

SER-407 - CERAMIC-GLAZE TECHNOLOGY AND APPLICATIONS IV - Güzel Sanatlar Fakültesi - Seramik Cam Bölümü

General Info

Objectives of the Course

The aim of this course is to enhance students' technical knowledge and skills in advanced glaze preparation, glaze analysis, and ceramic surface applications. Students will conduct experiments with various glaze compositions and gain the ability to analyze the physical, chemical, and aesthetic properties of glazes.

Course Contents

Advanced glaze formulation, effects of raw materials, evaluation of glaze surfaces, glaze defects and their solutions, effects of firing atmospheres on glazes, surface coating techniques, experimental applications and artistic interpretations.

Recommended or Required Reading

Seramik Teknolojisi (2021). Ateş Arcasoy, Hasan Başkırkan, Literatür Yayıncılık, İstanbul. Artistik Seramik Sırları (2022). Soner Genç, Ülkü Ofset, Eskişehir Ceramic tiles, glaze raw materials (feldspar, quartz, kaolin, etc.), color oxides, glaze brushes, spray gun, glass measuring tools, kiln

Planned Learning Activities and Teaching Methods

Theoretical presentations, laboratory practices, group work, experimental glaze trials, classroom discussions, individual project work

Recommended Optional Programme Components

Students are expected to conduct weekly glaze trials, analyze the results, and report them in a portfolio. Compliance with safety rules is mandatory.

Instructor's Assistants

There is no assistant teaching staff.

Presentation Of Course

In-person instruction; theoretical lectures and practical laboratory work are conducted together. Students are expected to prepare their own glaze projects by the end of the term.

Dersi Veren Öğretim Elemanları

Res. Assist. Esra Öztürk Razi Assoc. Prof. Dr. Betül Aytepe Serinsu

Program Outcomes

1. The student can prepare advanced glaze recipes and analyze their relationships with raw materials.
2. The student can evaluate surface and color changes of different glaze formulations depending on firing atmospheres.
3. The student can create aesthetically and technically functional surfaces through experimental glaze applications.

Weekly Contents

Order	PreparationInfo	Laboratory	TeachingMethods	Theoretical	Practise
1	* Seramik Teknolojisi (2021). Ateş Arcasoy, Hasan Başkırkan, Literatür Yayıncılık, İstanbul. * Artistik Seramik Sırları (2022). Soner Genç, Ülkü Ofset, Eskişehir	The glaze raw materials are identified and weighed at 10 grams each, then fired in calcination crucibles at 1000°C and 1160°C to allow for comparative evaluation.	Lecture Method, Question and Answer, Problem Solving, Individual Work, Discussion	Glaze raw materials and structural properties of raw materials Seramik Teknolojisi (2021). Ateş Arcasoy, Hasan Başkırkan, Literatür Yayıncılık, İstanbul.p.259-277	The glaze raw materials are identified and weighed at 10 grams each, then fired in calcination crucibles at 1000°C and 1160°C to allow for comparative evaluation.

