

**Course Curricula**

**for**

**Short Term Courses based on  
Modular Employable Skills (MES)**

**in**

**Plastic Processing Sector**



**DIRECTORATE GENERAL OF EMPLOYMENT AND TRAINING  
MINISTRY OF LABOUR & EMPLOYMENT  
GOVERNMENT OF INDIA**

**Course Curricula for Short Term Courses based on Modular  
Employable Skills (MES) in the Plastic Processing Operator Sector**

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## Skill Development based on Modular Employable Skills (MES)

### Background

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The need for giving emphasis on the Skill Development, especially for the less educated, poor and out of school youth has been highlighted in various forums. The skill level and educational attainment of the work force determines the productivity, income levels as well as the adaptability of the working class in changing environment. Large percentage of population in India is living below poverty line. One of the important causes is lower percentage of skilled persons in the workforce

The skill development at present is taking place mostly in the informal way, i.e. persons acquire skill at the work-place when they help their parents, relatives and employers etc. Such persons do not have a formal certificate and thus earn lower wages and are exploited by employers. They have come through informal system due to socio-economic circumstances of the family and the compulsions of earning a livelihood rather than attending a formal course. While their productivity is low, their contribution to the national GDP cannot be ignored. If the country can create a system of certification which not only recognizes their skills but also provides education and training in a mode that suits their economic compulsions, it will not only benefit the workforce to earn a decent living but also contribute to the national economy by better productivity of this workforce.

Another related problem to be tackled is large number of students drop outs (About 63% of the school students drop out at different stages before reaching Class-X).

### Frame work for Skill Development based on 'Modular Employable Skills (MES)'

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Very few opportunities for skill development are available for the above referred groups (out of school youth & existing workers especially in the informal sector). Most of the existing Skill Development programmes are long term in nature. Poor and less educated persons can not afford long term training programmes due to higher entry qualifications, opportunity cost etc. Therefore, a new frame work for Skill Development for the Informal Sector has been evolved by the DGET to address to the above mentioned problems. The **key features of the new frame work for skill development** are:

- ◇ Demand driven Short term training courses based on modular employable skills decided in consultation with Industry
- ◇ Flexible delivery mechanism (part time, weekends, full time)
- ◇ Different levels of programmes (Foundation level as well as skill upgradation) to meet demands of various target groups
- ◇ Central Government will facilitate and promote training while Vocational Training (VT) Providers under the Govt. and Private Sector will provide training
- ◇ Optimum utilisation of existing infrastructure to make training cost effective.
- ◇ Testing of skills of trainees by independent assessing bodies who would not be involved in conduct of the training programme, to ensure that it is done impartially.
- ◇ Testing & certification of prior learning (skills of persons acquired informally)

The Short Term courses would be based on 'Modular Employable Skills (MES)'.

The **concept for the MES** is :

- Identification of 'minimum skills set' which is sufficient to get an employment in the labour market.
- It allows skills upgradation, multiskilling, multi entry and exit, vertical mobility and life long learning opportunities in a flexible manner.
- It also allows recognition of prior learning (certification of skills acquired informally) effectively.
- The modules in a sector when grouped together could lead to a qualification equivalent to National Trade Certificate or higher.
- Courses could be available from level 1 to level 3 in different vocations depending upon the need of the employer organisations.
- MES would benefit different target groups like :
  - Workers seeking certification of their skills acquired informally
  - workers seeking skill upgradation
  - early school drop-outs and unemployed
  - previously child labour and their family

### **Age of participants**

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The minimum age limit for persons to take part in the scheme is 14 years but there is no upper age limit.

### **Curriculum Development Process**

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Following procedure is used for developing course curricula

- Identification of Employable Skills set in a sector based on division of work in the labour market.
- Development of training modules corresponding to skills set identified so as to provide training for specific & fit for purpose
- Organization of modules in to a Course Matrix indicating vertical and horizontal mobility. The course matrix depicts pictorially relation among various modules, pre requisites for higher level modules and how one can progress from one level to another.
- Development of detailed curriculum and vetting by a trade committee and by the NCVT

(Close involvement of Employers Organizations, State Governments, experts, vocational training providers and other stake holders is ensured at each stages).

### **Development of Core Competencies**

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Possession of proper attitudes is one of the most important attribute of a competent person. Without proper attitudes, the performance of a person gets adversely affected. Hence, systematic efforts will be made to develop attitudes during the training programme.

The trainees deal with men, materials and machines. They handle sophisticated tools and instruments. Positive attitudes have to be developed in the trainees by properly guiding them

and setting up examples of good attitudes by demonstrated behaviors and by the environment provided during training.

