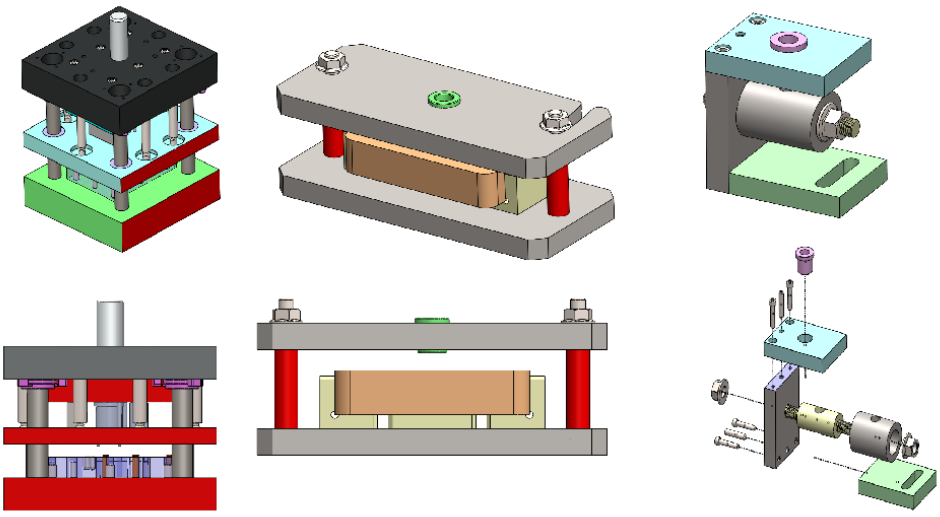
सूक्ष्म, लघु एवं मध्यम उद्यम मंत्रालय
DEVELOPMENT COMMISSIONER
MINISTRY OF MICRO, SMALL & MEDIUM ENTERPRISES
MSME TECHNOLOGY CENTRE

MODEL CURRICULUM



Qualification Name:

Sr. Technician/ Supervisor-- Tool and Die

Qualification Code:

Version: 1.0

NCrF/NSQF Level: 4.5

Model Curriculum Version: 1.0

Submitted By:

MSME TECHNOLOGY CENTRE

O/o DC MSME, Ministry of Micro, Small and Medium Enterprises

Govt. of India

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NOS / MODULE TEMPLATE

SEM-V

NOS /Module: TOOL DESIGN- ADVANCED PLASTIC MOULD

NOS /Module Code: MSME/DTE/33

Outcomes:

After completion of course Student should be able to:

1. Understand different types of moulding methods.
2. Understand about different types of plastic moulding and machines of it.
3. Get knowledge about component of plastic mould.

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

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH hours	PR hours	TH/PR Marks
UNIT-I	Introduction	At the end of this unit Student should be able to know different types of plastic materials and its properties. • Understanding the classification of plastic. • To Get knowledge about the concept of mould. • Application of mould. • Different types of injection moulding machine.	• Introduction basic knowledge of mass production of molded of plastic component, application of plastic, • Classification of plastic material, and application of moulding machine and equipment, concept of mould material, application of mould.	5	5	10
UNIT-II	Moulding operation	At the end of this unit Student should be able to know abo ut compression moulding machine and process • Functions of compression moulding machines and their process application • Transfer moulding machine and process • Functions of transfer moulding machines and their process application	• Parts & functions of compression moulding machine such as clamping, heating, feeding, process set-up data • Compression moulding process elements: material machine & parts • Parts & functions of transfer moulding press such as clamping, heating, feeding, process set-up data • transfer moulding process elements: material press&mould	5	5	15
UNIT-III	Elements of mould and their function.	At the end of this unit Student should be able to • understand the hot runner system, • feeding system, • heating system, • ejection system, • core & cavity retainer plates • Transfer mould and application	• Classification and functions of hot runner system, feeding, heating system • Material used for core & cavity, mould • Types of transfer mould, temperature control, parting surface, heating elements	5	5	20
UNIT-IV	Classification of mould	At the end of this unit Student should be able to	• Positive mould, semi positive mould, flash mould inclined flash mould landed positive mould • Plunger type transfer mould	5	-	15

