

**Curriculum**  
**For**  
**“Dies and Moulds Technology”**  
**(Associate Engineer)**  
**(Level-5)**



**National Vocational & Technical**  
**Training Commission**

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## **Introduction**

### **Definition/ Description of the training programme for *Dies and Moulds Technology***

There is an increasing demand of the Dies and Moulds technologist. If an individual is planning to pursue a career in Dies and Moulds technology, this program will be helpful in targeting various industries including mechanical, electrical, automobile, hydraulics, computers, home appliances, ceramics, household products, plastic (especially furniture, Food packaging, crockery and aerospace sector) etc.

### **Purpose of the training programme**

The purpose of this training is to develop a range of skills and techniques, personal skills and attributes essential for successful performance in Dies & Mould sector in accordance with industry requirements. Graduates of this program may find employment in local and international industries

### **Overall objectives of training programme**

The main objective of this training program is to improve the employability of young graduates through qualifying job-related training in the Dies & Mould sector, and to train them so that they can prove to be an asset to this sector.

### **Competencies to be gained after completion of course**

- Design Moulds
- Design Dies
- Manufacture Dies and Moulds components
- Perform Dies & Moulds Assembly and Try outs
- Practice Professionalism

### **Possible available job opportunities available immediately and later in the future**

- Die & Mould Maker
- Dies & Mould Designer
- CNC Programmer
- CAD/CAM Programmer

- Workshop Supervisor
- Charge Man
- Associate Engineer

### **Trainee entry level**

For National Vocational Certificate Level-5 in Associate Engineer in Dies and Moulds Technology, the entry requirement is award of National Vocational Certificate Level-4 in “CAD/CAM Supervisor”.

### **Minimum qualification of trainer**

Teaching staff should have at least five years’ experience in Dies & Mould. They should also hold or be working towards a formal teaching qualification.

Other formal qualifications in the Dies & Mould would be useful in addition to the above.

### **Recommended trainer: trainee ratio**

The recommended maximum trainer: trainee ratio for this programme is 1 trainer for 25 trainees.

### **Medium of instruction i.e. language of instruction**

Instruction will be Urdu and English.

### **Duration of the course (Total time, Theory & Practical time)**

<b>Module</b>	<b>Theory<sup>1</sup> Days/hours</b>	<b>Workplace<sup>2</sup> Days/hours</b>	<b>Total hours</b>
<b>Module 1: Design Moulds</b>	80	120	200

<sup>1</sup> Learning Module hours in training provider premises

<sup>2</sup> Training workshop, laboratory and on-the-job workplace

<b>Module 2:</b> Design Dies	40	60	100
<b>Module 3:</b> Manufacture Die and Mould Components	120	180	300
<b>Module 4:</b> Perform Dies & Moulds Assembly and Try outs	160	240	400
<b>Module 5:</b> Practice Professionalism	80	120	200

This curriculum comprises 9 modules. The recommended delivery time is 1200 hours. Delivery of the course could therefore be full time, 5 days a week. Training providers are at liberty to develop other models of delivery, including part-time and evening delivery.

The full structure of the course is as follow:

### Sequence of the Modules

Each module covers a range of learning components. These are intended to provide detailed guidance to teachers (for example the Learning Elements component) and give them additional support for preparing their lessons (for example the Materials Required component). The detail provided by each module will contribute to a standardized approach to teaching, ensuring that training providers in different parts of the country have clear information on what should be taught. Each module also incorporates the industrial needs of Pakistan.

The distribution table is shown below:

<b>Module 1:</b> Design Moulds 200 Hours	<b>Module2:</b> Design Dies 100 Hours	<b>Module3:</b> Manufacture Dies and Moulds 300 Hours
<b>Module 4:</b> Perform Dies & Moulds Assembly and Try outs 400 Hours	<b>Module 5:</b> Practice Professionalism 200 Hours	

## Summary – overview of the curriculum

Module Title and Aim	Learning Units	Theory Days/hours	Workplace Days/hours	Timeframe of modules
<b>Module 1:</b> Design Moulds  <b>Aim:</b> After successful completion of this module, the trainee is competent in designing Moulds	<b>LU1:</b> Design a Blow Mould using appropriate CAD software <b>LU2:</b> Design an Injection Mould using appropriate CAD software <b>LU3:</b> Design a Die Casting Mould using appropriate CAD software <b>LU4:</b> Design a Vacuum Mould using appropriate CAD software	80	120	200
<b>Module 2:</b> Design Dies  <b>Aim:</b> After successful completion of this module, the trainee is competent in designing Dies	<b>LU1:</b> Design a Piercing Die using appropriate CAD software <b>LU2:</b> Design a Blanking Die using appropriate CAD software <b>LU3:</b> Design a Forming Die using appropriate CAD software	40	60	100
<b>Module 3:</b> Manufacture Die and Mould Components  <b>Aim:</b> After successful completion of this module, the trainee is competent in manufacturing Die and Mould Components	<b>LU1:</b> Perform Operational Planning <b>LU2:</b> Carry out machining operations of Mould components <b>LU3:</b> Carry out machining operations of die components	120	180	300
<b>Module 4:</b> Perform Dies & Moulds Assembly and Try outs  <b>Aim:</b> After successful completion of this module, the trainee is competent in performing Dies & Moulds Assembly and Try outs	<b>LU1:</b> Perform Moulds Assembly and Try out <b>LU2:</b> Perform Dies Assembly and Try out	160	240	400

Module Title and Aim	Learning Units	Theory Days/hours	Workplace Days/hours	Timeframe of modules
<b>Module 5:</b> Practice Professionalism  <b>Aim:</b> After successful completion of this module, the trainee is competent in Practicing Professionalism	<b>LU1:</b> Develop Portfolio for industry <b>LU2:</b> Perform Internship	80	120	200



