

**Curriculum  
For  
Certificate in Ceramics  
One year Duration Course  
Code:VI81S006  
(2013)**

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## **INTRODUCTION**

The ceramics certificate course has been designed to provide an introduction to the basic techniques and knowledge involved in the practice of ceramics Industry. Through practical sessions that are designed to impart a range of production approaches, students will have the experience and acquire knowledge in the aspect of slip, glazes model and mould making, drying in different dryers, different glazing techniques and its applications, firing the kiln and the quality control of the products. This course also provides students with a solid foundation to understand and operate the different Equipments involved in any ceramics Industry. Upon completion, students will understand the entire process of ceramic, and acquire the ability to work in any ceramics industry in Pakistan and international job market.

### **1. OVERALL OBJECTIVE OF COURSE**

1. The main objective of this course is to produce semi-skilled labor (through training of fresh entrants and / or impart formal training to unskilled labor) for the ceramic industry to work as ceramicist.
2. This training course is designed to create job opportunities for the semi-literate students on the national and international level so as to impart them the requisite skills to work in different ceramics industries.
3. Further, this curriculum is developed by considering the requirements of local market and need of the trade enabling the pass-outs to meet the market-jobs with a view to reduce the shortage of semi-skilled and skilled workers in this area.
4. Provide technical and vocational training basis which reflect the requirements of the industry.
5. The course mostly focuses on practical-oriented skill aided by some theory as it is necessary for understanding the procedures and processes of performing different tasks and functions.
6. This course covers all areas of working in a Ceramics Process Industry including weighing of raw materials, mixing, forming, and finishing drying, glazing and firing.

## 2. COMPETENCIES GAINED AFTER COMPLETION OF COURSE

After completion of this course the student should be able to:

1. Explain the basic ceramic-terms and its classifications.
2. Describe the ceramics raw materials, their usage & properties.
3. Describe the classification of clay bodies and their properties.
4. Express the material mixing methods.
5. Describe the knowledge of different forming techniques used in ceramics industry.
6. Express knowledge of slip quality assessment.
7. Explain the glaze manufacturing process and its types.
8. Describe the tests to check the quality of the slip and glaze for the particular application.
9. Describe the mould and model making techniques.
10. Describe the plaster of Paris, its properties and setting time.
11. Express the knowledge of drafting, tracing & scale drawing.
12. Describe different types of moulds..
13. Explain the Jigging and Jollying process.
14. Describe the mechanism for drying of ceramics bodies.
15. Explain the working principles of different dryers used in ceramics industry.
16. Express the knowledge of proper moisture content required for finishing.

17. Elucidate basic principles of joining.
18. Express the knowledge of Finishing and Joining techniques.
19. Explain the different decoration techniques.
20. Express the knowledge of different glazing techniques.
21. Describe the different types of kiln furniture used in the kilns.
22. Explain the stacking of different wares.
23. Describe the importance of kiln reading.
24. Describe the combustion and complete and incomplete combustion.
25. Describe the different temperature, pressure and flow measuring devices.
26. Safety precautions applicable to ceramics industries.
27. Identification of different defects and their troubleshooting techniques.
28. Identify the raw materials used in the ceramics industry.
29. Perform the batching for the desired composition of body and glazes.
30. Perform the crushing of raw materials on Crusher.
31. Perform the grinding of the raw materials on Ball Mill.
32. Operate the blunger for the mixing of raw materials.
33. Perform the filter pressing of the slip.
34. Operate the Vacuum Pug mill.

35. Draft the new pattern or draw graph to map the product for making model.
36. Make full scale working drawings.
37. Apply various techniques of model making i.e. direct carving, modeling wheel etc as per situation/requirement.
38. Make moulds of various types i.e. press molds, slip casting molds, jiggering molds etc.
39. Work on a Modeling wheel.
40. Make models for one to three piece moulds.
41. Hand carve model for irregular or geometric shapes.
42. Develop different types of moulds.
43. Perform casting keeping in mind the required thickness of the piece & releasing the casted pieces.
44. Inspect/assess the quality of casting slip i.e. density, viscosity and residue.
45. Operate the Jiggering and Jollying machine
46. Operate the hydraulic press to make tiles
47. Make a joining paste
48. Perform trimming and finishing of the products
49. Perform the joining of the different parts to the body
50. Inspect and rectify the faults in finished pieces
51. Operate the different dryers like Spray dryer and Conveyor belt dryer used in the industry
52. Perform the loading and unloading of the kiln.

53. Make proper stacking of different ceramics wares.
54. Perform the routine maintenance of the kiln.
55. Identify the damaged insulation and replace it properly.
56. Control of the kiln important parameters like temperature and pressure.
57. Skills in trouble shooting of during kiln firing, along with exposure routine maintenance techniques that develop an operator.
58. Prepare and maintain the record of kiln reading in logbook.
59. Record, identify and perform corrective action during trouble shooting during kiln firing.
60. Identify the different defects in body and glazes
61. Apply all safety precautions about using tools and different equipments used in the ceramics industry..

### **3. JOB OPPORTUNITIES AVAILABLE IMMEDIATELY AND IN THE FUTURE**

The Pass outs of this course may find job / employment opportunities in the following areas:

- ✓ Ceramics (table ware) industry
- ✓ Ceramics (Sanitary ware) Industry
- ✓ Ceramics (Wall and Floor Tiles) Industry
- ✓ Refractory manufacturing factory
- ✓ Ceramics (Insulator) Industry
- ✓ Ceramics teaching and Research Institutes
- ✓ Self Employment

## **4. CURRICULUM SALIENT POINTS**

### **Trainee Entry Level**

Middle

### **Min Qualification of Trainer**

DAE in Ceramics with 3 year experience

Certificate in Ceramics with 5 year experience

Matric with 10 years of experience in the Ceramic Industry

### **Medium of Instruction**

Urdu and English

### **Sequence of the modules**

1. Preparation of Slip and Glazes
2. Model And Mould Making
3. Form articles by different techniques
4. Perform drying of the articles
5. Perform finishing and joining
6. Make decoration in articles
7. Glaze applications methods
8. Kiln firing
9. Sorting and quality control
10. Perform Communications
11. Safety at work



## **Timeframe of Assessment**

Duration of Course:	01 Year
Total Hours:	1600
Days per week:	06
Training Methodology:	Practical 80 % Theory 20 %

#### 4. SCHEME OF STUDIES

<b>Sr. No</b>	<b>Module</b>	<b>Theory (Hours)</b>	<b>Practical (Hours)</b>	<b>Total (Hours)</b>
1	Preparation of Slip and Glazes	54	144	198
2	Model And Mould Making	40	126	166
3	Form articles by different techniques	29	130	159
4	Perform drying of the articles	17	60	77
5	Perform finishing and joining	20	180	200
6	Make decoration in articles	38	140	178
7	Glaze applications methods	34	160	194
8	Kiln firing	42	190	232
9	Sorting and quality control	21	50	71
10	Perform Communications	11	40	51
11	Safety at work	14	60	74
<b>TOTAL HOURS</b>		<b>320</b>	<b>1280</b>	<b>1600</b>

## 5. OVERVIEW ABOUT THE PROGRAM– INTRODUCTION TO CERAMICS

Module Title and Aim	Learning Units	theory1 Days/hour s	Workplace2 Days/hours	timeframe of modules
<p><b>Module 1: Preparation of Slip and Glazes</b></p> <p>On completion of this module the student will be enabled to prepare different types of clay bodies &amp; glazes like raw glaze, opaque &amp; color glazes used in the ceramic industry.</p>	<ol style="list-style-type: none"> <li>1. Perform Crushing of raw materials</li> <li>2. Perform batching of raw materials for slip and glazes</li> <li>3. Perform grinding and mixing of raw materials</li> <li>4. Check and adjust the parameters of slip and glazes</li> <li>5. Perform filtration of the slip</li> <li>6. Perform vacuum Kneading of the filtered cake</li> </ol>	8 14 16 6 6 4	144	198
<p><b>Module 2:- Model and Mould Making</b></p> <p>The trainee will be enabled to prepare Models of the desired product, different types of Moulds by using necessary tools and equipment.</p>	<ol style="list-style-type: none"> <li>1. Make pattern of the desire product</li> <li>2. Make Model of the desired product</li> <li>3. Make various types of Plaster mold</li> </ol>	12 10 18	126	166
<p><b>Module 3: Form articles by different techniques</b></p> <p>After completion of this module, the trainee will be able to understand the different fabrication techniques like casting, pressing and jiggering &amp; jollying</p>	<ol style="list-style-type: none"> <li>1. Make Articles by casting technique</li> <li>2. Filling of mould</li> <li>3. Analyze the casting thickness and time</li> <li>4. Make articles by pressing technique</li> <li>5. Make article by Jiggering and Jollying</li> </ol>	8 6 5 8 2	130	159

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

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

<p><b>Module 4 :Perform drying of the articles</b></p> <p>The Trainee will be able to describe the drying, drying time and temperature and the different types of dryers used in the industry and able to dry the given product</p>	<ol style="list-style-type: none"> <li>1. Perform drying in Conveyor belt dryer</li> <li>2. Perform drying in spray dryer</li> </ol>	<p style="text-align: center;"><b>8</b></p> <p style="text-align: center;"><b>9</b></p>	<p style="text-align: center;">60</p>	<p style="text-align: center;">77</p>
<p><b>Module 5: Perform finishing and joining</b></p> <p>The Trainee is able to understand the importance of the finishing and joining techniques and perform the desired finishing and joining of the given wares</p>	<ol style="list-style-type: none"> <li>1. Inspection of the green ware piece</li> <li>2. Perform the finishing of the piece</li> <li>3. Perform the cutting of the piece</li> <li>4. Perform the joining of the piece</li> <li>5. Refinishing of the piece</li> </ol>	<p style="text-align: center;">3</p> <p style="text-align: center;">4</p> <p style="text-align: center;">4</p> <p style="text-align: center;">5</p> <p style="text-align: center;">4</p>	<p style="text-align: center;">180</p>	<p style="text-align: center;">200</p>

