UNIT - I

Syllabus : Introduction to metal cutting, Elements of machining process, Geometry of single-point cutting tool, Orthogonal and Oblique cutting processes, Chip formation, Types of chips, Chip thickness ratio, Process parameters and their effect on machining, chip breakers, Merchant's Circle of forces analysis - forces and energy calculations, power consumed - MRR- Effect of Cutting variables on forces, Concepts of Machinability - Factors affecting machinability, Machinability Index, Tool Life, Tool life equation of Taylor, Tool wear and its types, Factors affecting on tool life.

UNIT - II

Syllabus : Introduction, Materials of gears, Methods of gear manufacturing-casting, forging, forming etc., milling of gears (indexing methods and numerical), Helical gear cutting, Gear Shaping and Gear hobbing, Gear inspection. **Thread Manufacturing :** Various methods of thread manufacturing, thread rolling, die threading & tapping, Thread milling, Thread grinding etc.

UNIT - III

Syllabus : **Types and Operations of grinding machines, Grinding wheel :** Shapes, Designation and selection, Abrasives & classification, Bond & bonding, Grit, Grade & Structure of wheels, Types of grinding wheels, mounting of grinding wheels, Glazing and loading of wheels, Dressing and truing of wheels, Balancing of wheels, Diamond wheels.

Super-finishing processes : Introduction to Honing, Lapping, Buffing and Burnishing. (Construction, working and controlling parameters).

UNIT - IV

Syllabus : Significance and purpose of jigs and fixtures and their functions in the manufacturing processes, Concept of degree of freedom, 3-2-1 principle of location. General guidelines to design jigs and fixtures, advantages of jigs and fixtures.

Jigs : Definition, Elements of jig with the types, Location guidelines, Principles of clamping, Principles of guiding, Channel jig, Template jig, Plate jig, Angle plate jig, Turn over jig, Box jig, Latch type jig.

Fixtures : Definition, Elements of fixtures, Location guidelines, Principles of clamping, Principles of setting element, turning fixture, welding fixture, Milling fixture, Assembly and Inspection fixtures.

UNIT - V

Syllabus : Introduction, Methods of Process Planning, Drawing Interpretation, material evaluation, Steps in process selection, production equipment and tooling selection, Process parameters calculations for various production processes, selection of jig's and fixtures, selection of quality assurance methods, documents for process planning, economics of process planning, case studies.

UNIT - VI

Syllabus : CNC Programming-CNC part programming adaptable to suitable controller. Steps in developing CNC part program. CNC part programming for Lathe Machine – Threading & Grooving cycle (Canned cycle). CNC part programming for Milling Machine - Linear & circular interpolation, milling cutter, tool length compensation & cutter radius compensation. Pocketing, contouring & drilling, subroutine and Do loop using canned cycle.

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