## Modules

### Module1: Design Moulds

**Objective of the module:** The aim of this module is to get knowledge, skills and understanding to design Moulds.

**Duration:** 200 hrs.

**Theory:** 80hrs.

**Practical:** 120 hrs.

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
<b>LU1:</b> Design a Blow Mould using appropriate CAD software	<b>The trainee will be able to:</b> <ol style="list-style-type: none"> <li>1. Prepare a 3D Model for Blow Mould and detailed drawings of required workpiece</li> <li>2. Prepare a conceptual Design of Blow Mould as per size of the machine</li> <li>3. Prepare 3D part and assembly modelling of all components of blow Mould according to conceptual design</li> <li>4. Prepare 2D assembly drawings and detailed drawings of all components of blow Mould</li> <li>5. Prepare a Bill of Quantity (BOQ) of all components of Blow Mould as per final design</li> </ol>	<ul style="list-style-type: none"> <li>• Introduction to Blow Moulding</li> <li>• Types of materials for Blow Moulding</li> <li>• Describe Basic structure of Blow Mould and its components</li> <li>• Standard procedures to design a Blow Mould, including:               <ul style="list-style-type: none"> <li>○ Preparation of 3D Model of product and detailed drawings for which blow Mould is required</li> <li>○ Preparation of conceptual design of Blow Mould as per size of the machine and product</li> <li>○ Preparation of shrinkage added model of product</li> <li>○ Preparation of 3D part and assembly modelling of all components of blow Mould according to conceptual design</li> <li>○ Preparation of 2D assembly</li> </ul> </li> </ul>	<b>Total:</b> 40hrs <b>Theory:</b> 16hrs <b>Practical:</b> 24hrs	<ul style="list-style-type: none"> <li>• Notebooks</li> <li>• Pencils</li> <li>• Erasers</li> <li>• Sharpeners</li> <li>• Pen</li> <li>• White board</li> <li>• Multimedia</li> <li>• Internet</li> <li>• Computer system</li> <li>• 3D Scanner</li> <li>• Measuring tools</li> </ul>	<ul style="list-style-type: none"> <li>• Class Room</li> <li>• Workshop</li> </ul>

		<p>drawings and detailed drawings of all components of blow Mould</p> <ul style="list-style-type: none"> <li>○ Preparation of a Bill of Quantity (BOQ) of all components of Blow Mould as per final design</li> <li>○ Verification and approval of the Blow Mould Design</li> </ul> <p><b><u>Practical Activity:</u></b></p> <ul style="list-style-type: none"> <li>• Prepare a design of Blow Mould of given product (assigned by instructor) following the complete mould designing procedure</li> <li>• Prepare complete set of assembly, part drawings and BOQ</li> </ul>			
<b>LU2:</b> Design an Injection Mould using appropriate CAD software	<p><b>The trainee will be able to:</b></p> <ol style="list-style-type: none"> <li>1. Prepare a 3D Model for Injection Mould and detailed drawings of required workpiece</li> <li>2. Prepare a conceptual Design of Injection Mould as per size of the machine</li> <li>3. Prepare 3D part and assembly modelling of all components of Injection Mould according to conceptual design</li> <li>4. Prepare 2D assembly drawings and detailed</li> </ol>	<ul style="list-style-type: none"> <li>• Introduction to Injection Moulding</li> <li>• Classification of Injection Moulds (2/3 Plate Mould, Cold/Hot runner Mould, etc.)</li> <li>• Describe Basic structure of Injection Mould and its components</li> <li>• Types of materials for Injection Moulding</li> <li>• Types of materials for Injection Moulds</li> <li>• Describe Gating and Runner Systems</li> <li>• Describe Cooling Systems</li> </ul>	<p><b>Total:</b> 60hrs <b>Theory:</b> 24hrs <b>Practical:</b> 36hrs</p>	<ul style="list-style-type: none"> <li>• Notebooks</li> <li>• Pencils</li> <li>• Erasers</li> <li>• Sharpeners</li> <li>• Pen</li> <li>• White board</li> <li>• Multimedia</li> <li>• Internet</li> <li>• Computer system</li> <li>• 3D Scanner</li> <li>• Measuring</li> </ul>	<ul style="list-style-type: none"> <li>• Class Room</li> <li>• Workshop</li> </ul>

	<p>drawings of all components of Injection Mould</p> <p>5. Prepare a Bill of Quantity (BOQ) of all components of Injection Mould as per final design</p>	<ul style="list-style-type: none"> <li>• Describe Ejection Systems</li> <li>• Describe Air Vents</li> <li>• Calculation of Clamping Force and injection capacity for Injection Mould</li> <li>• Mould strength calculations</li> <li>• Standard procedures to design Injection Mould, including:               <ul style="list-style-type: none"> <li>○ Preparation of 3D Model of product and detailed drawings for which Injection Mould is required</li> <li>○ Preparation of conceptual design of Injection Mould as per size of the machine and product</li> <li>○ Preparation of shrinkage added model of product</li> <li>○ Extraction of core and cavity model from shrinkage added product model</li> <li>○ Preparation of 3D parts and assembly modelling of all components of Injection Mould according to conceptual design and standard sizes of Mould base</li> <li>○ Preparation of 2D assembly drawings and detailed drawings of all components of Injection Mould</li> <li>○ Preparation of a Bill of Quantity (BOQ) of all</li> </ul> </li> </ul>		tools	
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		<p>components of Injection Mould as per final design</p> <ul style="list-style-type: none"> <li>○ Verification and approval of the Injection Mould Design</li> </ul> <p><b>Practical Activity:</b></p> <ul style="list-style-type: none"> <li>• Prepare a design of injection Mould of given product (assigned by instructor) following the complete mould designing procedure</li> <li>• Prepare complete set of assembly, part drawings and BOQ</li> </ul>			
<p><b>LU3:</b> Design a Die Casting Mould using appropriate CAD software</p>	<p><b>The trainee will be able to</b></p> <ol style="list-style-type: none"> <li>1. Prepare a 3D Model for Die Casting and detailed drawings of required workpiece</li> <li>2. Prepare a conceptual Design of Die Casting Mould as per size of the machine</li> <li>3. Prepare 3D part and assembly modelling of all components of Die Casting according to conceptual design</li> <li>4. Prepare 2D assembly drawings and detailed drawings of all components of Die Casting Mould</li> <li>5. Prepare a Bill of Quantity (BOQ) of all components of</li> </ol>	<ul style="list-style-type: none"> <li>• Introduction to Die Casting Moulding</li> <li>• Classification of Die Casting Moulds (Hot chambered, Cold Chambered)</li> <li>• Describe Basic structure of Die Casting Mould and its components</li> <li>• Types of materials for Die Casting Moulding</li> <li>• Types of materials for Die Casting Moulds</li> <li>• Describe Gating and Runner Systems</li> <li>• Describe Cooling Systems</li> <li>• Describe Ejection Systems</li> <li>• Describe Riser and Air Vents</li> <li>• Calculation of Clamping Force and Die Casting capacity for Die Casting Mould</li> </ul>	<p><b>Total:</b> 60hrs <b>Theory:</b> 24hrs <b>Practical:</b> 36hrs</p>	<ul style="list-style-type: none"> <li>• Notebooks</li> <li>• Pencils</li> <li>• Erasers</li> <li>• Sharpeners</li> <li>• Pen</li> <li>• White board</li> <li>• Multimedia</li> <li>• Internet</li> <li>• Computer system</li> <li>• 3D Scanner</li> <li>• Measuring tools</li> </ul>	<ul style="list-style-type: none"> <li>• Class Room</li> <li>• Workshop</li> </ul>