<b>Module Title and Aim</b>	<b>Learning Units</b>	<b>theory<sup>3</sup> Days/hour s</b>	<b>Workplace<sup>4</sup> Days/hours</b>	<b>timeframe of modules</b>
<b>Module 6 :Make decoration in articles</b>  The Trainee will be able to describe the different decoration techniques used and perform the require decoration of the given ceramics ware	1. Make under glaze decoration 2. Make engraving 3. Make embossing 4. Perform over glaze decoration 5. Make engobe decoration	<b>8</b> <b>4</b> <b>4</b> <b>8</b> <b>14</b>	<b>140</b>	<b>178</b>
<b>Module 7: Glaze application methods</b>  The Trainee will be able to understand the different techniques for glazing and its correction application to given ceramics ware	1. Perform glazing by spraying 2. Perform glazing by brushing 3. Perform glazing by dipping 4. Perform glazing by pouring 5. Correct application of glaze	<b>6</b> <b>4</b> <b>8</b> <b>8</b> <b>8</b>	<b>160</b>	<b>194</b>
<b>Module 8 : Kiln firing</b>  After completion of this module, Trainee will be able to know the operation of the kiln	1. Perform loading and unloading of the kiln 2. Perform the maintaince of the kiln 3. Ensure the correct control of the kiln 4. Record the kiln data 5. Kiln Trouble shooting phenomena	<b>8</b> <b>10</b> <b>10</b> <b>6</b> <b>8</b>	<b>190</b>	<b>232</b>
<b>Module 9:- Sorting and Quality Control</b>  The Trainee will be able to understand the importance of quality control and different types of defects in the body and perform	1. Evaluate the raw materials 2. Identify the glazing defects 3. Identify the defects in Ceramics body 4. Make grading of the products.	<b>8</b> <b>5</b> <b>5</b> <b>3</b>	<b>50</b>	<b>71</b>

<sup>3</sup> Learning hours in training provider premises

<sup>4</sup> Training workshop, laboratory and on-the-job workplace

the sorting of different wares as per the quality control policy of the company				
<p><b>Module 10:- Perform Communication</b></p> <p>This module develop the competency to properly communicate with the peers, engineer, seniors/juniors, electrical and mechanical department and the concerned office</p>	<ol style="list-style-type: none"> <li>1. Communicate with seniors / juniors</li> <li>2. Communicate with peers</li> <li>3. Communicate with engineer/ Supervisor</li> <li>4. Communicate with electrical department</li> <li>5. Communicate with Mechanical department</li> <li>6. Communicate with concerned office / stakeholder</li> </ol>	<p><b>2</b></p> <p><b>2</b></p> <p><b>2</b></p> <p><b>2</b></p> <p><b>2</b></p> <p><b>1</b></p>	<b>40</b>	<b>51</b>
<p><b>Module 11:- Safety at work</b></p> <p>After completion of this module, the trainee will be able to describe the precautions, safe working environment procedures and how to cope with hazards during working</p>	<ol style="list-style-type: none"> <li>7. Identify the protective procedures</li> <li>8. Ensure the cleaning of the working area</li> <li>9. Use of Fire Extinguisher, and safety alarms</li> </ol>	<p><b>6</b></p> <p><b>3</b></p> <p><b>5</b></p>	<b>60</b>	<b>74</b>

## 6. INTRODUCTION TO CERAMICS- CURRICULUM CONTENTS (TEACHING AND LEARNING GUIDE)

### Module 1:Preparation of Slip and Glazes

**Objective :**The Trainee will be able to understand the different processes like crushing, grinding, filtration and the de-airation. Also able to understand the operation of the equipments used in slip house and prepare the slip and glazes of the required composition

**Duration:** ..198..... hours **Theory:** ....54..... hours **Practice:**....144..... hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
1. Perform Crushing of raw materials	1.1 Understand the Ceramics, different raw materials use in ceramics industry 1.2 Able to perform the crushing of the raw materials in the Jaw Crusher	<b>Knowledge of:</b> <ul style="list-style-type: none"> <li>• Ceramics and Raw Materials</li> <li>• Types of Crusher</li> <li>• Working Principal and operation of jaw Crusher</li> <li>• Feed size and product size</li> <li>• Trouble shooting during crushing</li> </ul> <b>Ability to:</b> <ol style="list-style-type: none"> <li>1. Understand the ceramics and the related raw materials</li> <li>2. Properly Feed the crusher</li> <li>3. Operate the Jaw Crusher</li> <li>4. Assess the material for crushing</li> </ol>	8hr Theory  20 hr Practical	Models, Wall Charts, Multimedia, White Board, Stationary, Jaw crusher, sandstone	Class Room/ Lab

<p>2. Perform batching of raw materials for slip and glaze</p>	<p>2.1 Understand the role of different raw materials used for making slip and glazes 2.2 Able to prepare the batches of different ceramics bodies, transparent and colored glazes</p>	<p><b>Knowledge of:</b></p> <ul style="list-style-type: none"> <li>• Slip Body Introduction</li> <li>• Fluxes like feldspar</li> <li>• Filler like quartz</li> <li>• Clays like china, ball and fire clay</li> <li>• Batch Calculations for slip</li> <li>• Addition of Deflocculants</li> <li>• Addition of suitable amount of water</li> <li>• Types of clay bodies</li> <li>• <b>Glaze and its types</b></li> <li>• Glass formers</li> <li>• Stabilizers</li> <li>• Fluxes</li> <li>• Binders</li> <li>• Opacifiers</li> <li>• Pigments used for colours</li> <li>• Addition of Deflocculants</li> <li>• Addition of Different colors</li> <li>• Addition of required amount of water</li> <li>• Weighting Balance</li> <li>• Addition of water</li> <li>• Glaze Calculations</li> </ul> <p><b>Ability to:</b></p> <ol style="list-style-type: none"> <li>1. Operate the weighting Balance</li> <li>2. Identify the materials for Body and glaze</li> <li>3. Perform Calculation of different batches of Body and glazes</li> <li>4. Prepare and add the Deflocculants</li> <li>5. Add the suitable water to the slip and glazes</li> <li>6. Prepare batches of different colored glazes</li> <li>7. Make different batches of glazes</li> </ol>	<p>14hr Theory</p> <p>30hr practical</p>	<p>Wall Charts, Multimedia, White Board, Stationary, Weighting scale, raw materials, Relevant data</p>	<p>Class Room/ Lab</p>
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<p>3. Perform grinding and mixing of raw materials</p>	<p>3.1 Understand the importance and working of different grinders 3.2 Able to perform the grinding of mixing of the batch in the ball mill</p>	<p><b>Knowledge of:</b></p> <ul style="list-style-type: none"> <li>• Types of Grinders</li> <li>• Working principle and operation of Ball mill and jar mill</li> <li>• Selection of grinding media used in the mill</li> <li>• dry grinding</li> <li>• wet grinding</li> <li>• Grinding of colours</li> <li>• liners in ball mill</li> <li>• RPM of Mill</li> <li>• Grinding time</li> <li>• Loading and unloading of the ball mill</li> </ul> <p><b>Ability to:</b></p> <ol style="list-style-type: none"> <li>1. Load the ball mill</li> <li>2. Charge the mill with the grinding media and batch</li> <li>3. Calculate the grinding time</li> <li>4. Make adjustment on the rpm of the mill</li> <li>5. Operate the ball mill</li> <li>6. Operate the jar mill</li> <li>7. Unload the ball mill properly</li> </ol>	<p>16hr Theory 36hr Practical</p>	<p>Models, Wall Charts, Multimedia, White Board, Stationary, Ball mill, grinding balls, Relevant data</p>	<p>Class Room/ Lab</p>
<p>4. Check and adjust the parameters of slip and glazes</p>	<p>4.1 Understand the parameters like viscosity, density and residue 4.2 Able to assess and adjust the quality for slip and glazes</p>	<p><b>Knowledge of:</b></p> <ul style="list-style-type: none"> <li>• Factors affecting quality of slip and glazes</li> <li>• Density of slip and glazes</li> <li>• Viscosity of slip and glazes</li> <li>• Residue test for slip and glazes</li> <li>• Related Apparatus like Viscometer Hydrometer, Sieves Stop watch</li> <li>• Adjustment of the parameters</li> <li>• PSA, water percent, particular size analyzer.</li> </ul> <p><b>Ability to:</b></p>	<p>6hr Theory 28hr Practical</p>	<p>Wall Charts, Multimedia, White Board, Stationary, Torsion balance viscometer, Hydrometer, sieves set Relevant data</p>	<p>Class Room/ Lab</p>

		<ol style="list-style-type: none"> <li>1. Assess the viscosity of slip and glaze</li> <li>2. Measure and maintain the required density of slip and glazes</li> <li>3. Perform the residue test</li> <li>4. Add suitable amount of water ,deflocculants and clay if necessary.</li> <li>5. Perform the PSA, and water test</li> </ol>			
5. Perform filtration of the slip	5.1 Able to mix and filter the slip in the blunger and the filter press	<p><b>Knowledge of:</b></p> <ul style="list-style-type: none"> <li>• Working principal of Blunger</li> <li>• Filling the blunger</li> <li>• Calculate the mixing time</li> <li>• filtration process of slip</li> <li>• operation and working of Filter Press</li> <li>• Pumping of slip to press</li> <li>• Selection of Filter cloth</li> <li>• Plates adjustment</li> <li>• Filtrate flow rate&amp; pressure in Press</li> </ul> <p><b>Ability to:</b></p> <ol style="list-style-type: none"> <li>1. Properly Charge the blunger</li> <li>2. Adjust the mixing time</li> <li>3. Operate the Pump</li> <li>4. Adjust the filter cloth in plate</li> <li>5. Adjust and measure the required pressure in the press</li> <li>6. Operate the filter press</li> <li>7. Check the filtrate flow rate</li> <li>8. Disassemble the plates</li> <li>9. Collect the cake from the press</li> </ol>	6hr Theory 20hr Practical	Models, Wall Charts, Multimedia, White Board, Stationary,blunger, pug mill, filter press, Relevant data	Class Room/ Lab
6. Perform vacuum Kneading of the Filter Cake	6.1 Understand the operation of the Vacuum Pug mill	<p><b>Knowledge of:</b></p> <ul style="list-style-type: none"> <li>• Vacuum Kneading</li> <li>• Operation of the Pug Mill</li> <li>• Use of Vacuum pump in the mill</li> </ul>	4hr	Wall Charts, Multimedia, White Board, pug	Class Room/ Lab

