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جامعة الزيتونة الأردنية
Al-Zaytoonah University of Jordan



Ceramics Vocational Course Road-map

Traditional Craft Heritage
Training , Design and Marketing
in Jordan and Syria
(HANDS)

ERASMUS+Programme

HANDS Project Number : 610238-EPP-1-2019-1-JOEPKKA2-CBHE-JP





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CERAMICS

Training Program

Objectives

To equip students with the foundational skills and techniques in ceramics, allowing them to create beautiful and functional ceramic pieces through hands-on projects

1

Learn manual construction methods (compression, ropes, slices)

2

Learn some basic skills in glazing and colouring projects (spraying, dipping, brushing)

3

Development of students' skills on manual, technical and visual experience through the basics of rope forming

4

Developing skills in how to build and decorate ceramic works with ropes and slides

5

To employ nature and decorative elements in the ceramic design work

6

Emphasis on texture as an integral part of ceramic work

7

Discuss construction problems, the importance of design and creative work in ceramic work

Program Details

Target Audience

School and university students

Program Duration

Four weeks, two days a week with three hours per day.

Delivery Method

- Presentations
- Training activities
- Brainstorming
- Discussion and dialogue

PROGRAM CONTENTS

- 1** Program Overview
Introduction of the history of ceramic
Break
Introduction to the clay material
Discussion
- 2** Preparing the sketches
Break
Preparing the clay (compression, ropes, slices)
Discussion
- 3** Introduction to the potter's wheel, centering the clay, forming bowls and cylinders, trimming and burnishing on the wheel
Break
How sculpture is made with clay, slab construction, extrusion, tile making and slip casting
Discussion
- 4** Project 1: 3 round forms in increasing size and elongation ranging in size from 10- 20 cm with emphasis on elegant, refined contour
Break
Project 2: 3 slab cylinder vessels, 15- 25 cm, emphasis on texture and process
Discussion

- 5** Learn about ceramic techniques
Break
Learn about how to build and decorate the clay
Discussion
- 6** Getting to know about glazing and coloring ceramic
Break
Project 3: 5 wheel thrown bowl and or cylinder forms, 10 – 20 cm tall. Emphasis: understand wheel thrown ceramics, learn to center
Discussion
- 7** Texturing and coloring clay, color used in clay and slips, engobes, oxides and underglazes as well as non-traditional decorative techniques including acrylic paint and dye
Break
Glazing: The function of glazes and how they are made up, simple glaze testing, proper application, health and safety
Discussion
- 8** Final submission for Projects
Break
Critical seminars
Discussion

WHAT ARE CERAMICS?

Ceramics are inorganic, non-metallic materials that are shaped and hardened through high-temperature firing. These materials, including clay, can be crafted into functional objects like pottery or artistic creations like sculptures, and are known for their durability, heat resistance, and wide range of aesthetics.





HISTORY OF CERAMICS

History of Ceramics

Early Beginnings (29,000 - 10,000 BC)

The earliest known ceramic objects are figurines, not pottery. Unearthed in Central Europe, these Gravettian figurines were likely created by shaping clay and firing them at low temperatures (approximately 800°C), likely in open hearths or rudimentary kilns. Their scarcity can be attributed to the fragility of low-fired ceramics.

The Gravettian figurines, often depicting female forms with exaggerated features, remain enigmatic regarding their function. However, some archaeologists posit a connection to rituals or symbolic representations of beauty. The discovery of these figurines underscores the presence of sophisticated artistic expression within early mobile hunter-gatherer societies.



History of Ceramics

Rise of Pottery (9,000 BC onwards)

This period saw a rise in pottery alongside settled communities and agriculture. Clay's perfect properties - workable when wet, form-holding when dry, and durable after firing - made it ideal for vessels to store and transport crops. Early pots were likely hand-built with simple decorations.

The potter's wheel (invented around 3500 BC in Mesopotamia) revolutionized production, allowing for efficient creation of standardized shapes and sizes, catering to new needs. Pottery transformed food storage and preparation, and became crucial for trade networks.



History of Ceramics

Ancient Civilizations (3000 BC onwards)

Egyptians, Mesopotamians, and Chinese all played a significant role in ceramic evolution. Egyptians mastered faience, a glazed quartz material, while Mesopotamian potters used the potter's wheel for faster production. China emerged as a leader in glazed stoneware as early as the 15th century BC.



