Sam's Techno School, Mohali

Detailed Training Module – Advanced Manufacturing (CNC)

Sr. No	Module	Session	Objectives
1	Metrology	Unit Conversion	To explain measurement terms To convert values between the measurement systems
2	Metrology	Engineering Drawing	Identify basic engineering symbols Read Engineering Drawings
3	Metrology	Precision Measurement	Reading Vernier Caliper Identify its parts Working principle
4	Metrology	Precision Measurement - Micrometer	Identify the parts Reading the Micrometre Working principle
5	Metrology	Precision Measurement - Gauges	Difference between measurement and Gauging Understanding gauges - snap gauge, plug gauge, ring gauge, thread gauge
6	Metrology	Engineering Drawing	Tolerances and Fits – Types, examples, acc/rej/rw
7	CNC Machines	Brief History (Industrial revolution) The way forward	Know why and how CNC machines came into existence and what potential do they hold in times to come
8	CNC Machines	Working Principle	Parts of a CNC machine Comparison with NC and conventional machines

9	CNC Machines	Working Principle	To enable students to identify parts on an actual CNC machine
10	CNC Machines	Safety Guidelines	To observe safety measures while working
11	CNC Machines	Introduction to Turning	To enable students to know what operations can be performed on CNC turning machine
12	CNC Programming	Introduction to Coordinate System	Understand the absolute system Understand the relative system Understand the machine axes movement
13	CNC Programming	Introduction to Codes	What are M codes? Why are they used? Understand the meaning of each M code
14	CNC Programming	Introduction to Codes	What are G codes? Why are they used? Understand the meaning of each G code
15	CNC Programming	Introduction to Codes	Understand the feed functions, Spindle speed functions, and Tool Functions
16	CNC Programming	Program Structure	Understanding the basic program syntax Understanding how to use G and M codes in a program Understanding the use of feed, spindle and tool functions
17	CNC Programming	Program Operation	Understand the concept of Work Offset and its significance How to register work offset on a machine
18	CNC Programming	Program Operation	Overview of operating panel Manual Operations (Modes) Automatic Operations (MEM, MDI, AUTO)
19	CNC Programming	Program Operation	Program Editing functions (Insert, Alter, Delete)
20	CNC Programming	Program Operation	Generate a facing program (individually and as group)

21	CNC Programming	Program Operation	Take work offset on machine How and when to use wear offset Perform facing operation on simulator
22	CNC Programming	Program Operation	Perform operations on CNC Machine
23	CNC Programming	Program Structure	Learn to generate program for: Turning and Step Turning
24	CNC Programming	Program Operation	Perform operations on CNC Machine
25	CNC Programming	Home Work	Check is students are able to combine facing and turning in a single program
26	CNC Programming	Program Structure	Learn to generate program for: Facing Cycle (G94)
27	CNC Programming	Program Operation	Perform operations on CNC Machine
28	CNC Programming	Program Structure	Learn to generate program for: Turning Cycle (G90)
29	CNC Programming	Program Operation	Perform operations on CNC Machine
30	CNC Programming	Program Structure	Learn to generate program for: Stock Removal in Facing and Turning (G71 & G72) Concept of Constant Surface Speed and Maximum RPM (G50 & G96)
31	CNC Programming	Program Operation	Perform operations on CNC Machine
32	CNC Programming	Program Structure	Learn to generate program for: Finishing cycle and Drilling Cycle (G70 & G74)
33	CNC Programming	Program Operation	Perform operations on CNC Machine
34	CNC Programming	Program Structure	Learn to generate program for: Grooving cycle (G75)
35	CNC Programming	Program Operation	Perform operations on CNC Machine
36	CNC Programming	Program Structure	Learn to generate program for: Threading Cycles (G92 & G76)

37	CNC Programming	Program Structure	Perform operations on CNC Machine
38	CNC Programming	Program Structure	Learn to generate program for: Using compensation functions (G40, G41, G42)
39	CNC Programming	Program Operation	Perform operations on CNC Machine
40	CNC Programming	Cycle Time Calculation	Calculating cycle time
41	CNC Programming	Cycle Time Calculation	Optimising cycle time
42	CNC Programming	Cycle Time Calculation	Calculating cycle time
43	CNC Tools	Understanding Inserts	Insert designation Understanding different insert angles and their significance
44	CNC Tools	Choosing Inserts	How to choose tooling based on job to be made How to correctly fix inserts on the tool holder
45	CNC Maintenance	Maintenance of CNC Machines	Understand Daily, Weekly, and Monthly maintenance of CNC Machines