	6.2 Able to perform the vacuum kneading in the Pug mill	<ul style="list-style-type: none"> <li>• Dies</li> <li>• Moisture Content of the cake</li> <li>• Blank Collection</li> <li>• Troubleshooting and de-airing of pug mill.</li> </ul> <p><b>Ability to:</b></p> <ol style="list-style-type: none"> <li>1. Properly Charge the cake in the hopper</li> <li>2. Operate the Pug mill with vacuum</li> <li>3. Perform the collection of the blank of the required size.</li> <li>4. Troubleshooting and de-airing of pug mill</li> </ol>	<p>Theory</p> <p>10hr</p> <p>Practical</p>	mill, Relevant data	
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**Module 2 :Model and Mould Making**

**Objective:** The Trainee will be able to make model of the desired product, also make plaster mould and different types of mould

**Duration:** ...166..... hours **Theory:** .....40..... hours **Practice:**...126..... hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
1. Make pattern of the desire product	1.1 Able to draft the basic pattern of any shape	<p><b>Knowledge of:</b></p> <ul style="list-style-type: none"> <li>• Relevant Units and their conversion</li> <li>• Basics of drafting i.e Side elevation, top, bottom, front etc.</li> <li>• scale basic drawing</li> <li>• Understanding of the tracing of patterns</li> <li>• Selecting of the proper measuring instruments and tools for jobs</li> </ul> <p><b>Ability to:</b></p>	<p>12hr</p> <p>Theory</p> <p>30hr</p> <p>Practical</p>	<p>Models,</p> <p>Wall Charts,</p> <p>Multimedia,</p> <p>White Board,</p> <p>Stationary,</p> <p>Graph papers,</p> <p>Boards Scale</p> <p>Vernier</p> <p>Calipers Relevant</p>	Class Room/ Lab

		<ol style="list-style-type: none"> <li>1. Select the basic tools for measuring,</li> <li>2. Perform basic mathematical calculations and unit conversions.</li> <li>3. Do freehand drawing</li> <li>4. Perform basic scale Drawings</li> </ol>		data	
2. Make Model of the desired product	<p>2.1 Understand different materials, shrinkage margins and tools used for model making</p> <p>2.2 Able to Prepare models on Vertical Lathe or Modeling wheel.</p>	<p><b>Knowledge of:</b></p> <ul style="list-style-type: none"> <li>• Materials used for the model making</li> <li>• Use of the plastic clay and shrinkage</li> <li>• Use of the Plaster of Paris</li> <li>• Modeling wheel</li> <li>• Different modeling tools</li> <li>• Water and plaster ratio</li> <li>• Mixing of water and plaster</li> </ul> <p><b>Ability to:</b></p> <ol style="list-style-type: none"> <li>1. Perform shrinkage margins</li> <li>2. Operate the modeling wheel</li> <li>3. Asses the proper modeling tools</li> <li>4. Perform the Plaster placement on lathe</li> <li>5. Operate the lathe machine</li> <li>6. Use turning tools</li> <li>7. Sharpen the tool</li> <li>8. Transfer and finishing the design</li> <li>9. Centering and hardness of plaster</li> </ol>	<p>10hr Theory</p> <p>30hr Practical</p>	<p>Wall Charts, Multimedia, White Board, Stationary, Plaster of Paris Clay Modeling wheel, Lathe tools Relevant data</p>	Class Room/ Lab
3. Make various types of Plaster mould	<p>3.1 Understand and able to arrange the tools and equipment required to perform the job</p> <p>3.2 Able to identify the type of</p>	<p><b>Knowledge of:</b></p> <ul style="list-style-type: none"> <li>• Batching of plaster and water ratio</li> <li>• Working on the Modeling Wheel</li> <li>• types of moulds</li> <li>• Master mould</li> <li>• Case mould</li> <li>• working mould</li> <li>• multiple piece mould</li> <li>• separator and mould sealer</li> <li>• setting of the mould</li> <li>• Jigging and press mould</li> <li>• tools used in mould making</li> </ul>	<p>18hr Theory</p> <p>66hr Practical</p>	<p>Models, Wall Charts, Multimedia, White Board, Stationary, Plaster of Paris, turning tools, shellac, soap, Relevant</p>	Class Room/ Lab

	mould required to perform certain job.	<b>Ability to:</b> <ol style="list-style-type: none"> <li>1. Make Plaster mould</li> <li>2. Keep the mould in proper alignment.</li> <li>3. Finish the interior &amp; exterior of the mould</li> <li>4. use the soap and shellac</li> <li>5. use of the turning box</li> <li>6. Make Jiggering and pressing mould</li> <li>7. Make different types of moulds</li> </ol>		data	
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### Module 3: Forming of Articles by Different Techniques

**Objective:** The trainee will be able to understand the different forming techniques and from articles by casting, pressing and jiggering and jollyng techniques

**Duration:** .....159..... hours **Theory:** .....29..... hours **Practice:**.....130..... hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
1. Make Articles by casting technique	1.1 Able to describe the slip casting and its application	<b>Knowledge of:</b> <ul style="list-style-type: none"> <li>• Slip casting and related tools</li> <li>• Application of slip casting</li> <li>• Slip casting moulds</li> <li>• Slip properties and quality</li> </ul> <b>Ability to:</b> <ol style="list-style-type: none"> <li>1. Understand the casting</li> <li>2. Arrange the tools</li> <li>3. Identify slip casting moulds</li> <li>4. Check the faults in slip</li> </ol>	8hr Theory	Models, Wall Charts, Multimedia, White Board, Stationary, Slip casting Moulds	Class Room
2. Mould Filling	2.1 Able to fill the mould properly	<b>Knowledge of:</b> <ul style="list-style-type: none"> <li>• Filling speed</li> <li>• Defects due to filling speed</li> <li>• Draining</li> <li>• Speed of draining</li> </ul> <b>Ability to:</b> <ol style="list-style-type: none"> <li>1. Control the filling speed of slip in the</li> </ol>	6hr Theory  30hr Practical	Models, Wall Charts, Multimedia, White Board, Slip Pouring Container, moulds	Class room/Lab

		mould 2. Control the position of the poured slip 3. Draining of the excess slip from the mould.			
3. Analyze the Casting thickness and time	3.1 Able to cast the piece of the required thickness at specific time	<b>Knowledge of:-</b> <ul style="list-style-type: none"> <li>• Desire thickness of the cast</li> <li>• Steady Draining speed</li> <li>• Angle of Drain</li> <li>• Avoiding of bubbles</li> <li>• Casting time</li> <li>• Relation of casting time with the size of mould</li> <li>• Casting time and environment temperature</li> </ul> <b>Ability to:</b> <ol style="list-style-type: none"> <li>1. Get the desired thickness of the cast</li> <li>2. Estimate the casting time</li> <li>3. Understand the reasons of casting faults</li> </ol>	5hr Theory  50hr Practical	Wall Charts, Multimedia, White Board, Slip Pouring Container, moulds	Class room/Lab
4. Make articles by pressing techniques	4.1 Understand the different pressing techniques 4.2 Able to operate the hydraulic press	<b>Knowledge of:</b> <ul style="list-style-type: none"> <li>• Pressing as fabrication techniques</li> <li>• Applications</li> <li>• Types of Press use in Industries</li> <li>• Dies</li> <li>• Pressure Requirements</li> <li>• Hydraulic and hand Press working principal</li> <li>• Moisture content in the cake</li> <li>• Heaters Dies Compressor Gauge</li> <li>• maintaince of the Hydraulic press</li> <li>• Granulating</li> <li>• Safety measures</li> </ul>	8hr Theory  30hr Practical	Models, Wall Charts, Multimedia, White Board, Slip Pouring Container, Hydraulic press, Cake	Class room/Lab

		<p><b>Ability to:</b></p> <ol style="list-style-type: none"> <li>1. Understand the pressing process</li> <li>2. Identify the moisture required for pressing</li> <li>3. Identify the material for pressing</li> <li>4. filling the same amount of material in the press</li> <li>5. Check the pressure of the press</li> <li>6. Press the stroke</li> <li>7. Operate the hydraulic press to make tile</li> <li>8. Do lubrication of the dies</li> <li>9. Perform inspection of the dies</li> <li>10. Understand safety precautions</li> </ol> <p>-</p>			
5. Make articles by Jiggering & Jollying	5.1 Able to understand the operation and working of the jiggering and jollying machine	<p><b>Knowledge of:</b></p> <ul style="list-style-type: none"> <li>• Jiggering &amp; Jollying Process</li> <li>• Dies and Moulds</li> <li>• Heating System</li> <li>• Adjustment of Cutter</li> <li>• Cutting of Blank</li> <li>• Moisture Content in Blank</li> <li>• Stroke</li> </ul> <p><b>Ability to:</b></p> <ol style="list-style-type: none"> <li>1. Asses the amount of cake for the jiggering &amp; Jollying Process</li> <li>2. Perform the Stroke of the machine</li> <li>3. Cut the Spare line</li> <li>4. Operate the machine</li> </ol>	<p>2hr Theory</p> <p>20hr Practical</p>	Models, Wall Charts, Multimedia, White Board, moulds, cutters, Machine	Class room/Lab

## Module 4: Perform Drying of Articles

Objective: To make enable the Trainee to understand the importance of drying, its types and the factors that affect the drying rate.