	Die Casting Mould as per final design	<ul style="list-style-type: none"> <li>• Mould strength calculations</li> <li>• Standard procedures to design Die Casting Mould, including: <ul style="list-style-type: none"> <li>○ Preparation of 3D Model of product and detailed drawings for which Die Casting Mould is required</li> <li>○ Preparation of conceptual design of Die Casting Mould as per size of the machine and product</li> <li>○ Preparation of shrinkage added model of product</li> <li>○ Extraction of core and cavity model from shrinkage added product model</li> <li>○ Preparation of 3D parts and assembly modelling of all components of Die Casting Mould according to conceptual design and standard sizes of Mould base</li> <li>○ Preparation of 2D assembly drawings and detailed drawings of all components of Die Casting Mould</li> <li>○ Preparation of a Bill of Quantity (BOQ) of all components of Injection Mould as per final design</li> <li>○ Verification and approval of the Die Casting Mould Design</li> </ul> </li> </ul>			
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		<b><u>Practical Activity:</u></b> <ul style="list-style-type: none"> <li>• Prepare a design of Die Casting Mould of given product (assigned by instructor) following the complete mould designing procedure</li> <li>• Prepare complete set of assembly, part drawings and BOQ</li> </ul>			
<b>LU4:</b> Design a Vacuum Mould using appropriate CAD software	<b>The trainee will be able to:</b> <ol style="list-style-type: none"> <li>1. Prepare a 3D Model for Vacuum Mould and detailed drawings of required workpiece</li> <li>2. Prepare a conceptual Design of Vacuum Mould as per required product</li> <li>3. Prepare 3D part and assembly modelling of all components of Vacuum Mould according to conceptual design</li> <li>4. Prepare 2D assembly drawings and detailed drawings of all components of Vacuum Mould</li> <li>5. Prepare a Bill of Quantity (BOQ) of all components of Vacuum Mould as per final design</li> </ol>	<ul style="list-style-type: none"> <li>• Introduction to Vacuum Moulding</li> <li>• Types of materials for Vacuum Moulding</li> <li>• Describe Basic structure of Vacuum Mould and its components</li> <li>• Standard procedures to design a Vacuum Mould, including: <ul style="list-style-type: none"> <li>◦ Preparation of 3D Model of product and detailed drawings for which Vacuum Mould is required</li> <li>◦ Preparation of conceptual design of Vacuum Mould as per size of the machine and product</li> <li>◦ Preparation of shrinkage added model of product</li> <li>◦ Preparation of 3D part and assembly modelling of all components of Vacuum Mould according to</li> </ul> </li> </ul>	<b>Total:</b> 40hrs <b>Theory:</b> 16hrs <b>Practical:</b> 24hrs	<ul style="list-style-type: none"> <li>• Notebooks</li> <li>• Pencils</li> <li>• Erasers</li> <li>• Sharpeners</li> <li>• Pen</li> <li>• White board</li> <li>• Multimedia</li> <li>• Internet</li> <li>• Computer system</li> <li>• 3D Scanner</li> <li>• Measuring tools</li> </ul>	<ul style="list-style-type: none"> <li>• Class Room</li> <li>• Workshop</li> </ul>

		<p>conceptual design</p> <ul style="list-style-type: none"> <li>○ Preparation of 2D assembly drawings and detailed drawings of all components of Vacuum Mould</li> <li>○ Preparation of a Bill of Quantity (BOQ) of all components of Vacuum Mould as per final design</li> <li>○ Verification and approval of the Vacuum Mould Design</li> </ul> <p><b><u>Practical Activity:</u></b></p> <ul style="list-style-type: none"> <li>• Prepare a design of vacuum Mould of given product (assigned by instructor) following the complete mould designing procedure</li> <li>• Prepare complete set of assembly, part drawings and BOQ</li> </ul>			
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## Module 2: Design Dies

**Objective of the module:** The aim of this module is to get knowledge, skills and understanding required for Dies Design.

**Duration:** 100 hrs.

**Theory:** 40 hrs.

**Practical:** 60 hrs.

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
<b>LU1:</b> Design a Piercing Die using appropriate CAD software	<p><b>The trainee will be able to:</b></p> <ol style="list-style-type: none"> <li>1. Prepare a 3D Model for Piercing Die and detailed drawings of required workpiece</li> <li>2. Prepare a conceptual Design of Piercing Dies per size of the press machine</li> <li>3. Prepare 3D part and assembly modelling of all components of Piercing Die according to conceptual design</li> <li>4. Prepare 2D assembly drawings and detailed drawings of all components of Piercing Die</li> <li>5. Prepare a Bill of Quantity (BOQ) of all components of Piercing Die as per final design</li> </ol>	<ul style="list-style-type: none"> <li>• Introduction to Die and different types of Die (Sheet Metal, Forging, Drawing, Bending/forming, etc.)</li> <li>• Describe Basic structure of Piercing Die and its components</li> <li>• Materials for Piercing Die and their heat treatment processes taking into consideration of Die life</li> <li>• Calculation of the Piercing punch and Die sizes considering the elastic recovery of the material, shearing forces, shear geometry, sheet thickness, Die block thickness, Die punch clearance, etc.</li> <li>• Standard procedures to design a Piercing Die, including: <ul style="list-style-type: none"> <li>○ Preparation of 3D Model for Piercing Die and detailed drawings of required workpiece</li> <li>○ Preparation of a conceptual Design of Piercing Die as per size of the press size/requirement</li> <li>○ Preparation of 3D part and</li> </ul> </li> </ul>	<p><b>Total:</b> 30 hrs <b>Theory:</b> 12 hrs <b>Practical:</b> 18 hrs</p>	<ul style="list-style-type: none"> <li>• Notebooks</li> <li>• Pencils</li> <li>• Erasers</li> <li>• Sharpeners</li> <li>• Pen</li> <li>• White board</li> <li>• Multimedia</li> <li>• Internet</li> <li>• Computer system</li> <li>• 3D Scanner</li> <li>• Measuring tools</li> </ul>	<ul style="list-style-type: none"> <li>• Class Room</li> <li>• Workshop</li> </ul>