Some important core competencies to be developed are:

1. Safety consciousness and safe working practices
2. Care of equipment and tools
3. Punctuality, discipline and honesty
4. Concern for quality
5. Respect for rules and regulations
6. Concern for health and hygiene
7. Cordial relationship and Cooperation with co-workers and team Work
8. Positive attitude and behavior
9. Responsibility and accountability
10. Learn continuously
11. Communication Skills
12. Concern for environment and waste disposal

Following competencies should also be developed during level-II and higher courses:

1. Ability for planning, organizing and coordinating
2. Creative thinking, problem solving and decision making
3. Leadership
4. Ability to bear stress
5. Negotiation

### **Duration of the Programmes**

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Time taken to gain the qualification will vary according to the pathway taken and will be kept very flexible for persons with different backgrounds and experience. Duration has been prescribed in hours in the curriculum of individual module, which are based on the content and requirements of a MES Module. However, some persons may take more time than the prescribed time. They should be provided reasonable time to complete the course.

### **Pathways to acquire Qualification:**

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**Access to** the qualification could be through:

- An approved training programme; **Or**
- A combination of an approved training programme plus recognition of prior learning including credit transfer; **Or**
- The recognition of prior learning that provides evidence of the achievement of the competencies for the qualification.

## **Methodology**

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The training methods to be used should be appropriate to the development of competencies. The focus of the programme is on “performing” and not on “Knowing”. Lecturing will be restricted to the minimum necessary and emphasis to be given for ‘hands on training’.

The training methods will be individual centered to make each person a competent one. Opportunities for individual work will be provided. The learning process will be continuously monitored and feedback will be provided on individual basis.

Demonstrations using different models, audio visual aids and equipment will be used intensively.

## **Instructional Media Packages**

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In order to maintain quality of training uniformly all over the country, instructional media packages (IMPs) will be developed by the National Instructional Media Institute (NIMI), Chennai.

## **Assessment**

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DGE&T will appoint assessing bodies to assess the competencies of the trained persons. The assessing body will be an independent agency, which will not be involved in conducting the training programmes. This, in turn, will ensure quality of training and credibility of the scheme. Keeping in view the target of providing training/testing of one million persons through out the country and to avoid monopoly, more than one assessing bodies will be appointed for a sector or an area.

