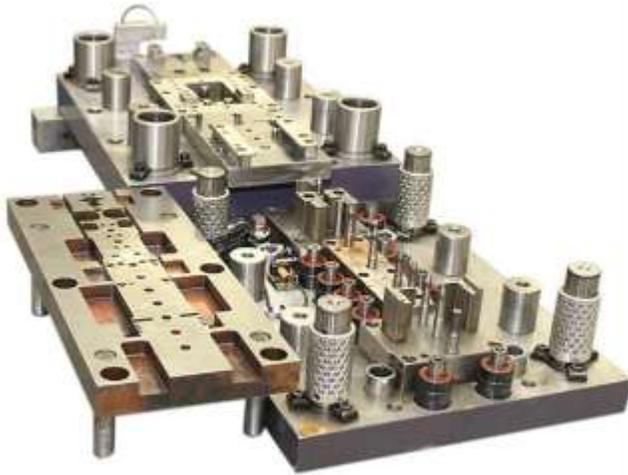# MODEL CURRICULUM

Qualification Name:

Jr. Technician -Tool & Die Maker

Qualification Code:

Version: 2.0

NSQF Level: 3.5

Model Curriculum Version: 2.0

Submitted By:
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COURSES / MODULE TEMPLATE

Semester-I

COURSE NAME: Create Part Drawing using CAD

COURSE CODE: MSME/CCTDM/01

COURSE OUTCOMES:

After completion of course Student should be able to

- Explain the application of engineering drawing.
- Construct orthographic Projections giving proper dimensioning with title block using appropriate line type and scale for any geometrical figure in Auto CAD
- Explain various drawing Equipment's.
- Understand of Engineering Dimensioning method and their application
- Distinguish between Isometric view and Isometric projections.
- Explain about GD&T
- Create 2D geometric sketches by using Auto CAD Software
- Develop 3D modeling by using advanced command
- Understand design generative & interactive drafting

THEORY HOURS: 30 **PRACTICAL HOURS: 120** **THEORY MARKS: NA** **PRACTICAL MARKS: 100**

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH hours	PR hours	PR Marks
Unit I	Drawing equipment's	After completion of unit Student should be able to ● Use of Drawing Instrument and Purpose. ● Use of different grade of Pencils ● Under stand of drawing sheet lay out. ● Explain and demonstrate use of scales.	Explain the use of, Drawing board, T - square Set square, Mini drafter, Instrument box, Protractors, French curves Identify the different grades of pencils HB, H, 2H, 3H.Classify the different sizes of drawing sheets according to B.I.S. Describe the layout of Drawing sheets and their contents. Give idea about Letters and numerals Explain the use of scales – Enlarging, Reducing, full scale and representative fraction.	2	10	5
Unit II	Dimensioning Techniques	After completion of unit Student should be able to ● Identify and use of different types of lines. ● Use of co-ordinate dimensioning	State the types of lines and their uses. Identify different dimensioning methods. Use Chain, parallel and combined dimensioning. Use aligned and unidirectional system of dimensioning in given situation.	4	10	10

			● Under stand of dimensioning Diameter, Radii, Chords, angles.	Use co-ordinate dimensioning, methods of dimensioning Diameter, Radii, Chords, angles.		
Unit III	Recognize the points in various quadrants	After completion of unit Student should be able to ● Understand of four quadrants. ● Use of different Plane ● Understand of front view, top view and side view	Explain all four quadrants Identify Horizontal plane, Vertical plane and Profile plane. Explain the projection of points – front view, top view and side view (both left and right).	4	15	10
Unit IV	Development of surfaces of objects	After completion of unit Student should be able to ● Use of parallel line and radial line methods ● Understand of Development of surfaces with section s	Illustrate the Development of surfaces by parallel line and radial line methods Draw the development of surfaces of geometrical objects and utility objects Draw Development of surfaces with section plane inclined to HP and Perpendicular to VP Draw development of Solids resting completely on its base	4	15	10
Unit V	Orthographic projection of Machine parts	After completion of unit Student should be able to ● Meaning of orthographic projection	State Meaning of orthographic projection Draw elevation, plan and side elevation of the machine parts like stepped block, fork lever, bearing block, etc.	4	20	20
Unit VI	Isometrics c projection	After completion of unit Student should be able to ● Distinguish between Isometric view and Isometric projections ● Understand of Use of different Isometric view of different geometrical objects and machine parts	Describe the use of Isometric scale Distinguish between Isometric view and Isometric projections To draw the Isometric view of different geometrical objects and machine parts Convert orthographic views into isometric view	4	20	20