		<p>assembly modelling of all components of Piercing Die according to conceptual design</p> <ul style="list-style-type: none"> <li>○ Preparation of 2D assembly drawings and detailed drawings of all components of Piercing Die</li> <li>○ Preparation of a Bill of Quantity (BOQ) of all components of Piercing Die as per final design</li> <li>○ Verification and approval of the Piercing Die Design</li> </ul> <p><b><u>Practical Activity:</u></b></p> <ul style="list-style-type: none"> <li>• Prepare a design of Piercing Die of given product (assigned by instructor) following the complete mould designing procedure</li> <li>• Prepare complete set of assembly, part drawings and BOQ</li> </ul>			
<p><b>LU2:</b> Design a Blanking Die using appropriate CAD software</p>	<p><b>The trainee will be able to:</b></p> <ol style="list-style-type: none"> <li>1. Prepare a 3D Model for Blanking Die and detailed drawings of required workpiece</li> <li>2. Prepare a conceptual Design of Blanking Die as per size of the press machine</li> <li>3. Prepare 3D part and assembly modelling of all components of</li> </ol>	<ul style="list-style-type: none"> <li>• Describe Basic structure of Blanking Die and its components</li> <li>• Difference between Piercing and Blanking Dies</li> <li>• Materials for Blanking Die and their heat treatment processes taking into consideration of Die life</li> <li>• Calculation of the Blanking punch and Die sizes considering the elastic recovery of the material, shearing forces, shear geometry, sheet thickness, Die block thickness, Die punch clearance,</li> </ul>	<p><b>Total:</b> 30 hrs <b>Theory:</b> 12 hrs <b>Practical:</b> 18 hrs</p>	<ul style="list-style-type: none"> <li>• Notebooks</li> <li>• Pencils</li> <li>• Erasers</li> <li>• Sharpeners</li> <li>• Pen</li> <li>• White board</li> <li>• Multimedia</li> <li>• Internet</li> <li>• Computer system</li> <li>• 3D Scanner</li> </ul>	<ul style="list-style-type: none"> <li>• Class Room</li> <li>• Workshop</li> </ul>

	Blanking Die according to conceptual design <b>4.</b> Prepare 2D assembly drawings and detailed drawings of all components of Blanking Die <b>5.</b> Prepare a Bill of Quantity (BOQ) of all components of Blanking Die as per final design	etc <ul style="list-style-type: none"> <li>Standard procedures to design a Blanking Die, including: <ul style="list-style-type: none"> <li>Preparation of 3D Model for Blanking Die and detailed drawings of required workpiece</li> <li>Preparation of a conceptual Design of Blanking Die per size of the press size/requirement</li> <li>Preparation of 3D part and assembly modelling of all components of Blanking Die according to conceptual design</li> <li>Preparation of 2D assembly drawings and detailed drawings of all components of Blanking Die</li> <li>Preparation of a Bill of Quantity (BOQ) of all components of Blanking Die as per final design</li> <li>Verification and approval of the Blanking Die Design</li> </ul> </li> </ul> <p><b><u>Practical Activity:</u></b></p> <ul style="list-style-type: none"> <li>Prepare a design of Blanking Die of given product (assigned by instructor) following the complete mould designing procedure</li> <li>Prepare complete set of assembly, part drawings and BOQ</li> </ul>		<ul style="list-style-type: none"> <li>Measuring tools</li> </ul>	
<b>LU3:</b> Design a	<b>The trainee will be able</b>		<b>Total:</b>		<ul style="list-style-type: none"> <li>Class Room</li> </ul>

Forming Die using appropriate CAD software	<p><b>to:</b></p> <ol style="list-style-type: none"> <li>1. Prepare a 3D Model for Forming Die and detailed drawings of required workpiece</li> <li>2. Prepare a conceptual Design of Forming Die as per size of the press machine</li> <li>3. Prepare 3D part and assembly modelling of all components of Forming Die according to conceptual design</li> <li>4. Prepare 2D assembly drawings and detailed drawings of all components of Forming Die</li> <li>5. Prepare a Bill of Quantity (BOQ) of all components of Forming Die as per final design</li> </ol>	<ul style="list-style-type: none"> <li>• Introduction to Forming Die</li> <li>• Describe Basic structure of Forming Die and its components</li> <li>• Materials for Forming Die and their heat treatment processes taking into consideration of Die life</li> <li>• Calculation of the Blank size, Forming punch and Die sizes considering the elastic recovery of the material, bending forces, sheet thickness, Die block thickness, Die punch clearance, etc.</li> <li>• Standard procedures to design a Forming Die, including: <ul style="list-style-type: none"> <li>◦ Preparation of 3D Model for Forming Die and detailed drawings of required workpiece</li> <li>◦ Preparation of blank drawing</li> <li>◦ Preparation of a conceptual Design of Forming Die as per press size/requirement</li> <li>◦ Preparation of 3D part and assembly modelling of all components of Forming Die according to conceptual design</li> <li>◦ Preparation of 2D assembly drawings and detailed drawings of all components of Forming Die</li> <li>◦ Preparation of a Bill of Quantity (BOQ) of all components of Forming Die as per final design</li> <li>◦ Verification and approval of the Forming Die Design</li> </ul> </li> </ul>	<p>40 hrs  <b>Theory:</b>  16 hrs  <b>Practical:</b>  24 hrs</p>	<ul style="list-style-type: none"> <li>• Notebooks</li> <li>• Pencils</li> <li>• Erasers</li> <li>• Sharpeners</li> <li>• Pen</li> <li>• White board</li> <li>• Multimedia</li> <li>• Internet</li> <li>• Computer system</li> <li>• 3D Scanner</li> <li>• Measuring tools</li> </ul>	<ul style="list-style-type: none"> <li>• Workshop</li> </ul>
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		<b><u>Practical Activity:</u></b> <ul style="list-style-type: none"> <li>• Prepare a design of Forming Die of given product (assigned by instructor) following the complete mould designing procedure</li> <li>• Prepare complete set of assembly, part drawings and BOQ</li> </ul>			
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### Module 3: Manufacture Dies and Moulds

**Objective of the module:** The aim of this module is to get knowledge, skills and understanding to perform manufacturing Dies and Moulds