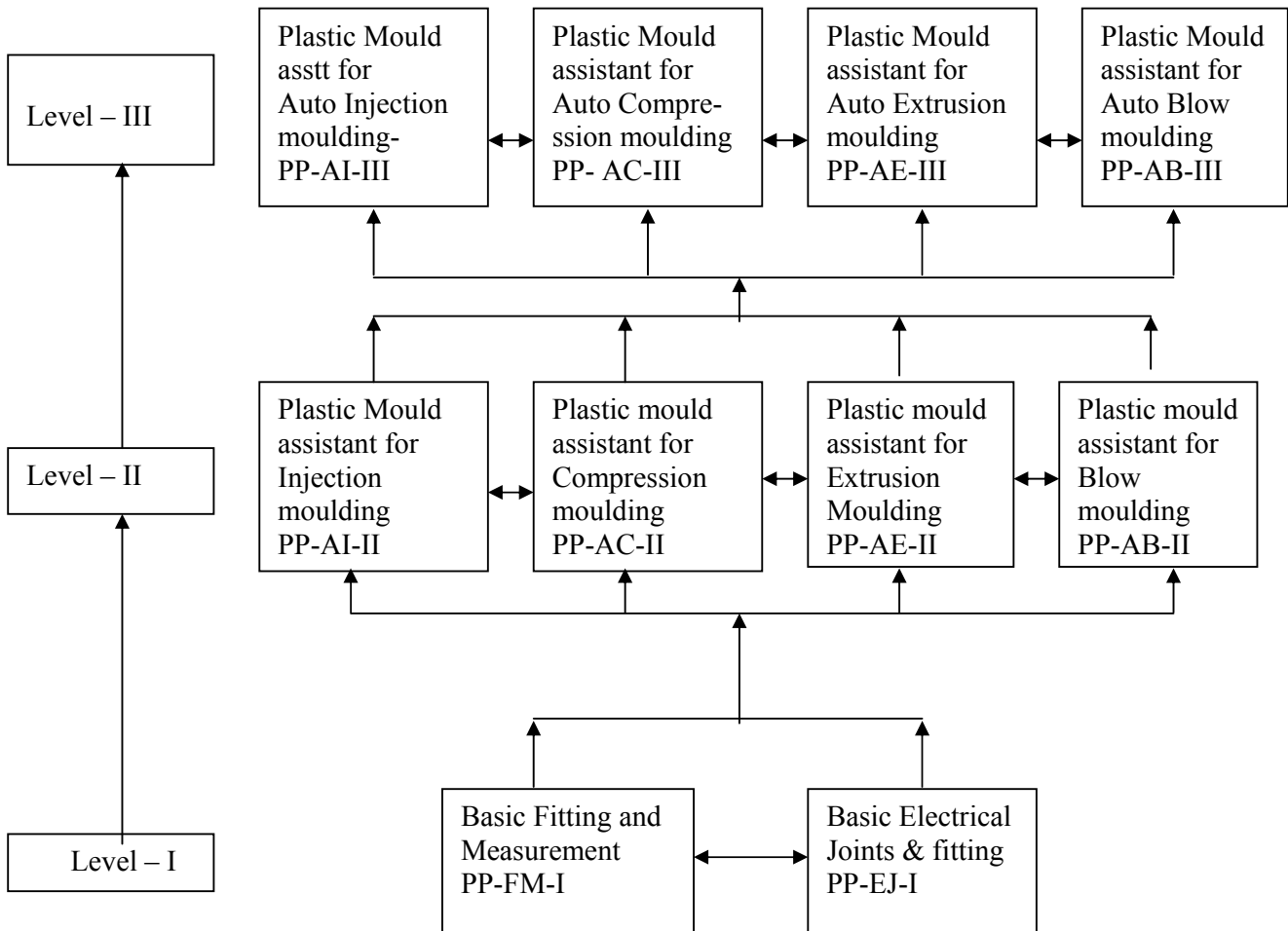
## **Certificate**

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Successful persons will be awarded certificates issued by National Council for Vocational Training (NCVT).

# Course Matrix

## Course Module for Plastic Processing



## MODULES

### Basic Fitting and Measurement

\* **Name** : Basic Fitting and Measurement

\* **Sector** : Plastic Processing Industries

\* **Code** : **PLA101**

\* **Terminal Competency:** On Completion of training the trainee will be able to:

- a) Use of fitter's hand tools, marking of job as per drawing, filing, hack sawing, chipping, drilling, manufacturing of individual components with in an accuracy of  $\pm 0.1$  mm.
- (b) Assembly of individual components maintaining interchangeability.

\* **Duration** : 120 hours

\* **Entry requirement:** a) Qualification: V<sup>th</sup> class.  
b) Age: Minimum 14 years.

#### Course Contents:

Practical Competencies	Underpinning Knowledge (Theory)
<ul style="list-style-type: none"> <li>● Familiarisation with tools and equipment used in the trade.</li> <li>● Carry out safe working practices and demonstrate the use of safety devices</li> <li>● Marking out of straight and parallel lines with the help of odd leg calipers, steel rule, scribing blocks, dividers and hack sawing to a given dimension of different types of metals of different sections.</li> <li>● Filing flat and square to a given dimension to an accuracy of <math>\pm 0.1</math> mm.</li> <li>● Chipping flat surface along a marked line.</li> <li>● Marking and drilling of holes on flat surface, finding centre of round bar with the help of 'V' according to drawing.</li> <li>● Forming external &amp; internal threads with taps &amp; dies.</li> <li>● Exercise on measuring instruments such as for linear measurement - steel rule, caliper, height gauge &amp; for cylindrical diameter – micrometer (inside &amp; outside)</li> <li>● Exercise on angular measuring instruments using combination set &amp; vernier bevel protector.</li> <li>● Finish different components individually and assembling them as per drawing maintaining interchangeability.</li> </ul>	<ul style="list-style-type: none"> <li>● Importance of general safety, machine &amp; electrical safety, shop floor safety observed while working in work shop.</li> <li>● Description of different kinds of hand tools used in bench work - bench vice &amp; hack - saw frames, hacksaw blade, marking &amp; punching tools, chisels, their types use, care and maintenance.</li> <li>● Hammer, punch and chisel-their types and use.</li> <li>● Description of Files- their grades, cuts and uses.</li> <li>● Drilling machine and its types - Bench type, pillar type, radial type, gang and multi spindle drilling machine.</li> <li>● Measuring instruments – vernier caliper, micrometer, height gauges, dial gauge, bevel protector – with its least count calculation.</li> <li>● Description and use of Taps and Die.</li> </ul>

## Basic Electrical Joints & fitting

\* **Name** : Basic Electrical Joints & fitting

\* **Sector** : Plastic Processing Industries

\* **Code** : **PLA102**

\* **Terminal Competency:** On Completion of training the trainee will be able to:

- (a) Fix and connect electrical accessories such as switches, holders, fuse, plugs, sockets etc.
- (b) Study of simple electrical circuit (series and parallel) and knowledge of electrical measuring instrument its function and use.

\* **Duration** : 120 hours

\* **Entry requirement:** a) Qualification: V th class.  
b) Age: Minimum 14 years.