**Duration:** .....77..... hours **Theory:** .....17..... hours **Practice:**..60..... hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
1. Perform drying in Conveyor belt dryer	1.1 Able to describe the drying, drying rate and operation of the Conveyor belt dryer	<p><b>Knowledge of:</b></p> <ul style="list-style-type: none"> <li>• Drying and Drying Equipments</li> <li>• Working of Conveyor- belt dryer</li> <li>• Applications</li> <li>• Drying Rate</li> <li>• Temperature and RPM</li> <li>• warping defect in drying</li> </ul> <p><b>Ability to:</b></p> <ol style="list-style-type: none"> <li>1. Understand the drying rate and drying temperature</li> <li>2. Measure and change the temperature in the dryer</li> <li>3. Adjust the RPM of the conveyor belt</li> <li>4. proper dry the article</li> </ol>	<p>8hr Theory</p> <p>25hr Practical</p>	<p>Models, Wall Charts, Multimedia, White Board, Stationary, Dryer</p>	<p>Class Room/ Lab</p>
2. Perform drying in spray dryer	2.1 Able to describe the operation of spray dryer and the control of the parameters	<p><b>Knowledge of:</b></p> <ul style="list-style-type: none"> <li>• Application of Spray Dryer</li> <li>• Working principal and operation of spray dryer</li> <li>• Flow rate and temperature adjustment in spray dryer</li> <li>• Cleaning of spray Dryer</li> <li>• Atomizing Nozzle</li> </ul>	<p>9hr Theory</p> <p>35hr Practical</p>	<p>Models, Wall Charts, Multimedia, White Board, Stationary, Dryer</p>	<p>Class Room/ Lab</p>



		<b>Ability to:</b> <ol style="list-style-type: none"> <li>1. Control the flow of steam in dryer</li> <li>2. Control the flow of slip in dryer</li> <li>3. Perform cleaning of the spray dryer</li> <li>4. Adjust the temperature of the dryer</li> <li>5. Operate the spray dryer</li> </ol>			
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### Module 5: Perform Finishing and Joining

**Objective:** To make able the trainee to undertasnd the finsihing and joining Operations and perform the finsihing and joining of the related articles

**Duration:** .....200..... hours **Theory:** .....20..... hours **Practice:**.....180..... hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
1. Inspection of the green ware piece	1.1 Able to check the quality and identify the defects of the given piece	<b>Knowledge of:</b> <ul style="list-style-type: none"> <li>• Green ware and green are strength</li> <li>• Defects in green ware</li> <li>• warpage</li> <li>• crack</li> <li>• Pin holes</li> </ul> <b>Ability to:</b> <ol style="list-style-type: none"> <li>1. Check Cracks</li> <li>2. Check deformation</li> <li>3. Check pin holes</li> <li>4. Check the weight proportions</li> </ol>	3hr Theory  20hr Practical	Multimedia, White Board, Stationary Eraser, wheel	Class Room/ Lab
2. Perform the Finishing of the piece	2.1 Able to identify the area for the filling and manually fill the desired area as per requirement	<b>Knowledge of:</b> <ul style="list-style-type: none"> <li>• Final shape of the product</li> <li>• Finishing tools and wheel</li> <li>• Spare line of the piece</li> <li>• Related Mould</li> <li>• Moisture content in the piece</li> <li>• Dimension of the piece</li> </ul>	4hr Theory  44hr Practical	Multimedia, White Board, Stationary Eraser, wheel, knife, foam, duster	Class Room/ Lab

		<b>Ability to:</b> <ol style="list-style-type: none"> <li>1. Identify and remove the spare line from the piece</li> <li>2. Understand the tools and wheel</li> <li>3. Make level the base of the piece</li> <li>4. Make the corners of the piece equal</li> </ol>			
3. Make the cutting of the piece	3.1 Able to perform cutting and tools used for cutting	<b>Knowledge of:</b> <ul style="list-style-type: none"> <li>• Shape of the final article</li> <li>• cutting tools</li> <li>• Cutting requirements of the piece</li> <li>• places for holes i.e. lamps, teapots etc</li> </ul> <b>Ability to:</b> <ol style="list-style-type: none"> <li>1. Understand the cutting tools</li> <li>2. Make holes of the required size</li> <li>3. Perform the job as per requirement</li> </ol>	4+hr Theory  60hr Practical	White board, Stationery, Apron knife foam sponge	Class room/Lab
4. Perform the joining of the piece	4.1 Enable student perform joining and pressing of different pieces	<b>Knowledge of:</b> <ul style="list-style-type: none"> <li>• Paste for joining pieces</li> <li>• Composition of the paste</li> <li>• viscosity and water ratio of the paste</li> <li>• Slip as paste</li> <li>• Importance of cleaning</li> <li>• proper pressing of the joined piece</li> </ul> <b>Ability to</b> <ol style="list-style-type: none"> <li>1. Make mixture of joining</li> <li>2. Apply the paste to the right place</li> <li>3. Clean the piece</li> <li>4. Press the piece</li> </ol>	5hr Theory  38hr Practical	White board, Stationery, Apron knife foam sponge	Class room/Lab
5. Re-finishing of the piece	5.1 Able to understand the importance of finishing, tools required to finish the job	<b>Knowledge of:</b> <ul style="list-style-type: none"> <li>• Final shape of the product</li> <li>• tools for finishing</li> </ul> <b>Ability to</b> <ol style="list-style-type: none"> <li>1. -Finalize the piece</li> </ol>	4hr Theory 18hr Practical	White board, Stationery, Apron knife foam sponge	Class room/Lab

## Module 6: Make Decoration on Articles

**Objective:** To enable the tainee to understand the different decoration techniques like under glaze, over glaze, engraving, embossing and engobe decorations and make the decorated ceramics wares

**Duration:** .....178..... hours **Theory:** .....38..... hours **Practice:**.....140..... hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
1. Make under glaze decoration	1.1 Able to describe the under glaze decoration on the ceramics wares and perform the decoration	<p><b>Knowledge of:</b></p> <ul style="list-style-type: none"> <li>• Under glaze decoration techniques</li> <li>• Applications</li> <li>• sketch</li> <li>• Tools and brushes</li> <li>• Coloring scheme</li> <li>• Stroke</li> <li>• Color Solution properties</li> </ul> <p><b>Ability to:</b></p> <ol style="list-style-type: none"> <li>1. Apply Sketch on the green ware</li> <li>2. Coloring the ware as the desire scheme</li> <li>3. Asses the coloring solution</li> </ol>	8hr Theory  40hr Practical	Slides, White Board, Brushes of different size, Pencils, Chromium oxide, Red colour, Yellow colour	Class Room/lab
2. Make engraving	2.1 Able to understand the engraving techniques and the relevant tools	<p><b>Knowledge of:</b></p> <ul style="list-style-type: none"> <li>• engraving technique for ceramics</li> <li>• tools for engraving like blades, cutters</li> <li>• Cutting and handling of green wares</li> <li>• Pattern for cutting</li> </ul> <p><b>Ability to:</b></p> <ol style="list-style-type: none"> <li>1. Properly use the cutting tools</li> <li>2. Make different engraving patterns on the wares</li> </ol>	4hr Theory  20hr Practical	Slides, Whiteboard, pencils, papers, Knives sets, cutters	Class Room/lab
3. Perform embossing	3.1 Able to understand the	<p><b>Knowledge of:</b></p> <ul style="list-style-type: none"> <li>• Embossing technique for ceramics</li> </ul>	4hr	Slides, Whiteboard,	Class Room/lab

	embossing techniques and the relevant tools	<ul style="list-style-type: none"> <li>• Pattern</li> <li>• Coil making</li> <li>• Joining</li> <li>• tools used for embossing</li> </ul> <p><b>Ability to:</b></p> <ol style="list-style-type: none"> <li>1. Make embossing on the articles</li> </ol>	Theory 20hr Practical	pencils, Coil, cake, Knives sets, cutters	
4. Perform over glaze decoration	<p>4.1 Understand the different over glazing techniques like enameling, luster, brushing spraying and, Stickers and the related tools</p> <p>4.2 Able to decorate the surface of the glaze with the help of enameling, luster, brushing and spraying and sticker</p>	<p><b>Knowledge of:</b></p> <ul style="list-style-type: none"> <li>• Over glaze decorations techniques</li> <li>• <b>Enamels</b></li> <li>• Screen printing Machine</li> <li>• Application of enamels</li> <li>• Proper pressing of Enamels paste</li> <li>• <b>Luster</b></li> <li>• Luster Application and tools</li> <li>• Luster viscosity</li> <li>• <b>Brushing techniques</b></li> <li>• Glaze properties for brushing</li> <li>• Brushes</li> <li>• <b>spraying techniques</b></li> <li>• Spray gun</li> <li>• Glaze properties for spraying</li> <li>• <b>Sticker printing</b></li> <li>• Cutting of Sticker</li> <li>• Proper sticking to the glazed surface</li> </ul> <p><b>Ability to:</b></p> <ol style="list-style-type: none"> <li>1. Understand different over glaze decoration techniques</li> <li>2. Operate the screen printing machine</li> <li>3. Apply enamels to the wares</li> <li>4. Apply luster to piece</li> <li>5. Apply decoration with the spray gun</li> <li>6. Apply sticker to piece</li> </ol>	8hr Theory  30hr Practical	White Board, Slides, Media, Enamels, Stickers, Luster, Spray gun, brushes, fired glazed ware	Class Room/lab

<p>5. Make engobe decoration</p>	<p>5.1 Able to properly apply the engobe fit to the surface of the body by pouring and understand different application methods</p>	<p><b>Knowledge of:</b></p> <ul style="list-style-type: none"> <li>• Engobeslip applications</li> <li>• Making of engobe</li> <li>• Colour Adjustment and addition</li> <li>• Engobe adjustment to the wares</li> <li>• Engobe composition</li> <li>• <b>Engobe applications like</b> Dipping, pouring, brushing</li> <li>• Engobe by pouring method</li> <li>• Cleanliness of body</li> <li>• Pores of the body</li> </ul> <p><b>Ability to:</b></p> <ol style="list-style-type: none"> <li>1. Understand engobe decoration techniques</li> <li>2. Understand different engobe application methods</li> <li>3. Make engobe body</li> <li>4. Apply engobe to body by pouring</li> <li>5. Properly fit the engobe to the body</li> <li>6. Asses Engobe defects</li> </ol>	<p>14hr Theory</p> <p>30hr Practical</p>	<p>White Board, Slides Engobe, Tub, Brushes of different sizes</p>	<p>Class Room/lab</p>
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## Module 7: Glaze Applications Methods

**Objective:** To makeenable trainees to glaze the articles by different techniques like spraying, brushing, dipping and pouring.