History of Ceramics

Medieval and Renaissance Europe

Islamic potters in the Middle East introduced new glazing techniques like lusterware, influencing European ceramics. The Italian Renaissance saw a renewed appreciation for classical forms and decoration in ceramics.



History of Ceramics

Modern and Contemporary Ceramics

Ceramics continue to evolve, encompassing functional objects, artistic sculptures, and even advanced technical applications like engineering ceramics used in electronics.





MATERIALS

Clays

Undoubtedly the foundation of ceramics, clays are fine-grained, naturally occurring earthen materials formed from the decomposition of rocks rich in aluminum silicate minerals. The specific properties of clay depend on its mineral composition, but generally, clays are plastic when wet, allowing them to be shaped, and harden upon drying and firing.

Types of Clay

Kaolin (China Clay)

Composition and Characteristics

Kaolin is the epitome of white-burning clays. Its fine particle size translates to superior plasticity and workability when in its hydrated state. However, this characteristic also necessitates careful consideration, as it can lead to significant shrinkage during drying and firing cycles. To mitigate this, kaolin is often blended with other clays.

Benefits and Applications

Prized for its ability to produce smooth, white porcelain bodies, kaolin's high resistance to temperatures makes it ideal for high-fired ceramics. Its applications encompass porcelain tableware, high-quality whiteware, sanitaryware, and even technical ceramics.



Types of Clay

Ball Clay

Composition and Characteristics

Distinguished by its exceptional workability and plasticity, ball clay boasts superior forming properties. The smooth texture and strong bonding strength contribute significantly to its suitability for throwing on the potter's wheel.

Benefits and Applications

This clay enhances the plasticity of other clays, allowing for easier shaping and reducing the risk of cracking. Ball clay's contribution to a smooth surface on finished pieces makes it a valuable asset. Its primary applications lie in pottery, tableware, and figurines. Additionally, it is frequently blended with other clays to improve workability in porcelain and stoneware bodies.



Types of Clay

Stoneware Clay

Composition and Characteristics

In contrast to kaolin and ball clay, stoneware clays contain a higher proportion of non-plastic materials like quartz. This results in a coarser texture and lower plasticity. However, the trade-off lies in their enhanced durability and heat resistance. Stoneware clays fire to a range of colors, encompassing buff, brown, and even reddish tones.

Benefits and Applications

Stoneware clays are particularly well-suited for high-fired ceramics due to their excellent heat resistance. They maintain their shape well during firing and exhibit a lower propensity for warping. The coarser texture can be leveraged to create visually interesting surface effects. Stoneware clays are the go-to choice for stoneware pottery, functional tableware, tiles, pipes, and even some sculptures.



Non-Clay Materials

Beyond the essential clay, other materials can be incorporated into ceramic bodies to achieve specific effects.

Types of Non-Clay Materials

Temper



Composition and Characteristics

Temper is an inert material typically composed of crushed rock or sand, with particle sizes ranging from fine to coarse depending on the desired effect. Common materials used for temper include quartz, grog, and chamotte (another form of crushed fired clay).

Benefits and Applications

The primary function of temper is to improve the workability of clay. It helps to reduce shrinkage during drying and firing, preventing cracking. Additionally, temper can influence the final texture of the ceramic piece, creating a more open and lightweight body with coarser temper or a denser and smoother body with finer temper. It's particularly beneficial for hand-building techniques like coiling and slab construction.

Types of Non-Clay Materials

Fluxes



Composition and Characteristics

Fluxes are a group of materials that lower the vitrification temperature of clay (the temperature at which a glassy phase forms within the ceramic body). These materials typically contain elements like sodium, potassium, and calcium, which act as melting agents.

Benefits and Applications

By lowering the firing temperature, fluxes contribute to energy savings during the firing process. Additionally, a lower firing temperature can help to reduce warping and cracking in ceramic pieces, especially for clays that are prone to these issues. Fluxes also influence the final properties of the ceramic, such as increasing its strength, durability, translucency, and creating a waterproof and more durable ceramic body.

Types of Non-Clay Materials

Grog



Composition and Characteristics

Grog is essentially crushed and fired clay. It can be made from the same clay body being used in the project or from a different clay with specific properties. The particle size of grog can be varied to achieve different effects.

Benefits and Applications

Grog offers several advantages in ceramics. It helps to reduce shrinkage during drying and firing, similar to temper, but to a lesser extent. More importantly, grog improves the thermal shock resistance of the ceramic piece. This means the piece is less likely to crack or break when subjected to sudden temperature changes. Grog is particularly beneficial for functional ceramics that will be exposed to heat, such as mugs or baking dishes. It can also be used to create interesting surface textures in ceramic artwork.