Unit		scales	with square nut			
Unit VII	Preparation of assembly drawing	After completion of unit Student should be able to • Understand of assembly drawing • Identify parts of the assembly • Parts drawing	Hinge, C-clamp, Drill base and table Tool makers clamp Drill jig Plumber block, etc.	4	20	15
Unit VIII	Surface finish symbols	After completion of unit Student should be able to • Understand of symbols of surface finish. • Understand of machining allowance • Under stand of special drawing instruction.	Special surface Direction of Machining allowance, Position of symbol Symbols with indications	4	10	10

COURSES / MODULE TEMPLATE

COURSE NAME: Checking dimensions of machined Part

COURSE CODE: MSME/CCTDM/02

COURSE OUTCOMES:

After completion of course Student should be able to
● Understand End and line Standard
● Check linear measurements by using Vernier, Micrometer (Digital and Analog type)
● Check Linear Measurement by height gauges (Digital and Analog type).

● Check various geometrical parameters using measuring instruments
● Demonstrate angle and taper measurements by bevel protractor and Sine bar.
● Demonstrate screw thread and gear measurement.
● Use various advance instruments for linear, angular and profile measurement.
● Carry out surface roughness measurement using Surface roughness tester

THEORY HOURS: NA PRACTICAL HOURS: 30   THEORY MARKS: NA   PRACTICAL MARKS: 100

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	PR hours	PR Marks

UNIT -I	Introduction to basic Engineering Measurement & Metrology	After completion of unit Student should be able to • Describe and explain End and line standards. • Demonstrate the use of Slip gauges • Explain and demonstrate various gauges	Define Metrology, Accuracy and Precision, End & line standards Desirable features of end standards, and use of slip gauge	6	20
UNIT -II	Measuring Instruments: Gauges & Comparators	After completion of unit Student should be able to • Explain and demonstrate various gauges • Understand and demonstrate comparators like multi angle, sigma comparators	Gauges: GO- No GO type , Plug, Ring, tapper, thread, Snap, filler gauge etc., Comparators: Multi angle Sigma comparator, Back pressure and free flow type pneumatic comparators, Differential back pressure gauge.	6	20
UNIT -III	Measuring Instruments: Vernier , Micrometer and height Gauge	After completion of unit Student should be able to • Explain various measuring machines • Demonstrate and explain Optical dividing head • Analyze the co-ordinate systems and its applications	vernier Caliper (Digital, Analog and Dial type), micrometer (Analog and Digital type), height gauges (Digital and Analog type), Dial indicator, calculation of least count for various instruments (Vernier Caliper, Micrometer and Height Gauge), inside micrometer, depth micrometer, bevel protractor and Sine bar, Optical Flat, Sprit level , Roughness tester and profile projector	12	40
UNIT -IV	Screw Threads and Form Errors	After completion of unit Student should be able to • Evaluate straightness & flatness • Evaluate and do analysis of parameters of screw threads • Identify and understand pitch errors • Determine and describe various methods of measurements of Screw threads	Evaluation of straightness & flatness, evaluation of roundness – intrinsic & extrinsic datum. Surface Finish: stylus instrument (TALYSURF), Measurement of thread elements for internal & external threads,	6	20

COURSES / MODULE TEMPLATE

COURSE NAME: Manufacturing of Tool & Die Parts

COURSE CODE: MSME/CCTDM/03

COURSE OUTCOMES:

After completion of course Student should be able to:

- Explain Hand Tools, Marking Tools and Drills
- Demonstrate and explain Drilling Machines
- The importance and use of PPE's
- The working of Bench grinding,
- Metal working technique, Lathe Machine , Turning tools and Tool Geometry , Turning operations & safety.
- Taper Turning Methods, Thread cutting methods.
- Calculate Cutting Speed and rpm.
- Lathe machines like Turret lathe, Capstan lathe
- The working of Milling Machines,.
- Various types of Milling cutters, Work holding devices.
- Various types of Milling operations like Indexing, Boring.
- Calculate Speeds & Feeds and Calculation of Machining time.
- The working of various types of Holding devices for Milling cutters and milling machine attachments and accessories
- Grind Drills for Drilling Machines.