		• understand different types of mould compression moulds and transfer moulds • Get knowledge about different parts of mould according to different types of mould. • Get knowledge about parting surface , relief of parting surface	• top plunger type • bottom plunger type • side plunger type • Screw type transfer mould			
UNIT-V	Design parameter for mould material and machine	At the end of this unit Student should be able to understand the design parameter which require for design of mould.. • Get knowledge about selection of material for all parts. • Understand process of manufacturing of each parts its costing of manufacturing. • Perfect design of plastic mould.	• Understanding of design parameters like properties of plastic material, quality and quantity of plastic material and describe design parameter of mould	5	5	30
UNIT-VI	Design of moulds	At the end of this unit Student should be able to understand how to assemble the parts by detailed drawings for manufacturing of mould	• Concept of use of design data sheet. concept of drawing & layout for assembly & details • Drawing the mould layout, drawing norms & practices • Drawing assembly and detailed drawings of mould	2	5	-
UNIT-VII	Mould data	At the end of this unit Student should be able to understand the bill of material and its use Mould data in the production of component	• Principle of bill of material, selection of material, standard parts material for processing. • Concept of machine set-up, processing parameter	3	5	20

NOS /Module: WORKSHOP PRACTICE-V

NOS /Module Code: MSME/DTE/34

Outcomes:

After completion of course Student should be able to

1. Get knowledge about practical work in workshop.
2. Get knowledge about different machine used in workshop like milling, turning, grinding, etc.
3. Find out different problems during manufacturing of different parts and using different machine.
4. Selection of components, design of components material selection.

THEORY HOURS: - PRACTICAL HOURS: 240 THEORY MARKS: NA PRACTICAL MARKS: 100

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	PR hours	PR Marks
Unit-I	Group project work	• At the end of this unit Student should be able to understand part component which we have to design in project. • Utilize skill of design, production, and other and creation of project. • Work in group with effectively output.	• To understand about selection of component according to the requirement • To understand about component design based on the selection of component and also selecting material as well. • To understand about material testing and selection based on the selection of component and also selecting material as well. • To understand about design of mould for the component according to the requirement. • To understand about Design of core and cavity insert material based on component. • To learn about preparation of part process sheet of various parts of press tool. • To understand according to the design proper selection raw material size and finally manufacturing the various parts of the mould. • To learn about the assembly sequences of manufactured mould parts during the workshop practice	240	400

NOS /Module: INDUSTRIAL MANAGEMENT

NOS /Module Code: MSME/DTE/35

Outcomes:

After completion of course Student should be able to

1. Get knowledge about the management concepts, human behavior, organizational structure, supervisory functions.
2. Get knowledge about accountancy and purchase management.
3. To develop as an entrepreneur.

THEORY HOURS: 60 PRACTICAL HOURS: - THEORY MARKS: 100 PRACTICAL MARKS: -

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH hours	Marks
Unit I	Introduction	• At the end of this unit Student should be able to understand the system concept, management concept and scientific management	• Concept and classification of management • Scientific management. concept of system, system designs	5	5
Unit II	Human relation	• At the end of this unit Student should be able to understand patterns of • human behaviours • Motivation • Attitude • Communication • Stress management • Decision making	• Concept of industrial psychology. • Concept of individual behaviour, group behaviour. concept of morale, motivation • Concept & importance of motivation-types-positive-motivation-negative motivation • Concept & importance of positive attitude and openness of mind, importance of mental health • Concept & definitions objective types downward, upward, lateral, grapevine • Concept of stress management, technique of relieve stress • Importance of decision making in context of productivity, quality, cost consciousness, factors affecting decision making	15	20
Unit III	Structure of Industrial organization	• At the end of this unit Student should be able to understand organization structure • Dynamic organization • Types of organization in industry	• Concept of organization, organization structure. concept of authority & responsibilities, span of control, goal achievement	10	16

			• Concept of line & staff function, delegation of function, organizational chart • Concept of dynamic organization, growth and decay, effective communication, motivation and morality and leadership. • Concept of single ownership, partnership & classification, joint stock company & classification. • Co-operative organization & classification. • State & central government owned organization & classification.		
Unit IV	Supervision & leadership	• At the end of this unit Student should be able to understand duties of supervisor and leadership • Effective supervision and its role • Supervisor's activities	• Concept &classification of management • Top, middle, junior management • Concept &classification of leadership. • Concept of effective supervision, towards work and people. concepts of achieving target, controlling cost, cooperation, improvement in work system, motivation, team development, discipline, management of change, human relations, leadership, communication • Qualification and qualities of supervisor. • Concept of daily schedule, weekly schedule, monthly schedule, yearly schedule, monitoring, reviewing, corrective action.	10	16
Unit V	Industrial legislation	• At the end of this unit Student should be able to understand history & necessity of industrial legislation • Factory Act 1948 • Laws related to wages& welfare • Laws related to association	• Concept of industrial legislation, social justice, social equality, national economy, international uniformity. • Concept of Factory Act 1948. concept of terms related to Factory act. • Concept of registration. concept of health, safety, hours of work, work environment, employee welfare & leave with wages. • Concept of payment of wages act, 1936, minimum wages act1948, workmen's compensation act, ESI act, EPF act • Concept of Trade Union Act 1926, industrial dispute act, contract labour act.	10	15

