

# AMMT17 CNC MACHINING TECHNOLOGY

## UNIT-1 INTRODUCTION TO CNC MACHINE TOOLS

- 1.1 Evolution of CNC Technology, Principles, Features, Advantages, Applications,
- 1.2 CNC and DNC concept, classification of CNC Machines
- 1.3 Turning centre, machining centre, grinding machine, EDM, types of control systems,
- 1.4 CNC controllers, characteristics, interpolators– Computer Aided Inspection

## UNIT-2 STRUCTURE OF CNC MACHINE TOOL

- 2.1 CNC Machine building, structural details, configuration and design, guide ways
- 2.2 Friction, Anti friction and other types of guide ways, elements used to convert the rotary motion to a linear motion
- 2.3 Screw and nut, recirculating ball screw, planetary roller screw, recirculating roller screw, rack and pinion, spindle assembly, torque transmission elements
- 2.4 Gears, timing belts, flexible couplings, Bearings.

## UNIT-3 DRIVES AND CONTROLS

- 3.1 Spindle drives- DC shunt motor, 3 phase AC induction motor, feed drives- stepper motor, servo principle,
- 3.2 DC and AC servomotors, Open loop and closed loop control, Axis measuring system
- 3.3 Synchro, synchro-resolver, gratings, moiré fringe gratings, encoders, inductosyn, laser interferometer.

## UNIT-4 CNC PROGRAMMING

- 4.1 Coordinate system, structure of a part program, G & M Codes, tool length compensation, cutter radius and tool nose radius compensation, do loops, subroutines, canned cycles, mirror image,
- 4.2 Parametric programming, machining cycles, programming for machining centre and turning centre for well-known controllers such as Fanuc,
- 4.3 Heidenhain, Sinumerik etc., generation of CNC codes from CAM packages.

## UNIT-5 TOOLING AND WORK HOLDING DEVICES

- 5.1 Introduction to cutting tool materials- Carbides, Ceramics, CBN, PCD- inserts classification
- 5.2 PMK, NSH, qualified, semi qualified and preset tooling, tooling system for Machining centre and Turning centre, work holding devices for rotating and fixed work parts,
- 5.3 Economics of CNC, maintenance of CNC machines.

### References Books:

1. James Madison, “CNC Machining Hand Book”, Industrial Press Inc., 1996.
2. Ken Evans, John Polywka & Stanley Gabrel, “Programming of CNC Machines”, Second Edition – Industrial Press Inc, New York, 2002
3. Peter Smid, “CNC Programming Hand book”, Industrial Press Inc., 2000