

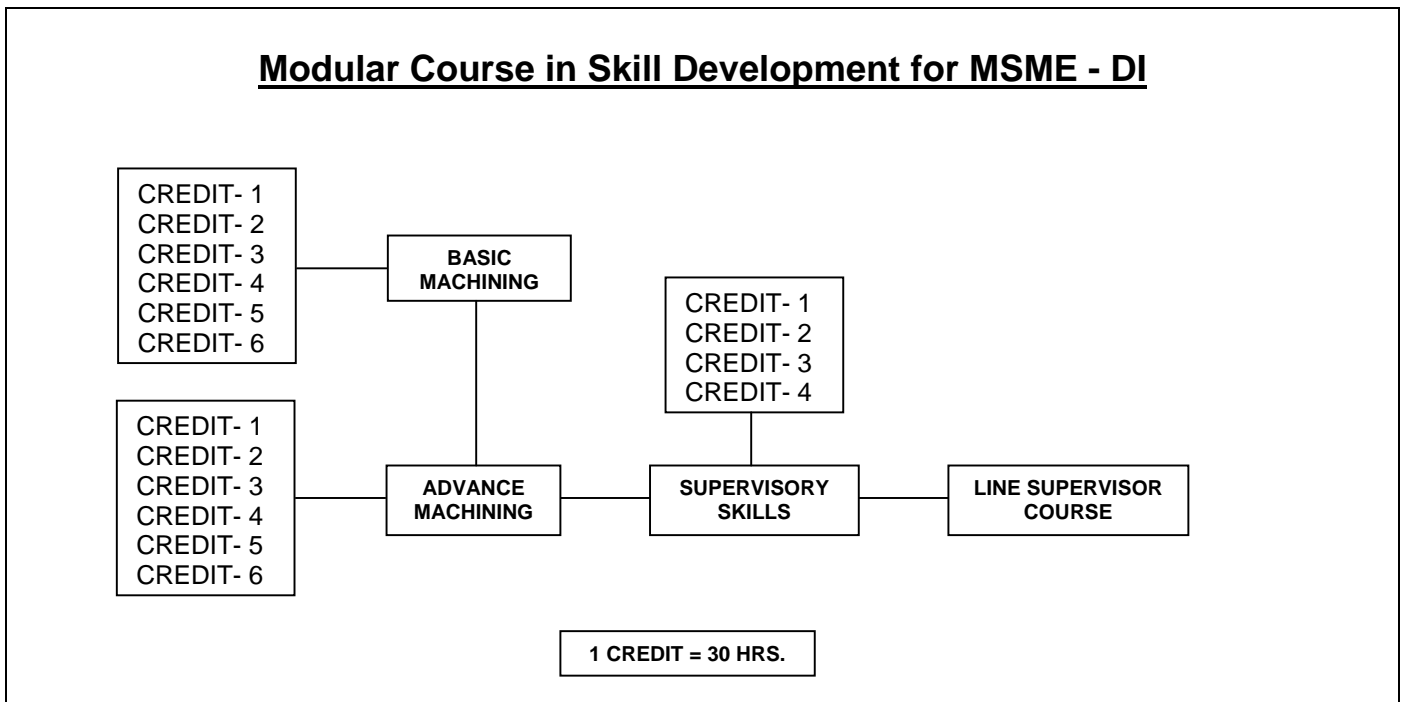
INTRODUCTION

Modular Course in Skill development is designed such a way that the trainee can choose the modules as per the time availability. There are 3 modules to get the final certificate on Line supervisor course. If a trainee wants to have the basic knowledge on Milling he has to complete 4 credits having 30 hours duration. He can complete the module at a stretch or credit wise.

Module -1 Basic Milling has 6 credits having each 30 hours duration, only after completion of 1st credit trainee will be eligible to choose next credit. At the end of 6th credit skill assessment test will be conducted and eligible candidate can go to next advanced Module.

Module -2 Advanced Milling has also has 6 credits having 30 hours duration in each credit.

Module-3 Supervisory skill has 4 credits having 30 hours each in Management & Supervisory skill.



