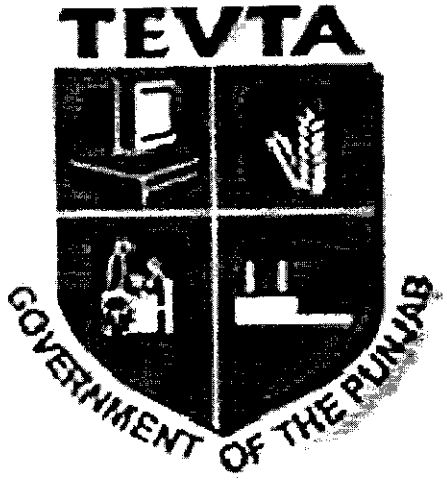
GOVERNMENT OF THE PUNJAB

TECHNICAL EDUCATION & VOCATIONAL TRAINING AUTHORITY



CURRICULUM FOR

MODEL / MOULD MAKING AND CASTING IN CERAMICS

(6-Months Course)

Revised April 2016

APPROVED
Date: 7-4-16
Sign:

CURRICULUM SECTION
ACADEMICS DEPARTMENT
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TRAINING OBJECTIVES

The objective of this course is to produce semi-skilled labour (through training of fresh entrants and / or impart formal training to unskilled labour) for the ceramic industry of Punjab.

On completion of course the student will be enabled to prepare Models, Moulds and castings in the ceramics (Pottery Development) using necessary tools and equipment of the trade. He should have learnt about different materials used in model / mould making and casting; difference between Mould for Jiggering / Jollying, de-airing in plaster of Paris mixing etc.

CURRICULUM SALIENTS

Entry Level	:	Middle (Preferable Matric)
Duration of course	:	6 - Months
Total training hours	:	800 Contact Hours
Training Methodology	:	Practical 80%
		Theory 20%
Medium of instructions	:	Urdu / English

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SKILL PROFICIENCY DETAILS

On successful completion of this course, trainee should be able to:

1. Selection, use, precaution of tools and masonry instruments for the preparation/making of model and mould with Plaster of Paris.
2. Making the slurry of Plaster of Paris of required viscosity.
3. Do the "Soaping" and "Shellacking"
4. De-air the mixture/slurry of Plaster or Paris through (De-air) mixing machine.
5. Making the model of round shaped on potter/modeling wheel according to given design & size.
6. Making the model of irregular / geometrical shape.
7. Calculate the body shrinkage and develop the model keeping in view this shrinkage.
8. Make the one piece, two-piece or more piece master mould.
9. Make the one piece, two-piece or more piece case/father mould.
10. Make the one piece, two-piece or more piece working mould.
11. Perform the routine maintenance of daily used tools and equipment.

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KNOWLEDGE PROFICIENCY DETAILS

On successful completion of this course, trainee should be able to:

1. Selection of proper tools and material for pottery making including Model & Mould Making.
2. How to make Pottery in brief.
3. Handling the potter/modeling wheel.
4. Basic principal of designing.
5. Selection of mixture/slurry of Plaster of Paris of required viscosity for working mould for jiggering / jollying process and casting process.
6. Preparation of Shellac and soap for Shellacking and soaping.

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SCHEME OF STUDIES

Model / Mould Making and Casting in Ceramics
(6-Months Course)

S. No	Main Topics	Theory Hours	Practical Hours	Total Hours
1.	Use of hand tools and safety prevention	8	4	12
2.	Introduction of raw material for Pottery.	20	-	20
3.	Making of Plaster Model	44	116	160
4.	Making of Plaster Mould	32	272	304
5.	Slip casting	28	136	164
6.	Defects due to casting	4	16	20
7.	I.T Fundamentals	8	32	40
8.	Functional English	16	64	80
Total		**160**	**640**	**800**

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DETAIL OF COURSE CONTENTS

Model / Mould Making and Casting in Ceramics

(6-Months Course)