\***Course Contents:**

<b>Practical Competencies</b>	<b>Underpinning Knowledge (Theory)</b>
<ul style="list-style-type: none"><li>● Demonstration about use of safety equipments and artificial respiration.</li><li>● Use of electrical hand tools.</li><li>● Safety precaution about electric joints and electric instruments.</li><li>● Measurements of electric current, voltage, power and energy by using voltmeter, ammeter, wattmeter and energy meter.</li><li>● Practice in fixing and connecting electrical accessories such as switches, holders, fuse, plug and sockets on extension boards.</li><li>● Forming a simple electrical circuits (series and parallel ) measuring insulation resistance and earth resistance.</li></ul>	<ul style="list-style-type: none"><li>● Safety precaution and first aid for electric shock. Common terms used in electrical work conductors and insulators.</li><li>● Electrical Units, insulation and resistance, ohms law and its application.</li><li>● Basic concept about simple electrical circuit - essential requirements of electrical circuit–series and parallel, different types of resistance, fuses, earthing etc.</li><li>● Types, grades and size of insulated wires and cables – their proper selection and use.</li></ul>

## Plastic Mould Assistant (Injection Molding)

- \* **Name** : Plastic Mould Assistant (Injection Molding)
- \* **Sector** : Plastic Processing Industries
- \* **Code** : **PLA203**
- \* **Terminal Competency:** On Completion of training the person will be able to :
- (a) Manually operate plastic processing Injection Moulding machine.
  - (b) Help to running maintenance of manually operate Injection Moulding machine.
- \* **Duration** : 120 hours
- \* **Entry requirement** : a) Qualification: V th class & MES Modules on Basic Fitting and Measurement / Basic Electrical Joints & fitting  
b) Age : Minimum 14 years.

**\*Course Contents:**

<b>Practical Competencies</b>	<b>Underpinning Knowledge (Theory)</b>
<ul style="list-style-type: none"> <li>● Demonstration about personal, machine &amp; electrical safety while working on hand operated injection Moulding machine.</li> <li>● Familiarisation with the mechanical &amp; electrical system of hand operated Injection moulding machine and its different parts and their respective functions.</li> <li>● Operating and controlling of hand operated Injection Moulding Machine in ideal run observation (IRO) - Fitting of mould injector, locking and cooling of mould, adjusting feed of screw or ram, Temperature controlling, fitting and adjusting nozzle, injector pressure and speed).</li> <li>● Operating and controlling of hand operated Injection Moulding Machine in Trial Run Observation (TRO) using thermoplastic material as available.</li> <li>● Operating and controlling of hand operated Injection Moulding Machine in Trial Run Observation (TRO) using thermosetting material as available.</li> <li>● Oiling, Lubrication and preventive maintenance of hand operated injection moulding machine. Identification and Testing of plastic.</li> </ul>	<ul style="list-style-type: none"> <li>● Importance of safety and general precautions observed in plastic processing work shop.</li> <li>● Hand operated Plastic processing Injection Molding Machine's different parts of mould, construction, their function and moulding techniques.</li> <li>● Definition, types, properties and uses of polymer substance such as wood, plastic, rubber, fibers etc.</li> <li>● Group of plastics - Thermoplastic– its properties use and application.</li> <li>● Low and high density polyethylene, polypropylene their properties use and application.</li> <li>● Styrene group of plastic ABS, SAN, PVC, Nylon group, Polycarbonate - properties, uses and application.</li> </ul>

## Plastic Mould Assistant (Compression Moulding)

- \* **Name** : Plastic Mould Assistant (Compression Moulding)
- \* **Sector** : Plastic Processing Industries
- \* **Code** : **PLA204**
- \* **Terminal Competency** : On Completion of training person will be able to:  
 (a) Manually operate plastic processing Compression Moulding machine.  
 (b) Help to running maintenance of manually operate Compression Moulding machine.
- \* **Duration** : 120 hours
- \* **Entry requirement:** a) Qualification: V th class & MES Modules on Basic Fitting and Measurement / Basic Electrical Joints & fitting  
 b) Age : Minimum 14 years.

**\*Course Contents:**

<b>Practical Competencies</b>	<b>Underpinning Knowledge (Theory)</b>
<ul style="list-style-type: none"> <li>● Demonstration about personal, machine &amp; electrical safety while working on compression molding machine.</li> <li>● Familiarisation with mechanical &amp; electrical system of hand operated compression moulding machine - different Parts and their respective functions.</li> <li>● Operating and controlling of hand operated compression moulding machine in IRO (movement of platen top or bottom adjustment and control, adjusting pressure in terms of per – square area, total tonnage, fitting and heating of modules controlling temperature, checking of bulk factor/ density etc.)</li> <li>● Operating and controlling of hand operated compression moulding machine in IRO using thermoplastic and thermosetting material as available.</li> <li>● Oiling, lubricating and preventive maintenance of hand operated compression moulding machine.</li> <li>● Testing method of plastics.</li> </ul>	<ul style="list-style-type: none"> <li>● Importance of safety and general precautions observed in plastic processing work shop.</li> <li>● Hand operated compression moulding machine – its construction, different parts - their function and moulding technique.</li> <li>● Thermosetting plastic material phenol formaldehyde (PE) urea formaldehyde (UF) melamine formaldehyde (MF) polyester based resin – its various form, properties, use and application.</li> <li>● Basic parts of mould and its construction details.</li> <li>● Moulding defects and their remedies.</li> <li>● Identification of plastic</li> <li>● Different plastic testing machines.</li> </ul>