**Duration:** .....194..... hours **Theory:** .....34..... hours **Practice:**....160..... hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
1. Perform glazing by spraying	<p>1.1 Understand the use of different equipments for spraying glazes</p> <p>1.2 Able to assess the glaze for spraying and apply glaze to the surface with the help of Spray gun</p>	<p><b>Knowledge of:</b></p> <ul style="list-style-type: none"> <li>• Glazing by spraying applications</li> <li>• Tools for spraying glazes</li> <li>• Air Brush</li> <li>• Spray gun with compressor</li> <li>• Spray booth</li> <li>• Turning wheel</li> <li>• Spray gun Nozzle adjustment</li> <li>• Cleaning after use</li> <li>• Glaze thickness for spraying</li> </ul> <p><b>Ability to:</b></p> <ol style="list-style-type: none"> <li>1. Asses the viscosity for glazing</li> <li>2. Adjust the glaze thickness</li> <li>3. Adjust the spray head</li> <li>4. Check the Spray Nozzle</li> <li>5. Place the piece in the spary booth</li> <li>6. Start the Exhaust in the booth</li> <li>7. Do glazing by spraying</li> <li>8. Perform washing the relevant tools after use</li> <li>9. Use the spray both and turning wheel</li> </ol>	<p>6hr Theory</p> <p>30hr Practical</p>	<p>White Board, Slides, Glaze solution, Spray gun with compressor, Turning wheel, spray booth</p>	Class room/Lab
2. Perform glazing by brushing	<p>2.1 Able to glaze the ware with the help of brushes</p>	<p><b>Knowledge of:</b></p> <ul style="list-style-type: none"> <li>• Glazing by brushing</li> <li>• Types of brushes</li> <li>• Pattern of the design</li> <li>• Properties of the glaze solution</li> </ul>	<p>4hr Theory</p>	<p>White Board, Slides, Glaze solution, Brushes of</p>	Class room/Lab

		<ul style="list-style-type: none"> <li>Thickness of the glaze</li> </ul> <p><b>Ability to:</b></p> <ol style="list-style-type: none"> <li>1. Make Pattern on the ware</li> <li>2. perform glazing with brushes</li> <li>3. Adjust the desired viscosity</li> </ol>	40hr Practical	different sizes,	
3. Perform glazing by dipping	<p>3.1 Understand the application of glazing of different wares by dipping technique</p> <p>3.2 Able to properly dip the pieces in glaze</p>	<p><b>Knowledge of:</b></p> <ul style="list-style-type: none"> <li>Glaze applications by dipping</li> <li>Related tools like Bowl, Sponge etc</li> <li>Mixing during application time</li> <li>Proper holding of Piece for dipping</li> <li>Dipping time</li> <li>Dipping of tiles in glazes while moving side ways</li> <li>Double dipping</li> </ul> <p><b>Ability to:</b></p> <ol style="list-style-type: none"> <li>1. Maintain the consistency of glaze during dipping</li> <li>2. Properly dip the piece in glaze</li> <li>3. Understand holding the piece and dipping time</li> </ol>	8hr Theory  30hr Practical	White Board, Slides, Glaze solution, Tubs	Class room/Lab
4. Perform glazing by pouring	<p>4.1 Understand the pouring method for glazes and the water fall glazing method</p> <p>4.2 Able to operate the water fall glazing system</p>	<p><b>Knowledge of:</b></p> <ul style="list-style-type: none"> <li>Glaze applications by pouring</li> <li>water fall glazing method</li> <li>Speed of the conveyor belt</li> <li>Amount of glaze flow</li> <li>Glaze thickness</li> <li>Wetting of piece before glazing</li> </ul> <p><b>Ability to:</b></p> <ol style="list-style-type: none"> <li>1. Understand water fall glazing method</li> <li>2. Control the glaze thickness by controlling RPM</li> <li>3. Control the flow rate of glaze</li> <li>4. Pump back the excess glaze</li> </ol>	8hr Theory  28hr Practical	White Board, Slides, Glaze solution,	Class room/Lab

<p>5. Correct application of glaze</p>	<p>5.1 understand the factors which affect the correct application of glazes</p>	<p><b>Knowledge of:</b></p> <ul style="list-style-type: none"> <li>• Organize the work place</li> <li>• Importance of the clean area</li> <li>• Parameters affecting correction applications of glazes like</li> <li>• Density of the glaze</li> <li>• Viscosity of the glaze</li> <li>• Porosity of the biscuit</li> <li>• Thickness of the piece</li> </ul> <p><b>Ability to:</b></p> <ol style="list-style-type: none"> <li>1. Adjust the viscosity for each application technique</li> <li>2. Flocculate the glaze</li> <li>3. Cleaning the glazing tools after use</li> </ol>	<p>8hr Theory</p> <p>32hr Practical</p>	<p>White Board, Slides, Glaze solution, Sieves, Viscometer, Hydrometer, Beakers, Measuring cylinder</p>	<p>Class room/Lab</p>
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## Module8: Kiln Firing

**Objective:** The Trainee will be able to understand the firing phenomena in the kiln, types of kilns, kiln furniture, importance of the maintenance of the kiln and the factors which affect the performance of the kiln

**Duration:** .....232..... hours **Theory:** .....42..... hours **Practice:**....190..... hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
1. Perform loading and unloading of kiln	<p>1.1 Understand different types of kiln and kiln furnitures</p> <p>1.2 Able to ensure the proper loading and unloading of different ceramics wares.</p>	<p><b>Knowledge of:</b></p> <ul style="list-style-type: none"> <li>• Kiln Classifications</li> <li>• Kiln furniture classification</li> <li>• Saggors, Slabs, Roller, Kiln Trolley, Shelves</li> <li>• Stacking of different wares</li> <li>• Loading for required firing</li> </ul> <p><b>Ability to:</b></p> <ol style="list-style-type: none"> <li>1. Identify the different types of kiln furniture</li> <li>2. Perform stacking of different wares like sanitary, bricks, tiles and table wares</li> <li>3. Load the kiln for the glazed wares</li> </ol>	<p>8hr Theory</p> <p>40hr Practical</p>	<p>Models, Wall Charts, Multimedia, White Board, Stationary, Relevant data, Shuttle kiln with SIC Slabs and supports, saggors, Different types of green wares like sanitary, bricks, tiles and table wares</p>	Class Room/ Lab
2. Perform the proper maintenance of the kiln	<p>2.1 Able to perform the routine inspection of kiln and its related accessories</p>	<p><b>Knowledge of:</b></p> <ul style="list-style-type: none"> <li>• Importance of maintenance of kiln furniture</li> <li>• Composition of the kiln wash</li> <li>• maintenance of burners</li> <li>• Proper ignition of burners</li> <li>• Lubrication of mechanical parts like rollers, compressor/blower</li> </ul>	<p>10hr Theory</p> <p>46hr Practical</p>	<p>Models, Wall Charts, Multimedia, White Board, Stationary, Relevant data Kilns</p>	Class Room/ Lab

		<ul style="list-style-type: none"> <li>Cracked insulation in the kiln</li> </ul> <p><b>Ability to:</b></p> <ol style="list-style-type: none"> <li>Identify and replace the contaminated kiln furniture</li> <li>Make and apply kiln wash to furniture</li> <li>Perform the cleaning of the spark plug</li> <li>Identify the lubrication needs of the rollers and the compressor/blower</li> <li>Identify the wear and tears in insulation</li> <li>Change the insulation</li> </ol>			
3. Ensure the proper control of the kiln	<p>3.1 Understand the different parameters that affects the control of the kiln</p> <p>3.2 Able to properly control the kiln parameters</p>	<p><b>Knowledge of:</b></p> <ul style="list-style-type: none"> <li>Parameters for affecting the control of the kiln</li> <li>Combustion ratio</li> <li>Temperature</li> <li>Pressure</li> <li>Flow</li> <li>Burner failure</li> <li>Devices used for their control and measurement</li> </ul> <p><b>Ability to:</b></p> <ol style="list-style-type: none"> <li>Identify proper and incomplete combustion</li> <li>Adjust the combustion ratio</li> <li>Check &amp; Adjust the temperature of the different zones of the kiln</li> <li>Understand different measuring devices in the kiln</li> <li>Adjust the flow of natural gas with the help of servo motor</li> <li>Understand the importance of the smoke pressure</li> <li>Identify the burner failure</li> <li>Perform cleaning of the burner</li> </ol>	<p>10hr Theory</p> <p>48hr Practical</p>	<p>Models, Wall Charts, Multimedia, White Board, Stationary, Relevant data</p>	<p>Class Room/ Lab</p>

<p>4. Record the Kiln data</p>	<p>4.1 Able to maintain the record of the Kiln</p>	<p><b>Knowledge of:</b></p> <ul style="list-style-type: none"> <li>• Importance of kiln reading</li> <li>• Log book</li> <li>• firing curve</li> <li>• trouble shooting data in log book</li> </ul> <p><b>Ability to:</b></p> <ol style="list-style-type: none"> <li>1. Record the log book</li> <li>2. Measure firing cycle</li> <li>3. Record and analyze trouble shooting data</li> </ol>	<p>6hr Theory</p> <p>20hr Practical</p>	<p>Models, Wall Charts, Multimedia, White Board, Stationary, Kiln, log book</p>	<p>Class Room/ Lab</p>
<p>5. Trouble shooting of the Kiln</p>	<p>5.1 Able to identify the trouble shooting phenomena during kiln firing and make quick action to minimize the defects.</p>	<p><b>Knowledge of:</b></p> <ul style="list-style-type: none"> <li>• <b>Trouble shooting in kiln like</b></li> <li>• Tile Break</li> <li>• Smoke in the zone</li> <li>• Slabs/ Roller break</li> <li>• Gas leakage</li> <li>• Over firing and under firing</li> </ul> <p><b>Ability to:</b></p> <ol style="list-style-type: none"> <li>1. Identify the defects due to firing</li> <li>2. Make Temperature adjustment to remove the defect</li> <li>3. Remove the tile during firing</li> <li>4. Change the Roller/ Slabs</li> <li>5. Clean the burner</li> <li>6. Detect the leakage in line</li> <li>7. Stop the leakage</li> </ol>	<p>8hr Theory</p> <p>36hr Practical</p>	<p>Models, Wall Charts, Multimedia, White Board, Stationary, Kiln,</p>	<p>Class Room/ Lab</p>

## Module 9: Sorting and Quality Control

**Objective :** The Trainee should be able to understand the importance of quality control of the raw materials and the fired products