Sr. No.	Topics	Theory Hours	Practical Hours
1.	**Use of hand tools and safety prevention** 1.1 Introduction 1.1.2 Basic tools and Mathematical Calculations 1.1.3 Measurement tools, Roller, Square Set, Vernier Calipers, Spirit Level etc. 1.1.4 Pencils for marking 1.1.5 Calculation of Radius, Circumference, etc. 1.1.6 Basic Unit conversion 1.2- Safety at work 1.2.1 Advantageous of safe working environment 1.2.2 Personnel Protective Equipments 1.2.3 Work hazards and Injuries 1.2.4 First Aid	8	4
2.	**Introduction of raw material for Pottery.** 2.1 Ceramics and its types 2.2 Clay and it types 2.3 Quartz as filler 2.4 Feldspar as Binder 2.5 Role of Deflocolents 2.6 Common materials for Mould Making 2.7 Conversion of Gypsum to plaster of paris 2.8 Alpha and beta Plaster of Paris 2.9 Plaster of Paris for Mould making	20	-
3.	**Making of Plaster Model** 3.1 Clay as Model Material	44	116

	3.2 Clay Body properties 3.3 Clay Body Shrinkage Calculations 3.4 Use of Plaster as model material 3.5 Properties of Plaster of Paris 3.6 Batching of Plaster of paris with water 3.7 Factors affecting Setting Time 3.8 Use of Modeling Wheel 3.9 Use of Modeling tools .i.e Vertical Lathe 3.10 Carving and cutting the Plaster 3.11 Making Model for irregular shapes		
4.	**Making of Plaster Mould** 4.1 Classification of Plaster moulds 4.2 Plater/water batching 4.3 Role of separating agents 4.4 Use of the relevant tools. ie Wooden Boards, Clamps, Rings etc. 4.5 Mould making from the Model 4.6 Case Mould Making 4.7 Master Mould Making 4.8 Multi piece Mould making 4.9 Finishing of Mould 4.10 Drying of Moulds 4.11 Water ratio for Press mould 4.12 Jiggering Mould 4.13 Stamps 4.14 Mould problems and solutions 4.15 Slump moulds for glass fusing	32	272
5.	**Slip casting** 5.1 Introduction to Ceramics fabrication techniques 5.2 Slip Water ratio and role of defloculents 5.3 Slip Quality assessment 5.4 Casting Slip preparation 5.5 Guideline for developing a casting body	28	136

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	5.6 Thickness control during casting 5.7 Role of Environment on casting time		
6.	**Defects due to casting** 6.1 Slip gelling in the mould 6.2 Underdeflocculated slip 6.3 Uneven casting thickness 6.4 Greenware cracking 6.5 Greenware sticking 6.6 Pinholes 6.7 Remedies of the problems	4	16
	Total	**136**	**544**

LIST OF PRACTICALS

- Introduction of Plaster tools and safety
- Making of Model at Modeling Wheel
- Making of Model for irregular shapes
- Plaster of Paris casting
- Making of one piece mould
- Making of two piece mould
- Making of Multi piece mould
- Making of case mould
- Making of master mould
- Making of press mould
- Making of jiggering mould
- Drying of mould
- Filling of mould
- Perform Casting at different moulds
- Perform drying of different moulds
- Mould defects Identification and cures

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SCHEME OF STUDIES

I.T. Fundamentals

S.No	Main Topics	Theory Hours	Practical Hours	Total Hours
1.	Introduction to Computers	2	6	8
2.	Typing - Microsoft Word	4	14	18
3.	Internet & Electronic Mail	2	12	14
Total		**8**	**32**	**40**