Unit VI	Wages and incentives	• At the end of this unit Student should be able to understand wages and incentives in an organization	• Concept & classification of wages. • Classification of incentives. • Factors influencing wages and incentives.	5	12
Unit VII	Accounting & budgeting	• At the end of this unit Student should be able to understand accounting system • Budgeting • Taxes and duties	• Concept & classification of "capital", Accounting& book keeping, assets & liabilities, journal & ledger, profit & loss, balance sheet • Concept of budget, budget control, classification of budget, preparation of budget • Concept & classification of direct and indirect taxes. • Concept & classification of duties	5	8
Unit VIII	Purchase management	• At the end of this unit Student should be able to understand purchasing • Contracting • Documentation of contracting	• Concept of purchasing, economical order quality, inventory control, storing and planning • Concept of contracting, costing, accounting, manufacturing and buying • Concept of costing & accounting, loss & profit. • Concept of sourcing.	5	8

NOS /Module: HYDRAULICS AND PNEUMATICS

NOS /Module Code: MSME/DTE/36

Outcomes:

After completion of course Student should be able to

1. Grasp the basics of hydraulics and pneumatics and be aware of the safety measures associated with these systems.
2. Analyze fluid properties and understand how pressure and flow affect fluid behavior.
3. Students will be proficient in designing, assembling, and troubleshooting hydraulic systems.
4. Students will gain the skills required to design, build, and maintain pneumatic systems.
5. Students will understand the diverse applications of fluid power systems in industrial settings
6. Students will be aware of advanced fluid power technologies and future trends in the field.
7. Students will demonstrate their ability to apply their knowledge to a real-world project and pass the final assessment.

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

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH hours	Marks
Unit I	Introduction to Hydraulics and Pneumatics	Students will grasp the basics of hydraulics and pneumatics and be aware of the safety measures associated with these systems.	• Understanding the significance of fluid power • Differentiating between hydraulics and pneumatics • Safety considerations in fluid power systems	2	5
Unit II	Fluid Properties and Behavior	Students will be able to analyze fluid properties and understand how pressure and flow affect fluid behavior.	• Properties of hydraulic and pneumatic fluids • Fluid flow and pressure • Pascal's law and Boyle's law	4	5
Unit III	Hydraulic Systems	Students will be proficient in designing, assembling, and troubleshooting hydraulic systems.	• Hydraulic components and symbols • Hydraulic pumps, motors, and actuators • Hydraulic circuits and their design • Troubleshooting hydraulic systems	8	20
Unit IV	Pneumatic Systems	Students will gain the skills required to design, build, and maintain pneumatic systems.	• Pneumatic components and symbols • Compressed air generation and treatment • Pneumatic actuators and control • Pneumatic circuit design and maintenance	8	20

Unit V	Applications in Industry	Students will understand the diverse applications of fluid power systems in industrial settings	• Real-world applications of hydraulics and pneumatics • Case studies and practical examples • Importance of fluid power in manufacturing and automation	4	20
Unit VI	Advanced Topics and Future Trends	Students will be aware of advanced fluid power technologies and future trends in the field.	• Electro-hydraulics and electro-pneumatics • Digital control and automation • Emerging technologies in fluid power	2	10
Unit VII	Final Project and Assessment	Students will demonstrate their ability to apply their knowledge to a real-world project and pass the final assessment.	• Students work on a hands-on project applying their knowledge • Assessment of project outcomes and a written test	2	20

NOS /Module: MAINTENANCE & SAFETY ENGINEERING

NOS /Module Code: MSME/DTE/37

Outcomes:

After completion of course Student should be able to

1. Understand the basics of maintenance and general practice in industry.
2. To diagnose the maintenance problem.
3. Importance of maintenance in production department and its effect on productivity.