PREPARING SKETCHES

Preparing Sketches

Why Sketch for Ceramics?

- Visualizing ideas: Turn abstract thoughts into concrete visual representations.
- Experimenting and iterating: Explore different designs and variations before committing to clay.
- Refining proportions and form: Ensure your ceramic piece has balanced and aesthetically pleasing proportions.
- Planning for decoration: Sketch how you will decorate your ceramic piece, considering surface area and functionality.
- Communicating ideas: Clearly convey your vision to others, such as instructors or collaborators.

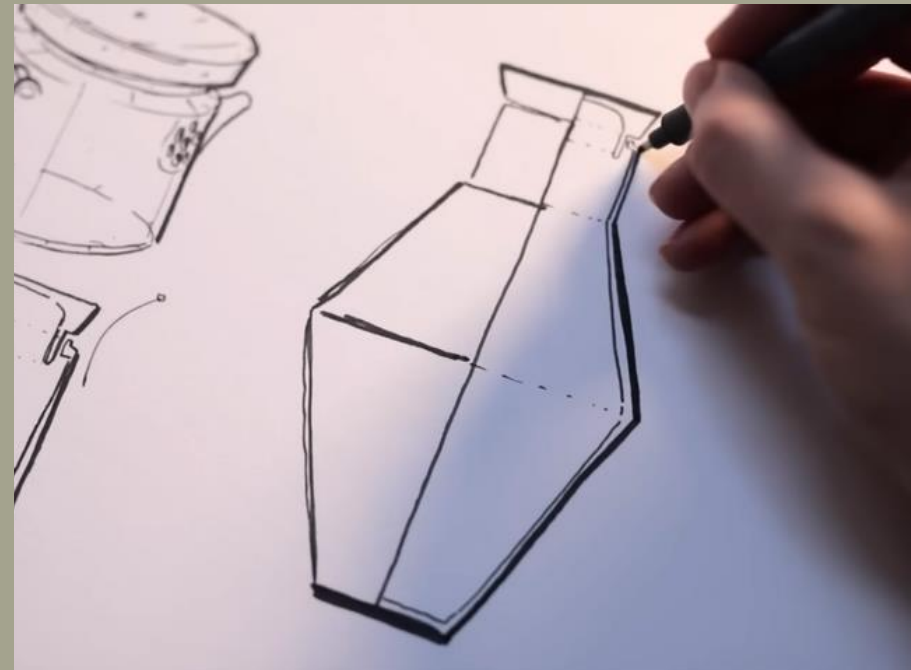


Preparing Sketches

Sketching Techniques

There are some specific techniques potters use for sketching ceramics that go beyond general drawing skills:

