सूक्ष्म, लघु एवं मध्यम उद्यम मंत्रालय
DEVELOPMENT COMMISSIONER
MINISTRY OF MICRO, SMALL & MEDIUM ENTERPRISES
MSME TECHNOLOGY CENTRE

MODEL CURRICULUM

Qualification Name:

ASST. OPERATOR - CONVENTIONAL MACHINES

Qualification Code:

Version: 2.0

NSQF Level: 2.5

Model Curriculum Version: 2.0

Submitted by:

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NOS / MODULE TEMPLATE

NOS /Module: Carry out Basic Machining Operation on Conventional Machine

NOS /Module Code: MSME/CCMO/01 & Version 1.0

Outcomes:

After completion of course Student should be able to:

- Explain various machine tools and their principle functions.
- Describe proper safety rules and environment regulation and housekeeping in machine shop.
- Explain different cutting tools, accessories, instruments used.
- Explain measuring tools and instruments.
- Explain sequence of machining operations.
- Develop their skill & knowledge on operating of conventional machines (Bench Work- filling, layout, sawing, punching, using of tools & instruments.
- Describe and classify hand tools
- Describe and classify machine tools
- Describe and classify measuring instruments

THEORY HOURS: 90 PRACTICAL HOURS: 300 THEORY MARKS: 100 PRACTICAL MARKS: 100

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH Hours	TH Marks	Pr Hours	Pr Marks
UNIT-I	Introduction to machine shop, tools, machine tools Measuring instruments, and Machining	After completion of unit Student should be able to Develop their skill & knowledge - on Bench work and operating of drilling machines - Demonstrate and explain Bench Work- filling, layout, sawing , punching , using of tools & instruments , drill machine and performing of drilling operations , tapping using suitable tools	• Introduction to Safety work rules and precautions to be maintained in the work shop, housekeeping, causes of accident. • Introduction to Bench work, tools, machineries, instruments, machine tools. • Performance on Bench work and drilling Machines. • Introduction and Identify the parts of a file, hammer, chisel, punch, hacksaw, bench vice, and their uses and all features. • Identify the features of a	90	300	100	100

		accessories, and measuring instruments - Appropriate parameters setting of drilling, reaming operations - operation sequence for the operations	steel rule, divider, try square and its uses. • Identify vernier caliper, common gauges and its uses. • Select material piece, study the drawing of exercise job • Practice sawing, Filing work etc. • Layout and marking of job using surface plate, height gauge, angle plate, vee block, vernier caliper, scriber etc. • Marking as per drawing • Identify & select of drill machine, vice or clamp holding devices, Drill chuck, sleeve, etc. • Knowing of belt drive and gear drive. • Centre punching, setting of job on machine. Setting parameter on machining. • Operation of Centre drilling, drilling, counter sinking, Counter boring, reaming, boring, etc. using coolants. • Selection of tap, parameter setting and tapping using lubricating oil. • Inspecting of job by measuring tool, gauges. • Cleaning of machine and oiling.				

NOS /Module: Read Simple Part Drawing

NOS /Module Code: MSME/CCMO/02 & Version 1.0

Outcomes:

After completion of course Student should be able to:

1. To scale, line and lettering drawing and practical in different lines and lettering. Drawing of different line and letters in drawing book.
2. Understand procedure for drawing, straight line, angles, polygons, circle, all drawing drawn in sketch book.
3. Drawing of object as per 1st & 3rd angle projection method
4. Drawing projection of plane and point. Drawing of isometric view of different object. Conversion of Isometric view to orthographicprojection understand
5. Assembly and detail drawing any object.

Theory Hours: 30 **Practical Hours: 90** **Theory Marks: - 00** **Practical Marks: 100**

Unit No.	**Unit Name**	**Unit level outcomes**	**Contents (chapters/topics)**	**PR hours**	**PR Marks**
UNIT-I	**Introduction**	After completion of unit Student should be able to: • Observation of ED. • Definition of sketch mechanical and comp. generated drawing (Identification)	• Introduction and observation of ED in mfg. industry. • Definition of drawing importance of drawing. Need of dry. General awareness of drawing. Drawing sheet & equipment required in drawing classification of drawing set, imp. Equipment related information. • Drawing instrument, concept of standard drawing	5	10
UNIT-II	**Scale, lines and lettering**	At the end of this unit Student should be able to Understand: To scale, line and lettering drawing and practical in different lines and lettering. Drawing of different line and letters in drawing book.	• Introduction to scale, line and lettering. • Classification of line and lettering. • Choice and use of BIS norms for scale, line andlettering. • Selecting of Various scales, line and lettering.	10	15

