PLASTIC PROCESSING OPERATOR

COMPETENCY BASED CURRICULUM

(Duration: 2 Yrs.)

APPRENTICESHIP TRAINING SCHEME (ATS)

NSQF LEVEL- 5

SECTOR – CHEMICAL

सत्यमेव जयते

GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT & ENTREPRENEURSHIP
DIRECTORATE GENERAL OF TRAINING

Directorate General of Training

Skill India
कौशल भारत-कुशल भारत

PLASTIC PROCESSING OPERATOR

(Revised in 2018)

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NSQF LEVEL - 5

Developed By

Ministry of Skill Development and Entrepreneurship
Directorate General of Training
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1. BACKGROUND

1.1 Apprenticeship Training Scheme under Apprentice Act 1961

The Apprentices Act, 1961 was enacted with the objective of regulating the programme of training of apprentices in the industry by utilizing the facilities available therein for imparting on-the-job training. The Act makes it obligatory for employers in specified industries to engage apprentices in designated trades to impart Apprenticeship Training on the job in industry to school leavers and person having National Trade Certificate(ITI pass-outs) issued by National Council for Vocational Training (NCVT) to develop skilled manpower for the industry**.** There are four categories of apprentices namely**; trade apprentice, graduate, technician and technician (vocational) apprentices.**

Qualifications and period of apprenticeship training of **trade apprentices** vary from trade to trade. The apprenticeship training for trade apprentices consists of basic training followed by practical training. At the end of the training, the apprentices are required to appear in a trade test conducted by NCVT and those successful in the trade tests are awarded the National Apprenticeship Certificate.

The period of apprenticeship training for graduate (engineers), technician (diploma holders and technician (vocational) apprentices is one year. Certificates are awarded on completion of training by the Department of Education, Ministry of Human Resource Development.

1.2 Changes in Industrial Scenario

Recently we have seen huge changes in the Indian industry. The Indian Industry registered an impressive growth during the last decade and half. The number of industries in India have increased manifold in the last fifteen years especially in services and manufacturing sectors. It has been realized that India would become a prosperous and a modern state by raising skill levels, including by engaging a larger proportion of apprentices, will be critical to success; as will stronger collaboration between industry and the trainees to ensure the supply of skilled workforce and drive development through employment. Various initiatives to build up an adequate infrastructure for rapid industrialization and improve the industrial scenario in India have been taken.

1.3 Reformation

The Apprentices Act, 1961 has been amended and brought into effect from 22nd December, 2014 to make it more responsive to industry and youth. Key amendments are as given below:

- Prescription of number of apprentices to be engaged at establishment level instead of trade-wise.
- Establishment can also engage apprentices in optional trades which are not designated, with the discretion of entry level qualification and syllabus.
- Scope has been extended also to non-engineering occupations.
- Establishments have been permitted to outsource basic training in an institute of their choice.
- The burden of compliance on industry has been reduced significantly.

2. TRAINING SYSTEM

2.1 GENERAL

Directorate General of Training (DGT) under Ministry of Skill Development & Entrepreneurship offers range of vocational training courses catering to the need of different sectors of economy/ Labour market. The vocational training programmes are delivered under aegis of National Council of Vocational Training (NCVT). Craftsman Training Scheme (CTS) and Apprenticeship Training Scheme (ATS) are two pioneer programmes of NCVT for propagating vocational training.

PLASTIC PROCESSING OPERATOR trade under ATS is one of the most popular courses delivered nationwide through different industries. The course is of two years (02 Blocks) duration. It mainly consists of Domain area and Core area. In the Domain area Trade Theory & Practical impart professional - skills and knowledge, while Core area - Workshop Calculation and science, Engineering Drawing and Employability Skills imparts requisite core skills & knowledge and life skills. After passing out the training programme, the trainee is being awarded National Apprenticeship Certificate (NAC) by NCVT having worldwide recognition.

Broadly candidates need to demonstrate that they are able to:

- Read & interpret technical parameters/document, plan and organize work processes, identify necessary materials and tools;
- Perform task with due consideration to safety rules, accident prevention regulations and environmental protection stipulations;
- Apply professional skill, knowledge, core skills & employability skills while performing jobs and solve problem during execution.
- Check the job/assembly as per drawing for functioning, identify and rectify errors in job/assembly.
- Document the technical parameters related to the task undertaken.

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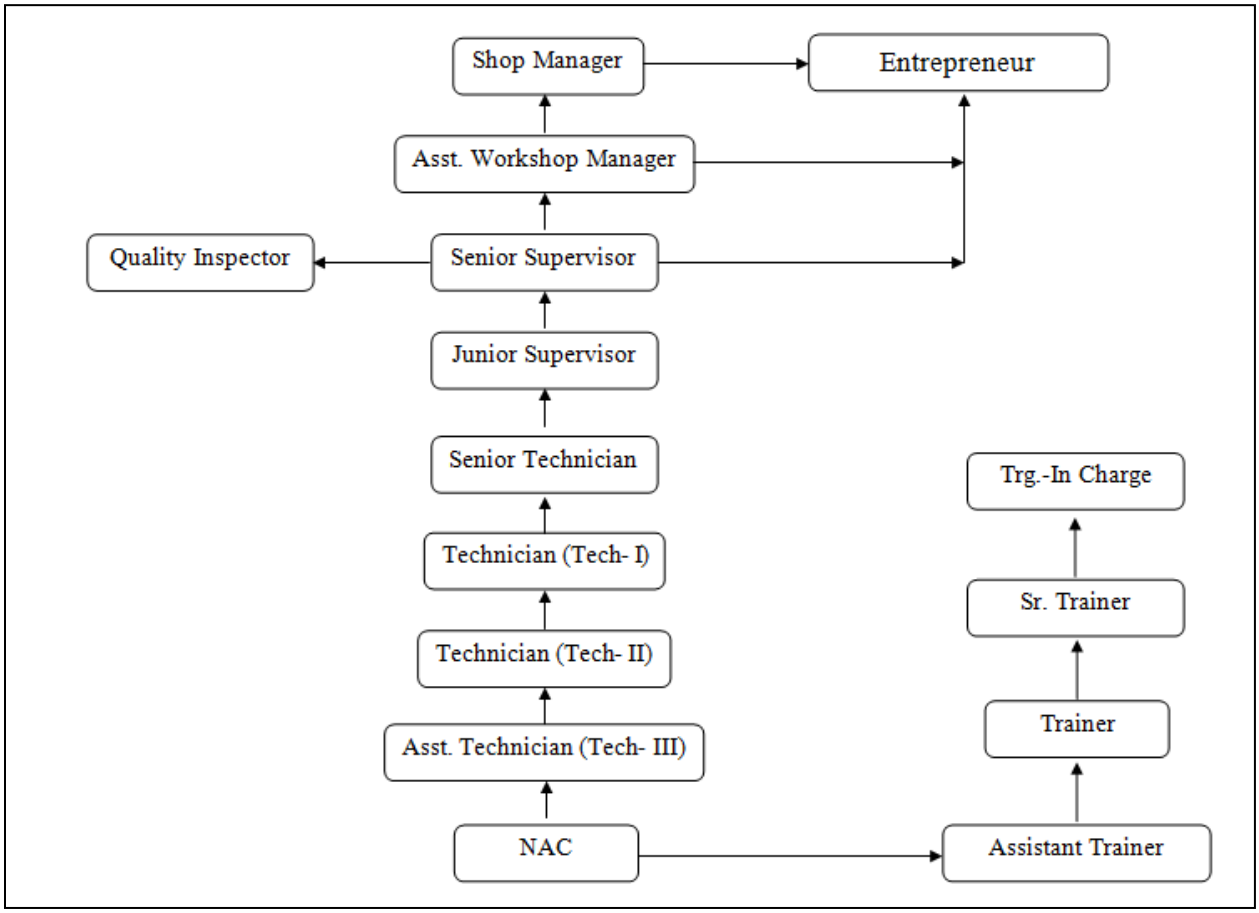
2.2 CAREER PROGRESSION PATHWAYS:

- Indicative pathways for vertical mobility.