**Plastic Mould Assistant (Extrusion Moulding)**

- \* **Name of the Module** : Plastic Mould Assistant (Extrusion Moulding)
- \* **Sector** : Plastic Processing Industries
- \* **Code** : **PLA205**
- \* **Terminal Competency** : On Completion of training the trainee will be able to:
  - (a) Manually operate plastic processing Extrusion Moulding machine.
  - (b) Help to running maintenance of manually operate Extrusion Moulding machine.
- \* **Duration** : 120 hours
- \* **Entry requirement** : a) Qualification: V th class MES Modules on Basic Fitting and Measurement / Basic Electrical Joints & fitting  
 b) Age : Minimum 14 years.

\* **Course Contents:**

<b>Practical Competencies</b>	<b>Underpinning Knowledge (Theory)</b>
<ul style="list-style-type: none"> <li>● Demonstration about personal, machine &amp; electrical safety while working on hand operated extrusion molding machine.</li> <li>● Familiarisation with mechanical &amp; electrical system of Extrusion machine and its different parts and their respective functions.</li> <li>● Operating of hand operated Extrusion machine in IRO (Changing and cleaning of screws in extruder, adjusting and controlling temperature, adjusting screen pack arrangement, adjusting variable speed, setting and adjusting die head for profile and film etc.)</li> <li>● Operating and controlling of hand operated Extrusion Machine in (TRO) using thermoplastic and thermosetting material as available.</li> <li>● Oiling, lubricating and preventive maintenance of hand operated extrusion moulding machine.</li> <li>● Identification and testing of plastic.</li> </ul>	<ul style="list-style-type: none"> <li>● Importance of safety and general precautions observed in plastic processing work shop.</li> <li>● Hand operated Extrusion machine – its construction, different parts - their function and moulding technique.</li> <li>● Knowledge of multilayer extrusion.</li> <li>● Thermoplastic- polybutylene terephthalate (PBT), polyethylene terephthalate (PET)- their description, properties and use in hand operated extrusion moulding process.</li> <li>● Polyester resin- its properties and use.</li> <li>● Epoxy resin- its properties and use.</li> <li>● Printing technique involved in pipe.</li> <li>● Preventive maintenance, oiling and lubrication of hand operated extrusion machine.</li> </ul>

## Plastic Mould Assistant (Blow Moulding)

- \* **Name of the Module** : Plastic Mould Assistant (Blow Moulding)
- \* **Sector** : Plastic Processing Industries
- \* **Code** : **PLA206**
- \* **Terminal Competency:** On Completion of training the trainee will be able to:  
 (a) Manually operate plastic processing Blow Moulding machine.  
 (b) Help to running maintenance of manually operate Blow Moulding machine.
- \* **Duration** : 120 hours
- \* **Entry requirement** : a) Qualification: V<sup>th</sup> class & MES Modules on Basic Fitting and Measurement / Basic Electrical Joints & fitting  
 b) Age : Minimum 14 years.
- \* **Course Contents :**

<b>Practical Competencies</b>	<b>Underpinning Knowledge (Theory)</b>
<ul style="list-style-type: none"> <li>● Demonstration about personal, machine &amp; electrical safety while working on hand operated blow molding machine.</li> <li>● Familiarization with mechanical &amp; Electrical system of Blow- Molding Machine and its different parts and their respective functions.</li> <li>● Operating and controlling of hand operated Blow-Molding Machine in IRO(Setting of die, adjusting mandrel, controlling and adjusting thickness uniformity).</li> <li>● Operating and controlling of hand operated Blow-Molding Machine in TRO using thermoplastic and thermosetting material as available.</li> <li>● Preventive maintenance of hand operated blow-molding machine-oiling and Lubrication.</li> <li>● Testing of mechanical properties-operating testing machine to determine tensile impact, elongation and compressive strength.</li> <li>● Cup flow testing identification of various plastic in relation to properties.</li> </ul>	<ul style="list-style-type: none"> <li>● Importance of safety and general precautions observed in plastic processing work shop.</li> <li>● Hand operated Blow moulding machine – its construction, different parts - their function and moulding technique.</li> <li>● Polymer - their properties, use and application of LDPE,HDPE,PET, PC.</li> <li>● Foamed plastic - its properties, use and application.</li> <li>● Knowledge of multilayer extrusion blow moulding, extrusion stretch blow moulding, press blow moulding for squeezable container.</li> <li>● Preventive maintenance, oiling and lubrication of hand operated Blow Moulding Machine.</li> <li>● Foamed plastic- its properties, use and application.</li> <li>● Thermoforming – its properties and use.</li> <li>● Concept of different testing machines and their use for testing and quality control with respect to manufacturing parameters.</li> </ul>