THEORY HOURS: 60   PRACTICAL HOURS: 180   THEORY MARKS: NA   PRACTICAL MARKS: 100

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH hour s	PR hour s	PR Mark s
UNIT-I	Introduction to Hand Tools	After completion of unit Student should be able to • Explain & Demonstrate the use of Hand Tools, Marking Tools and Drills	**Vices,** Construction parts specification uses of, Bench vice, Leg vice, Pipe vice, Hand vice, Pin vice,Tool makers vice, Care of vices, Vice clamps, Hammers, Ball peen , Cross peen, Straight peen, Soft hammers, Files, Parts, size, cut of teeth, shapes, filing, methods of filing, care, special purpose file and needle files. Centre punches, Dot punch, Prick punch, Scrapers, Shapes, Scraping, Frosting or flowering,	3	10	10

			Hacksaws, Definition, types of frames, Parts of a blades, Kinds of blade, Types of blade, Teeth arrangements, Sawing - Power hacksaw, parts, function of type of blade, band saw, parts function, types of blade. Pliers, Spanners, Screw drivers,.			
UNIT-II	Marking tools	After completion of unit Student should be able to ● Demonstrate and explain Marking techniques ● Demonstrate and explain marking tools	**Scribers,** Try squares, parts of uses, Jenny calipers, parts uses calipers O/S I/S, dividers. Surface plates, material, constructions, specification and uses. Parallel blocks, 'V' blocks, Scribers, Features, uses, Surface gauges, types, ordinary universal, parts and uses. Angle plate, features, functions, types of uses.	3	10	10
UNIT-III	Drills and Drill Machine	After completion of unit Student should be able to ● Demonstrate and explain drilling method ● Demonstrate and explain drills, taps, dies etc ● Drill machines	Drills: Types of drills, flat drill, straight fluted drill and twist drill, parts of a twist drill. Counter sinkers: Definition angle of counter sinking, countersinks, counter sink with pilots, Counter boring & spot facing. Reamers: introduction, advantages and classification of reamers Parts and function of various Drilling Machine such as Pillar Drilling Machine, Bench, Column, Multi Spindle, Gang Spindle and Radial Different types, Work holding devices.	4	10	5
UNIT-IV	Single point cutting tools	After completion of unit Student should be able to ● Demonstrate and explain single point cutting tool ● Tool terminologies ● Demonstrate and use pedestal grinding machine	Definition and function of Cutting Tools, shape & Geometry. Bench & pedestal grinders, features. Wheel dressers.	3	10	5

UNIT-V	Lathe machine	After completion of unit Student should be able to ● Demonstrate and Explain lathe machine ● Demonstrate and explain lathe machine accessories ● Demonstrate and explain lathe machine attachments	**Centre lathe and its parts**, Specification of a center lathe, Parts, head stock, Lathe bed, Carriage, Feed mechanism, Tool poste, Tail stock, work holding devices, Chucks – 3 jaws, 4 jaws, Self centering , Face plate. Work supporting accessories, Catch plate, Driving plate, Tail stock center Lathe dogs, Fixed study rest, Traveling study rest, Collets, Mandrels.	3	20	5
UNIT-VI	Types of cutting tools	After completion of unit Student should be able to ● Demonstrate and explain different types of turning tools ● Demonstrate and explain lathe machine accessories and attachments.	**HSS, Carbide, Diamond**, Ceramic, Tool angles and their functions, Roughing tools, Finishing tools Plain turning (1) L.H. tool, (2) R.H. tool, Facing tool, Threading tool, Boring tool, Profile tool, Parting of or end cutting tool. Tool holders, Holders for tool bit, Tool post, Clamping plate, Four way tool post, Single roller knurling tool holder, Joint type knurling tool holder, Revolving head knurling tool.	4	20	5
UNIT-VII	Types of lathe operations	After completion of unit Student should be able to ● Demonstrate and explain different types of turning operations	**Plain, Steps, Square shoulder,** Filleted shoulder, Beveled shoulder, Parting, Boring, Grooving, Facing, Threading, Profile, Drilling, Tapping, Reaming, Counter boring, Knurling, Trepanning Operation.	4	10	5
UNIT-VIII	Taper turning	After completion of unit Student should be able to ● Demonstrate and explain different types of taper turning methods.	**Form tool method,** Compound slide method, Offset tail stock, Taper turning attachment, Effect of tool position, Taper calculations, eccentric turning, Calculations, Aids, Inspection, copy turning, Equipment, Hydraulic, Mechanical, Templates.	4	10	5