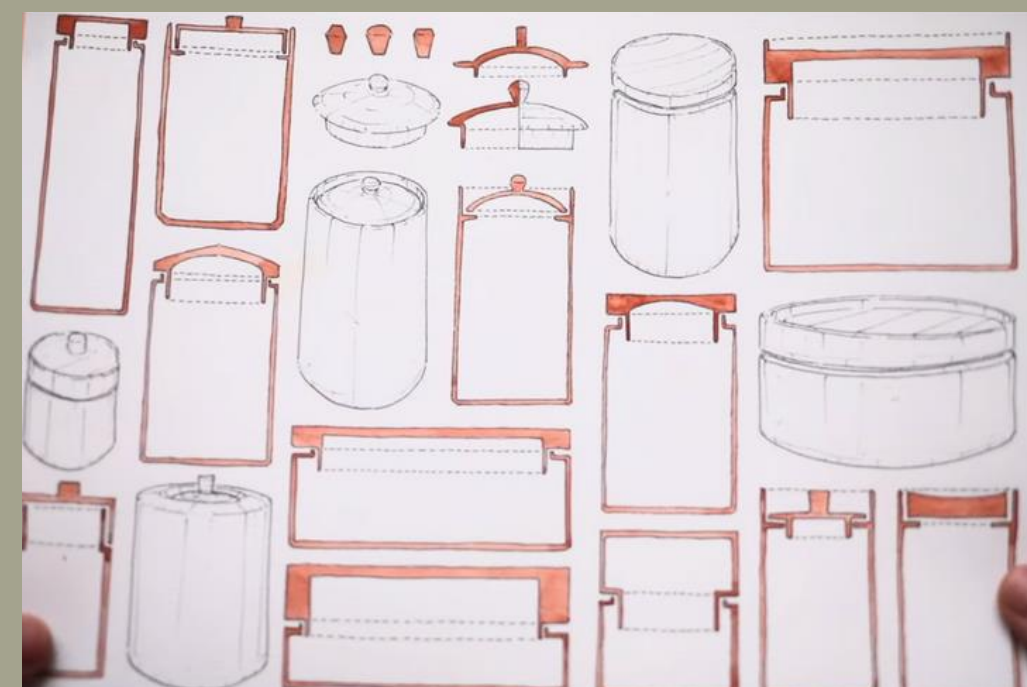
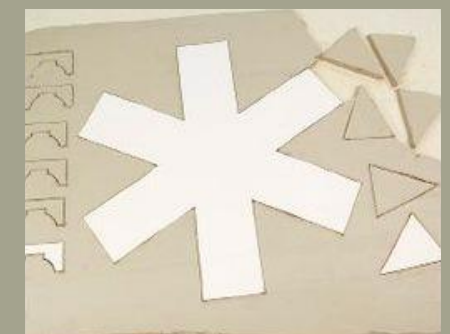
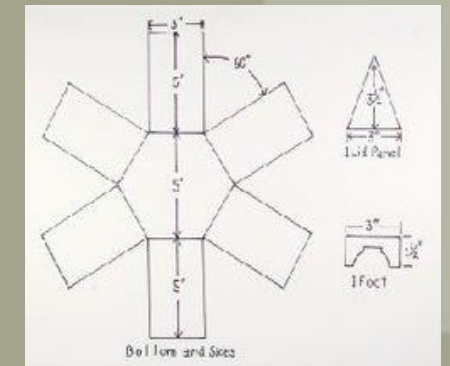
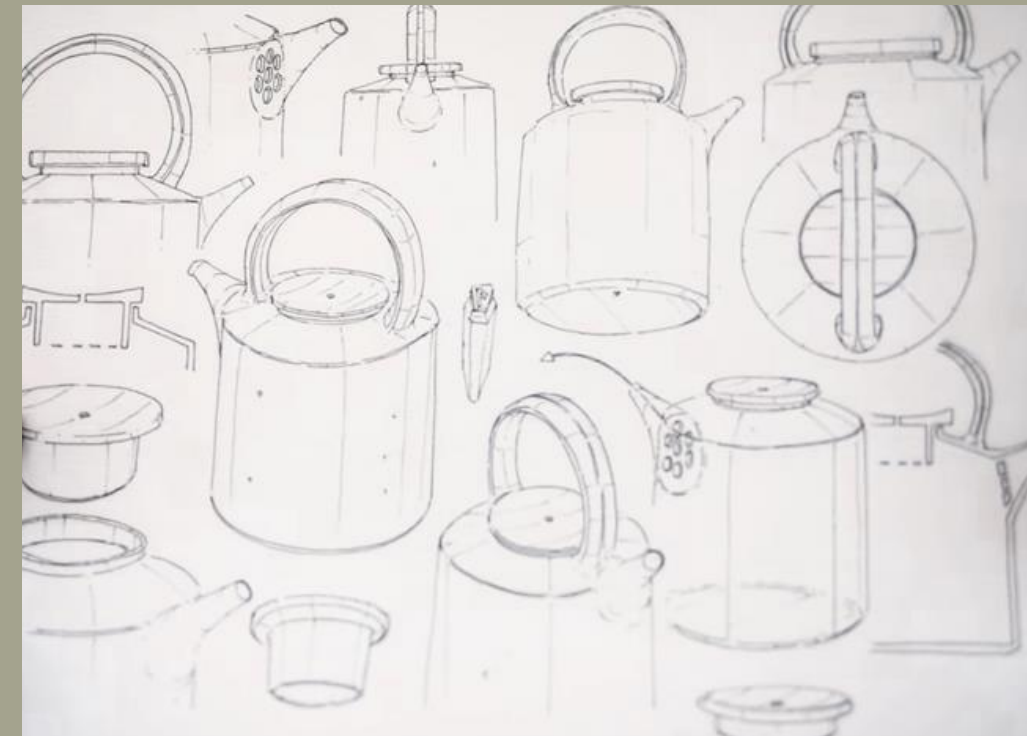
- **Silhouette Sketches:** Draw the basic outline of your ceramic piece, focusing on the overall shape and proportions. This is a good starting point to explore different ideas before diving into details.
- **Silhouette with Sections:** Divide your silhouette sketch into sections to represent different parts of the form (base, body, neck, handle). This helps visualize how these parts will connect and function together.