2.3 COURSE STRUCTURE:

Table below depicts the distribution of training hours across various course elements during a period of two years (*Basic Training and On-Job Training*) : -

Total training duration details: -

Time (in months)	**1-3**	**4-12**	**13-15**	**16-24**
Basic Training	**Block– I**	**-----**	**Block – II**	**------**
Practical Training (On - job training)	**----**	**Block – I**	**------**	**Block – II**

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A. Basic Training

For 02 yrs. Engg. Course :-(**Total 06 months:** 03 months in 1st yr. + 03 months in 2nd yr.)

For 01 yr. Engg. course :-(**Total 03 months:** 03 months in 1st yr.)

Sl. No.	Course Element	Total Notional Training Hours	
		For 02 yrs. course	**For 01 yr. course**
1	Professional Skill (Trade Practical)	550	275
2	Professional Knowledge (Trade Theory)	240	120
3	Workshop Calculation & Science	40	20
4	Engineering Drawing	60	30
5	Employability Skills	110	55
	Total (including Internal Assessment)	**1000**	**500**

B. On-Job Training:-

For 02 yrs. Engg. Course :- (**Total 18 months:** 09 months in 1st yr. + 09 months in 2nd yr.)

Notional Training Hours for On-Job Training: 3120 Hrs.

For 01 yr. Engg. course :-(**Total 12 months**)

Notional Training Hours for On-Job Training: 2080 Hrs.

C. Total training hours:-

Duration	Basic Training	On-Job Training	Total
For 02 Engg. yrs. course	1000 hrs.	3120 hrs.	4120 hrs.
For 01 yr. Engg. course	500 hrs.	2080 hrs.	2580 hrs.

2.4 ASSESSMENT & CERTIFICATION:

The trainee will be tested for his skill, knowledge and attitude during the period of course and at the end of the training programme as notified by Govt of India from time to time. The Employability skills will be tested in first two semesters only.

a) The **Internal assessment** during the period of training will be done by **Formative assessment method** by testing for assessment criteria listed against learning outcomes. The training

institute have to maintain individual *trainee portfolio* as detailed in assessment guideline. The marks of internal assessment will be as per the template (Annexure – II).

b) The final assessment will be in the form of summative assessment method. The All India Trade Test for awarding NAC will be conducted by NCVT on completion of course as per guideline of Govt of India. The pattern and marking structure is being notified by govt of India from time to time. **The learning outcome and assessment criteria will be basis for setting question papers for final assessment. The examiner during final examination will also check** individual trainee's profile as detailed in assessment guideline before giving marks for practical examination.

2.4.1 PASS REGULATION

The minimum pass percent for Practical is 60% & minimum pass percent for Theory subjects 40%. The candidate pass in each subject conducted under all India trade test.

2.4.2 ASSESSMENT GUIDELINE

Appropriate arrangements should be made to ensure that there will be no artificial barriers to assessment. The nature of special needs should be taken into account while undertaking the assessment. Due consideration should be given while assessing for teamwork, avoidance/reduction of scrap/wastage and disposal of scrap/waste as per procedure, behavioral attitude, sensitivity to the environment and regularity in training. The sensitivity towards OSHE and self-learning attitude are to be considered while assessing competency.

Assessment will be evidence based comprising the following:

- Job carried out in labs/workshop
- Record book/ daily diary
- Answer sheet of assessment
- Viva-voce
- Progress chart
- Attendance and punctuality
- Assignment
- Project work

Evidences of internal assessments are to be preserved until forthcoming semester examination for audit and verification by examining body. The following marking pattern to be adopted while assessing:

Performance Level	Evidence
(a) Weightage in the range of 60%-75% to be allotted during assessment	
For performance in this grade, the	• Demonstration of good skill in the use of

candidate should produce work which demonstrates attainment of an acceptable standard of craftsmanship with occasional guidance, and due regard for safety procedures and practices	hand tools, machine tools and workshop equipment. • Below 70% tolerance dimension achieved while undertaking different work with those demanded by the component/job. • A fairly good level of neatness and consistency in the finish. • Occasional support in completing the project/job.
(b) Weightage in the range of 75%-90% to be allotted during assessment	
For this grade, a candidate should produce work which demonstrates attainment of a reasonable standard of craftsmanship, with little guidance, and regard for safety procedures and practices	• Good skill levels in the use of hand tools, machine tools and workshop equipment. • 70-80% tolerance dimension achieved while undertaking different work with those demanded by the component/job. • A good level of neatness and consistency in the finish. • Little support in completing the project/job.
(c) Weightage in the range of more than 90% to be allotted during assessment	
For performance in this grade, the candidate, with minimal or no support in organization and execution and with due regard for safety procedures and practices, has produced work which demonstrates attainment of a high standard of craftsmanship.	• High skill levels in the use of hand tools, machine tools and workshop equipment. • Above 80% tolerance dimension achieved while undertaking different work with those demanded by the component/job. • A high level of neatness and consistency in the finish. • Minimal or no support in completing the project.

3. JOB ROLE

Brief description of Job roles:

Laminating Press Operator (Plastic)

Laminating Press Operator (Plastics) sets and operates laminating press to heat and press plastics or plastics impregnated material into solid laminated sheets. Selects metal plates according to finish desired. Weighs and assembles sheets of impregnated material and places assemblies between metal planishing plates; slides plates into platens of hydraulic press; moves controls to heat press to specified temperature and compress assemblies between plates; removes plates from platens after specified time and strips plastics sheets from metal plates, using knife; examines sheets for defects. Cleans metal plates, using cloth, solvents, or scrapers or by dipping plates into vats of hot water, using chain hoist. May adjust heat and pressure controls.

Extruding Machine Setter (Plastic)

Extruding Machine Setter (Plastics) sets and adjusts die and extrusion machine to form dry or dough-like plastics into continuous rod, tube, strip or similar shape of desired dimensions. Installs dies, machine screws and sizing rings, using hand tools; couples hose to die holder to circulate steam, water, air or oil to die; fills machine hopper with materials, using conveyor auger or stuffs rolls of plastic dough into machine cylinders; starts machine and sets controls to regulate vacuum, air pressure, sizing rings and temperature and synchronizes speed of extrusion with pulling rolls; examines extruded sample product for defects, such as wrinkles, bubbles and splits. Measures extruded articles for conformance to specifications using micrometres, callipers and gauges and makes adjustments by regulating speed and weight controls or manipulating hot and cold water, air, oil or steam valves and observing gauges so as to obtain forms of specified dimensions.

Extruding Machine Operator (Plastic)

Extruding Machine Operator (Plastics) operates machine to extrude thermoplastic materials to form tubes, rods and film, according to specifications. Weighs and mixes pelletized, granular, or powdered thermoplastic materials and colouring pigments in tumbling machine set by Extruding Machine Setter (Plastics) couples hose to die holder to circulate steam, water, air or oil to die; fills machine hopper with mixed materials or stuffs rolls of plastic dough into machine cylinders; starts machine and synchronizes speed of conveyor belt with speed of extrusion through die; examines extruded product for defects, such as wrinkles, bubbles and splits; measures extruded articles for conformance to specifications, using micrometres, callipers and gauges and adjusts speed and weight, controls or turns hot and cold water, air, oil or steam valves to obtain product of specified dimensions. May reel extruded product into rolls of specified length and weight. May oil and clean machine.

