Sam's Techno School, Mohali

Detailed Training Module – Advanced Manufacturing (VMC)

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	VMC Machines	Brief History (Industrial revolution) The way forward	Know why and how VMC machines came into existence and what potential do they hold in times to come
8	VMC Machines	Working Principle	Parts of a VMC machine Comparison with NC and conventional machines

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

21	VMC Programming	Program Operation	Take work offset on machine How and when to use wear offset Perform facing operation on simulator
22	VMC Programming	Program Operation	Perform operations on VMC Machine. Familiarise with different modes – HND, MEM, SBK Tool call, Offset, etc.
23	VMC Programming	Program Structure	Learn to generate program for: Facing and Side facing
24	VMC Programming	Program Operation	Perform above operations on VMC Machine
25	VMC Programming	Home Work	Check if students are able to combine facing and side facing in a single program
26	VMC Programming	Program Structure	Learn to generate program for: Profiling (Chamfer, Radius)
27	VMC Programming	Program Operation	Perform above operations on VMC Machine
28	VMC Programming	Program Structure	Learn to generate program for: Slot cutting (Straight slot and circular slot). Use G16/G15
29	VMC Programming	Program Operation	Perform above operations on VMC Machine Perform facing and slot cutting together
30	VMC Programming	Program Structure	Learn to generate program for: Circular Pocket Cutting Learn the use of I and J for cutting circular pocket Learn how to use Z for helical path
31	VMC Programming	Program Operation	Perform above operations on VMC Machine
32	VMC Programming	Program Structure	Learn the use of G41 and G42 How to position the tool while using G41/G42 How to judge which one to use – G41 or G42
33	VMC Programming	Program Operation	Perform above operations on VMC Machine
34	VMC Programming	Program Structure	Learn to generate program for: Drilling Cycles (G81, G82, G83)

			Demonstrate the use of G98 and G99 as well (Retract Levels)
35	VMC Programming	Program Operation	Perform operations on VMC Machine
36	VMC Programming	Program Structure	Learn to generate program for: Tapping Cycle (G84)
37	VMC Programming	Program Structure	Perform operations on VMC Machine
38	VMC Programming	Program Structure	Learn to generate program for: Boring Cycles (G85, G86, G76)
39	VMC Programming	Program Operation	Perform operations on VMC Machine
40	VMC Programming	Program Structure	Learn to use Sub-Programs (M98 and M99) - How to call a sub-program - How to end a sub-program
41	VMC Programming	Cycle Time Calculation	Calculating cycle time
42	VMC Programming	Cycle Time Calculation	Optimising cycle time
43	VMC Tools	Understanding Inserts	Insert designation Understanding different insert angles and their significance
44	VMC Tools	Choosing Inserts	How to choose tooling based on job to be made How to correctly fix inserts on the tool holder
44	Maintenance	Maintenance of VMC Machines	Understand Daily, Weekly, and Monthly maintenance of VMC Machines