**Duration:** .....71..... hours **Theory:** .....21..... hours **Practice:**...50..... hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
1. Evaluate the raw materials	1.1 Able to perform the physical analysis of the raw materials for the quality control	<p><b>Knowledge of:</b></p> <ul style="list-style-type: none"> <li>• Sampling (quartering and Coning)of the different raw materials</li> <li>• Mesh size</li> <li>• Physical testing on raw materials</li> <li>• Visual inspection of the raw materials</li> <li>• Moisture test</li> <li>• Loss on Ignition test</li> <li>• Plasticity test</li> <li>• Drying and firing shrinkage</li> <li>• Color after firing</li> </ul> <p><b>Ability to:</b></p> <ol style="list-style-type: none"> <li>1. Understand the importance of these tests</li> <li>2. Perform the sampling of the raw materials</li> <li>3. Measure mesh size</li> <li>4. Identify the plasticity of the clay</li> <li>5. Measure % age moisture and %age Loss on ignition (LOI)</li> <li>6. Identify color after firing</li> <li>7. Measure shrinkage</li> </ol>	8hr Theory  20hr Practical	Models, Wall Charts, Multimedia, White Board, Stationary, Oven, Kiln, Crucibles, Scale, Analytical Balance	Class Room/ Lab
2. Identify the defects on the glazed	2.1 Able to identify the different defects of the glazed material	<p><b>Knowledge of:</b></p> <ul style="list-style-type: none"> <li>• different defects of glazes like</li> <li>• Crazing, shivering, pin holes</li> <li>• Describe their remedies</li> </ul> <p><b>Ability to:</b></p>	5hr Theory  10hr	Slides, Models, Whiteboard Sheets, Defected	Class Room/ Lab

body	of the products like crazing, pin holes, crawling, shiverage etc.	<ol style="list-style-type: none"> <li>1. Understand the glazing defects</li> <li>2. Identify the pin hole</li> <li>3. Identify the crazing</li> <li>4. Identify the shivering</li> <li>5. Identify the crawling</li> <li>6. Understand the reasons and their remedies</li> </ol>	Practical	glazed products, Oven, Kiln, Inks	
3. Identify the defects on fired body	3.1 Able to identify the defects in ceramics bodies like warpage, crack etc	<p><b>Knowledge of:</b></p> <ul style="list-style-type: none"> <li>• Defects in bodies like warpage, crack etc.</li> <li>• Describe their remedies</li> </ul> <p><b>Ability to:</b></p> <ol style="list-style-type: none"> <li>1. Understand the body defects</li> <li>2. Identify the warpage</li> <li>3. Remove the defects</li> </ol>	<p>5hr Theory</p> <p>10hr Practical</p>	Slides, Models, Whiteboard Sheets, Defected glazed products, Oven, Kiln, Inks	Class Room/ Lab
4. Make grading of the products.	4.1 Able to perform the sorting of the different fired products as the quality control policy of company	<p><b>Knowledge of:</b></p> <ul style="list-style-type: none"> <li>• importance of the grading the products</li> <li>• Quality control policy of the company</li> </ul> <p><b>Ability to:</b></p> <ol style="list-style-type: none"> <li>1. Perform grading</li> </ol>	<p>3hr Theory</p> <p>10hr Practical</p>	Slides, Models, Whiteboard Sheets, Fired products, Kiln,	Class Room/ Lab

## Module 10: Perform Communication

**Objective :** To make enable the trainee to properly communicate with the related persons in the Industry

**Duration:** ..51..... hours **Theory:** ....11..... hours **Practice:**....40..... hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
1. Communicate with seniors / juniors	1.1 Understand the communication skill and communicate with seniors / juniors	<p><b>Knowledge of:</b></p> <ul style="list-style-type: none"> <li>Verbal communication, channel of communication and written communication</li> </ul> <p><b>Ability to:</b></p> <ol style="list-style-type: none"> <li>Communicate verbally according to the status of seniors / juniors, select the suitable channel and communicate in written.</li> </ol>	2hr Theory 8hr Practical	Related books, White Board, Papers	Class Room/ Lab
2. Communicate with peers	2.1 Understand the communication	<p><b>Knowledge of:</b></p> <ul style="list-style-type: none"> <li>Communication technique and communication skill</li> </ul> <p><b>Ability to:</b></p> <ol style="list-style-type: none"> <li>Perform communication technique and communication skill</li> </ol>	2hr Theory 8hr Practical	Related books, White Board, Papers	Class Room/ Lab

3. Communicate with engineers/ Supervisor	3.1 Understand the communication skill and communicate with engineers/ supervisor	<p><b>Knowledge of:</b></p> <ul style="list-style-type: none"> <li>Verbal communication, channel of communication and written communication.</li> </ul> <p><b>Ability to:</b></p> <ol style="list-style-type: none"> <li>Communication verbally according to the status of engineer / overseer, select the suitable channel and communicate in written.</li> </ol>	2 hr Theory 8 hr Practical	Related books, White Board, Papers	Class Room/ Lab
4. Communicate with electrical department	4.1 Understand the communication skill and communication with electrical department	<p><b>Knowledge of:</b></p> <ul style="list-style-type: none"> <li>Verbal communication, channel of communication and written communication.</li> </ul> <p><b>Ability to:</b></p> <ol style="list-style-type: none"> <li>Communicate verbally/ written according to the status of electrical faults.</li> </ol>	2 hr Theory 8 hr Practical	Related books, White Board, Papers	Class Room/ Lab
5. Communicate with Mechanical department	5.1 Understand the communication skill and communication with mechanical departments	<p><b>Knowledge of:</b></p> <ul style="list-style-type: none"> <li>Verbal communication, channel of communication and written communication.</li> </ul> <p><b>Ability to:</b></p> <ol style="list-style-type: none"> <li>Communicate verbally/ written according to the status of mechanical fault</li> <li>Select the suitable channel and communicate in written.</li> </ol>	2 hr Theory 8 hr Practical	Related books, White Board, Papers	Class Room/ Lab

6. Communicate with concerned office / stakeholder	6.1 Understand the communication and communicate with office / stakeholder	<p><b>Knowledge of:</b></p> <ul style="list-style-type: none"> <li>• Verbal communication, channel of communication and written communication.</li> </ul> <p><b>Ability to:</b></p> <ol style="list-style-type: none"> <li>1. Communicate verbally according to the status of office / stakeholder, select the suitable channel and communicate in written.</li> </ol>	<p>1 hr Theory</p> <p>8 hr Practical</p>	Related books, White Board, Papers	Class Room/ Lab
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## Module 11: Safety at Work

**Objective:** The Trainee should be able to describe the safe working environment procedures, precautions and how to cope with hazards during accidents

**Duration:** .....74..... Hours **Theory:** ....14..... Hours **Practice:**..60..... hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
1. Identify the protective procedures	1.1 able to identify the various types of protective clothing/equipment and their uses	<p><b>Knowledge of:</b></p> <ul style="list-style-type: none"> <li>• <b>Personal protective equipment,</b> tools and their uses</li> <li>• Overalls</li> <li>• ear defender/plugs</li> <li>• Safety boots</li> <li>• Safety Gloves</li> <li>• Safety Helmets</li> <li>• Safety Masks</li> <li>• Safety Goggles</li> </ul> <p><b>Ability to:</b></p> <ol style="list-style-type: none"> <li>1. Protect him from accident</li> </ol>	6 hr Theory 20 hr Practical	Whiteboard Sheets, safety cloths, ,Overalls, ear defender/plugs,Safety boots,Safety Gloves,Safety Helmets,Safety Masks,Safety Goggles	Class room/lab
2. Ensure the cleaning of the working area	2.1 Able to keep the work place clean and provide the necessary first aid treatment	<p><b>Knowledge of:</b></p> <ul style="list-style-type: none"> <li>• importance of safe working environment</li> <li>• importance of the proper positioning of the related tools</li> <li>• first aid treatment</li> <li>• Electrical Shock</li> <li>• Bleeding</li> <li>• Breakage of bones</li> </ul>	3 hr Theory 20 hr Practical	Slides, Models, Whiteboard Sheets, safety cloths, ,	Class room/lab

		<ul style="list-style-type: none"> <li>• Minor burns</li> <li>• Eye Injuries</li> </ul> <p><b>Ability to:</b></p> <ol style="list-style-type: none"> <li>1. Deal with minor accidents and injuries</li> <li>2. Make proper placement of tools in the work place</li> <li>3. Provide first aid treatment</li> </ol>			
3. Use of Fire Extinguisher and safety alarms	3.1 Able to use the fire extinguisher and Safety Alarms at the time of emergency	<p><b>Knowledge of:</b></p> <ul style="list-style-type: none"> <li>• Fire Extinguishers and their uses</li> <li>• Safety alarms</li> </ul> <p><b>Ability to:</b></p> <ol style="list-style-type: none"> <li>1. Use at the time of fire due to electrical short circuit or combustion</li> <li>2. Use the alarm during fire</li> </ol>	5 hr Theory 20 hr Practical	Slides, Models, Whiteboard Sheets, safety cloths, ,Fire Extinguisher	Class room/lab