## Auto Plastic Mould Assistant (Injection Molding)

- \* **Name** : Auto Plastic Mould Assistant (Injection Molding)
- \* **Sector** : Plastic Processing Industries
- \* **Code** : **PLA307**
- \* **Terminal Competency:** On Completion of training the trainee will be able to:  
 (a) Operate plastic processing auto injection Moulding machine.  
 (b) Help to running maintenance of auto injection Moulding machine.
- \* **Duration** : 120 hours
- \* **Entry requirement:** a) Qualification: V th class + **MES Modules** on Basic Fitting and Measurement / Basic Electrical Joints & fitting /Plastic Mould Assistant (Injection Molding)/Plastic Mould Assistant (Compression Moulding)/Plastic Mould Assistant (Extrusion Moulding)/Plastic Mould Assistant (Blow Moulding)  
 b) Age : Minimum 14 years.

**\*Course Contents:**

<b>Practical Competencies</b>	<b>Underpinning Knowledge (Theory)</b>
<ul style="list-style-type: none"> <li>● Demonstration about personal, machine, electrical &amp; hydraulic safety while working on semi-auto &amp; auto injection Moulding machine.</li> <li>● Familiarisation with the mechanical, electrical and hydraulic system of semi automatic &amp; automatic Injection moulding machine and its different parts and their respective functions.</li> <li>● Operating and controlling of semi automatic Injection Moulding Machine to produce components in different moulds, cycle time, process parameter &amp; study in IRO.</li> <li>● Operating and controlling of automatic Injection Moulding Machine – its process sequence, ejector stroke, tie-bar distance platen sizes, mould clamping arrangements.</li> <li>● Idle Run Observation (IRO) &amp; study of injection unit, clamping system, start up &amp; shut-down procedure, types of nozzle &amp; hydraulic system.</li> <li>● Oiling, Lubrication and preventive maintenance of semi automatic automatic injection moulding machine.</li> </ul>	<ul style="list-style-type: none"> <li>● Importance of safety and general precautions observed in plastic processing work shop.</li> <li>● Types of semi-automatic &amp; automatic Injection Molding Machine their different parts, construction and their function and moulding techniques.</li> <li>● Nomenclature of moulds - its types and material.</li> <li>● Importance of pre-drying of plastic materials.</li> <li>● Setting of mould, process parameters.</li> <li>● Operational requirement of annealing, stress relieving, warp age control.</li> </ul>

## Auto Plastic Mould Assistant (Compression Moulding)

\* **Name** : Auto Plastic Mould Assistant (Compression Moulding)

\* **Sector** : Plastic Processing Industries

\* **Code** : **PLA308**

\* **Terminal Competency** : On Completion of training the trainee will be able to:  
 (a) Operate plastic processing Compression Moulding machine.  
 (b) Help to running maintenance of Compression Moulding machine.

\* **Duration** : 120 hours

\* **Entry requirement** : a) Qualification: V<sup>th</sup> class + **MES Modules** on Basic Fitting and Measurement / Basic Electrical Joints & fitting / Plastic Mould Assistant (Injection Molding)/Plastic Mould Assistant (Compression Moulding)/Plastic Mould Assistant (Extrusion Moulding)/Plastic Mould Assistant (Blow Moulding)  
 b) Age : Minimum 14 years.

**\*Course Contents:**

<b>Practical Competencies</b>	<b>Underpinning Knowledge (Theory)</b>
<ul style="list-style-type: none"> <li>● Demonstration about personal, machine, electrical &amp; hydraulic safety while working on semi automatic &amp; automatic compression molding machine.</li> <li>● Familiarisation with mechanical, electrical and hydraulic system of semi automatic &amp; automatic compression moulding machine – different Parts and their respective functions.</li> <li>● IRO of automatic compression Moulding Machine parts, mould loading / unloading, setting up process and its process variables.</li> <li>● Operating and controlling of compression moulding machine in IRO using thermoplastic and thermoforming material as available.</li> <li>● IRO of Roto Moulding Machine mould loading / unloading, setting up process.</li> <li>● Oiling, lubricating and preventive maintenance of compression moulding &amp; roto moulding machine.</li> <li>● Testing method of plastics.</li> </ul>	<ul style="list-style-type: none"> <li>● Importance of safety and general precautions observed in plastic processing work shop.</li> <li>● Types of semiautomatic &amp; automatic compression moulding machine – its construction, different parts - their function and moulding technique.</li> <li>● Types of transfer moulds its function, limitation, advantages.</li> <li>● Principle of compression moulding of thermoplastic and thermoforming.</li> <li>● Roto moulding machine and its process.</li> </ul>

## Auto plastic Mould Assistant (Extrusion Moulding)

\* **Name** : Auto plastic Mould Assistant (Extrusion Moulding)

\* **Sector** : Plastic Processing Industries

\* **Code** : **PLA309**

\* **Terminal Competency:** On Completion of training the trainee will be able to:  
 (a) Operate plastic processing Extrusion Moulding machine.  
 (b) Help to running maintenance of Extrusion Moulding machine.