UNIT-IX	Thread cutting	After completion of unit Student should be able to • Demonstrate and explain thread cutting techniques on lathe machine	**Gear setting, Inch conversion,** Metric threads from inch lead screw, Inch threads from metric lead screw, Threading dial, Right & left hand threads, External & internal threads, Thread Terminology, inch, metric, pitch, square profile, saw tooth etc.,	4	10	5
UNIT-X	Turning parameters	After completion of unit Student should be able to • Calculate various parameters of turning operation	Calculation OF R.P.M , Cutting speed, Diameter of work piece, Tables Feeds & depth of cut, Material Cutting Tools, Cutting angles, Feed in mm per revolution, Calculation of machining time, Setting time, Machining time, Auxiliary time, Delay time, Total time	4	10	5
UNIT-XI	Milling machine	After completion of unit Student should be able to • Understand the working principle of a milling machine. • Demonstrate and explain different parts of a milling machine • Explain different types of milling machine	**Principle of Milling,** Classification Column & knee type, Fixed bed type, Planer type, Special type, Different types, Plain / horizontal milling machine Vertical milling machine, Universal milling machine, Main parts – column, knee, gear box, spindle, saddle, over arm and brace.	3	10	5
UNIT-XII	Milling cutters	After completion of unit Student should be able to • Understand the working principle of milling cutters. • Explain different types of milling cutters • Demonstrate and explain different parts of a milling cutters and their specifications	**Solid cutters** Plain Milling cutter of slab milling cutter (solid, inserted), Light duty plain milling cutter, Heavy duty plain milling cutter, Helical plain milling cutters, Brazed on tip cutters, Side and face milling cutters, Plain S/F, Staggered teeth S/F, Milling , Inter locking S/F, End milling cutters Slot drills, Gear cutters, Shell end mills, Slot drills, Carbide milling cutters, Angular milling cutters, Single angle, Equal angle, Double unequal angle, Slitting saw, Form Milling cutters, Convex and concave, Corner rounding milling cutter, T-Slot cutter, Wood ruff	3	10	5

			key cutters, Thread Milling , cutter, Sprocket cutters, Spline cutters , Tap & reamer cutter, Fly cutters, Bolted cutters			
UNIT-XIII	Milling attachments	After completion of unit Student should be able to • Understand the working principle of a milling machine accessories and attachments • Understand and explain indexing principles and methods.	**Long arbor** & stub arbor, Collects, Tapered shanks "Clarkson" system, Adopter, Machine vice, Direct clamping, 3-jaw chuck, 4-jaw chuck, milling fixtures, Angle plates, **Index plate, Vertical Milling attachment,** High Speed attachment Slotting attachment, Universal attachment Rack Milling attachment, Circular Table attachment, Internal grooves, Key ways Design of attachment, Length of stroke Slotting tools,	4	10	5
UNIT-XIV	Milling operations	After completion of unit Student should be able to • Understand and explain different milling operations.	Plain / slab milling, **Face milling,** End milling, Up cut milling, Down cut milling, Gang milling, Key ways, Slides, Hexagons, Profiles, Cam milling, Types of Indexing heads, Direct Indexing head, Purpose Principle Direct Indexing mechanism , Plain or Simple Indexing , Purpose Principle Simple Indexing mechanism, Linear Indexing , Angular Indexing.	4	10	5
UNIT-XV	Milling parameters	After completion of unit Student should be able to • Calculate various parameters of milling operation • Explain various	**Cutting Speed Calculations,** Milling Feeds, Depth of cut, Feed rate mm/min, Feed / Tooth, Feed / Cutter revolution, Feed / minute, Chip formation, Machine power, Surface finish, Roughness waviness revolution, Cutting fluid, Advantages &	4	10	10