**Duration:** 300 hrs.

**Theory:**120 hrs

**Practical:** 180 hrs.

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1: Perform Operational Planning	<b>The trainee will be able to:</b> <ol style="list-style-type: none"> <li>1. Interpret engineering drawing of required part</li> <li>2. Calculate sizes of material required for the work piece</li> <li>3. Create a list of required tools</li> <li>4. Allocate estimated time for each operation</li> <li>5. Perform Sequencing of manufacturing process of each part</li> </ol>	<ul style="list-style-type: none"> <li>• Project planning</li> <li>• Interpretation of engineering drawing of each part</li> <li>• Calculation of material sizes required for each part</li> <li>• Required machines, tools and equipment for each part</li> <li>• Time allocation for each process</li> <li>• Sequencing of manufacturing process of each part and heat treatment where required</li> <li>• Scheduling of all parts manufacturing</li> </ul> <p><b><u>Practical Activity:</u></b></p> <ul style="list-style-type: none"> <li>• Prepare process plan for manufacturing parts of Dies/ Moulds on various machines</li> </ul>	<b>Total:</b> 40hrs <b>Theory:</b> 16hrs <b>Practical:</b> 24hrs	<ul style="list-style-type: none"> <li>• Notebooks</li> <li>• Pencils</li> <li>• Erasers</li> <li>• Sharpeners</li> <li>• Pen</li> <li>• Raw materials</li> <li>• Cutters</li> <li>• Grinding discs</li> <li>• Coolants</li> <li>• Lubricants</li> <li>• Cotton rags</li> <li>• PPEs'</li> <li>• White board</li> <li>• Multimedia</li> <li>• Internet</li> <li>• Computer system</li> <li>• Measuring tools</li> </ul>	<ul style="list-style-type: none"> <li>• Class Room</li> <li>• Workshop</li> </ul>

				<ul style="list-style-type: none"> <li>• Clamping tools</li> <li>• Grinders</li> <li>• Lathe Machines (CNC/Conventional)</li> <li>• Milling Machines (CNC/Conventional)</li> <li>• Drill Machines</li> <li>• Shaper</li> <li>• EDM</li> <li>• Heat treatment furnaces</li> <li>• Welding Plant</li> </ul>	
<b>LU2:</b> Carry out machining operations of Mould components	<b>The trainee will be able to:</b> <ol style="list-style-type: none"> <li>1. Manufacture all components of Mould as per process plan according to design requirements</li> <li>2. Perform inspection of final parts and perform rectification accordingly</li> </ol>	<ul style="list-style-type: none"> <li>• Manufacturing process of all components of Mould as per process plan and schedule</li> <li>• Progress Monitoring</li> <li>• Inspection of all parts (In process and final)</li> <li>• Rectification/amendments according to inspection results</li> </ul> <p><b><u>Practical Activity:</u></b></p> <ul style="list-style-type: none"> <li>• Execute manufacturing process for all parts of Moulds on various machines according to design requirement</li> </ul>	<b>Total:</b> 165hrs <b>Theory:</b> 66hrs <b>Practical:</b> 99hrs	<ul style="list-style-type: none"> <li>• Notebooks</li> <li>• Pencils</li> <li>• Erasers</li> <li>• Sharpeners</li> <li>• Pen</li> <li>• Raw materials</li> <li>• Cutters</li> <li>• Grinding discs</li> <li>• Coolants</li> <li>• Lubricants</li> <li>• Cotton rags</li> </ul>	<ul style="list-style-type: none"> <li>• Class Room</li> <li>• Workshop</li> </ul>

				<ul style="list-style-type: none"> <li>• PPEs'</li> <li>• White board</li> <li>• Multimedia</li> <li>• Internet</li> <li>• Computer system</li> <li>• Measuring tools</li> <li>• Clamping tools</li> <li>• Grinders</li> <li>• Lathe Machines (CNC/Conventional)</li> <li>• Milling Machines (CNC/Conventional)</li> <li>• Drill Machines</li> <li>• Shaper</li> <li>• EDM</li> <li>• Heat treatment furnaces</li> <li>• Welding Plant</li> </ul>	
<b>LU3:</b> Carry out machining operations of die components	<b>The trainee will be able to:</b> <ol style="list-style-type: none"> <li>1. Manufacture all components of</li> </ol>	<ul style="list-style-type: none"> <li>• Manufacturing process of all components of Die as per process plan and schedule</li> </ul>	<b>Total:</b> 95hrs <b>Theory:</b> 38hrs	<ul style="list-style-type: none"> <li>• Notebooks</li> <li>• Pencils</li> <li>• Erasers</li> </ul>	<ul style="list-style-type: none"> <li>• Class Room</li> <li>• Workshop</li> </ul>

	<p>Die as per process plan according to design requirements</p> <p><b>2.</b> Perform inspection of final parts and perform rectification accordingly</p>	<ul style="list-style-type: none"> <li>• Progress Monitoring</li> <li>• Inspection of all parts (In process and final)</li> <li>• Rectification/amendments according to inspection results</li> </ul> <p><b><u>Practical Activity:</u></b></p> <ul style="list-style-type: none"> <li>• Execute manufacturing process for all parts of Dies on various machines according to design requirement</li> </ul>	<p><b>Practical:</b> 57hrs</p>	<ul style="list-style-type: none"> <li>• Sharpeners</li> <li>• Pen</li> <li>• Raw materials</li> <li>• Cutters</li> <li>• Grinding discs</li> <li>• Coolants</li> <li>• Lubricants</li> <li>• Cotton rags</li> <li>• PPEs'</li> </ul> <ul style="list-style-type: none"> <li>• White board</li> <li>• Multimedia</li> <li>• Internet</li> <li>• Computer system</li> <li>• Measuring tools</li> <li>• Clamping tools</li> <li>• Grinders</li> <li>• Lathe Machines (CNC/ Conventional)</li> <li>• Milling Machines (CNC/ Conventional)</li> <li>• Drill Machines</li> <li>• Shaper</li> </ul>	
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				<ul style="list-style-type: none"><li>• EDM</li><li>• Heat treatment furnaces</li><li>• Welding Plant</li></ul>	
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## Module 4: Perform Dies & Moulds Assembly and Try Out

**Objective of the module:** The aim of this module is to get knowledge, skills and understanding to perform Dies & Moulds Assembly and Try Out