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Mold Setter (Plastic)

Mold Setter (Plastics) sets up and adjusts compression, injection and similar type of machines used to Mold plastic materials to specified shape. Positions assembled Mold on press bed of Molding machine or bolts matrix of unassembled Mold to bed and aligns die (attached to ram) with matrix; adjusts stroke of ram, using hand tools. Connects steam, oil or water lines to Mold or moves controls to regulate Mold temperature; sets machine controls to regulate forming pressure of machine and curing time of plastic in Mold; installs knock-out pins in Mold, and makes other adjustments, using handtools; starts machine to produce sample products; examines sample for surface defects, such as bumps, bubbles, and scratches, and adjusts machine set up to eliminate defects; removes, cleans, and greases Molds and places them in storage racks. May supply plastic materials to Molding machines. May direct supplying of necessary equipment, such as jigs, containers or forms to workers engaged in tending Molding machines. May be designated according to type of machine set up, as COMPRESSION-MOLDING MACHINE SETUP MAN; INJECTION MOLDING MACHINE SET-UP MAN.

Injection Molding Machine Operator (Plastic)

Injection Molding Machine Operator (Plastics) sets up and operates injection Molding machines to cast products from thermoplastic materials. Installs dies on machine, according to work order specifications, using clamps, bolts, and hand-tools; sets thermostatic controls to obtain specified Molding temperature; dumps pre-mixed plastic powders or pellets into hopper and starts machine; pulls lever to close dies and inject into dies to cast part; removes finished product from dies, using hand tools and trims excess material from part using knife. May mix thermoplastic materials and colouring pigments in mixing machine, according to formulae. May grind scrap plastic into powders for reuse.

Compression Molding Machine Operator (Plastic)

Compression Molding Machine Operator (Plastics) sets up and operates compression Molding machines to Mold plastics products by heat and pressure according to specifications. Installs dies on press, using clamps, bolts, and hand tools and coats dies with parting agents; sets thermostat to regulate temperature of dies; weighs premixed plastic compound and pours compound into die well, or spreads fabric on die and dumps compound over fabric; pulls lever to lower hydraulic ram that compresses compound between dies to form and cure part; removes cured part from Mold, using hand tools and air hose. May mix catalysts and colouring pigments with plastic compound, using paddle and mixing machine. May operate compression Molding machines to form product under pressure only and be designated COLDMOLDING-PRESS OPERATOR.

Bottle Blowing Machine Operator (Plastic)

Bottle Blowing Machine Operator (Plastics) feeds thermo-plastics material into hopper and operates buttons and levers of bottle blowing machine to extrude tube like material and pumps air to shape it into form of Mold. Weighs and mixes pelletized, granular, or powdered thermoplastic materials and colouring pigments in tumbling machine according to formula;

installs dies, machine screws, sizing rings, using handtools; and couples hose to die holder to circulate steam, water, air or oil to die; fills machine hopper with mixed materials or stuffs rolls of plastic dough into machine cylinders; starts machine and sets controls to regulate vacuum, air pressure, sizing rings and temperature; depresses lever of machine and ensures that parison tube reaches entire length of Mold or die; cuts ends of tube with scissors near nozzle and blows air into Mold by operating pump; opens Molds and removes finished article. Repeats process.

Vacuum Plastic Forming Machine Operator

Vacuum Plastic Forming Machine Operator tends machine that Molds thermoplastic sheets into products, such as automobile pillar posts, nose pieces, rear quarter-panel covers, and toys. Places plastics sheet on top of Mold, positions sealing frame around sheet, and fastens frame to rim of Mold with clamps. Pushes button to start machine that heats sheet, draws it into Mold to form product, and sprays product with cold water or air to harden it. Removes product from Mold and reloads thermoplastic sheet into machine. May trim excessive Molding material from products, using knife, scissors, or band saw. May set up machine to form products.

Molder, Hand (Plastic)

Molder, Hand (Plastics) Molds plastics sheets into desired shapes in hand Molding press. Studies specifications for Molded product and assembles Mold. Determines weight of charge, pressure, temperature and curing time for Molding; collects plastic sheets, cuts them to required size and heats them on electrically operated heater to soften for Molding; removes sheet when sufficiently heated and places it in female of wooden Mold, fixes wooden slab of Mold to keep sheet in position and inserts male block of Mold; sets Mold in hand press and manipulates controls to compress material and form material to shape of Mold; removes Molded plastics object after specified time-interval by opening Mold; examines and gauges product for conformity to plant or customer standards. May make minor adjustments in Molding procedure to eliminate defects, and reMold product.

Embossing Machine Setter (Plastic)

Embossing Machine Setter (Plastics) sets up embossing machine that stamps and embosses design on plastic sheets. Installs and locks embossed plate in chase and locks chase in bed of press. Lays piece of card board on machine bed under plate and impresses it with plate. Cuts out impression and glues it to bed under plate adjusting table in order that impression and plate are in exact alignment; sets guides to hold plastics sheet in position under plate and adjusts table height to impart correct depth of impression. Starts machine and places sample piece of plastics sheet in guides and pushes it under embossing plate. Inspects embossing on sample for correct depth of identification and correct faults as necessary.

Embossing Machine Operator (Plastic)

Embossing Machine Operator (Plastics) feeds and operates embossing machine to stamp and emboss designs on plastics sheets. Installs engraved embossing roller, pressure roller and roll

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of plastics sheets to be embossed in machine by hand or using hoist; manipulates lever or clutch to regulate pressure between rollers; threads plastics sheet through machine and regulates flow of steam into rollers to counteract curling of sheet and to obtain desired depth of embossing or surface shine to sheet; starts machine, examines embossed sheet and makes adjustments to secure desired results; adjusts rotary cutting device to cut sheets or tend winding machine to wind embossed sheet into rolls. May feed plastics sheets to machine.

Reference NCO-2015:

(i) 8142.0200 – Laminating Press Operator (Plastic)
(ii) 8142.0300 – Extruding Machine Setter (Plastic)
(iii) 8142.0400 – Extruding Machine Operator (Plastic)
(iv) 8142.1300 – Mold Setter (Plastic)
(v) 8142.0501 – Injection Molding Machine Operator (Plastic)
(vi) 8142.0600 – Compression Molding Machine Operator (Plastic)
(vii) 8142.0700 – Bottle Blowing Machine Operator (Plastic)
(viii) 8142.0800 – Vacuum Plastic Forming Machine Operator
(ix) 8142.1400 – Molder, Hand (Plastic)
(x) 8142.0900 – Embossing Machine Setter (Plastic)
(xi) 8142.1000 – Embossing Machine Operator (Plastic)

4. NSQF LEVEL COMPLIANCE

NSQF level for PLASTIC PROCESSING OPERATOR trade under ATS: **Level 5**

As per notification issued by Govt. of India dated- 27.12.2013 on National Skill Qualification Framework total 10 (Ten) Levels are defined.

Each level of the NSQF is associated with a set of descriptors made up of five outcome statements, which describe in general terms, the minimum knowledge, skills and attributes that a learner needs to acquire in order to be certified for that level.

Each level of the NSQF is described by a statement of learning outcomes in five domains, known as level descriptors. These five domains are:

a. Process
b. professional knowledge,
c. professional skill,
d. core skill and
e. Responsibility.