Preparing Sketches

Sketching Techniques

- **Template Sketches:** Create paper templates of your design, especially for flat pieces or lids. You can cut out the template and lay it on the clay for tracing or reference.
- **Perspective Sketches:** When sketching more complex forms, use perspective drawing to accurately represent the three-dimensionality of the piece. This is especially helpful for items with multiple angles or curves.
- **Developmental Drawings:** Create a series of sketches showing the piece from different angles (front, back, side) or in different stages of construction (assembled vs. separate parts).



PREPARING THE CLAY

Preparing the Clay

Compression (Wedging)

Purpose

Wedging, a process that incorporates compression, is essential for preparing clay. It evens out air pockets, removes any trapped air bubbles, and ensures a smooth, consistent texture throughout the clay body.



Method

Slam a lump of clay repeatedly onto a work surface. Fold the clay in half repeatedly, pressing down firmly with each fold. You can also use a wedging tool for leverage.

Preparing the Clay

Ropes (Coil Building)

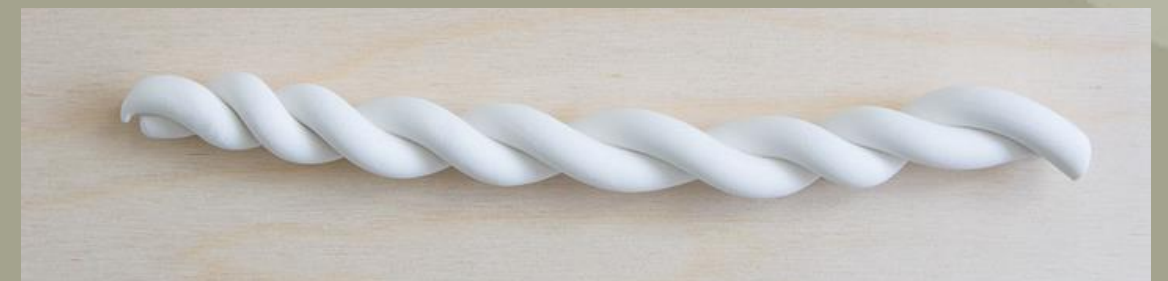
This is a fundamental hand-building technique where long ropes of clay act as the building blocks. Individual coils are stacked upon each other and then carefully pinched together to create the form.

Method

Take a wedged clay slab and roll it out into a long, even log-like shape. The thickness of the rope will depend on your project's needs. Use a rolling pin or your hands to achieve the desired thickness.

Tips for Working with Ropes

- Maintain consistent thickness for easier construction and smoother joining.
- Lightly dampen the connection points to ensure good adhesion when attaching them to each other.
- After joining, use pottery tools to smooth out the seams between the coils and create a unified form.



Preparing the Clay

Slices (Slab Building)

Slab building is a popular ceramic construction method that utilizes flat sheets of clay, created by slicing the wedged clay.



Method

- Roll out the clay: Use guides and a rolling pin to create a flat sheet (slab) with the desired thickness.
- Cut shapes: Use pottery knives or templates to cut out your desired shapes from the slab.
- Leather-hard stage: Let the cutouts dry slightly until firm but pliable (leather-hard).
- Join and shape: Moisten edges and use scoring/slipping to connect pieces for your ceramic creation.



THE POTTER'S WHEEL

The Potter's Wheel

Introduction

The potter's wheel is a machine that allows transforming clay into beautiful and functional ceramic pieces. It spins at variable speeds, allowing the creation of shapes using hands and tools.

- **Parts:** The wheel typically consists of a rotating wheelhead, a foot pedal for speed control, and a splash pan to catch excess water.
- **Safety:** Keep long hair, loose clothing, and jewelry away from the spinning wheel to avoid accidents.



The Potter's Wheel

Centering the Clay

Centering is a crucial step in ensuring the clay is evenly distributed and eliminating wobbliness during shaping.

- **Wedging:** Before centering, thoroughly wedge the clay to remove air bubbles and achieve a consistent texture.
- **Throwing the Clay:** Place a ball of clay on the center of the spinning wheelhead.
- **Centering with Pressure:** Using your palms and fingers, apply gentle but firm pressure to push the clay upwards and inwards, centering it on the wheel.
- **Refining Center:** Once somewhat centered, use a combination of pushing and pulling motions to refine the form and eliminate any remaining wobble.