**Duration:** 400 hrs.

**Theory:** 160hrs.

**Practical:** 240 hrs.

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1: Perform Moulds Assembly and Try out	<p><b>The trainee will be able to:</b></p> <ol style="list-style-type: none"> <li>1. Perform polishing/finishing of core cavities of Mould</li> <li>2. Carry out final assembly of all Mould components according to the assembly drawing</li> <li>3. Verify all functions of Mould</li> <li>4. Perform try-outs of Mould as required</li> <li>5. Inspect final product before delivery</li> </ol>	<ul style="list-style-type: none"> <li>• Introduction to Moulding process and Moulding machines (Injection, Blow, Die casting, etc.)</li> <li>• Selection and use of Mould Polishing tools (Sand papers, stones, polishing compounds, paste, etc.)</li> <li>• Polishing/finishing of core cavities of Mould</li> <li>• Process of final assembly of all Mould components according to the assembly drawing</li> <li>• Verification of all functions of Mould</li> <li>• Try-outs and rectification process as required</li> <li>• Inspection of final product before delivery</li> </ul> <p><b><u>Practical Activity:</u></b></p> <ul style="list-style-type: none"> <li>• Perform Assembling of all parts of Mould according to assembly drawing</li> <li>• Perform polishing process of core and cavity according to</li> </ul>	<p><b>Total:</b> 200hrs <b>Theory:</b> 80hrs <b>Practical:</b> 120hrs</p>	<ul style="list-style-type: none"> <li>• Notebooks</li> <li>• Pencils</li> <li>• Erasers</li> <li>• Sharpeners</li> <li>• Pen</li> <li>• Raw materials</li> <li>• Polishing tools</li> <li>• Grinding papers</li> <li>• Buffs</li> <li>• Cotton rags</li> <li>• PPEs'</li> <li>• White board</li> <li>• Multimedia</li> <li>• Internet</li> <li>• Computer system</li> <li>• Measuring tools</li> <li>• Grinders</li> <li>• Moulding machines</li> </ul>	<ul style="list-style-type: none"> <li>• Class Room</li> <li>• Workshop</li> </ul>

		<p>requirement</p> <ul style="list-style-type: none"> <li>• Ensure functioning of all mechanisms of Mould are working properly</li> <li>• Perform try outs of the mould on Moulding machine</li> <li>• Perform inspection of product after each try out and apply remedial actions to achieve the final product as per requirement</li> </ul>			
<p><b>LU2:</b> Perform Dies Assembly and Try out</p>	<p><b>The trainee will be able to:</b></p> <ol style="list-style-type: none"> <li>1. Perform finishing of Die and punch</li> <li>2. Carry out final assembly of all Die components according to the assembly drawing</li> <li>3. Verify all functions of Die and punch</li> <li>4. Perform try-outs of Die and punch as required</li> <li>5. Inspect final product before delivery</li> </ol>	<ul style="list-style-type: none"> <li>• Introduction to Press machines (Mechanical/Hydraulic) and Press work operations</li> <li>• Finishing of punch and cavities of Die</li> <li>• Process of final assembly of all Die components according to the assembly drawing</li> <li>• Verification of all functions of Die</li> <li>• Try-outs and rectification process as required</li> <li>• Inspection of final product before delivery</li> </ul> <p><b><u>Practical Activity:</u></b></p> <ul style="list-style-type: none"> <li>• Perform Assembling of all parts of Die according to assembly drawing</li> <li>• Perform matching process of die and punch according to requirement</li> <li>• Ensure functioning of all mechanisms of Die are working properly</li> </ul>	<p><b>Total:</b> 200hrs <b>Theory:</b> 80hrs <b>Practical:</b> 120hrs</p>	<ul style="list-style-type: none"> <li>• Notebooks</li> <li>• Pencils</li> <li>• Erasers</li> <li>• Sharpeners</li> <li>• Pen</li> <li>• Raw materials</li> <li>• Grinding papers</li> <li>• Buffs</li> <li>• Cotton rags</li> <li>• PPEs'</li> <li>• White board</li> <li>• Multimedia</li> <li>• Internet</li> <li>• Computer system</li> <li>• Measuring tools</li> <li>• Press Machine</li> </ul>	<ul style="list-style-type: none"> <li>• Class Room</li> <li>• Workshop</li> </ul>

		<ul style="list-style-type: none"> <li>• Perform try outs of the Die on Press machine</li> <li>• Perform inspection of product after each try out and apply remedial actions to achieve the final product as per requirement</li> </ul>			
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## Module 05: Practice Professionalism

**Objective of the module:** The aim of this module to get knowledge, skills and understanding to Practice Professionalism

**Duration:** 200 hrs.

**Theory:** 80hrs.

**Practical:** 120 hrs.

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
<b>LU1:</b> Develop Portfolio for industry	<b>The trainee will be able to:</b> <ol style="list-style-type: none"> <li>1. Select previous assignments for portfolio</li> <li>2. Work on previous selected assignments for portfolio</li> <li>3. Compile variety of assignments for portfolio</li> <li>4. Make Professional Portfolio for industry</li> <li>5. Develop Digital Portfolio for industry</li> </ol>	<ul style="list-style-type: none"> <li>• Importance of portfolio</li> <li>• Types of portfolio</li> </ul> <p><b><u>Practical Activity:</u></b></p> <ul style="list-style-type: none"> <li>• Make Professional Portfolio for industry</li> </ul>	<b>Total:</b> 100hrs <b>Theory:</b> 40hrs <b>Practical:</b> 60hrs	<ul style="list-style-type: none"> <li>• Notebooks</li> <li>• Pencils</li> <li>• Erasers</li> <li>• Sharpeners</li> <li>• Pen</li> <li>• PPEs'</li> </ul> <ul style="list-style-type: none"> <li>• White board</li> <li>• Multimedia</li> <li>• Internet</li> <li>• Computer system</li> </ul>	<ul style="list-style-type: none"> <li>• Class Room</li> <li>• Workshop</li> </ul>
<b>LU2:</b> Perform inspection of faulty product	<b>The trainee will be able to:</b> <ol style="list-style-type: none"> <li>1. Select tools required for the inspection of product</li> <li>2. Perform inspection</li> </ol>	<ul style="list-style-type: none"> <li>• Inspection techniques</li> <li>• Fault Analysis</li> </ul> <p><b><u>Practical Activity:</u></b></p> <ul style="list-style-type: none"> <li>• Perform inspection of product as per SOPs.</li> </ul>	<b>Total:</b> 100hrs <b>Theory:</b> 40hrs <b>Practical:</b> 60hrs	<ul style="list-style-type: none"> <li>• Notebooks</li> <li>• Pencils</li> <li>• Erasers</li> <li>• Sharpeners</li> <li>• Pen</li> <li>• PPEs'</li> </ul>	<ul style="list-style-type: none"> <li>• Class Room</li> <li>• Workshop</li> </ul>

	<p>of product as per SOPs.</p> <p><b>3.</b> Prepare inspection report and list down the possible causes of the defects as per SOPs</p>			<ul style="list-style-type: none"> <li>• White board</li> <li>• Multimedia</li> <li>• Internet</li> <li>• Computer system</li> </ul>	
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## General assessment guidance for *Dies & Mould Technology*

Good practice in Pakistan makes use of sessional and final assessments, the basis of which is described below. Good practice by vocational training providers in Pakistan is to use a combination of these sessional and final assessments, combined to produce the final qualification result.