UNIT-III	**Geometric Construction**	At the end of this unit Student should be able to Understand: • Procedure for drawing, straight line, angles, polygons, circle, all drawing drawn in sketch book.	• Introduction & Advance geometrical Construction Definition: Straight line angles, polygons, circle areas. • Conic Sections: Ellipse, Parabola, Hyperbola. • Other Curves: helix, Cycloid, involutes.	20	15
UNIT-IV	**Orthographic Projection**	At the end of this unit Student should be able to Understand: • Drawing of object as per 1st & 3rd angle projection method, • Procedure for drawing different view in 1st& 3rd angle. Procedure of indication of dimension	Introduction to orthographic, Different view and plane-identification. Definition of plots, lines, planes, solids. Principal of quadrants and panes. Drawing of difference view of paints in 1st and 3rdangle projection Introduction to dimension, Definition: functional dimension, Non – functional dimension auxiliary dimension. Rules of dimensioning. method of dimensioning indication of dimension	20	20
UNIT-V	**Isometric view**	At the end of this unit Student should be able to Understand: • Drawing projection of plane and point, • Drawing of isometric view of different object. Conversion of Isometric view to orthographic projection	Introduction Isometrics drawingdefinition of Isometric Isometric projection of planes, prisms, pyramids,cylinders, cones, irregular object. Dimensioning of Isometric drawing chain dimensionparallel dimension Oblique dimension Align Dimension Drafting of object. Isometric part drawing drafted in orthographic view as per 1st & 3rd angle projection method.	20	25

UNIT-VI	**Elements of assembly**	At the end of this unit Student should be able to Understand • Practical drawing in different temporary joints as perBIS standard which is used for assembly	Definition & introduction of element of assembly Definition of temporary joints, Screw Thread, bolts, nuts,dowels, washers, spring Permanent joints. standard elements as per BIS being used for assembly Section and representation of different elements inused in assembly.	15	25

NOS /Module: Perform basic Mathematical calculation for machining

NOS /Module Code: MSME/CCMO/03 & Version 1.0

Outcomes:

After completion of course Student should be able to:

1. Demonstrate basic arithmetic to derive value of unknown quantity / variable.
2. Understand & apply engineering material, their classification, properties and applications in the day to day technical application heat treatment & their advantages.
3. Explain & apply speed, velocity, work, power & energy for application in field of work.
4. Demonstrate basic algebraic, mensuration, trigonometric facts and formulas to derive value of unknown quantity / variable.
5. Explain & apply principles of simple machine & levers for mechanical advantage, efficiency for practical application.
6. Demonstrate & apply calculation of area of cut-out regular & irregular surfaces, Volume of geometrical shapes and their cut section in related shop floor problems.
7. Calculate value of unknown sides and angles of geometrical shapes by trigonometrically methods and apply in shop floor problems.
8. Understand& apply transmission of power

Theory Hours: 90 **Practical Hours: 00** **Theory Marks: 100** **Practical Marks: 00**

Unit No.	**Unit Name**	**Unit level outcomes**	**Contents (chapters/topics)**	**Th hours**	**Th Marks**
Unit: I	**Unit system And simple calculations**	At the end of this unit Student should be able to Understand: • Unit system • Solve Multiplication decimals, root, ratios, percentage calculation • Velocity and speed	Unit: Systems of unit- FPS, CGS, MKS/SI unit, unit of length, Mass and time, Conversion of units Fractions: Fractions, Decimal fraction, L.C.M., H.C.F., Multiplication and Division of Fractions and Decimals, conversion of Fraction to Decimal and vice versa. Simple problems using Scientific Calculator. Square Root: Square and Square	15	20

			Root, method of finding out square roots, Simple problem using calculator. Ratio & Proportion: Simple calculation on related problems. Percentage: Introduction, Simple calculation. Changing percentage to decimal and fraction and vice versa. Mass, Weight and Density: Mass, Unit of Mass, Weight, difference between mass and weight, Density, unit of density, specific gravity of metals. Speed and Velocity: Rest and motion, speed, velocity, difference between speed and velocity, acceleration, retardation, equations of motions, simple related problems		
Unit: II	**Algebra, mensuration and trigonometry**	At the end of this unit Student should be able to Understand: • Solve simple algebra , mensuration and trigonometry problems	Algebra: - Addition, Subtraction, Multiplication, Division, Algebraic formula, Linear equations (with two variables). Mensuration:- Area and perimeter of square, rectangle, parallelogram, triangle, circle, semi-circle, Volume of solids – cube, cuboids, cylinder and Sphere. Surface area of solids – cube, cuboids, cylinder and Sphere. Trigonometry: Trigonometrical ratios, measurement of angles. Trigonometric tables	25	25
Unit: III	**Engineering materials**	At the end of this unit Student should be able to Understand: • Understand the materials: • Type of material • Properties of material	Material Science : properties - Physical & Mechanical, Types – Ferrous & Non-Ferrous, difference between Ferrous and Non-Ferrous metals, introduction of Iron, Cast Iron, Wrought Iron, Pig Iron, Steel, difference between Iron and Steel,	25	25

		• Alloying of materials • Heat treatment of material and its process	Alloy steel, carbon steel, stainless steel, Non-Ferrous metals, Non-Ferrous Alloys. Heat treatment and advantages.		
Unit: IV	**Simple Mechanics**	At the end of this unit Student should be able to Understand: • Understand the basic science about work, power, energy • Understand the basic function of livers and mechanics of simple machines • Understand transmission of power by different mechanism	Work, Power and Energy: work, unit of work, power, unit of power, Horse power of engines, mechanical efficiency, energy, use of energy, potential and kinetic energy, examples of potential energy and kinetic energy. Levers and Simple Machines: levers and its types. Simple Machines, Effort and Load, Mechanical Advantage, Velocity Ratio, Efficiency of machine, Relationship between Efficiency, velocity ratio and Mechanical Advantage. Transmission of power by belt, pulleys & gear drive. Calculation of Transmission of power by belt pulley and gear drive.	25	30