THEORY HOURS: 60 PRACTICAL HOURS: - THEORY MARKS: 100 PRACTICAL MARKS: -

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH hours	Marks
Unit I	Significance of maintenance	• At the end of this unit Student should be able to understand importance of maintenance , need and scope	• Introduction to maintenance, its needs and economic significance • Effect on productivity scope and functions of maintenance, organizational structure of maintenance department.	5	7
Unit II	Concept of Basic maintenance practices	• At the end of this unit Student should be able to understand methods of maintenance • Preparation methods	• Different maintenance practices. Basic concepts, advantages and disadvantages, • Principles and procedures of preventive maintenance, schedule preparation for maintenance, maintenance hand tools and measuring equipment's, • Maintainability definition and objective.	8	20
Unit III	Wears and its effects	• At the end of this unit Student should be able to understand effects of wear on performance,	• Definition causes of wear, types of wear with examples, concepts of permissible wear,	5	15

		methods of measurement of wear	wear reduction factors, component replacement.		
Unit IV	Lubrication and Lubrication system	• At the end of this unit Student should be able to understand types of lubricants • Lubricating methods • Procedure of applying lubrication.	• Functions, principle of liquid lubrication, types of lubrication-hydrodynamic, boundary layer, externally pressurized, selection of lubrications, prevention of lubricants, types of lubrication, causes of lubrication failures.	5	15
Unit V	Fault tracing, trouble shooting and remedies	• At the end of this unit Student should be able to understand troubles during maintenance • And their remedies	• Definition of purpose, • Sequence of activities in fault finding, measurement to prevent repetition of similar faults, troubleshooting charts, • Identification of operational errors and replacement.	5	10
Unit VI	Leakages	• At the end of this unit Student should be able to understand leakages and its prevention methods	• Checking and stopping of leakages, different methods of detection of leakages, types of seals and packing.	2	5
Unit VII	Assembly and Disassembly of M/C parts	• At the end of this unit Student should be able to understand types of assembly and disassembly and its procedure	• Process and steps of assembly and disassembly of M/C parts like Bearings, Belts, Pulleys, Gears, Clutches, Couplings, Gear box etc.	10	8
Unit VIII	Maintenance of hydraulics and pneumatics system	• At the end of this unit Student should be able to understand hydraulic system • Pneumatic system • Valves, cylinder	• Working Principles, common troubles & repair methods, assembly and disassembly of pneumatic valves, cylinders.	5	6
Unit IX	Preventive maintenance	• At the end of this unit Student should be able to understand the importance of preventive maintenance in industry • Methods of preventive maintenance	• Preventive maintenance - steps and need of preventive maintenance - advantage - two merger division of activities - frequency cycle - program schedule of preventive maintenance - repair complexity - typical forms for preventive maintenance - aids to good preventive maintenance, its types and effects on preventive maintenance.	5	8

Unit X	Safety Engineering	• At the end of this unit Student should be able to understand the Safety Principles and practices, safe layout, safety aspects of machines to include putting guards, provision of interlocking and vibration damping etc. • Factors governing housekeeping to include proper layout & Equipment	• Safety arrangement during manufacturing processes like Welding, Grinding, Machining, Handling of chemical etc., • Regular Plant inspection & safety audit, hazard analysis, • Safety of electrical installations & general electrical safety practices, • M/C maintenance, lubrication, safety during material handling, safety management. Accident & their classification (minor, reportable, fatal, dangerous occurrences), salient points of safety regulations for mechanical & electrical machines / equipment's and chemical products etc. fire safety measures, fire potential areas, firefighting measures, equipment's, training, requirements, regular drill. • First aid, safe working environment. safety consciousness, Industrial Housekeeping • Correct material handling & Storage, cleanliness and orderliness, proper equipment, tools & Supplies, work schedules, assistance from another working group, housekeeping inspections.	10	6

NOS /Module: PROJECT WORK-TOOL & DIE MAKING(ELECTIVE)

NOS /Module Code: MSME/DTE/38

Outcomes:

After completion of course Student should be able to

1. Get knowledge about practical work in workshop.
2. Acquiring practical knowledge and hand skill in operating the types of machines used in workshop

NOS /Module: ADVANCED COMPUTER AIDED DRAWING AND DESIGN

NOS /Module Code: MSME/DTE/38

Outcomes:

After completion of course Student should be able to

1. Understand the function and procedures of CAD used in manufacturing and quality control.
2. Understanding the concepts, principles and procedure of developing models and designs using CAD software
3. Using CAD software for understanding subjects like press tool, plastics mold.