CREDIT-1**SAFETY & ALLIED TRAINING - 30 Hrs.**

This credit consists of four units. The first unit presents the Safety in workshop, explaining different safety precautions to prevent accidents. The second unit deals with Hand Tools used in workshop, safety and care of tools. Unit 3 explains about the Milling Machines parts and functions. Unit 4 deals with Work holding & Tool holding devices commonly used in milling, setting of Work piece & Tools etc.

CREDIT-2**MILLING CUTTER NOMENCLATURE & TYPES – 30 Hrs.**

This credit consists of three units. The first unit presents the Milling cutter Nomenclature which will explain about the angles provided on the milling cutter. The second unit deals with different types of milling cutters. Unit three explains about the Important Measuring Instruments used in milling i.e. Vernier caliper.

CREDIT-3**MACHINING PARAMETERS AND MACHINE SET UP – 30 Hrs.**

This credit consists of three units. The first unit explains about the machining parameters on milling machine such as cutting speed, feed & depth of cut. Second unit explain about the setting of tools & job. Unit three explains about Plain Milling, Block Milling & Step milling operations.

CREDIT- 4**BASIC MILLING OPERATIONS AND PRACTICES – 30 Hrs.**

This credit consists of four units. First unit deals with Centre Drilling & Drilling operation and practice. Second unit consists of Reaming operation on milling machine. Third unit deals with Slot Milling operation. Unit four deals with Angular Milling by tilting milling head.

CREDIT- 5**SELECTION OF PARAMETERS FOR DIFFERENT MATERIALS – 30 Hrs.**

This credit consists of four units. First unit deals with Principle of Metal Cutting & tool geometries of different materials & their properties. Second unit deals with Profile/Form tools. Third unit consists of types of materials & selection of speed/feed for different materials. Unit four describes with selection of cutting fluids its properties, types & their applications for different materials.

CREDIT- 6
ASSIGNMENTS – 30 Hrs.

This credit consists of practical exercises. The trainees have to do their self appraisal after finishing each practical exercise.

MODULE DESCRIPTON – (SAMPLE)

01	MODULE NUMBER	: MOD 01
02	NO.OF CREDITS	: 06
03	TITLE	: BASIC MILLING
04	DURATION	: 180 Hrs. (06 CREDITS OF 30 Hrs.)
05	OBJECTIVES	:

At the end of this Module trainee will be able to

- Operate the Milling Machine independently.
- Do Plain Milling, Block Milling & Step Milling.
- Do Slot Milling & Angular Milling.
- Do Drilling & Reaming.
- Do the day to day maintenance of Machine
- Work as milling operator in industry with basic skill set.

06	PRE-REQUISITE	:
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6.1 Trainers Capability:

- He / She should be at least an ITI Certificate Holder
- He / She should be confident of running the machine.
- He / She should be able to take necessary theory classes.

6.2 Trainees Minimum Qualification:

- He / She should be 8th Pass

07	TRAINING METHODOLOGY:
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Practical Oriented training programme with 90% Practical & 10%Theory during demonstration

08 COURSE CONTENT:**8.1 Theory/Demonstration:****8.1.1 Knowledge to be obtained:**

- should be able to explain parts of machine
- Should be able to explain functions of different parts of machine
- Should be able to explain different safety practices
- Should be able to explain different work holding devices
- Should be able to explain different Tool holding devices
- Should be able to explain different cutting tools used

8.2 Practical:**8.2.1 Skill to be obtained**

- Work clamping setting skills
- Tool clamping & setting skills
- Machine setting skills including RPM selection
- Operation of machine with specified accuracy.
- Plain milling & Block milling
- Slot milling & Step milling
- Angular Milling, Drilling & Reaming
- Measurement using Vernier caliper

8.2.2 Job sequence to be mentioned in sample exercise.

- Hold the job in the Vice
- Set the cutting tool properly hold in the Tool holding device
- Calculate the RPM and set the RPM on the machine.
- Do the plain milling on the job.
- Do the plain milling and maintain the block
- Do the block milling and maintain the required dimensions.