The Broad Learning outcome of PLASTIC PROCESSING OPERATOR trade under ATS mostly matches with the Level descriptor at Level- 5.

The NSQF level-5 descriptor is given below:

Level	Process Required	Professional Knowledge	Professional Skill	Core Skill	Responsibility
Level 5	Job that requires well developed skill, with clear choice of procedures in familiar context.	Knowledge of facts, principles, processes and general concepts, in a field of work or study	A ange of cognitive and practical skills required to accomplish tasks and solve problem by selecting and applying basic methods, tools, materials and information.	Desired mathematical skill, understanding of social, political and some skill of collecting and organizing information, communication.	Responsibility for own work and Learning and some responsibility for other's works and learning.

5. GENERAL INFORMATION

Name of the Trade	Plastic Processing Operator
NCO - 2015	8142.0200, 8142.0300, 8142.0400, 8142.1300, 8142.0501, 8142.0600, 8142.0700, 8142.0800, 8142.1400, 8142.0900,8142.1000
NSQF Level	Level – 5
Duration of Apprenticeship Training (Basic Training + On-Job Training)	Two years (02 Blocks each of one year duration).
Duration of Basic Training	a) Block –I : 3 months b) Block – II : 3 months **Total duration of Basic Training: 6 months**
Duration of On-Job Training	a) Block–I: 9 months b) Block–II : 9 months **Total duration of Practical Training: 18 months**
Entry Qualification	Passed 10th Class with Science and Mathematics under 10+2 system of Education or its equivalent
Selection of Apprenticeship	The apprentices will be selected as per Apprenticeship Act amended time to time.
Instructors Qualification for Basic Training	As per ITI instructors qualifications as amended time to time for the specific trade.
Infrastructure for basic training	As per related trade of ITI
Examination	The internal examination/ assessment will be held on completion of each block. Final examination for all subjects will be held at the end of course and same will be conducted by NCVT.
Rebate to Ex-ITI Trainees	01 year
CTS trades eligible for PLASTIC PROCESSING OPERATOR Apprenticeship	1. PLASTIC PROCESSING OPERATOR

Note:

- *Industry may impart training as per above time schedule for different block, however this is not fixed. The industry may adjust the duration of training considering the fact that all the components under the syllabus must be covered. However the flexibility should be given keeping in view that no safety aspects is compromised.*
- *For imparting Basic Training the industry to tie-up with ITIs having such specific trade and affiliated to NCVT.*

6. LEARNING OUTCOME

6.1 GENERIC LEARNING OUTCOME

The following are minimum broad Common Occupational Skills/ Generic Learning Outcome after completion of the PLASTIC PROCESSING OPERATOR course of 02 years duration under ATS.

Block I & II:-

1. Apply safe working practices.
2. Comply with environment regulation and housekeeping.
3. Interpret & use company and technical communication
4. Demonstrate basic mathematical concept and principles to perform practical operations.
5. Understand and explain basic science in the field of study including simple machine.
6. Read and apply engineering drawing for different application in the field of work.
7. Understand and apply the concept in productivity, quality tools, and labour welfare legislation in day-to-day work to improve productivity & quality.
8. Explain energy conservation, global warming and pollution and contribute in day-to-day work by optimally using available resources.
9. Explain personnel finance, entrepreneurship and manage/organize related task in day-to-day work for personal & societal growth.
10. Utilize basic computer applications and internet to take benefit of IT developments in the industry.

6.2 SPECIFIC LEARNING OUTCOME

Block – I

1. Practice and understand precautions to be followed while working in plastic processing operator workshop.
2. Prepare different types of documentation as per industrial need by different methods of recording information.
3. Identification and testing of plastics and polymers
4. Repair & Maintenance work
5. Carry out the different activities of the plant with plant capacity and production.
6. Test and identify of various plastic materials/Components by applying test.
7. Understanding of compression Molding operations & its control.
    - Compression Molding M/c & Auxiliaries.

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- Compression Molding Process
- Compression Mold & It Types.
- Troubleshooting

8. Understanding of Injection Molding operations & its control.
    - Injection Molding M/c & Auxiliaries.
    - Injection Molding Process
    - Injection Mold & It Types.
    - Troubleshooting.
9. Understanding of Film Extrusion operations & its control.
    - Extruder M/c & Auxiliaries
    - Extrusion Process
    - Extrusion Dies & Die Setting.
    - Troubleshooting
10. Computerized Documentation and Its Analysis.
11. Understanding of Material Conveying and Feeding system.
12. Understanding of M/c & Mold (Die) Maintenance
    - Routine Maintenance
    - Maintenance
    - Autonomous Maintenance
    - Breakdown Maintenance
    - Preventive Maintenance Predictive

Block – II

13. Operate and control of Blow Molding machines.
14. Understanding of Blow Molding operations & its control.
    - Blow Molding M/c & Auxiliaries.
    - Blow Molding Process
    - Blow Molding Dies & Die Setting.
    - Troubleshoot
15. Understanding of advance injection Molding techniques.
16. Operate and control of Thermoset Molding machines.
17. Understanding of Thermoset Molding operations & its control.
    - Thermoset Molding M/c & Auxiliaries.
    - Thermoset Molding Process
    - Thermoset Dies.
    - Troubleshoot
18. Operate and control of extrusion process machines such as plastic extruder
19. Understanding of Extrusion Process & its control.

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- Extruders & Auxiliaries.
- Extrusion Process
- Extrusion Dies.
- Troubleshoot

20. Understanding of Co- Extrusion Operation & its control.
    - Co- Extruders & Auxiliaries.
    - Co- Extrusion Process
    - Co- Extrusion Dies.
    - Troubleshoot
21. Understand the Hand layup / Spray up / vacuum bag Molding Operation & its Control.
22. Understanding of Sheet Extrusion Operation & its control.
    - Sheet Extruders & Auxiliaries.
    - Sheet Extrusion Process
    - Sheet Extrusion Dies.
    - Troubleshoot
23. Understanding of Wire & Cable Extrusion Operation & its control.
24. Fiber reinforce plastic (FRP) process
25. Understanding of ISO Management System
    - QMS
    - EHS & OHSAS
    - EMS
26. Operation Management System
    - Lean Manufacturing
    - Six Sigma

Note: *Learning outcomes are reflection of total competencies of a trainee and assessment will be carried out as per assessment criteria.*

7. LEARNING OUTCOME WITH ASSESSMENT CRITERIA

GENERIC LEARNING OUTCOME	
LEARNING OUTCOMES	**ASSESSMENT CRITERIA**
1. Recognize & comply safe working practices, environment regulation and housekeeping.	1. 1. Follow and maintain procedures to achieve a safe working environment in line with occupational health and safety regulations and requirements.
	1. 2. Recognize and report all unsafe situations according to site policy.
	1. 3. Identify and take necessary precautions on fire and safety hazards and report according to site policy and procedures.
	1. 4. Identify, handle and store / dispose off dangerous/unsalvageable goods and substances according to site policy and procedures following safety regulations and requirements.
	1. 5. Identify and observe site policies and procedures in regard to illness or accident.
	1. 6. Identify safety alarms accurately.
	1. 7. Report supervisor/ Competent of authority in the event of accident or sickness of any staff and record accident details correctly according to site accident/injury procedures.
	1. 8. Identify and observe site evacuation procedures according to site policy.
	1. 9. Identify Personal Productive Equipment (PPE) and use the same as per related working environment.
	1. 10. Identify basic first aid and use them under different circumstances.
	1. 11. Identify different fire extinguisher and use the same as per requirement.
	1. 12. Identify environmental pollution & contribute to avoidance of same.
	1. 13. Take opportunities to use energy and materials in an environmentally friendly manner
	1. 14. Avoid waste and dispose waste as per procedure
	1. 15. Recognize different components of 5S and apply the same in the working environment.
2. Demonstrate basic mathematical concept and principles to perform practical operations. Understand and	2.1 Explain concept of basic science related to the field such as Material science, Mass, weight, density, speed, velocity, heat & temperature, force, motion, pressure, heat treatment, centre of gravity, friction.

