating and clamping devices, advantages of jigs and fixtures.

### **Text Books:**

1. Comprehensive Workshop Technology (Manufacturing Processes), by S. K. Garg, Laxmi Publication
2. Elements of Workshop Technology, S. K. Hajra Choudhury, Hajra Choudhury A K

### **Reference Book:**

1. Production Technology by R. K. Jain, Khanna Publishers