\* **Duration** : 120 hours

\* **Entry requirement** : a) Qualification: V<sup>th</sup> class + **MES Modules** on Basic Fitting and Measurement / Basic Electrical Joints & fitting / Plastic Mould Assistant (Injection Molding)/Plastic Mould Assistant (Compression Moulding)/Plastic Mould Assistant (Extrusion Moulding)/Plastic Mould Assistant (Blow Moulding)  
 b) Age : Minimum 14 years.

\* **Course Contents:**

<b>Practical Competencies</b>	<b>Underpinning Knowledge (Theory)</b>
<ul style="list-style-type: none"> <li>● Demonstration about personal, machine, electrical &amp; hydraulic safety while working on semi automatic &amp; automatic extrusion molding machine.</li> <li>● Familiarisation with mechanical, electrical and hydraulic system of semi automatic &amp; automatic extrusion machine and its different parts and their respective functions.</li> <li>● Operating of semi automatic &amp; automatic Extrusion machine in IRO (Setting process parameters, screw speed, nip roller speed, wider speed, blow ratio, control of cooling bubble &amp; air pressure).</li> <li>● Practice of die setting on the machine, sizing techniques, procedure for parameter setting &amp; operation practice to produce pipes.</li> <li>● Practice of operating machines to produce different size of pipes.</li> <li>● Oiling, lubricating and preventive maintenance of semi automatic &amp; automatic extrusion machines.</li> <li>● Identification and testing of plastic.</li> </ul>	<ul style="list-style-type: none"> <li>● Importance of safety and general precautions observed in plastic processing work shop.</li> <li>● Types of semi automatic &amp; automatic extrusion machine – its construction, different parts &amp; their function.</li> <li>● Fundamental knowledge of semi automatic &amp; automatic extrusion process.</li> <li>● Fundamental knowledge about extrusion moulding materials, its behavior.</li> <li>● Simple method of identification of plastic materials.</li> <li>● Basic knowledge about extrusion coating materials, its pretreatment and surface treatment.</li> <li>● Basic knowledge about processing parameter, defects, cause and remedies of trouble shooting for extrusion moulding process.</li> <li>● Simple techniques of reprocessing of plastic waste.</li> </ul>

## Auto Plastic Mould Assistant (Blow Moulding)

- \* **Name** : Auto Plastic Mould Assistant (Blow Moulding)
- \* **Sector** : Plastic Processing Industries
- \* **Code** : **PLA310**
- \* **Terminal Competency**: On Completion of training the trainee will be able to:  
 (a) Operator plastic processing Blow Moulding machine.  
 (b) Help to running maintenance of Blow Moulding machine.
- \* **Duration** : 120 hours
- \* **Entry requirement** : a) Qualification: V th class **MES Modules** on Basic Fitting and Measurement / Basic Electrical Joints & fitting / Plastic Mould Assistant (Injection Molding)/Plastic Mould Assistant (Compression Moulding)/Plastic Mould Assistant (Extrusion Moulding)/Plastic Mould Assistant (Blow Moulding)
- b) Age : Minimum 14 years.

\* **Course Contents:**

<b>Practical Competencies</b>	<b>Underpinning Knowledge (Theory)</b>
<ul style="list-style-type: none"> <li>● Demonstration about personal, machine, electrical &amp; hydraulic safety while working on blow molding machine.</li> <li>● Familiarization with mechanical, Electrical and hydraulic system of semi automatic &amp; automatic blow- molding machine and its different parts and their respective functions.</li> <li>● Operating and controlling of semi automatic &amp; automatic Blow-Molding Machine in IRO (Setting of dies, mould, cycle time and process parameter).</li> <li>● Operating &amp; practice of removing &amp; fix the parison die to produce correct type of blowing system.</li> <li>● Operating and practice of single stage, two stage blow moulding process.</li> <li>● Operation and practice of multilayer blow moulding process.</li> <li>● Operation and practice of dip and press moulding process .</li> </ul>	<ul style="list-style-type: none"> <li>● Importance of safety and general precautions observed in plastic processing work shop.</li> <li>● Fundamental knowledge of Semi automating and automatic Blow moulding machine – its construction, different parts - their function and moulding technique.</li> <li>● Fundamental knowledge of extruded multilayer, die and press Blow moulding machine – its construction, different parts - their function and moulding technique.</li> <li>● Fundamental knowledge of multilayer extrusion blow moulding, extrusion stretch blow moulding, press blow moulding for squeezable container.</li> <li>● Basic knowledge of blow moulds, materials, temperature control during blow moulding process.</li> <li>● Basic knowledge about processing parameter, defects, cause and remedies of trouble shooting for blow moulding process.</li> </ul>