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

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

Unit I	Creation/Editing of curves	• At the end of this unit Student should be able to understand the types of Curves • Modifying Curves • Precision construction of curved objects.	• Drawing Curved Objects, creating point objects, changing drawing order of objects, creating solid fill areas and regions. • Editing Methods of different types of curved objects. • Concept of precision construction of curved objects. Different types of curved objects with precision	10	10
Unit II	Creation/Editing of objects	• At the end of this unit Student should be able to understand about Orthographic view of Objects (M.D.T.) • Scale, dimension, text (for 3D drawings) • Sectioning and hatching	• Definition of orthographic views of object: Front, Top, left side, Right side. • Concept of Drawing to scale, dimensioning and text, tolerances, modifying dimension and tolerance. • Definition of sectional views: types of sections, section planes, assembly sectioning and hatching.	40	15
Unit III	Creation/Editing of 3D objects	• At the end of this unit Student should be able to understand the Isometric views of Drawing • Working with wire frame model - Practice • Introduction to parametric sketches - practice • Surface Modelling	• Definition of WCS, UCS, Point Filters, elevation, drawing basic entities, concept of Isometric axes, isometric lines, isometric planes, isometric model. • Definition of Basic entities (lines and arcs), Elevation. Point filters, UCS. • Definition of Constraints, construction geometry, cut line sketch, Degree of freedom, Feature, Geometric Constraints, path sketch, split line. • Definition of line, base surface, derived surface, and motion based surface, skin surface, surface normal.	15	15
Unit IV	Creation/Editing of Simple assemblies up to 6 elements	• At the end of this unit Student should be able to understand Assembly parts up to 6 elements - practice • Creating orthographic views and sectioning details • Assembly with external references.	• Definition of Assembly catalogue, Material Assembly, Constraints, Insert, Assembly tree and constraints, Bottom-up Design, Root, Localized Part. • Definition of assembly catalogue, assembly tree, attach, detach, external reference, insert constraints, path, scene, trail, tweak. • Definition of drawing new view, edit scale, create view, base view, parent view, reference dimension.	15	20
Unit V	Creation/Editing of simple assemblies for press tools	• At the end of this unit Student should be able to understand the Assembling parts - practice • Assembling with external references - practice • Creating Orthographic views and sectioning details - practice	• Definition of Assembly catalogue, Material Assembly constraints, Insert, assembly free and constraints, bottom-up design, Root, Localized parts. • Definition of assembly catalogue, assembly tree, attach, detach, external	10	40

			• references, insert constraints, path, scene, trail, tweak. • Definition of drawing new view, edit scale, create view, base view, Model View, reference dimension.		

SEM-VI

NOS /Module: INTERNSHIP&PROJECT

NOS /Module Code: MSME/DTE/40

Outcomes:

After completion of course Student should be able to understand

1. The machine shop layout, facilities, and equipment
2. The components and functions of each machine.
3. Selection and installation of cutting tools.
4. Setting up machines for specific tasks.
5. Adjusting cutting speeds, feeds, and depth of cuts.

NOS /Module: EMPLOYBILITY SKILL

NOS /Module Code: MSME/ES/02

Outcomes:

After completion of course Student should be able to

1. Outline the importance of Employability Skills for the current job market and future of work

2. List different learning and employability related GOI and private portals and their usage
3. Research and prepare a note on different industries, trends, required skills and the available opportunities

THEORY HOURS: 60 PRACTICAL HOURS: - THEORY MARKS: 100 PRACTICAL MARKS: -

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH hours	Marks
Unit I	Career Development & Goal Setting	After completing this unit, participants will be able to: • Create a career development plan. • identify well-defined short- and long-term goals	• Create a career development plan. • Identify well-defined short- and long-term goals	25	25
Unit II	Getting ready for apprenticeship & Jobs	After completing this unit, participants will be able to: • Draft a professional Curriculum Vitae (CV) • Do job search sources on employment exchanges, recruitment agencies, and job portals respectively	• Draft a professional Curriculum Vitae (CV) • Use various offline and online job search sources such as employment exchanges, recruitment agencies, and job portals respectively • Demonstrate how to apply to identified job openings using offline /online methods as per requirement • Discuss how to prepare for an interview • Role play a mock interview • List the steps for searching and registering for apprenticeship opportunities	35	75

COURSES / MODULE TEMPLATE

NOS /Module: Employability Skills

NOS /Module Code: MSME/ES/04

Module Hours: 120

Refer Standard Curriculum developed by NCVET. (120-hours-MC-Employability-Skills_v4-DGT (1).pdf)