The Potter's Wheel

Forming Bowls and Cylinders

Bowls

- Using your thumb and fingers, gently push down into the centered clay, creating a hollow cone shape.
- Apply even pressure to the sides of the cone, gradually raising and thinning the walls to form the bowl shape. Use your thumb on the inside and fingers on the outside to control the thickness.
- Use your thumb or a shaping tool to smooth and define the rim of the bowl.

Cylinders

- With centered clay, use your palms to gently and evenly press upwards on the sides, raising the clay into a cylinder shape.
- Apply consistent pressure to ensure the cylinder walls have a uniform thickness.
- Use a tool or fingers to smooth and define the top rim of the cylinder.



The Potter's Wheel

Trimming and Burnishing

Trimming

After shaping, use pottery trimming tools to remove excess clay from the base of the piece. This creates a clean and even foot for the piece to rest on.



The Potter's Wheel

Trimming and Burnishing

Burnishing (Optional)

Burnishing involves smoothing the surface of the leather-hard clay with a smooth tool or stone. This creates a slight sheen and compresses the clay particles for a stronger form.



A close-up photograph of a person's hands working on pottery. The person is dipping a piece of pottery into a shallow bowl containing a liquid mixture, likely slip or glaze. The pottery is being held by the left hand, and the right hand is dipping it into the liquid. In the background, a tall, cylindrical piece of pottery is visible on a wooden surface. The scene is set on a wooden table with a white cloth and a piece of burlap fabric. The text "METHODS AND TECHNIQUES" is overlaid in the center of the image.

METHODS AND TECHNIQUES

Methods and techniques

Slip Casting

This method involves creating multiples of a ceramic form by pouring liquid clay (slip) into a mold.



Benefits

- Reproducibility: Create multiples of your design.
- Complexity: Achieve intricate shapes efficiently.
- Efficiency: Faster production compared to hand-building.

Process

- Mold Making: Create a plaster mold of your desired form.
- Casting Slip: Prepare a liquid clay mixture (casting slip).
- Pour & Set: Pour slip into the mold, letting a clay layer form on the walls.
- Release & Trim: Remove excess slip, open the mold, and trim the greenware cast.
- Dry & Fire: Dry completely, then fire for a durable ceramic piece.

Methods and techniques

Jointing

In ceramics, creating functional or sculptural pieces often involves joining separate clay elements. Here's a look at some key techniques:

Scoring and Slipping: This fundamental technique involves scratching the surfaces of clay pieces to be joined, then applying a thin layer of liquid clay (slip) to create a strong bond. It's essential for assembling slabs or attaching handles, spouts, or lids.



Weld Joining: This simple method uses a small amount of wet clay to directly connect two clay pieces for a seamless bond.

Methods and techniques

Piercing

Piercing is a technique for creating decorative or functional holes in the clay body using pottery tools. There are various tools for piercing, from simple needles to specialized wire tools.

- **Decoration:** Pierced designs can add visual interest, create light effects when used with lanterns or tea lights, or mimic natural textures like leaves.
- **Function:** Piercings can be functional, allowing for drainage in planters, creating steam vents in lids, or even acting as handles for small objects.

Carefully consider the placement of piercings to maintain the structural integrity of the piece.





TEXTURING

Texturing

Early Integration



Impressing

Press objects like leaves, textured fabrics, or rolling pins with interesting patterns.



Carving

Use carving tools to create designs, geometric shapes, or even intricate patterns directly on the clay.



Coil Building

Create coils with textured surfaces before building the form.



Adding Elements

Incorporate found objects, textured materials, or pre-made ceramic elements onto the clay surface.

Texturing

Later Applications



Slipping and Stenciling

Apply colored slips (liquid clay) through stencils to create layered or patterned textures.



Stamping

Use pre-made stamps or create your own to add repetitive patterns or designs.



Altering Surfaces

Scratch the clay surface with tools or sandpaper to create a rougher texture.



COLORING AND GLAZING

Coloring and Glazing

Coloring



Engobes

Engobes are colored clay slips applied to the clay surface before glazing. They can be used for creating opaque or textured effects and can also influence the final glaze color.



Sgraffito

This technique involves carving away a colored slip layer to reveal the contrasting clay body underneath, creating a beautiful contrast.



Underglaze Decoration

Paint designs or patterns directly onto the clay surface with underglaze pigments. These pigments come in various colors and can be layered for more complex artwork.