## 7. ASSESSMENT

### Module 1:- Preparation of Slip and Glazes

Learning Units	Theory hours	Workplace Days/hours	Recommended formative assessment	Recommended Methodology	Scheduled Dates
1. Perform Crushing of raw materials	8	20	<ol style="list-style-type: none"> <li>1. Explain the different types of raw materials used in the ceramics industries</li> <li>2. Explain the working principle and operation of different crushers like Jaw Crusher, Gyratory crusher</li> <li>3. Demonstrate the Crushing of Sand stone in the Jaw Crusher</li> </ol>	Short Question and answer, Oral test, Task	
2. Perform batching of raw materials for slip and glaze	14	30	<ol style="list-style-type: none"> <li>1. Explain the types of the different clay bodies w.r.t composition</li> <li>2. Explain the Flux, binder and filler used in the slip body</li> <li>3. Describe the preparation of slip</li> <li>4. Describe the use of Deflocculants in the slip</li> <li>5. Describe Glaze and its types</li> <li>6. Explain the different colors used in making colored glazes</li> <li>7. Demonstrate the batch calculations of the stone ware, Porcelain and terra cotta bodies</li> <li>8. Demonstrate to make batch for different types of glazes</li> </ol>	Short Question and answer, Oral test, Task	
3. Perform grinding and mixing of raw materials	16	36	<ol style="list-style-type: none"> <li>1. Explain the working principle and operation of different grinding mills</li> <li>2. Explain the types of grinding and the selection factors for choosing of the grinding media.</li> <li>3. Demonstrate to do the complete grinding of raw materials in the ball mill</li> </ol>	Short Question and answer, Oral test, Task	
4. Check and adjust the parameter	6	28	<ol style="list-style-type: none"> <li>1. Explain the different parameters affecting quality of slip and glazes</li> <li>2. Demonstrate the density measurement of the given slip</li> <li>3. Demonstrate to perform the residue test</li> <li>4. Demonstrate the viscosity measurement test of the slip</li> </ol>	Short Question and answer, Oral test, Task	

s of slip and glazes			and glaze		
5. Perform filtration of the slip	6	20	<ol style="list-style-type: none"> <li>1. Define and explain the filtration</li> <li>2. Explain the operating principal of the filter press</li> <li>3. Explain the working principal of blunger</li> <li>4. Perform filter pressing of the slip</li> <li>5. Perform the mixing in the blunger</li> </ol>	Short Question and answer, Oral test, Task	
6. Perform the vacuum kneading of the filter cake	4	10	<ol style="list-style-type: none"> <li>1. Explain the Vacuum Kneading process</li> <li>2. Describe the working operation and principal of the pug mill</li> <li>3. Explain the role of the vacuum pump, dies, cutter in the mill</li> <li>4. Demonstrate to operate the pug mill and make the blank</li> </ol>	Short Question and answer, Oral test, Task	

## Module 2:- Model and Mould Making

Learning Units	Theory hours	Workplace Days/hours	Recommended formative assessment	Recommended Methodology	Scheduled Dates
1. Make pattern of the desired product	12	30	<ol style="list-style-type: none"> <li>1. Explain different Units of Length, Area and Volume</li> <li>2. Perform the Conversion of these units</li> <li>3. Describe the basics of drafting i.e Side elevation, Top, bottom, front etc.</li> <li>4. Explain scale drawings</li> <li>5. Demonstrate the tracing of the given pattern</li> <li>6. Demonstrate the use of the Vernier Calipers, Scale etc.</li> <li>7. Demonstrate the free hand and scale drawing</li> </ol>	Short Question and answer, Oral test, Task	
2. Make Model of the desired product	10	30	<ol style="list-style-type: none"> <li>1. Describe different materials used for the model making</li> <li>2. Explain the different tools used for Model making</li> <li>3. Demonstrate the Model making of the given pattern</li> </ol>	Short Question and answer, Oral test, Task	
3. Make various types of Plaster mould	18	65	<ol style="list-style-type: none"> <li>1. Explain the different types of Moulds</li> <li>2. Demonstrate the making of the given size of jiggering mould</li> <li>3. Demonstrate the making of the Case, Master and working mould</li> <li>4. Demonstrate the making of the multipiecesmold</li> </ol>	Short Question and answer, Oral test, Task	

### Module 3: Forming of Articles by Different Techniques

Learning Units	Theory hours	Workplace Days/hours	Recommended formative assessment	Recommended Methodology	Scheduled Dates
1. Make Articles by casting technique	8	0	1. Explain the different forming techniques used in the ceramics industries.	Short Question and answer, Oral test,	
2. Mould Filling	6	30	1. Explain the filling of the mould with slip 2. Demonstrate the filling of the given mould	Short Question and answer, Oral test, Task	
3. Analyze the Casting thickness and time	5	50	1. Explain the factors for controlling casting thickness 2. Explain casting time 3. Demonstrate to cast the slip for the controlled thickness		
4. Make articles by pressing techniques	8	30	1. Explain the articles made by pressing 2. Explain the different pressing techniques 3. Demonstrate to make the tile manual or automatic		
5. Perform Jiggering and jollying	2	20	1. Describe the Jiggering & Jollying Process 2. Explain the Dies and Moulds used for this process 3. Demonstrate to make cup and plate from the machine		

#### Module 4: Perform Drying of the Articles

Learning Units	Theory hours	Workplace Days/hours	Recommended formative assessment	Recommended Methodology	Scheduled Dates
1. Perform drying of the articles	8	25	<ol style="list-style-type: none"> <li>1. Define drying and explain the different drying equipments used in the ceramics industries</li> <li>2. Perform the drying in dryer</li> </ol>	Short Question and answer, Oral test, Task	
2. Perform drying in spray dryer	9	35	<ol style="list-style-type: none"> <li>1. Explain the working principal and construction of the Spray dryer</li> <li>2. Explain the importance of grain size, Atomization and the controlling factors of low of slip and steam</li> <li>3. Demonstrate the drying of the slip in the spray dryer</li> </ol>	Short Question and answer, Oral test, Task	

#### Module 5: Perform finishing and joining

Learning Units	Theory hours	Workplace Days/hours	Recommended formative assessment	Recommended Methodology	Scheduled Dates
1. Inspection of the green ware Pieces	3	20	<ol style="list-style-type: none"> <li>1. Explain defects in the green ware piece</li> <li>2. Demonstrate to identify the different defects in the pieces</li> </ol>	Short Question and answer, Oral test, Task	
2. Perform the Finishing of the pieces	4	44	<ol style="list-style-type: none"> <li>1. Define green ware items and explain the need of finishing</li> <li>2. Explain the use of Wheel</li> <li>3. Demonstrate the finishing of the given piece</li> </ol>	Short Question and answer, Oral test, Task	
2. Make the cutting of the pieces	4	60	<ol style="list-style-type: none"> <li>1. Describe the importance for the cutting</li> <li>2. Demonstrate the cutting of piece as per demand</li> </ol>	Short Question and answer, Oral test, Task	

3. Perform the joining of the pieces	5	38	<ol style="list-style-type: none"> <li>1. Explain the joining materials for joining of pieces</li> <li>2. Demonstrate to make a paste</li> <li>3. Demonstrate the joining of the given pieces</li> </ol>	Short Question and answer, Oral test, Task	
4. Re-finishing of the pieces	4	18	<ol style="list-style-type: none"> <li>1. Explain the need of refinishing the piece</li> <li>2. Explain refinishing and the tools</li> <li>3. Demonstrate the re-finishing of the given pieces</li> </ol>	Short Question and answer, Oral test, Task	

### Module 6: Make decoration in articles

Learning Units	Theory hours	Workplace Days/hours	Recommended formative assessment	Recommended Methodology	Scheduled Dates
1. Make under glaze decoration	8	40	<ol style="list-style-type: none"> <li>1. Explain the under glaze decoration</li> <li>2. Describe the related tools and the properties of color solution</li> <li>3. Demonstrate to make the pattern for the under glaze decoration in the given piece</li> </ol>	Short Question and answer, Oral test, Task	
2. Make engraving	4	20	<ol style="list-style-type: none"> <li>1. Explain engraving technique and the related tools</li> <li>2. Demonstrate the engraving in the given piece</li> </ol>	Short Question and answer, Oral test, Task	
3. Perform embossing	4	20	<ol style="list-style-type: none"> <li>1. Explain embossing technique and the related tools</li> <li>2. Demonstrate the embossing in the given piece</li> </ol>	Short Question and answer, Oral test, Task	
4. Perform overglaze decoration	8	30	<ol style="list-style-type: none"> <li>1. Explain the types of Over glaze decoration</li> <li>2. Explain the enameling and its applications methods</li> <li>3. Explain luster, Spraying and brushing and their related tools</li> <li>4. Demonstrate to apply the screen printing, Spraying, ,brushing Luster and sticker pasting in the given piece</li> </ol>	Short Question and answer, Oral test, Task	
5. Make engobe decoration	14	30	<ol style="list-style-type: none"> <li>1. Explain the engobe, its making, adjustment and application methods</li> <li>2. Demonstrate to apply the engobe the body with the help of pouring technique</li> </ol>	Short Question and answer, Oral test, Task	



## Module 7: Glaze application methods

Learning Units	Theory hours	Workplace Days/hours	Recommended formative assessment	Recommended Methodology	Scheduled Dates
1. Perform glazing by spraying	6	30	<ol style="list-style-type: none"> <li>1. Explain the glazing by spray gun and its applications.</li> <li>2. Explain the working principal and use of the spray gun.</li> <li>3. Explain the role of Wheel and Spray booth on spray glazing</li> <li>4. Demonstrate the glazing on the given item with the help of spray gun</li> </ol>	Short Question and answer, Oral test, Task	
2. Perform glazing by brushing	4	40	<ol style="list-style-type: none"> <li>1. Explain the application of glazing by brushing technique</li> <li>2. Demonstrate the glazing on the piece with brush</li> </ol>	Short Question and answer, Oral test, Task	
3. Perform glazing by dipping	8	30	<ol style="list-style-type: none"> <li>1. Explain the application of glazing by dipping techniques and the factors of controlling glaze consistency</li> <li>2. Demonstrate the glazing on the different pieces with dipping technique</li> </ol>	Short Question and answer, Oral test, Task	
4. Perform glazing by pouring	8	28	<ol style="list-style-type: none"> <li>1. Describe the application of glazes by pouring</li> <li>2. Explain the water fall glazing method</li> <li>3. Demonstrate the glazing on the piece with pouring in the water fall glazing system</li> </ol>	Short Question and answer, Oral test, Task	
5. Correct application of glaze	8	32	<ol style="list-style-type: none"> <li>1. Explain the parameters that affect the application of glazing</li> <li>2. Demonstrate to apply the given glaze on the ware by adjusting the related parameters</li> </ol>	Short Question and answer, Oral test, Task	