UNIT-XVI	Jigs & Fixture	At the end of this Unit the student should be able to: ● Understand various types of tool & Die. ● Understand various tool & die manufacturing Processes. ● Define Jigs & Fixtures. ● Conceive the Purposes use of Jigs & fixtures. ● State Design consideration for jigs & fixtures. ● Illustrate the Various Method of Locating, Clamping supporting of job in Jigs & Fixture. ● Understand Manufacturing Considerations.	introduction of tool & Die Manufacturing, Different Types of Tool & Dies Definition Of Fixture And Jig, Purpose Of Using Fixtures And Jigs, Fundamental Principle of Jigs & Fixture Design, Types of Jigs & Fixture, Components of Jigs & Fixture, Locating, Supporting and Clamping of jobs in jigs and fixtures, Different Methods Used for Locating & Clamping, Machine Considerations for manufacturing Horsepower, Size limitations, Weight limitations, Cutting Tools, Special Machinery.	6	10	10

| | | milling surface finish | characteristics of a cutting fluid
Types, functions and application of cutting fluid | | | |

COURSES / MODULE TEMPLATE

COURSE NAME: Use and Application of Engineering Materials

COURSE CODE: CCTDM-04

COURSE OUTCOMES: After completion of course Student should be able to

- Understand knowledge on the structure, properties, treatment, testing of engineering materials.
- Understand the different materials, their processing, and heat treatments.

- Identify and select suitable materials for various engineering applications.
- Understand applications of metals and non-metallic materials.
- Know how to approach the design of a heat treatment for an alloy for a particular application.
- Troubleshoot problems in the use of metals and alloys

THEORY HOURS: 30   PRACTICAL HOURS:-   THEORY MARKS:-100   PRACTICAL MARKS:-

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	PR hours	PR Marks
UNIT -I	Alloys	After completion of unit Student should be able to: ● Understand chemical composition of Alloy. ● Difference between ferrous & non-ferrous Alloy. ● Classify of Steel & Cast Iron. ● Understand its properties & application	Constitution of alloys (Fe and Non-Fe), Solid solutions, substitutional and interstitial, Classification of steel and cast Iron its properties and applications.	6	20
UNIT -II	Mechanical Properties and testing	After completion of unit Student should be able to: ● Understand mechanical Properties of material. ● Understand Mechanism of Plastic deformation. ● Understand types of Fracture. ● Understand various material testing methods.	Mechanism of plastic deformation, slip and twinning – Types of fracture – Testing of materials under tension, compression and shear loads – Hardness tests (Brinell, Vickers and Rockwell),	6	20
UNIT -III	Ferrous and Non Ferrous metals	After completion of unit Student should be able to: ● Understand difference between ferrous & non-ferrous Alloy. ● Understand effect of alloying elements on steel.	Effect of alloying elements on steel (Mn, Si, Cr, Mo, V, Ti & W) stainless and tool steels: HSLA - Maraging steels Cast Irons: Grey, White malleable, spheroidal- Graphite. cast irons, Copper and Copper alloys Brass, Bronze and Cupronickel – Aluminum and Al-Cu	6	20

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	PR hours	PR Marks
UNIT-IV	Non-metallic Materials	After completion of unit Student should be able to: ● Classify Types of Polymers, ● Understand the applications of various polymers. ● Understand Ceramics and composite ● Differentiate between composite and alloys	Introduction of Polymers Materials, Classification and Types of Polymers materials, commodity & applications of various polymers materials , composite and Ceramics	6	20
UNIT-V	Heat treatment	After completion of unit Student should be able to: ● Understand application & various types of Heat treatment process ● Understand the principles behind heat treatment of metals and alloys	Definition & Concept of Heat treatment, steps and process, types of heat treatment process, Full annealing, stress relief, recrystallization and Spheroidizing, Normalizing, hardening and tempering of steel. Hardenability, Jominy end quench test	6	20

COURSE NAME: Design of Press Tool

COURSE CODE: CCTDM-05
COURSE OUTCOMES:
After completion of course Student should be able to
● Prepare the component drawing, strip layout, Design Ejection system and calculate the tonnage, plate sizes, decide feeding of strip.