explain basic science in the field of study including simple machine.	2.2 Measure dimensions as per drawing
	2.3 Use scale/ tapes to measure for fitting to specification.
	2.4 Comply given tolerance.
	2.5 Prepare list of appropriate materials by interpreting detail drawings and determine quantities of such materials.
	2.6 Ensure dimensional accuracy of assembly by using different instruments/gauges.
	2.7 Explain basic electricity, insulation &earthing.
3. Read and apply engineering drawing for different application in the field of work.	3. 1. Read & interpret the information on drawings and apply in executing practical work.
	3. 2. Read & analyse the specification to ascertain the material requirement, tools, and machining /assembly /maintenance parameters.
	3. 3. Encounter drawings with missing/unspecified key information and make own calculations to fill in missing dimension/parameters to carry out the work.
4. Understand and apply the concept in productivity, quality tools, and labour welfare legislation in day-to-day work to improve productivity & quality.	4.1 Explain the concept of productivity and quality tools and apply during execution of job.
	4.2. Understand the basic concept of labour welfare legislation and adhere to responsibilities and remain sensitive towards such laws.
	4.3. Knows benefits guaranteed under various acts
5.Explain energy conservation, global warming and pollution and contribute in day	5.1Explain the concept of energy conservation, global warming, pollution and utilize the available recourses optimally & remain sensitive to avoid environment pollutio
	5.2Dispose waste following standard procedure.
6. Explain personnel finance, entrepreneurship and manage/organize related task in day to day work for personal & societal growth.	6.1Explain personnel finance and entrepreneurship.
	6.2Explain role of Various Schemes and Institutes for self-employment i.e. DIC, SIDA, SISI, NSIC, SIDO, Idea for financing/ non financing support agencies to familiarizes with the Policies /Programmes & procedure & the available scheme.
	6.3Prepare Project report to become an entrepreneur for submission to financial institutions.
SPECIFIC OUTCOME	
Block-I & II	

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*Assessment Criteria i.e. the standard of performance, for each specific learning outcome mentioned under **block – I & block – II**(section: 10) must ensure that the trainee achieves well developed skill with clear choice of procedure in familiar context. Assessment criteria should broadly cover the aspect of **Planning** (Identify, ascertain, estimate etc.); **Execution** (perform, illustration, demonstration etc. by applying 1) a range of cognitive and practical skills required to accomplish tasks and solve problems by selecting and applying basic methods, tools, materials and information 2) Knowledge of facts, principles, processes, and general concepts, in a field of work or study 3)Desired Mathematical Skills and some skill of collecting and organizing information, communication) and **Checking/ Testing** to ensure functionality during the assessment of each outcome. The assessments parameters must also ascertain that the candidate is responsible for own work and learning and some responsibility for other's work and learning.*

8. SYLLABUS

BASIC TRAINING (Block – I)

Duration: (03) Three Months

Week No.	Professional Skills	Professional Knowledge
1	Familiarization & importance of trade training , machinery used in the trade, types of jobs made by the trainees in the trade: safety and firefighting equipment and their use	**Safety:** Firefighting equipment its precautions observed in the section. Introduction about occupational health hazards followed in plastic industries
2	Marking, Hacksawing, Filing on mild steel flat using steel rule, calipers, punches etc.	Linear measuring tools. Introduction to hand tools used for marking, punching, sawing, filing etc. marking table
3	Practice of drilling on flat surfaces. Forming internal threads with taps to standard size and preparing studs and bolts	Bench vice-its types and parts. Files – its description types, grades & cut. Hacksaw - its type use and care.
4	Safety precaution and first aid about electricity while working on machines. Basic knowledge about fixing and connecting of electrical accessories.	Tap &dies its use and care. Vernier caliper, micrometer, height gauge, bevel protector. Least count calculation and its measurements
5	Making hydraulic and pneumatic circuits by using flow control valves, pressure control valves. Logic valves, pumps and compressor.	Safety precaution and first aid while working on machine. Drilling machines-its type – (portable, bench type, and pillar type), parts & working procedure.
6	**Testing of Various Plastics Material**: Tensile test, Compressive test, Shear test, Hardness test, MFI test, Melting point test. Identification of plastics practical by simple methods like burning	Operating and maintenance of hydraulic and pneumatic components- flow control valves, pressure control valves. Logic valves, pumps and compressor
7	**Injection Molding**: Basic idea of mechanical electrical and hydraulic system of IMM & its different parts and their respective functions. Operating and controlling of IMM in IRO & TRO. Parameters setting. Practical on Hand injection, vertical Injection/Horizontal injection	Identification of Various Plastics Material Thermo Plastic:PE,PP,ABS,POM,SAN,PMMA,PS,PC,NYLON,PVC,PET,CN,CA,CAP,PBT Thermosetting Plastic: PF, MF, UF, EPOXY, SILICON, POLYESTER RESIN, SMC, DMC) its properties and applications.
8	Microprocessor Controlled & PLC	Injection Molding:

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	IMM, Machine setting procedure, setting for process-parameters. Types of Molds, Types of runners and gates.	Introduction about injection Molding machine – its types. Molds and its parts. Processing defects, causes, remedies. Trouble shooting of IMM
9	Oiling, lubrication and preventive maintenance of injection Molding machine	Microprocessor Controlled & PLC Injection Molding machine. Its comparison. Thermoset Injection Molding All electrical & Multi Injection Molding Machines, Types of Molds. Types of runners and gates.
10	**Compression Molding:** Basic idea of mechanical electrical and hydraulic system of CMM and its different parts and the irrespective functions. Operating and controlling of CMM in IRO & TRO	Preventive maintenance of IMM Compression Molding: Types of CMM its different parts and functions. Molds and its parts. Processing Defects, Causes, and Remedies etc. Trouble shooting of CMM
11	Oiling, lubrication and preventive maintenance of compression Molding machine	Transfer Molding
12-13	Fiber Reinforce Plastic (FRP) process (hand lay-up process).	Introduction of fiber reinforced plastic processing method.
	Internal Assessment 03days	

BASIC TRAINING (Block – II)