NOS /Module: Carry out Advance Machining Operation on Conventional Machine

NOS /Module Code: MSME/CCMO/04 & Version 1.0

Outcomes:

After completion of course Student should be able to:

- Describe working principle of conventional machine tools, function of various machine tools and their field of applications.
- Identify method of machining and sequence of operations.
- Identify the function of instruments, accessories and attachments used.
- Identify various machining operation techniques.
- Describe basic maintenance of machines, machineries, accessories, and instruments.
- Identify safe working practice and environment regulation and housekeeping.
- Set machining parameter with all relevant calculation.
- Perform various drilling operation, reaming operations, tapping operation using suitable tools, accessories, and measuring instruments.
- Perform various machining operations on lathe machines for manufacturing job using suitable tools, accessories and measuring instruments.

- Perform various machining operations on Milling Machines for manufacturing of job using suitable tools, accessories and measuring instruments.
- Perform various machining operations on Grinding Machines for manufacturing job using suitable tools accessories and measuring instruments.
- Understand and follow basic maintenance work of machines, machineries and instruments.

THEORY HOURS: 60 PRACTICAL HOURS: 270 OJT HOURS: 150 THEORY MARKS: 100 PRACTICAL MARKS: 100 VIVA MARKS: 100

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH Hours	TH Marks	Pr Hours	Pr Marks	OJT Hours	VIVA Marks
UNIT-I	Lathe machines	After completion of unit Student should be able to understand and develop their skill and knowledge on: • Lathe Machine and performing of different operations on lathe machine for manufacturing a job using suitable tools, accessories, and measuring instruments. • Appropriate parameters setting of lathe operations • operation sequence for the lathe operations	Introduction to Safety work rules and precautions to be maintained in the work shop, housekeeping, causes of accident. Introduction to Lathe Machine: Identify and knowing the functions, features and uses of different parts of a lathe machine. Study the drawing, identify and select material, machine, tools, & measuring instruments. Formation of cutting tool. Setting of job and machining parameter Setting of cutting tool to the centre height. Operation carried out on facing, centre drilling, drilling, turning, step turning, grooving, knurling thread cutting, taper turning and	**20**	**35**	**90**	**35**	**50**	**35**

			checking its taper, Parting off, chamfering, boring, etc.						
UNIT-II	Milling Machines	After completion of unit Student should be able to understand and develop their skill and knowledge on: • Milling Machine and performing of different operations on milling machine for manufacturing a job using suitable tools, accessories, and measuring instruments • Appropriate parameters setting of milling operations • operation sequence for the milling operations	Introduction to Safety work rules and precautions to be maintained in the work shop, housekeeping, causes of accident. Identify and knowing the function and features and uses of different parts of a milling machine. Study the drawing, identify and select material, machine, tools, & measuring instruments. Selection of different milling cutters for specific operation. Setting and dialing of job and setting of machining parameter, Operation carried out on surface milling, open & close slot milling, angle milling, form milling, vee slot milling, narrow slot milling, 'T'-slot milling, dovetail milling etc. Use of machine vice, 'T' bolt clamps, vee block, rotary table, indexing devices, etc. Uses of cutter holding device like arbour,	**20**	**35**	**90**	**35**	**50**	**35**

			collets, adapters, spring collect etc. Inspecting of job by measuring tool, gauges. Cleaning of machine and oiling.						
UNIT-III	Grinding Machines	After completion of unit Student should be able to understand and develop their skill and knowledge on: • Grinding Machine and performing of different operations on grinding machine for manufacturing a job using suitable tools accessories, and measuring instruments • Appropriate parameters setting of grinding operations • operation sequence for the grinding operations	Introduction of Safety work rules and precautions to be maintained in the work shop, housekeeping, causes of accident. Identify and knowing the function and features and uses of different parts of a grinding machine. Study the drawing, identify machine, tools, & measuring instruments. Selection of different grinding wheel for specific operation. Setting and dialling of job and setting of machining parameter. Setting and dialling of job and setting of machining parameter. Operation carried out on surface grinding , slot grinding, angle grinding , form grinding , vee slot grinding , narrow slot grinding, external and internal cylindrical grinding etc. uses of sine table,	**20**	**30**	**90**	**30**	**50**	**30**

			magnetic vice, stick dresser , sitting dresser, etc. Use of Jigs and Fixture tool to perform specific operation Inspecting of job by measuring tools and gauges. Cleaning of machine and oiling.						

COURSES / MODULE TEMPLATE

NOS /Module: Employability Skill

NOS /Module Code: MSME/ES/04

THEORY HOURS: 120 PRACTICAL HOURS: - THEORY MARKS: 100 PRACTICAL MARKS: -

Refer Standard Curriculum developed by NCVET _ Employability skills 120 Hrs