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DETAIL OF COURSE CONTENTS

I.T Fundamentals

S. No	Detail of Topics	Theory Hours	Practical Hours
1	**Introduction to Computers** 1.1 What is a computer- Definition, functions and general features? 1.2 What is Hardware – 1.2.1 Computer parts and units 1.2.1.1 Input Unit - Keyboard, Mouse etc. 1.2.1.2 Central Processing Unit 1.2.1.3 Output Unit 1.3 What is Software – 1.3.1 Electronic Parts of a Pc it is 1.3.1.1 Software and Its types 1.3.1.2 System Software, Application software and its functions 1.4 Working with windows Operating System 1.4.1 How does windows desktops work? 1.4.2 Setting desktop, background and wall papers etc. 1.4.3 Viewing directories – List of files and folders different styles. 1.5 What are the Icons, Shortcuts and other graphic, 1.5.1 How to see computer contents on different drives etc.	2	6
2	**Typing and Word processing (MS Word)** 2.1 Proper way of typing correct and speedy - getting familiar with the keys 2.2 Where to type in computer? How to save a file? How to get it back? Where to find your saved work? 2.3 Formatting in MS Word Bold, Italic, page setup, setting shades and colors. 2.4 Working with saved work, opening and moving files. 2.5 How to get it printed?	4	14

3	**Emailing and Internet Surfing** 3.1 How to go to Internet, what is required for an internet connection etc. 3.2 How to use email? How to search on web? Etc 3.3 How to make new email account, login and logout an email account etc.? 3.4 Downloading and uploading attachments etc.	2	12
	Total	**8**	**32**

LIST OF PRACTICALS

I.T Fundamentals

S. No.	Name of Practical
1.	Turn On/Off and setting of power supply
2.	Accessing The Desktop
3.	Using of Icons and Shortcuts
4.	Setting / customizing the desktop
5.	Viewing the contents of computer – Directory
6.	Setting the view of a folder
7.	Copying, Deleting and Moving Files in a folder
8.	Working with different Applications
9.	Opening MS Word for typing
10.	First lesson of Typing A S D F
11.	Second Lesson of typing J K L ;
12.	Third Lesson U I O P
13.	Fourth Lesson R E W Q
14.	Fifth Lesson N M , .
15.	Sixth Lesson V C X Z
16.	Seventh Lesson All letter using R index Finger
17.	Eighth Lesson All letter using L index Finger
18.	Formatting in MS Word Bold, Italic etc.
19.	Page Setting/ Page Layout
20.	Using Internet
21.	Opening Email, making new account
22.	Sending Receiving Emails
23.	Downloading and uploading attachments etc.

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SCHEME OF STUDIES
Functional English

S.No	Main Topics	Theory Hours	Practical Hours	Total Hours
1.	Use of past indefinite tense	2	6	8
2.	Use of 'was' 'were' ' questions and negatives	3	6	8
3.	Explaining a situations/ analysis	2	6	8
4.	Communication in writing	2	6	8
5.	Comprehension	1	6	7
6.	Application/ C.V.	1	6	7
7.	Dialogues	1	9	10
8.	Understand vocabulary	1	3	4
9.	Writing complaints/ answers to complaints	1	9	10
10.	Interviews	2	7	10
Total		**16**	**64**	**80**

DETAIL OF COURSE CONTENTS

Functional English

S. No	Detail of Topics	Theory Hours	Practical Hours
1	**Use of past indefinite tense** 1.1 Describing past events	2	6
2	**Use of 'was' 'were' ' questions and negatives**	2	6
3	**Explaining a situations/ analysis** 3.1 Making a plan 3.2 Visiting factory area 3.3 Giving justifications	2	6
4	**Communication in writing** 4.1 Asking for list of stationery items 4.2 Submitting report of performance of team of technicians 4.3 Submitting joining report	2	6
5	**Comprehension: practice sets**	2	6
6	**Job application/C.V.**	1	6
7	**Dialogues**	1	9
8	**Understand vocabulary**	1	3
9	**Writing complaints/ answers to complaints**	1	9
10	**Interviews**	2	7
Total		**16**	**64**

LIST OF PRACTICALS

Functional English

S. No.	Practical
1.	Group discussion
2.	Interviews
3.	Role play

LIST OF LABS

Model / Mould Making and Casting in Ceramics

- Casting and Moulding Workshop

I.T Fundamentals

- Computer Lab

LIST OF MACHINERY / EQUIPMENT / TOOLS

(For a class of 25 students)