THEORY HOURS: 30   PRACTICAL HOURS: 120   THEORY MARKS:-100   PRACTICAL MARKS:100

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	PR hours	PR Marks

UNIT -I	Press Tool Design	After completion of unit Student should be able to • Demonstrate various press Operations using different types of press tools. • Demonstrate different parts of press tools and their functions and materials used to manufacture the tool • Calculate the data of various parts for manufacturing of press tools & die • Prepare the BOM • Develop press Tools for shearing and non-shearing Operations • Design & Develop various parts of press tools and die • Construct die set • Explain the materials used in the press tools	Concept of press tool, Types of press machine, Press tool operation (shearing and non-shearing operation), Types of punches and dies, Design of strip layout, Calculation of cutting force (Tonnage) and plate sizes, Calculation of parameters like die Margin, die land, shears angle and concept of BOM. Types of dies (progressive dies, inverted dies, compound dies). Accessories used in a press tool, function of press tools parts. Press operation like shearing (blanking, piercing, perforating) & none shearing (bending, coining, embossing etc. Strip layout, basic blank size, blank positioning, and different blank layout. Scrap allowance, strip margin selection for rectangular or circular profile, % of utilization. Die set, types of Die set, full proofing of Die Set, Troubleshooting the die set. Clearance to be provided, land margin to be left in the dies. calculation of Cutting and Stripping force. Die block construction, die material, thickness & heat treatment processes. Full proofing of the strip movement. Construction of the Punches, categories & mounting of punches. Design of Thrust plate, material & heat treatment and Die Assembly	120	100

COURSES / MODULE TEMPLATE

Semester-II

COURSE NAME: Assist in Operation of CNC Machine

COURSE CODE: CCTDM 06

COURSE OUTCOMES:

After completion of course Student should be able to:

- Explain applications and advantages of CNC machines and technology
- Demonstrate and explain various CNC control Calculate technological data for CNC machining
- The importance and use of PPE's
- Prepare and understand line program for various profiles Identify and set parameters for various simulators
- Prepare programs , demonstrate , simulate and operate CNC lathe machines for various machining operations
- Prepare programs , demonstrate , simulate and operate CNC milling machines for various machining operations
- Define and explain Modern CNC systems and explain its importance in manufacturing.

THEORY HOURS: 30   PRACTICAL HOURS: 120   THEORY MARKS: -NA   PRACTICAL MARKS: 100

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH hours	PR hours	PR Marks
UNIT-I	Introduction to CNC technology and CNC programming	After completion of unit Student should be able to - Explain applications and advantages of CNC machines and technology - Understand and explain difference between conventional & non-conventional machine tool - Demonstrate and explain various CNC control - Calculate technological data for CNC machining System. - Understand the importance and use of safety on machines	Introduction to CNC technology, CNC machines & controls, History & development of CNC technology. Conventional Vs. non- conventional machine tool. Numerical control on CNC machine tools CNC control and CNC Control and types of CNC control. Calculation of technological data for CNC machining, CNC clamping system. Basic health and safety and implementation of JH for CNC Introduction to manual NC programming Manual NC programming for lathe & milling machines. Numerical Control & Adoptive Control	8	20	25

			System			
UNIT-II	CNC Programming	After completion of unit Student should be able to • Understand and explain the concept and importance of CNC programming • Prepare and understand line program for various profiles • Identify and set parameters for various simulators • Prepare and simulate various operation cycles for lathe and milling • Use and simulate cycles using various Controls • Analyze parameters for various machining cycles and operations	Introduction to CNC programming Introduction and demonstration of line programs CNC programming for lathe & milling machine using ISO codes into the CNC simulator. CNC programming for lathe and milling machines using different machining cycles into the CNC simulator. Procedures Associated with part programming, Cutting process parameter selection, Process planning issues and path planning, G & M Codes, Interpolations, Canned Cycles and Subprograms, Tool compensations Exposure for programming and simulator of FANUC, SINUMERIC, DMG TURNPLUS & Controls through post processors. Programming exercise. Machining of programmed exercise on CNC lathe & milling machines.	6	40	25
UNIT-III	CNC Machining Lathe	After completion of unit Student should be able to • Optimize parameters for turning operations • Analyze the parameters of lathe operations • Explain operation sequence for the lathe operations • Prepare operation sequence for test run • Set , Simulate, and perform various operations like turning , grooving threading etc	Plan and optimize programs for CNC turning operations. Calculate parameters like speed feed etc. and set a references for the various operations Prepare operation and operationsequence for the lathe operations like turning, grooving etc. Prepare & set CNC lathe operations and test run programmed. Execute program and inspect simple geometrical forms/ standard parts Use of various PPE's on CNC lathe machine	8	30	25