Coloring and Glazing

Glazing

Glazing serves two primary purposes:

- **Creating a Glassy Surface:** Glazes transform the raw clay into a smooth, durable, and waterproof surface.
- **Adding Color and Effects:** Glazes come in a vast array of colors and finishes, allowing potters to bring their color vision to life.

The firing process plays a crucial role in glazing. There are two main firing stages:

- **Bisque Firing:** The first firing at a lower temperature hardens the clay piece before applying glazes or decorations.
- **Glaze Firing:** The final firing at a high temperature matures the clay and melts the glaze, creating a final, durable ceramic piece.



A collection of handcrafted ceramic vessels is displayed on a windowsill. In the background, a white ceramic cup with two small, dark, eye-like shapes is visible. To its right are two tall, cylindrical vases with a textured, cracked glaze. In the foreground, a large, shallow bowl with a similar cracked glaze is prominent. To the left of the bowl, a smaller, shallow dish with a blue and white glaze is partially visible. The background shows a window with a view of a building's exterior.

EXERCISES AND PROJECTS

Project 1

3 round forms in increasing size and elongation ranging in size from 10- 20 cm, emphasis on elegant, refined contour.

Steps

- Prepare Clay: Wedge clay thoroughly to remove air bubbles and achieve even texture.
- Forming the Base: Choose a construction method (hand-building or throwing) and create a solid base for each form.
- Shaping and Elongation: Gradually build or throw the clay upwards, refining the walls to achieve a smooth, round form with increasing height for each piece.
- Refining Contours: Use shaping tools and techniques to achieve elegant and refined contours for each form. Focus on smooth curves and a balanced silhouette.
- Trimming and Finishing: Once leather-hard, trim the base and refine any uneven areas.



Project 2

3 slab cylinder vessels, 15- 25 cm, emphasis on texture and process.

Steps

- Prepare Clay: Wedge clay thoroughly to ensure even texture.
- Create Slabs: Roll out wedged clay to create flat sheets (slabs) with a consistent thickness of approximately 5-8 mm.
- Apply Textures: Utilize various techniques to add texture to the clay slabs before cutting (e.g., pressing objects into the clay, using textured rolling pins, carving designs).
- Cut and Assemble: Use templates or rulers to cut out rectangular shapes from the textured slabs. Score and slip the edges for good adhesion, then carefully assemble the slabs into cylindrical forms.
- Refine and Smooth: Once assembled, use pottery tools to smooth any uneven areas and refine the overall shape of the cylinders.
- Trimming and Finishing: When leather-hard, trim the base of each vessel for stability.



Project 3

Slab bowl forms, "hump mold" method, with foot, diameter: 20 – 25 cm, emphasis on clarity and simplicity.

Steps

- Roll Slabs: Prepare clay slabs with a rolling pin to an even thickness of about 5-6 mm.
- Form the Hump Mold: Create a simple hump mold using a cylindrical object like a mug or rolling pin covered in plastic wrap. Drape a slab of clay over the hump mold, smoothing the sides to create a curved form.
- Shape the Base: Cut a separate slab of clay to create the base of the bowl. Score and slip the base to the curved slab, ensuring a secure connection.
- Refine and Attach Foot (Optional): Use pottery tools to smooth and refine the bowl's rim and sides. For a foot, roll a thin coil of clay and attach it to the base of the bowl using scoring and slipping.
- Let it Dry: Allow the bowl to dry slowly and evenly on a stable surface before firing.



Project 4

5 wheel thrown bowl and or cylinder forms, 10 – 20 cm tall, emphasis on understanding wheel thrown ceramics and learning to center.

Steps

- **Place Clay:** Place a ball of clay on the center of the spinning wheelhead.
- **Centering with Pressure:** Using your palms and fingers, apply gentle but firm pressure to push the clay upwards and inwards, centering it on the wheel.
- **Refine Center:** Once somewhat centered, use a combination of pushing and pulling motions to refine the form and eliminate any remaining wobble.
- **Open the Clay:** Using your thumb and fingers, gently push down into the centered clay, creating a hollow cone shape.
- **Refine the Walls:** Apply even pressure to the sides of the cone, gradually raising and thinning the walls to form the bowl shape. Use your thumb on the inside and fingers on the outside to control the thickness.
- **Refine the Rim:** Use your thumb or a shaping tool to smooth and define the rim of the bowl.