09 MACHINERY REQUIREMENT : (Sample)**Basic Machine : Vertical Milling**

- Table Overall Size : 1245 X 230 MM
- Longitudinal Movement: 560 MM
- Transverse Movement : 250 MM
- Vertical Movement : 390 MM
- Speed Range : 45 – 2000 RPM
- Feed Range : 16 – 800 MM/MIN

10 TOOLS & EQUIPMENTS (SUGGESTED):

Sr. No.	Tools and Equipments	Specification
01	Carbide Cutter	Ø80
02	Vernier Caliper	0-150mm
03	Outside Micro Meter	0-25mm, 25-50mm
04	Drill Chuck	[1-13mm]
05	Center Drill	(A-type, 2.5x6.3mm)
06	Drill Bit	
07	Boring Tool with Boring Bar.	
08	Reamer	
09	Steel Rule	300mm
10	Outside, Inside Spring Caliper	150mm
11	Divider Spring	150, 200mm
12	Centre Punch	100mm
13	Ball Peen Hammer	0.5kg
14	Combination Pliers	
15	Safety Goggle	
16	Files (Such As Coarse, Medium, Smooth Of Fiat, Half – Round, Round And Tri-Angular File)	200mm
17	Surface Plate With Table	900x900x1200mm
18	Marking Table	1200x1200x900mm h
19	Scribing Block Universal	300mm
20	V Block	100mm
21	Clamps For V Block	150mm
22	Try Square	200mm
23	Depth Micrometer	0-25mm, 25-50mm
24	Screw Driver, Heavy Duty Handle Assorted	6, 8, 12
25	Reduction Sleeve MT (To Suit The M/C)	MT
26	Grinding Wheel Dresser	
27	Hacksaw Frame With Blades	250-300mm
28	Universal Table Angle Plate	
29	Magnifying Glass	75mm
30	Collet Adaptor With Collet	
31	Vernier Bevel Protector	150mm
32	Depth Vernier	0-200mm
33	Radius Gauge Metric Set	

10.1 Accessories and Attachment Required:

- Clamping Vice
- Strap Clamp
- Angle Plate
- Indexing Head
- Parallel Block

10.2 Raw Material Required:

- Mild Steel, Aluminium, Brass of specified dimension as per drawing.

11 SAFETY:

11.1 Personal safety:

- Wear safety shoe and safety goggles and apron.
- Don't touch any rotating part of the machine.
- Avoid wearing the loose clothes while working on the machines.

11.2 Machine safety:

- Don't change the gear during machine running.
- Don't hammer and part of the machine for any purpose.
- Before leaving the machine ensure that all switches are off.
- Clean the machine properly and lubricate all the guide ways of machine before leaving.

12 MAINTAINANCE:

12.1 Daily Maintenance:

- Check and lubricate all slides of the machine.
- Check smooth running of the machine.

12.2 Weekly Maintenance Checklist:

- Operators weekly check records for milling machining

Tech. ID

Machine Name:

Date:

Check point	Activities	Week No.			
		01	02	03	04
Gear Box	Check and fill up lubrication oil				
Table	Check all fill up lubrication oil in lead screw and rear bearing				
Spindle Cutters	Check for free movement				
Bottom pan	Check properly bottom pan				
Machine exterior	Clean near the machine				
Panel filter	Clean the suction filter of the electrical cabinet.				

12.3 Quarterly Maintenance Checklist:

- Maintenance quarterly check records for milling machine

Tech. ID

Machine Name:

Date:

Date	Checkpoints	Activities	Spares	Status	Sign.	Remark
	Stock	Change oil				
	Apron	Change oil				
	Filter Cartridge	Clean with petrol and dry				
	E. Connectors	Check for rigidity at all points				
	Relay	Clean all the contacts inside the panel with CTC.				
	Motors	Check for excessive heat variation and noise and lubricate the bearings.				
	Lead screws	Lubricate bearings and check for backlash in slides				
	Gears	Check for all gear shifting properly and adequate oil.				
	Spindles	Check for run out				
	Work head lamp	Check work head lamp				
	Coolant motor	Check function of coolant flow				

12.4 Preventive Maintenance:

- Check all slides, gear box and drive internally.
- Check cable routing, smooth running and vibration of the machine.

12.5 Break Down Maintenance:

- Check only the break down area and replace / repair the damage / worn out parts.

12 EVALUATION:

- Total Marks : 100 Marks, Pass Marks : 40 Marks,
- Practical Test : 50 Marks, Written Test : 30 Marks,
- Sessional Marks : 20 Marks (Work Book/Attendance)