Name of Trade	Model / Mould Making and Casting in Ceramics
Duration of Course	6-Months Course

S. No	Nomenclature of Equipment / Tools	Quantity
1.	Plaster mixing machine including de-airing pump	1 No.
2.	Stainless steel buckets	25 Nos.
3.	Mug / Jug, Tub set	25 Nos.
4.	Working table 4" x 6" wooden top	10 Nos.
5.	Working table 3" x 4" marble top	10 No.
6.	Modeling wheel	2"
7.	Model tool set.	2 set.
8.	Engraving tool set.	25 set.
9.	Geometry box including set Sq. D, Etc.	25 set.
10.	Compass set (inner and outer)	10 set
11.	Scale (length 1ft and 3ft long)	5 set
12.	Werner Caliper	5 Nos.
13.	"Randa"	5 "
14.	Copying pencil	12 dozen
15.	Hacksaw blades single	12 "
16.	Hacksaw blade double	12"
17.	Wooden slabs / planks 8" x 1.5' x 1"	50"
18.	Wooden slabs / planks 12" x 1.5' x 1"	50"
19.	Belt width 2ft x length 6 Ft.	2 Nos.

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20.	Belt width 2ft x length 3 Ft.	2 Nos.

COMPUTER LAB

S. No.	Tools / Equipment	Quantity
1.	**Desktop computer (Specifications as per notification issued by MIS Section, TEVTA)**	26 (1 for each student & 1 for the teacher)
2.	Printer (Laser)	01
3.	Scanner	01
4.	Internet Connection (At least 1 MB speed)	01
5.	UPS 10 KVA	01
6.	Air Conditioner 1 ½ Ton	02
7.	Multimedia Projector	01

LIST OF CONSUMABLES

S. No	Item	Quantity
1	Clay	**500 kg**
2	Plaster of Paris	**6 ton**
3	Soap	**10 Dozzen**
4	Shellac	**50 kg**
5	Sponges	**100**
6	Sand Papers	**120**

Functional English

S. No.	Item	Quantity
1.	Stationary	As per requirement
2.	Board Markers	As per requirement

I.T Fundamentals

S. No.	Item	Quantity
1.	Printing Paper	As per requirement
2.	Printer Toner	As per requirement

REFERENCE BOOKS

1. Henrik Norsker, Forming Techniques for the Self-Reliant Potter, GTZ, 1991, 194 p

Functional English

1. High School English Grammar By Wren & Martin

2. Oxford English Grammar

I.T Fundamentals

3. Introduction to Computer by Peter Norton
4. 2007 Microsoft® Office System Step by Step by Joyce Cox, Steve Lambert and Curtis Frye
5. Internet and E-mail with Windows 7 by Studio Visual Steps

MINIMUM QUALIFICATION OF INSTRUCTOR/ TEACHER

- Matric with Industrial experience of five years (minimum)

OR

- Certificate course in respective field with two years of industrial experience

Functional English

- M.A (English)

I.T Fundamentals

- DAE CIT/ BCS from HEC recognized university

EMPLOYABILITY OF GRADUATES

On successful completion of this course, trainees can find employment in following sectors:

1. As a skilled worker in ceramics (table ware) industry.
2. As a skilled worker in ceramics (sanitary ware) industry.
3. As a skilled worker in ceramics (refractory and tiles) industry.
4. Self employment

LIST OF TRADE RELATED JARGON

- Mould
- Model
- Casting
- Clay
- Pin hole
- Blister
- Deflocculation
- Green ware
- Hard pencil
- Soft pencil
- Jiggering
- Jollying
- Drying
- BAT
- Flux
- Glaze
- Binder
- Filler
- Leather hard
- Plastic

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Curriculum Revision Committee

1. **Muhammad Mukhtar** — **Convener**
   Chief Instructor,
   GCT-Faisalabad.

2. **Mr. Ishaq Tehseen,** — **Member**
   Sr. Instructor,
   GCT (Glass & Ceramics) Shahdara

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