● **List of Tools (For a batch of 16 trainees)**

Sr No.	Name of the Tools & Equipment	Quantity for Instructor	Trainees	Total
1.	Rule steel 15 cm with metric graduations.	1	16	17
2.	Try square 10 cm blade.	1	16	17
3.	Outside spring caliper.15 cm	1	16	17
4.	Inside spring caliper 15 cm	1	16	17
5.	Divider 15 cm spring.	1	16	17
6.	Scriber 15 cm.	1	16	17
7.	Punch Centre 10 cm.	1	16	17
8.	Screw driver 15 cm.	1	16	17
9.	Chisel cold 10.	1	16	17
10.	Hammer ball pein 0.45 kg with handle.	1	16	17
11.	Hammer ball pein 0.22 kg with handle.	1	16	17
12.	File flat 25 cm second cut.	1	16	17
13.	File flat 25 cm smooth.	1	16	17
14.	File half round 2nd cut 15 cm.	1	16	17
15.	Hacksaw frame adjustable 20-30 cm.	1	16	17
16.	Safety goggles.	1	16	17
17.	Dot slot punch.	1	16	17

**Instruments & General Shop Outfit per Unit**

1.	Plate surface 45 cm * 45 cm	2
2.	Marking table 91 * 91 * 122 cm height	1
3.	Portable hand drill (electric) 0 to 6 mm	2
4.	Drill brace hand o to 12 mm	2
5.	Drill twist S/S 1.5 to 12 mm by 0.4 mm	1 set.
6.	Drill twist S/S 8 mm to 15 mm by ½ mm	1 set.
7.	Taps and dies complete set in box B.S.F.	1
8.	Taps and dies complete set in box (Metric)	1
9.	Micrometer 25-50 mm outside	3
10.	Vernier caliper 20 cm	1
11.	Vice Bench 12 cm jaw	16
12.	Bench working L:240 cm * W:120 cm * H:75 cm	4
13.	Lockers with 8 drawers (standard size)	2
14.	Almirah 180 CM * 90 cm * 30 cm	2
15.	Metal rack 182 cm * 182 cm * 45 cm	1
16.	Black Board	1
17.	Fire extinguisher (For 4 units)	2
18.	Fire buckets	2
19.	Hand hammer 1 kg with handle	2
20.	Rule wooden 4 fold 600 mm	2
21.	Saw tennon 250 mm	2
22.	C-Clamps ( 100 mm,150 mm and 200 mm )	2 each
23.	Drill Machine hand 6 mm cap	2
24.	Rawal plug tool and kit	2 sets
25.	Ammeter 1 ma to 500 ma DC	10
26.	Ammeter 0 to 1 Amp. DC	10
27.	Volt Meter 0-300 V A.C.	10 Nos.
28.	A.C. Ammeter 0.5 & 0.25 Amp.	5 each

29. Magger 500 volts	1
30. Electric switches, fuses, holders, lamps, teak wood boards, plug sockets, solder, flux, wires and cables, batters, round blicks and other consumables.	As required.

• **Machinery**

1. Drilling Machine Pilar Sensitive 0-20 mm cap. With swivel table motorized with chuck & key.	1
2. Grinding machine (General purpose) D.E. pedestal with 20 cm dia. Wheels rough & smooth with twist drill grinding attachment.	1
3. 30 mm extruder with downstream lines such as film pipe with re-processing unit to process PVC, IDP & RDP.	1
4. Auto Injection Moulding Machine 40 T Cap.	1
5. Hand operated injection moulding machines	
(a) 13 grams capacity	1
(b) 30 grams capacity	1
(c) 60 grams capacity	1
6. Hand operated compression moulding machines 40 T Cap.	1
7. Automatic compression press 100 T cap. with moulds.	1
8. Pipe extrusion machine	1
9. Hand operated Blow Moulding Machine ---	
(a) 1 litre capacity	1
(b) 3 litre capacity	1
10. Full automatic double stage blow moulding machine with multilayer extrusion with accessories	1
11. Test Equipment (Tensile, MFI, Hardness, Izod, Impact identifying unit etc. )	1 set
12. Accessories & moulds including scrap grinder	1 set
13. Hand operated compression moulding machine 60 ton cap.	1 No.
14. Preheater 12 trays of 25 kgs. capacity.	1 No.

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### CURRICULUM DEVELOPMENT FOR SHORT TERM COURSES BASED ON MODULAR EMPLOYABLE SKILLS

SECTOR/AREA: Plastic Processing

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