Duration: (03) Three Months

Week No.	Professional Skills	Professional Knowledge
1	**Blow Molding Process**: Familiarization with basic idea of mechanical, electrical, hydraulic and pneumatic system of blow Molding machine and its different parts and their respective functions.	**Blow Molding Process:** Types Blow Molding machine (Hand operated & Automatic) –its description, different parts & their respective functions. Sequence of operation BM Process and its latest processing techniques.(Stretch blow, extrusion stretch blow, injection stretch blow multilayer blow).
2	Operating and controlling of blow Molding machine in IRO & TRO (setting of die, adjusting mandrel, controlling Parisian, adjusting thickness uniformity).	Description about Blow Molds and its parts. Processing defects, causes, remedies etc. Trouble shooting of Blow Molding machine.
3	Oiling, lubrication and preventive maintenance of Blow Molding machine	preventive maintenance of Blow Molding machine
4	**Extrusion process:** Familiarization with basic idea of mechanical, electrical and hydraulic system of extrusion machine and its different parts and their respective functions.	**Extrusion Process**: Extrusion machine – its description, use of different parts and their functions. PVC compounding and its chemical ingredients. Its latest processing techniques.(multi-layer film, co-extruded sheets, corrugated pipes)
5	Extrusion machine in IRO & TRO. Changing and cleaning of screws in extruder, adjusting and controlling temperature, screen pack arrangement, variable speed, setting and die head for pipe, profile, reprocessing and blown film.	Description about extrusion dies and its parts. Processing defects, causes, remedies etc. Trouble shooting of extruder machine.
6	Oiling, lubricating and preventive maintenance of extruder machine.	Introduction about Oiling, lubrication and preventive maintenance of extruder machine.
7	Operating and controlling of thermoforming & vacuum forming machine in IRO & TRO.	Thermoforming & vacuum forming – its brief description and use. Processing technique of different plastic material.
8	Demo about rotational Molding machine.	Introduction about Rotational Molding process.
9	Practice for Annealing, Stress Relieving,	Post Molding Operations: Annealing,

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	Warpage Control, De-flashing and Printing of finish products.	Stress Relieving, Warpage Control, De-flashing and Printing.
10	Practice of Pre-drying of Plastics Materials	Importance of Pre-drying of Plastics Materials Pre drying equipments and ancillaries
11	Fabricating acrylic sheet ABS- sheet, HIPS sheet, HMHDPE blocks. Involving, drilling screwing buffing sanding. Types of plastic casting	Machinery used for buffing, sanding, welding and their application. Types of plastic casting
12-13	Demo on Preservation/storage methods. (scaling, corrosion, blocking, sliding, revolving parts)	Hot runner Molds, cold runner Molds, blow Molds, Stretch Mold& dies.
	Internal Assessment 03 days	

9. SYLLABUS - CORE SKILLS

9.1 WORKSHOP CALCULATION SCIENCE & ENGINEERING DRAWING

Block – I		
Sl. No.	**Workshop Calculation and Science (Duration: - 20 hrs.)**	**Engineering Drawing (Duration: - 30 hrs.)**
1.	**Unit**: Systems of unit- FPS, CGS, MKS/SI unit, unit of length, Mass and time, Conversion of units	**Engineering Drawing**: Introduction and its importance **Drawing Instruments** : their Standard and uses - Drawing board, T-Square, Drafter (Drafting M/c), Set Squares, Protractor, Drawing Instrument Box (Compass, Dividers, Scale, Diagonal Scales etc.), Pencils of different Grades, Drawing pins / Clips. **(2 Hrs)** **Lines :** - Definition, types and applications in Drawing as per BIS SP:46-2003 - Classification of lines (Hidden, centre, construction, Extension, Dimension, Section) - Drawing lines of given length (Straight, curved) - Drawing of parallel lines, perpendicular line
2.	**Fractions**: Fractions, Decimal fraction, Addition, Subtraction, Multiplication and Division of Fractions and Decimals, conversion of Fraction to Decimal and vice versa. Simple problems using Calculator.	**Drawing of Geometrical Figures**: Definition, nomenclature and practice of - Angle: Measurement and its types, method of bisecting. - Triangle -different types - Rectangle, Square, Rhombus, Parallelogram, polygons. - Circle and its elements. **(4 Hrs)** **Lettering and Numbering** as per BIS SP46-2003: - Single Stroke, Double Stroke, inclined, Upper case and Lower case **(4 Hrs)**.
3.	**Properties of Material** : properties - Physical & Mechanical, Types – Ferrous & Non-Ferrous, difference between Ferrous and Non-Ferrous	**Practice of Lettering and Title Block** **(2 Hrs)** **Dimensioning practice**: - Position of dimensioning (unidirectional,

	metals, introduction of Iron, Cast Iron, Wrought Iron, Steel, difference between Iron and Steel, Alloy steel, carbon steel, stainless steel, Non-Ferrous Alloys.	aligned, oblique as per BIS SP:46-2003) - Symbols preceding the value of dimension and dimensional tolerance. **(2 Hrs)**Methods of Division of line segment
4.	**Ratio & Proportion** : Simple calculation on related problems.	**Drawing of Solid figures** (Cube, Cuboids, Cone, Prism, Pyramid, Frustum of Cone and Pyramid.) with dimensions. **(4 Hrs)** **Free Hand sketch of hand tools and measuring tools used in res**pective trades.
5.	**Mass, Weight and Density**: Mass, Unit of Mass, Weight, difference between mass and weight, Density, unit of density.	**Free-hand sketches** of Hand Tools, Screw drivers, Pliers, Spanner, Tweezer. Free-hand sketches of Vernier Caliper, micrometer, Depth Gauge, Dial Test Indicator, Bevel protractor **(4 Hrs)** **ISI symbols** of Generator, Voltmeter, Ammeter, Watt- meter. Resister, inductor, Capacitor, Transformer, AC & DC motors.etc. Drawing of pressure control process line**(2 Hrs)**
6.	**Percentage**: Introduction, Simple calculation. Changing percentage to decimal and fraction and vice-versa.	-
7.	**Speed and Velocity**: Rest and motion, speed, velocity, difference between speed and velocity, acceleration, retardation.	-
8.	**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. - Area of cut-out regular surfaces: circle and segment and sector of circle. - Volume of cut-out solids: hollow cylinders, frustum of cone, block section. - Volume of simple solid blocks.	-
9.	**Heat & Temparature**: Heat and	-

	temperature, their units, difference between heat and temperature, boiling point, melting point, scale of temperature, relation between different scale of temperature, Thermometer, pyrometer, transmission of heat, conduction, convection, radiation.	
10.	**Work, Power and Energy**: work, unit of work, power, unit of power, Horse power, mechanical efficiency, energy, use of energy, potential and kinetic energy, examples of potential energy and kinetic energy.	-

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Block – II		
Sl. No.	**Workshop Calculation and Science (Duration: - 20 hrs.)**	**Engineering Drawing (Duration: - 30 hrs.)**
1.	Archimedes's principle, principle of floatation hydrometers. Centre of gravity and Equilibrium condition. **(2Hrs)**	- **Drawing sketches of different types of valves**, such as gate valve, globe valve, ball valve, Plug Valve, check valve etc. **(4 Hrs)** **Drawing of different types locking devices** such as double nut, castle nut, pin etc
2.	Pressure, temperature, Boyle's law, Charles's law, Equation of perfect gas. Calculations.	- Screw thread, their standard forms as per BIS, **Symbolic representation of different types of valves**- gate valve, globe valve, butterfly valve, ball valve, diaphragm valve, control valve, non-return valve, and needle valve. **(2 Hrs)** **Free hand sketches** of Belt conveyor, Screw conveyer, Bucket elevator.
3.	Centre of Gravity, (C.G. Of square, rectangle, triangle, circle, semicircle, cone) & its calculations	- **Drawing of pressure, Level , flow and temperature control system.** **(2 Hrs)** **Free hand sketches** of crushers, ball mill, hammer mill and centrifuges
4.	**Flow of fluids-** Equation of continuity, Bernoulli's theorem	- **Free hand sketches** of steam jet ejector, steam trap **(2 Hrs)** **Diagram of distillation column** with all accessories Free hand sketches of process instrument- such as temperature indicator, level indicator, LIC, TIC, PI, PIC, FI, FIC
5.	Flow measurement by orifice meter, venturi meter, Rota meter, U-tube manometer.	Injection Molding Machine Sketch Injection Molds .(Simple Insulated & Hot Runner Molds) Runner & Gate Systems Blow Molding Machine Sketch Blow Molding Molds ,Stretch Blow Molds Extrusion Process Sketch (Pipe ,Film up Stroke & Down stroke, Wire, Calendering Roto Molding Machine Sketch Roto Mold, FRP Technique Sketch SMC & DMC Sketch, Thermoforming& Vacuum Machine Sketch Thermoforming& Vacuume forming Molds
6.	Definition - viscosity, flash point, fire point, flash points of standard lubricating oils, octane number.	