**Sessional assessment** is going on all the time. Its purpose is to provide feedback on what students are learning:

- To the student: to identify achievement and areas for further work
- To the teacher: to evaluate the effectiveness of teaching to date, and to focus future plans.

Assessors need to devise sessional assessments for both theoretical and practical work. Guidance is provided in the assessment strategy

**Final assessment** is the assessment, usually on completion of a course or module, which says whether or not the student has "passed". It is – or should be – undertaken with reference to all the objectives or outcomes of the course, and is usually fairly formal. Considerations of security – ensuring that the student who gets the credit is the person who did the work – assume considerable importance in final assessment.

### Methods of assessment

For lessons with a high quantity of theory, written or oral tests related to learning outcomes and/ or learning content can be conducted. For workplace lessons, assessment can focus on the quality of planning the related process, the quality of executing the process, the quality of the product and/or evaluation of the process.

Methods include direct assessment, which is the most desirable form of assessment. For this method, evidence is obtained by direct observation of the student's performance.

Examples for direct assessment of a Dies & Mould Technology include:

- Work performances, for example form basic communication, maintain personal health, hygiene and safety and perform basic computer operations
- Demonstrations, for example organize store merchandizing, handling documents

- Direct questioning, where the assessor would ask the student how to perform personal safety at work place, how they can communicate work place policy and procedures, how they can handle documents, what are the benefits of organizing store merchandising
- Paper-based tests, such as multiple choice or short answer questions on communication at work place policy and procedures, handling documents, organizing store merchandizing
- Indirect assessment is the method used where the performance could not be watched and evidence is gained indirectly.

Examples for indirect assessment of a Dies & Mould Technology include:

- Work products, such as preparing and handling documents, perform some procedures of store merchandising

Indirect assessment should only be a second choice. (In some cases, it may not even be guaranteed that the work products were produced by the person being assessed.)

### **Principles of assessment**

All assessments should be valid, reliable, fair and flexible:

Fairness means that there should be no advantages or disadvantages for any assessed person. For example, it should not happen that one student gets prior information about the type of work performance that will be assessed, while another candidate does not get any prior information.

Validity means that a valid assessment assesses what it claims to assess. For example, if documentation or organizing procedures of store merchandiser are to be assessed and certificated, the assessment should involve performance criteria that are directly related to that documentation activity. An interview about the organization of store merchandizing would not meet the performance criteria.

Reliability means that the assessment is consistent and reproducible. For example, if the work performance of preparing documents in words has been assessed, another assessor (e.g. the future employer) should be able to see the same work performance and witness the same level of achievement.

Flexibility means that the assessor has to be flexible concerning the assessment approach. For example, if there is a power failure during the assessment, the assessor should modify the arrangements to accommodate the students' needs.

## **Assessment strategy for Dies & Mould Technology**



This curriculum consists of 11 modules:

- **Module 1:** Maintain Personal Health, Hygiene and Safety
- **Module 2:** Perform Basic Communication Skills
- **Module 3:** Perform Basic Computer Operations
- **Module 4:** Perform Calculations and Estimation for Mechanical Work
- **Module 5:** Carryout General Maintenance
- **Module 6:** Perform Bench Works
- **Module 7:** Perform Shaper and Planar Operations
- **Module 8:** Perform Basic Grinding Operations
- **Module 9:** Perform Lathe Operations
- **Module 10:** Perform Basic Milling Operations
- **Module 11:** Perform Engineering Drawings

## **Sessional assessment**

The sessional assessment for all modules shall be in two parts: theoretical assessment and practical assessment. The sessional marks shall contribute to the final qualification.

Theoretical assessment for all learning modules must consist of a written paper lasting at least one hour per module. This can be a combination of multiple choice and short answer questions.

For practical assessment, all procedures and methods for the modules must be assessed on a sessional basis. Guidance is provided below under Planning for assessment.

## **Final assessment**

Final assessment shall be in two parts: theoretical assessment and practical assessment. The final assessment marks shall contribute to the final qualification.

## **The assessment team**

The number of assessors must meet the needs of the students and the training provider. For example, where two assessors are conducting the assessment, there must be a maximum of five students per assessor. In this example, a group of 25 students shall therefore require assessments to be carried out over a four-day period. For a group of only 10 to 15 students, assessments would be carried out over a two-day period only.

## **Planning for assessment**

Sessional assessment: assessors need to plan in advance how they will conduct sessional assessments for each module. The tables on the following pages are for assessors to use to insert how many hours of theoretical and practical assessment will be conducted and what the scheduled dates are.

Final assessment: Training providers need to decide ways to combine modules into a cohesive two-day final assessment programme for each group of five students. Training providers must agree the content for practical assessments in advance.