UNIT-IV	CNC Machining – Milling	After completion of unit Student should be able to - Optimize parameters for milling operations - Analyze the parameters of milling operations - Explain operation sequence for the milling operations - Prepare operation sequence for test run - Set, Simulate, and perform various operations like core milling, cavity milling, PCD drilling.	Plan and optimize programs for CNC Milling operations. Calculate parameters like speed feed , depth of cut etc. and set a references for the various operations Various methods of work process like edge finding block center etc. Prepare & set CNC Milling operations and test run programmed Execute program and inspect simple geometrical forms / standard parts Use of various PPE's on CNC milling machine	8	30	25

COURSE NAME: Design of Mould

COURSE CODE: CCTDM-07

COURSE OUTCOMES:

After completion of course Student should be able to:

- Identify different types of mould with its parts.
- Design component drawing
- Calculate the plate sizes, injection system and ejection system, type of core and cavity used.
- Demonstrate the mould parts and its function.
- Design and develop mould

THEORY HOURS: 30   PRACTICAL HOURS: 120   THEORY MARKS: -NA   PRACTICAL MARKS: 100

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH hours	PR hours	PR Marks
UNIT-I	Mould Design	After completion of unit Student should be able to: ● Explain molding machines & types of moulds. ● Demonstrate the function of injection mould and standard mould base. ● Demonstrate parting line, guiding elements. ● Demonstrate gate & runner of mould. ● Demonstrate ejection system & cooling system. ● Demonstrate split moulds. ● Explain Component drawing for material, shape, shrinkage & parting surface. ● Demonstrate the design process of core & cavity Inserts. ● Explain design procedures of Cavity plate, core plate. ● Explain mould base elements ike Top & Bottom Plates, Core back plate, & guiding elements such as Guide pillar & Guide bush. ● Demonstrate feed system	Introduction to mould & its parts, types of moulds. Types of standard mould bases, core and cavity of mould, types of core and selection of suitable core. Arrangement of plate's assembly of the mould. Injection system like locating ring, sprue, runner, gate and their types. Ejection system like pin, stripper, blade, sleeve. Calculation of injection pressure standard mould base size, parts sizes etc. Calculation of spacer sizes for easy ejection Layout of impression & balanced layout. Concept of mould, its terminology, parts of the mould. Construction of standard mould bases. Calculation of mould parameters like shot weight, injection pressure, day light distance, ejection bar movement, standard mould base size, and ejection system. Pre tooling of parts of the mould.	30	120	100

		elements like locating ring, Sprue bush, runner & gate. ● Demonstrate two plate Injection mould with single cavity and multi cavity. ● Explain to prepare part drawings with GD & T symbols with mould parts	Determination of insert size, mould plate length for ordering standard mould base. Core and cavity of the mould. Types of core and cavity used in mould. (Integer type and inserted type). Method of fitting local inserts. Types of mould like Hand injection mould, semi-automatic Injection mould, automatic mould, split mould, hot runner mould. Actuation of core plate, core retainer plate, spacer, ejector plate, feed button, guide pillar, push back pin, sprue puller pin & material of all parts of mould. Parts involved in injection mould top half its component locating ring, sprue bush, runner, gate, top plate, cavity plate, cavity inserts, guide pillar & guide bush. Design of feed and Injection system, path of injection like locating ring, sprue bush, runner and its types, gate and its type Ejection system and types of ejection like pin ejection, stripper ejection, blade ejection, sleeve ejection. Assembly of the mould. Types of parting injection ection moulding machines and its types, Parameter to set on the machine like injection pressure, holding time.			

COURSES / MODULE TEMPLATE

NOS /Module: Create & Modify part using higher End software (Solid Works)

NOS /Module Code: CCTDM/08

Outcomes:

After completion of course Student should be able to:

- Understand different types of CAD software.
- Create 2D geometric sketches by using Solid works software.
- Develop 3D modeling by using advanced command.
- Clarify of Knowledge to the assembly constraint & develop different types of assembly design by using Solid Work.
- Understand design generative & interactive drafting.