7.	Newton's laws of motion unit of force, find out resultant force parallelogram law of forces,	
8.	Condition of equilibrium, kind of equilibrium, some examples of equilibrium in daily life,.	
9.	Advantages & Disadvantages of friction, Limiting friction, Laws of limiting friction, Coefficient of friction, angle of friction, Inclined plane, Force of friction	
10.	Latent heat, sensible heat, saturated steam, wet steam, superheated steam. Reynolds's number, at different velocities	

9.2 EMPLOYABILITY SKILLS

(DURATION: - 110 HRS.)

Block – I (Duration – 55 hrs.)	
1. English Literacy	Duration : 20 Hrs. Marks : 09
Pronunciation	Accentuation (mode of pronunciation) on simple words, Diction (use of word and speech)
Functional Grammar	Transformation of sentences, Voice change, Change of tense, Spellings.
Reading	Reading and understanding simple sentences about self, work and environment
Writing	Construction of simple sentences Writing simple English
Speaking / Spoken English	Speaking with preparation on self, on family, on friends/ classmates, on know, picture reading gain confidence through role-playing and discussions on current happening job description, asking about someone's job habitual actions. Cardinal (fundamental) numbers ordinal numbers. Taking messages, passing messages on and filling in message forms Greeting and introductions office hospitality, Resumes or curriculum vita essential parts, letters of application reference to previous communication.
2. I.T. Literacy	Duration : 20 Hrs. Marks : 09
Basics of Computer	Introduction, Computer and its applications, Hardware and peripherals, Switching on-Starting and shutting down of computer.
Computer Operating System	Basics of Operating System, WINDOWS, The user interface of Windows OS, Create, Copy, Move and delete Files and Folders, Use of External memory like pen drive, CD, DVD etc, Use of Common applications.
Word processing and Worksheet	Basic operating of Word Processing, Creating, opening and closing Documents, use of shortcuts, Creating and Editing of Text, Formatting the Text, Insertion & creation of Tables. Printing document. Basics of Excel worksheet, understanding basic commands, creating simple worksheets, understanding sample worksheets, use of simple formulas and functions, Printing of simple excel sheets.
Computer Networking	Basic of computer Networks (using real life examples), Definitions of

and Internet	Local Area Network (LAN), Wide Area Network (WAN), Internet, Concept of Internet (Network of Networks), Meaning of World Wide Web (WWW), Web Browser, Web Site, Web page and Search Engines. Accessing the Internet using Web Browser, Downloading and Printing Web Pages, Opening an email account and use of email. Social media sites and its implication. Information Security and antivirus tools, Do's and Don'ts in Information Security, Awareness of IT - ACT, types of cyber crimes.
3. Communication Skills	Duration : 15 Hrs. Marks : 07
Introduction to Communication Skills	Communication and its importance Principles of Effective communication Types of communication - verbal, non verbal, written, email, talking on phone. Non verbal communication -characteristics, components-Para-language Body language Barriers to communication and dealing with barriers. Handling nervousness/ discomfort.
Listening Skills	Listening-hearing and listening, effective listening, barriers to effective listening guidelines for effective listening. Triple- A Listening - Attitude, Attention & Adjustment. Active Listening Skills.
Motivational Training	Characteristics Essential to Achieving Success. The Power of Positive Attitude. Self awareness Importance of Commitment Ethics and Values Ways to Motivate Oneself Personal Goal setting and Employability Planning.
Facing Interviews	Manners, Etiquettes, Dress code for an interview Do's & Don'ts for an interview.
Behavioral Skills	Problem Solving Confidence Building Attitude
Block – II **Duration – 55 hrs.**	
4. Entrepreneurship Skills	Duration : 15 Hrs. Marks : 06

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Concept of Entrepreneurship	Entrepreneur - Entrepreneurship - Enterprises:-Conceptual issue Entrepreneurship vs. management, Entrepreneurial motivation. Performance & Record, Role & Function of entrepreneurs in relation to the enterprise & relation to the economy, Source of business ideas, Entrepreneurial opportunities, The process of setting up a business.	
Project Preparation & Marketing analysis	Qualities of a good Entrepreneur, SWOT and Risk Analysis. Concept & application of PLC, Sales & distribution Management. Different Between Small Scale & Large Scale Business, Market Survey, Method of marketing, Publicity and advertisement, Marketing Mix.	
Institutions Support	Preparation of Project. Role of Various Schemes and Institutes for self-employment i.e. DIC, SIDA, SISI, NSIC, SIDO, Idea for financing/ non financing support agencies to familiarizes with the Policies /Programmes & procedure & the available scheme.	
Investment Procurement	Project formation, Feasibility, Legal formalities i.e., Shop Act, Estimation & Costing, Investment procedure - Loan procurement - Banking Processes.	
5. Productivity		Duration : 10 Hrs. Marks : 05
Benefits	Personal / Workman - Incentive, Production linked Bonus, Improvement in living standard.	
Affecting Factors	Skills, Working Aids, Automation, Environment, Motivation - How improves or slows down.	
Comparison with developed countries	Comparative productivity in developed countries (viz. Germany, Japan and Australia) in selected industries e.g. Manufacturing, Steel, Mining, Construction etc. Living standards of those countries, wages.	
Personal Finance Management	Banking processes, Handling ATM, KYC registration, safe cash handling, Personal risk and Insurance.	
6. Occupational Safety, Health and Environment Education		Duration : 15 Hrs. Marks : 06
Safety & Health	Introduction to Occupational Safety and Health importance of safety and health at workplace.	
Occupational Hazards	Basic Hazards, Chemical Hazards, Vibroacoustic Hazards, Mechanical Hazards, Electrical Hazards, Thermal Hazards. Occupational health, Occupational hygienic, Occupational Diseases/ Disorders & its prevention.	
Accident & safety	Basic principles for protective equipment. Accident Prevention techniques - control of accidents and safety	

	measures.
First Aid	Care of injured & Sick at the workplaces, First-Aid & Transportation of sick person.
Basic Provisions	Idea of basic provision legislation of India. safety, health, welfare under legislative of India.
Ecosystem	Introduction to Environment. Relationship between Society and Environment, Ecosystem and Factors causing imbalance.
Pollution	Pollution and pollutants including liquid, gaseous, solid and hazardous waste.
Energy Conservation	Conservation of Energy, re-use and recycle.
Global warming	Global warming, climate change and Ozone layer depletion.
Ground Water	Hydrological cycle, ground and surface water, Conservation and Harvesting of water.
Environment	Right attitude towards environment, Maintenance of in -house environment.
7. Labour Welfare Legislation	Duration : 05 Hrs. Marks : 03
Welfare Acts	Benefits guaranteed under various acts- Factories Act, Apprenticeship Act, Employees State Insurance Act (ESI), Payment Wages Act, Employees Provident Fund Act, The Workmen's compensation Act.
8. Quality Tools	Duration : 10 Hrs. Marks : 05
Quality Consciousness	Meaning of quality, Quality characteristic.
Quality Circles	Definition, Advantage of small group activity, objectives of quality Circle, Roles and function of Quality Circles in Organization, Operation of Quality circle. Approaches to starting Quality Circles, Steps for continuation Quality Circles.
Quality Management System	Idea of ISO 9000 and BIS systems and its importance in maintaining qualities.
House Keeping	Purpose of House-keeping, Practice of good Housekeeping.
Quality Tools	Basic quality tools with a few examples.