## Complete list of tools and equipment

Sr#	Description	Quantity
1.	Computer with internet	26
2.	White board	1
3.	Multimedia	1
4.	Scanner	1
5.	Hardness Testers	1
6.	Universal testing machine(UTM)	1
7.	Impact Testing Machines	1
8.	Lathe machine with accessories	5
9.	Lathe Tools(Facing, Threading, Knurling, Parting off, Forming etc)	10each
10.	Drilling machine with accessories	5
11.	Drilling tools (twist drill, center drill, counter boring tool , reamer, taps etc)	10 each
12.	Milling Machine with accessories	5
13.	Milling tools(End mill, Ball nose, Face mill, Side and face mill, Slab mill, Convex cutter, Concave cutter, Dovetail cutter, Involute cutter ,etc)	10 each
14.	Surface Grinding Machine with accessories and consumables	2
15.	Cylindrical Grinding Machine with accessories and consumables	2
16.	Pedestal Grinder with accessories and consumables	2
17.	Tool and cutter Grinder with accessories and consumables	2
18.	Shaper Machine with accessories	2

<b>19.</b>	Planar Machine with accessories	1
<b>20.</b>	Steel Rules	10
<b>21.</b>	Tri Square	10
<b>22.</b>	Inside Vernier Caliper	10
<b>23.</b>	Odd leg Vernier Caliper	10
<b>24.</b>	Trammel Vernier Caliper	10
<b>25.</b>	Outside Vernier Caliper	10
<b>26.</b>	Vernier Depth gauge	5
<b>27.</b>	Vernier Bevel protractor	5
<b>28.</b>	Thread gauges	5
<b>29.</b>	Screw pitch gauges	5
<b>30.</b>	Fillet gauges	5
<b>31.</b>	Feeler gauges	5
<b>32.</b>	Vernier Height gauge	5
<b>33.</b>	Dial indicators with magnetic stand	5
<b>34.</b>	Vernier Micrometer	5
<b>35.</b>	Inside Micrometer	5
<b>36.</b>	Outside Micrometer	10
<b>37.</b>	Depth Micrometer	5
<b>38.</b>	Snap Gauge set	2
<b>39.</b>	Dial Bore Gauge	5
<b>40.</b>	Set of Adjustable Wrench	5

<b>41.</b>	Set of Spanners (Open end, Ring)	5 each
<b>42.</b>	Pipe wrench	2
<b>43.</b>	Pipe Dies	2
<b>44.</b>	L-key sets	5
<b>45.</b>	Nose pliers	5
<b>46.</b>	Grip pliers	5
<b>47.</b>	Straight peen Hammer	5
<b>48.</b>	Ball peen Hammer	5
<b>49.</b>	Mallets Hammer	5
<b>50.</b>	Claw Hammer	5
<b>51.</b>	Long nose Tong	5
<b>52.</b>	Short nose tong	5
<b>53.</b>	Flat Chisel	5
<b>54.</b>	Scraper of different shapes	5 each
<b>55.</b>	Scriber	10
<b>56.</b>	Hand hacksaw	25
<b>57.</b>	Chipping hammer	10
<b>58.</b>	Oxy acetylene welding torch	10
<b>59.</b>	Tip cleaners	5
<b>60.</b>	Oxy acetylene welding cylinder set(oxygen, C <sub>2</sub> H <sub>2</sub> )	5
<b>61.</b>	Oxy acetylene welding table	5
<b>62.</b>	Welding gloves	10 set

<b>63.</b>	Face screen	10
<b>64.</b>	Goggles	10
<b>65.</b>	Electric arc welding transformer	5
<b>66.</b>	Electric arc welding pliers	5
<b>67.</b>	Disc grinder 4 inch	5
<b>68.</b>	Disc cutter	5
<b>69.</b>	Electric arc welding table	5
<b>70.</b>	Welding electrode of different size & grade	10 packs
<b>71.</b>	3D scanner	1
<b>72.</b>	3D printer	1
<b>73.</b>	Rockwell Hardness tester	1
<b>74.</b>	Brinell Hardness tester	1
<b>75.</b>	Vicker Hardness tester	1
<b>76.</b>	Mould polishing stones(Mesh no 240 to 1200)	10 each
<b>77.</b>	Sand papers of different grade( Mesh no 180 to 2000)	10 each
<b>78.</b>	Diamond Paste tubes of different grades ( Micron 2500 to 5000)	2 each
<b>79.</b>	Ceramics stones of different grades (Mesh no 300 to 1200)	5 each
<b>80.</b>	Diamond hand file set	5 set
<b>81.</b>	Riffle hand file set	5
<b>82.</b>	Needle hand file set	5
<b>83.</b>	Round hand file	5
<b>84.</b>	Half round hand file	5

<b>85.</b>	Triangular hand file	5
<b>86.</b>	Square hand file	5
<b>87.</b>	Flat hand file	5
<b>88.</b>	Ultrasonic Polishing box	2
<b>89.</b>	Drawing board	25

### List of consumable supplies

<b>Sr no</b>	<b>Material</b>	<b>Quantity</b>
<b>1.</b>	Note book	25
<b>2.</b>	Pencil	25
<b>3.</b>	White sheets	25
<b>4.</b>	Eraser	25
<b>5.</b>	Sharpener	25
<b>6.</b>	Pen	25
<b>7.</b>	Clutch pencils	25

## Credit values

The credit value of the National Certificate Level 5 in Dies & Mould Technology is defined by estimating the amount of time/ instruction hours required to complete each competency unit and competency standard. The NVQF uses a standard credit value of 1 credit = 10 hours of learning (Following Higher Education Commission (HEC) guidelines).

The credit values are as follows:

Competency Standard	Estimate of hours	Credit
A. Design Moulds	200	20
B. Design Dies	100	10
C. Manufacture Die and Mould Components	300	30
D. Perform Dies & Moulds Assembly and Try outs	400	40
E. Practice Professionalism	200	20



## Curriculum Validation Committee

Name	Designation
1. Mr. Nadeem Shahid	Vice Principal, PITAC Lahore
2. Mr. Naveed Aslam Qureshi	Deputy Director, PITAC Lahore
3. Mr. Muhammad Tariq Pervaiz	Retd , PITAC, Lahore
4. Ms Tehrim Ijaz	BS industrial Engineer, Lahore
5. Ms. Ariba Afzal Kazi	BS Metallurgy, Material Engineer, Lahore
6. Mr. Muhammad Arshad	Chief Instructor, PSTC, Lahore
7. Engr. Rashid Bashir	Instructor, PSTC, Lahore
8. Engr. Salman Khalid	AD, PITAC, Lahore

Name	Designation
9. Engr. Tashiq Semab Amin	Dy Manager, HIT, Taxila
10. Engr. Abdul Waqar	CAD CAM designer, Shan Group Engineering Wing, Peshawar
11. Engr. Liaqat Ali Jamhroo	Director Academics, STEVTA
12. Mr. Aman Ullah Ch	Sr. Research Officer, PBTE, Lahore
13. Syed Mansoor Ahmad	Assistant Manager, NVQF Registry Incharge, SBTE, Karachi
14. Mr. Mushtaq Ahmad	Director, Monitoring, PTEVTA, Lahore
15. Engr. Aijaz Ahmad Zia	DACUM Expert, Lahore