Theory Hours: NA   Practical Hours: 90   Theory Marks: NA   Practical Marks: 100

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	PR Hours	PR Marks
UNIT-I	PART DESIGN & SURFACE MODELING	At the end of this Unit the student should be able to: ● Working with block & defining block attributes. ● Understand Concept of Isometric Drawing, Layout & Plotting. ● Execute of solid modeling / 3d modelling. ● Create surface modeling.	Working with block & defining block attributes. Concept of Isometric Drawing, Layout & Plotting. Creating of solid modeling / 3d modelling. Like creating, Editing, and modification technique. Creating of surface modeling like creating, Editing, and modification technique.	30	20
UNIT-II	PART MODELING & ASSEMBLY	At the end of this Unit the student should be able to: ● Understand Capability of Solid Work Software. ● Understand Basic Part Modeling, Basic Modeling, Terminology, Choosing the Best Profile, Choosing the Sketch Plane, Details of the Part feature. ● Understand concept of assembly constraint. ● Clarify Different type of assembly	Introduction & Capabilities of Solid Work. SolidWorks Basics and the User Interface What is the SolidWorks Software Design Intent File References Opening Files The SolidWorks User Interface. Basic Part Modeling, Basic Modeling, Terminology, Choosing the Best Profile, Choosing the Sketch Plane, Details of the Part Boss Feature, Patterning, revolving, shelling, ribs & editing features. Assembly-Bottom-Up Assembly, Creating a New Assembly.	30	40
UNIT-III	DRAFTING	At the end of this Unit the student should be able to: ● Understand Bill of Materials. ● Create Assembly Drawings.	Bill of Materials, Assembly Drawings, Drafting generate standard three views, model view, and predefined view, standard section views, crafting drawings, creating dimensions, annotations, notes and surface finish symbols, add geometric tolerance to	30	40

		● Create & draw various drafting views. ● Understand dimensions, annotations & various Engineering symbols.	the drawing views, add center marks and center lines to the drawing views, add center marks and center lines to the drawing views		

NOS /Module: Generate Part Program for CNC Machine using CAM (NX- CAM / Master CAM)

NOS /Module Code: CCTDM/09

Outcomes:

After completion of course Student should be able to

- Understand design generative & interactive drafting.
- Apply knowledge in create complicated modeling & creative/innovative solution.
- Understand Post processing.
- Execute & generate various Milling & Lathe operations in CAM
- Generate CNC program with CAM Software

THEORY HOURS:NA   PRACTICAL HOURS: 90   THEORY MARKS: -NA   PRACTICAL MARKS: 100

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	PR hours	PR Marks
UNIT-I	SKETCHER, & SOLID MODELING	At the end of this Unit the student should be able to: ● Create complicated geometry sketch ● Understand Adding Geometric & Dimensional Constraint to sketches. ● Perform Drawing sketches for solid models. ● Understand various sketching tools. ● Understand & Create sketches in the Sketch task environment & Modeling Environment.	Drawing sketches for solid models. Creating sketches in the Sketch task environment & Modeling Environment. Understand Various Sketching Tool. Editing, Extruding, Revolving sketches. Adding Geometric & Dimensional Constraint to sketches.	30	30

UNIT-II	TOOL PATH GENERATION	At the end of this Unit the student should be able to: • Understand capabilities of NX-CAM/ Master CAM • Understand CAM concept, Master Model concept. • Understand Manufacturing application.	Introduction to Unigraphics CAM environment. Review of Modelling. Introduction to CAM concept, Master model concept. Machining environment, Operation Navigator. Re-entering into the Manufacturing application. Manufacturing Tools, Creating new operation. Manufacturing applications, Saving part file, closing part file.	40	30
UNIT-III	CAM PROGRAM GENERATION	At the end of this Unit the student should be able to: Understand Various Milling and Lathe operations by using Unigraphics CAM. • Execute various drilling, reaming operation & hole making etc. • Understand various boundary setting. • Execute all milling & lathe operation by using NX- CAM/ Master CAM	Various Milling and Lathe operations by using CAM software. Point to point machining. Creating drilling & reaming operation and hole making. Planner mill overview Profiling, Single level, Multi-level. Multi region, Creation of Boundaries. Setting Custom Boundary Member Data Setting Drive Cutting Method, Ramping method. Cut types, Trim boundary, and Uncut Region boundary. Creating Cavity Milling operation. Blank Geometry and offset, uses of cutting option. Creating fixed contour operation. Lathe cross section, common turning parameters.	40	30

COURSES / MODULE TEMPLATE

NOS /Module: Employability Skill

NOS /Module Code: MSME/ES/03

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

Refer Standard Curriculum developed by NCVET _ Employability skills 120 Hrs