10. DETAILS OF COMPETENCIES (ON-JOB TRAINING)

The competencies/ specific outcomes on completion of On-Job Training are detailed below: -

Block – I

1. Safety and best practices (5S, KAIZEN etc.)
2. Record keeping and documentation
3. Identification and testing of plastics and polymers
4. Repair & Maintenance work
5. Practice and understand precautions to be followed while working in plastic processing operator workshop.
6. Prepare different types of documentation as per industrial need by different methods of recording information.
7. Identification and testing of plastics and polymers
8. Repair & Maintenance work
9. Carry out the different activities of the plant with plant capacity and production.
10. Test and identify of various plastic materials/Components by applying test.
11. Understand of compression Molding operations & its control.
    - Compression Molding M/c & Auxiliaries.
    - Compression Molding Process
    - Compression Mold & It Types.
    - Troubleshooting
12. Understand of Injection Molding operations & its control.
    - Injection Molding M/c & Auxiliaries.
    - Injection Molding Process
    - Injection Mold & It Types.
    - Troubleshooting.
13. Understand of Film Extrusion operations & its control.
    - Extruder M/c & Auxiliaries
    - Extrusion Process
    - Extrusion Dies & Die Setting.
    - Troubleshooting
14. Computerized Documentation and Its Analysis.
15. Understand of Material Conveying and Feeding system.
16. Understanding of M/c & Mold (Die) Maintenance
    - Routine Maintenance
    - Maintenance

- Autonomous Maintenance
- Breakdown Maintenance
- Preventive Maintenance Predictive

Block – II

17. Safety and best practices (5S, KAIZEN etc.)
18. Store procedure, Record keeping, inventory management and documentation
19. Identification and testing of plastics and polymers
20. Repair & Maintenance work of Molding and Extrusion Machines
21. Operate and control of Blow Molding machines.
22. Understand of Blow Molding operations & its control.
    - Blow mold M/c & Auxiliaries.
    - Blow Molding Process
    - Blow Molding Dies & Die Setting.
    - Troubleshoot
23. Understand of advance injection Molding techniques.
24. Operate and control of Thermoset Molding machines.
25. Understand of Thermoset Molding operations & its control.
    - Thermoset Molding M/c & Auxiliaries.
    - Thermoset Molding Process
    - Thermoset Dies.
    - Troubleshoot
26. Operate and control of extrusion process machines such as plastic extruder
27. Understand of Extrusion Process & its control.
    - Extruders & Auxiliaries.
    - Extrusion Process
    - Extrusion Dies.
    - Troubleshoot
28. Understand of Co- Extrusion Operation & its control.
    - Co- Extruders & Auxiliaries.
    - Co- Extrusion Process
    - Co- Extrusion Dies.
    - Troubleshoot
29. Understand the Hand layup / Spray up / vacuum bag Molding Operation & its Control.
30. Understand of Sheet Extrusion Operation & its control.
    - Sheet Extruders & Auxiliaries.
    - Sheet Extrusion Process
    - Sheet Extrusion Dies.

- Troubleshoot

31. Understand of Wire & Cable Extrusion Operation & its control.
32. Fiber reinforce plastic (FRP) process
33. Understand of ISO Management System
    - QMS
    - EHS & OHSAS
    - EMS
34. Operation Management System
    - Lean Manufacturing
    - Six Sigma

Note:

1. Industry must ensure that above mentioned competencies are achieved by the trainees during their on job training.

2. In addition to above competencies/ outcomes industry may impart additional training relevant to the specific industry.

ANNEXURE – I

INFRASTRUCTURE FOR PROFESSIONAL SKILL & PROFESSIONAL KNOWLEDGE

PLASTIC PROCESSING OPERATOR			
LIST OF TOOLS AND EQUIPMENT for Basic Training			
A. TRAINEES TOOL KIT			
Sl. no.	**Name of the Tool &Equipments**	**Specification**	**Quantity**
1.	Steel Rule	15 cm with metric graduation	2O nos.
2.	Try Square	150 CM	2O nos.
3.	Caliper inside /Out Side	150CM	20 nos.
4.	Straight Scriber	15CM	20 nos.
5.	Screw driver	15CM	20 nos.
6.	Hammer ball peen	0.45 kg. With handle	20 nos.
7.	File flat	25CM	20 nos.
8.	Dot slot punch	10 CM	20nos.
9.	Plier	150mm insulated flat type	20 nos.
10.	Hacksaw frame	3OCM	20 nos.

Note: In case of basic training setup by the industry the tools, equipment and machinery available in the industry may also be used for imparting basic training.

INFRASTRUCTURE FOR WORKSHOP CALCULATION & SCIENCE AND ENGINEERING DRAWING

TRADE: PLASTIC PROCESSING OPERATOR

LIST OF TOOLS& EQUIPMENTS FOR -20APPRENTICES

1) **Space Norms** : 45 Sq. m.(For Engineering Drawing)

2) Infrastructure:

A : TRAINEES TOOL KIT:-			
Sl. No.	**Name of the items**	**Specification**	**Quantity**
1.	Draughtsman drawing instrument box		20
2.	Set square celluloid	45^o (250 X 1.5 mm)	20
3.	Set square celluloid mm)	30^o-60^o (250 X 1.5	20
4.	Mini drafter		20
5.	Drawing board	(700mm x500 mm) IS: 1444	20
B : Furniture Required			
Sl. No.	**Name of the items**	**Specification**	**Quantity**
1	Drawing Board		20
2	Models : Solid & cut section		as required
3	Drawing Table for trainees		as required
4	Stool for trainees		as required
5	Cupboard (big)		01
6	White Board	(size: 8ft. x 4ft.)	01
7	Trainer's Table		01
8	Trainer's Chair		01

TOOLS & EQUIPMENTS FOR EMPLOYABILITY SKILLS		
Sl. No.	**Name of the Equipment**	**Quantity**
1.	Computer (PC) with latest configurations and Internet connection with standard operating system and standard word processor and worksheet software	10 Nos.
2.	UPS - 500VA	10 Nos.
3.	Scanner cum Printer	1 No.
4.	Computer Tables	10 Nos.
5.	Computer Chairs	20 Nos.
6.	LCD Projector	1 No.
7.	White Board 1200mm x 900mm	1 No.
Note: - Above Tools & Equipments not required, if Computer LAB is available in the institute.		

FORMAT FOR INTERNAL ASSESSMENT

Name & Address of the Assessor :		**Year of Enrollment :**
Name & Address of ITI (Govt./Pvt.) :		**Date of Assessment :**
Name & Address of the Industry :		**Assessment location: Industry / ITI**
Trade Name :	**Semester:**	**Duration of the Trade/course:**
Learning Outcome:		

Sl. No	**Candidate Name**	**Father's/Mother's Name**	Safety consciousness	Workplace hygiene	Attendance/ Punctuality	Ability to follow Manuals/ Written instructions	Application of Knowledge	Skills to handle tools & equipment	Economical use of materials	Speed in doing work	Quality in workmanship	VIVA	**Total internal assessment Marks**	**Result (Y/N)**
Maximum Marks (Total 100 Marks)			**15**	**5**	**10**	**5**	**10**	**10**	**5**	**10**	**15**	**15**		
1														
2														