Project 5

Glazing applications and techniques on different craft objects.

Techniques

Dipping:

- Submerge the entire piece or specific areas into the glaze mixture.
- Creates a smooth and even coat.

Brushing:

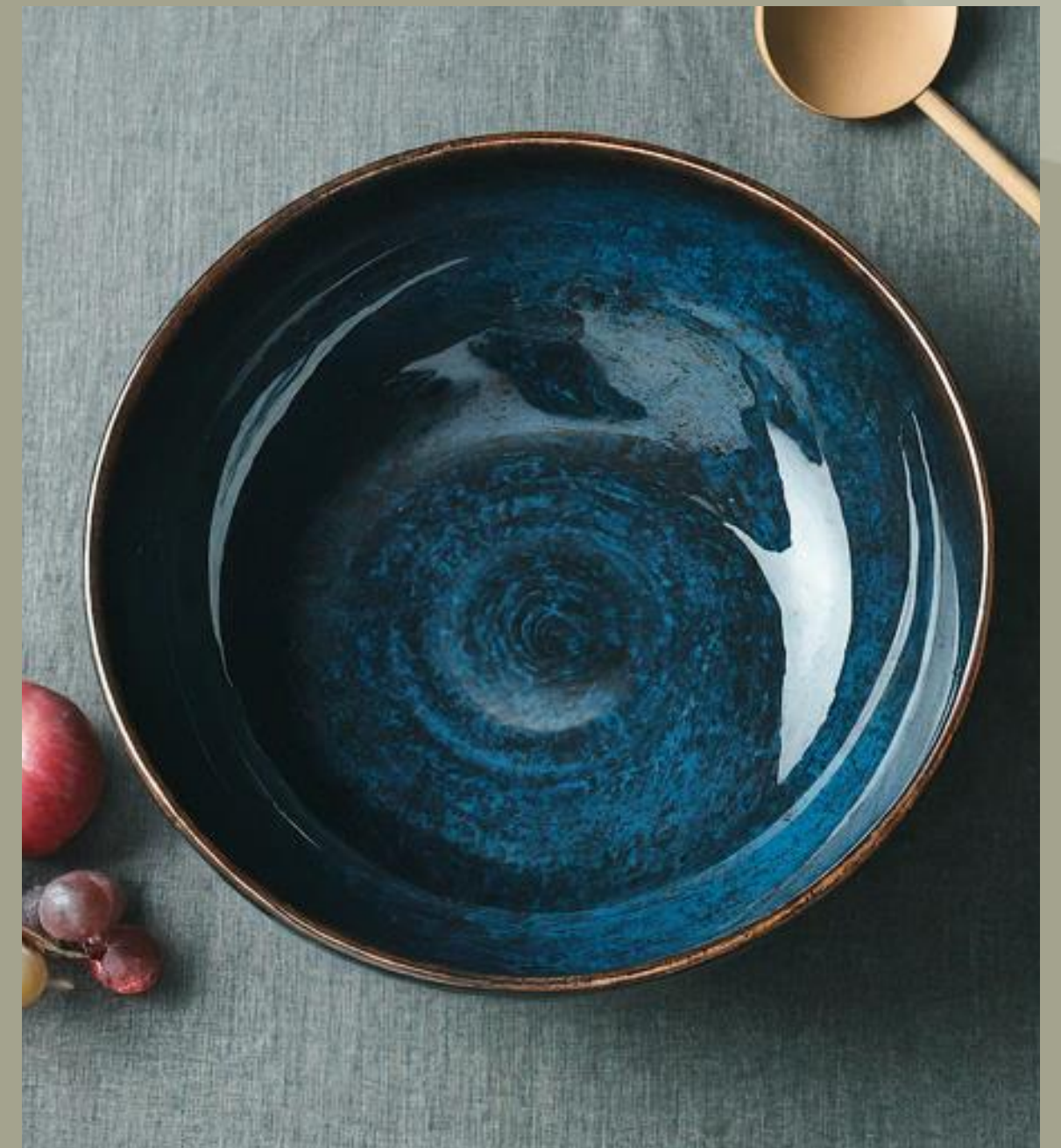
- Apply glaze with a brush for more control and expressive application.
- Allows for layering and creating textured effects.

Pouring:

- Pour glaze over the piece, letting it flow and pool naturally.
- Creates organic drips and variations in glaze thickness.

Spraying:

- Use a glaze sprayer for a uniform and efficient application.
- Ideal for large pieces or achieving a misty effect.





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