## Module 8: Kiln Firing

Learning Units	Theory hours	Workplace Days/hours	Recommended formative assessment	Recommended Methodology	Scheduled Dates
1. Perform loading and unloading of kiln	8	40	<ol style="list-style-type: none"> <li>1. Define kiln, explain the kiln furniture and its types</li> <li>2. Describe staking</li> <li>3. Perform the loading of the given different types of wares on the kiln furniture</li> </ol>	Short Question and answer, Oral test, Task	
2. Perform the proper maintainance of the kiln	10	46	<ol style="list-style-type: none"> <li>1. Describe the maintaince of the kiln furniture</li> <li>2. Describe the maintaince of the burners</li> <li>3. Describe the importance of the insulation and mechanical parts of the kiln</li> <li>4. Demonstrate to perform the maintenance of the kiln</li> </ol>	Short Question and answer, Oral test, Task	
3. Ensure the proper control of the kiln	10	48	<ol style="list-style-type: none"> <li>1. Describe the different parameters for affecting the control of the kiln</li> <li>2. Combustion ratio</li> <li>3. Temperature</li> <li>4. Pressure</li> <li>5. Flow</li> <li>6. Demonstrate the control of the running kiln by adjusting these above parameters</li> </ol>	Short Question and answer, Oral test, Task	
4. Record the Kiln data	6	20	<ol style="list-style-type: none"> <li>1. Describe the importance of kiln reading</li> <li>2. Describe Log book and its application</li> <li>3. Explainthe firing curve</li> <li>4. Describe trouble shooting data</li> <li>5. Demonstrate to ledgerize the data in the log book</li> </ol>	Short Question and answer, Oral test, Task	
5. Trouble shooting of the Kiln	8	36	<ol style="list-style-type: none"> <li>6. Describe the trouble shooting data in kiln</li> <li>7. Explain Over firing and under firing</li> <li>8. Demonstrate to minimize the gas leakage and change the break roller/ slabs during firing</li> <li>9. Demonstrate to identify and remove the smoke from the kiln zone</li> </ol>	Short Question and answer, Oral test, Task	

## Module 9: Sorting and Quality Control

Learning Units	Theory hours	Workplace Days/hours	Recommended formative assessment	Recommended Methodology	Scheduled Dates
1. Evaluate the raw materials	8	20	<ol style="list-style-type: none"> <li>1. Explain the sampling technique for the raw materials</li> <li>2. Explain the physical tests used for the raw materials</li> <li>3. Demonstrate the sampling of the raw materials</li> <li>4. Demonstrate the physical testing like, moisture, % LOI, plasticity, color after firing on the given raw materials</li> </ol>	Short Question and answer, Oral test, Task	
2. Identify defects on the glazed body	5	10	<ol style="list-style-type: none"> <li>1. Explain the different defects on the surface of glazes</li> <li>2. Describe the reasons of these defects</li> <li>3. Identify the different defects on glazed surface</li> </ol>	Short Question and answer, Oral test, Task	
3. Identify the defects on the fired body	5	10	<ol style="list-style-type: none"> <li>1. Explain the different defects on bodies</li> <li>2. Describe the reasons of these defects</li> <li>3. Identify the different defects on surface</li> </ol>	Short Question and answer, Oral test, Task	
4. Make grading of the products.	3	<b>10</b>	<ol style="list-style-type: none"> <li>1. Explain the importance of grading and the quality control</li> <li>2. Demonstrate the grading of the given materials</li> </ol>	Short Question and answer, Oral test, Task	

## Module 10: Perform Communication

Learning Units	Theory hours	Workplace Days/hours	Recommended formative assessment	Recommended Methodology	Scheduled Dates
1. Communicate with seniors / juniors	2	8	<ol style="list-style-type: none"> <li>1. Explain communication technique and communications skill with seniors/juniors.</li> <li>2. Demonstrate to perform the communication with the related person</li> </ol>	Short Question and answers, Quiz, Task	
2. Communicate with peers	2	8	<ol style="list-style-type: none"> <li>1. Explain communication technique and communications skill with peers</li> <li>2. Demonstrate to perform the communication with the related person</li> </ol>	Short Question and answers, Quiz, Task	

3. Communicate with engineer/ Supervisor	2	8	<ol style="list-style-type: none"> <li>1. Explain communication technique and communications skill with engineer/supervisor.</li> <li>2. Demonstrate to perform the communication with the related person</li> </ol>	Short Question and answers, Quiz, Task	
4. Communicate with electrical department	2	8	<ol style="list-style-type: none"> <li>1. Explain communication technique and communications skill with electrician/Electrical department</li> <li>2. Demonstrate to perform the communication with the related person</li> </ol>	Short Question and answers, Quiz, Task	
5. Communicate with Mechanical department	2	8	<ol style="list-style-type: none"> <li>1. Explain communication technique and communications skill with mechanical /Electrical department</li> <li>2. Demonstrate to perform the communication with the related person</li> </ol>	Short Question and answers, Quiz, Task	
6. Communicate with concerned office / stakeholder	1	8	<ol style="list-style-type: none"> <li>1. Explain communication technique and communications skill with concerned office/stakeholder</li> <li>2. Demonstrate to perform the communication with the related person</li> </ol>	Short Question and answers, Quiz, Task	

### Module 11: Safety at Work

Learning Units	Theory hours	Workplace Days/hours	Recommended formative assessment	Recommended Methodology	Scheduled Dates
1. Identify the protective procedures	6	20	<ol style="list-style-type: none"> <li>1. Describe different personal protective equipments, tools and their uses</li> <li>2. Demonstrate to wear the safety equipment for eyes, hands, body and feet</li> </ol>	Short Question and answers, Quiz, Task	
2. Ensure the cleaning of the working area	3	20	<ol style="list-style-type: none"> <li>1. Describe the importance of safe working environment</li> <li>2. Describe first aid treatment</li> <li>3. Explain different types of injuries</li> <li>4. Demonstrate the arrangement of tools and equipments for the clean work place</li> </ol>	Short Question and answers, Quiz, task	

3. Use Fire Extinguisher and safety Alarms	5	20	<ol style="list-style-type: none"> <li>1. Explain the different types of fire extinguishers.</li> <li>2. Describe the importance of safety alarms</li> <li>3. Demonstrate the extinguishing of fire with the help of fire extinguisher</li> </ol>	Short Question and answers, Quiz, Task	

## 8. SUPPORTIVE NOTES

### Assessment context:

This unit has to be assessed on the job, off the job, or a combination of on and off the job demonstrated by an individual work.

### Critical aspects:-

- ✓ Able to make different batches for body and glazes
- ✓ Ability to operate all the machinery in the slip house
- ✓ Able to make different types of Plaster of Paris moulds
- ✓ Ability to make different items by casting, jiggering and jollying and pressing techniques
- ✓ Ability to operate the dryers
- ✓ Ability to perform finishing and joining
- ✓ Ability to apply glaze on the ceramics ware by spraying dipping pouring and brushing techniques
- ✓ Ability to decorate the ceramics ware by different techniques
- ✓ Ability to operate the kiln
- ✓ Ability to record the kiln data
- ✓ Ability to perform sorting
- ✓ Ability to properly communicate
- ✓ Follow safety rules

### Assessment condition:-

Each unit should be assessed separately.

The candidate will have to access all the related tools, equipment, material and demonstrations required.

The candidate will be required orally or by other methods of communication to answer questions asked by the assessor.

Present evidence related to the skills.

Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by criteria and that he possesses the required knowledge and skill.

### Resources required for assessment:-

It includes all tools, equipment and related material, listed in the curriculum

## 9. LIST OF TOOLS, MACHINERY & EQUIPMENT

SR. NO.	NOMENCLATURE OF EQUIPMENT / TOOLS	QUANTITY
1.	<p>Shuttle kiln with all accessories</p> <p>Volume:- 500 liter</p> <p>Maximum temperature:- 1300 deg C</p> <p>Fuel- Natural gas fired</p> <p>Blower as per specification of the Kiln</p> <p>, Suitable for oxidizing &amp; Reduction firing</p> <p>Equipped with all temp/fuel control system</p> <p>Kiln Furnitures</p> <p>SiC Slabs, Saggars, Pilleretc</p>	1 No. (Imported)
2.	<p>Ball Mill with complete accessories</p> <p>Capacity: 100 kg</p>	1 No.

	Grinding Media: Stone balls Rubber Lining Speed Reducer with RPM controller	
3	Jaw Crusher Feed size 130 Product size 10 mm	1 No.
4	Vibrating Sieve Shaker With Standard Sieves sets	25 set.
5	Blunger	1 No.
6	Filter Press Cylinder capacity: 30 to 300 m Filter plate material: Pure Polypropylene	1 No.
7	Jiggering and jollying Machine	1 No.
8	Laboratory Oven Capacity 500 L Max Temperature: 300 deg C	1 No.



9	Pug Mill with vacuum	1 No.
10	Portable Spray Gun	4 No
11	Modeling Wheel	5 No
12	Torsion Balance Viscometer	1 No
13	Magnetic Separator	1 No.
14	Spray Booth	4 No
15	Lab Scale Kiln Max Temperature 1200 deg C Volume 20 L	1 No.
16	Plaster Modeling Wheel	5 No
17	Plaster Mixing Machine	1 No
18	Analytical weighting Scale	1 No

19	Buckets, jugs	10 No
20	Spoons & whisks	20 No
21	Wooden Boards	60 No
22	Plaster Bats	20 No
24	Plaster's Turning Tools Set	2 No
25	Scrapers or Metal Kidneys	10 No
26	Carpenter's Saw	2 No
27	Surforms Blades	30 No
28	Forged Steel Tools	20 No
29	Hacksaw Blades	20 No

30	Variety of Files, Knives, Gouges, chisels	50 No
31	Weighing scale	1 No.
32	Calipers	10 No
33	Flexi curves	10 No
34	Compasses	20 No

## 10. LIST OF CONSUMABLE SUPPLIES

SR. NO.	Consumable Items	QUANTITY
1.	Green wares like <ul style="list-style-type: none"><li>- Plates</li><li>- Bowls</li><li>- Dishes</li><li>- Basins</li><li>- Commodes</li><li>- Bricks</li></ul>	100 each
3.	Pyrometric sager cones	20 set
3.	Insulating Wool	10 set
4	Kiln furniture like SiC Slabs etc.	20 No

	China Clay,	2 Ton
	Ball Clay	2 Ton
	Pottery Clay	2 Ton
	Soda Feldspar	2 Ton
	Potash feldspar	2 Ton
	Quartz	2 Ton
	Lime Stone	1 Ton
	Talc	500 Kg
	Zironia	300 Kg
	Corundum	100 Kg

	Beakers 1 L, 500 mL, 100 mL	50 No
	Hydrometer	25 No
	Porcelain Crucibles 30 ml	40 No
	Eraser	100 No
	Blades	70 No
	Sponges	100 No
	Tub 20 L	10 No

## 11. REFERENCE BOOKS

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3. Susan Peterson, The Craft and Art of Clay, Overlook Press, 1996
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