Order	PreparationInfo	Laboratory	TeachingMethods	Theoretical	Practise
2	* Seramik Teknolojisi (2021). Ateş Arcasoy, Hasan Başkırkan, Literatür Yayıncılık, İstanbul. * Artistik Seramik Sırları (2022). Soner Genç, Ülkü Ofset, Eskişehir	Glazes are applied by grouping them as transparent, opaque, colored, and artistic-effect glazes (such as tenmoku, crystalline, and ash glazes), according to their visual harmony and appropriate firing temperature. In this classification, the type of clay body, glaze density, viscosity, and the firing schedule play a significant role.	Lecture Method, Question and Answer, Problem Solving, Individual Work, Discussion	Classification of glazes Seramik Teknolojisi (2021). Ateş Arcasoy, Hasan Başkırkan, Literatür Yayıncılık, İstanbul.p.275-277	During the application process, the glazes are grouped according to their intended use and the desired appearance to be achieved on the surface.
3	* Seramik Teknolojisi (2021). Ateş Arcasoy, Hasan Başkırkan, Literatür Yayıncılık, İstanbul. * Artistik Seramik Sırları (2022). Soner Genç, Ülkü Ofset, Eskişehir	In the laboratory environment, students experimentally observe the effects of oxides on glaze surfaces. According to the designated recipes, glaze preparation, sieving, density and viscosity measurements, test tile preparation, and firing processes are carried out. Trial firings are performed to compare the effects of different oxide contents.	Lecture Method, Question and Answer, Problem Solving, Individual Work, Discussion	Properties of oxides Seramik Teknolojisi (2021). Ateş Arcasoy, Hasan Başkırkan, Literatür Yayıncılık, İstanbul. p.269-275	Students learn how different oxides are incorporated into glaze recipes, how they influence the final surface, and which oxide combinations should be used to achieve the desired effects (matte, glossy, opaque, fluid, speckled, crystalline, etc.). Within the scope of the application, small test tiles are prepared, and the surface variations that emerge through changes in oxide percentages are evaluated.
4	* Seramik Teknolojisi (2021). Ateş Arcasoy, Hasan Başkırkan, Literatür Yayıncılık, İstanbul. * Artistik Seramik Sırları (2022). Soner Genç, Ülkü Ofset, Eskişehir	The recipes created during the application stage are prepared and tested in the laboratory environment. The laboratory procedures include weighing and mixing the raw materials according to the calculated formula, adjusting the density and viscosity of the glaze suspension, preparing the test samples, glazing the specimens, and firing them according to the designated firing schedule. After firing, the surface characteristics of the samples are observed and evaluated.	Lecture Method, Question and Answer, Problem Solving, Individual Work, Discussion	The calculation of a glaze recipe based on a given Seger formula.	The Seger formula is step by step converted into a glaze recipe. Within the scope of the study, practical exercises are carried out such as determining the raw material equivalents of the oxides, calculating the raw material quantities using conversion factors, and demonstrating how properties such as matte, gloss, and fluidity can be modified through adjustments made directly on the formula.
5	* Seramik Teknolojisi (2021). Ateş Arcasoy, Hasan Başkırkan, Literatür Yayıncılık, İstanbul. * Artistik Seramik Sırları (2022). Soner Genç, Ülkü Ofset, Eskişehir	The recipes created during the application stage are prepared and tested in the laboratory environment. The laboratory process includes weighing and mixing the raw materials according to the calculated formula, adjusting the density and viscosity of the glaze suspension, preparing the test samples, glazing the specimens, and carrying out the firing process in accordance with the designated firing schedule. After firing, the surface characteristics of the samples are observed and evaluated.	Lecture Method, Question and Answer, Problem Solving, Individual Work, Discussion	The calculation of a glaze recipe based on a given Seger formula.	The Seger formula is step by step converted into a glaze recipe. Within the scope of the study, practical exercises are carried out such as determining the raw material equivalents of the oxides, calculating raw material quantities using conversion factors, and demonstrating how properties such as matte, gloss, and fluidity can be modified through adjustments made directly on the formula.

Order	PreparationInfo	Laboratory	TeachingMethods	Theoretical	Practise
6	* Seramik Teknolojisi (2021). Ateş Arcasoy, Hasan Başkırkan, Literatür Yayıncılık, İstanbul. * Artistik Seramik Sırları (2022). Soner Genç, Ülku Ofset, Eskişehir	The glaze recipe created during the application stage is then taken into the production process. In this phase, the glaze mixture is prepared according to the designated formula. The mixture is adjusted to achieve the proper consistency for application. The prepared glaze is applied to test samples, and firing is carried out according to the predetermined firing schedule. After firing, the behavior of the glaze on the surface is observed and evaluated.	Lecture Method, Question and Answer, Problem Solving, Individual Work, Discussion	Calculating the Seger formula from the prescription Seramik Teknolojisi (2021). Ateş Arcasoy, Hasan Başkırkan, Literatür Yayıncılık, İstanbul.p.265	he functions and effects of the oxides specified in the formula are evaluated within the glaze structure. The raw materials corresponding to these oxides are selected, and the basic composition of the glaze is established. By interpreting the given formula, students gain an understanding of whether the glaze will be matte or glossy, fluid or non-fluid, transparent or opaque. The necessary steps for converting the formula into a practical recipe—such as material selection, proportioning, and balancing the formula—are demonstrated. Examples are provided to explain how different formulas can be modified and adapted.
7	* Seramik Teknolojisi (2021). Ateş Arcasoy, Hasan Başkırkan, Literatür Yayıncılık, İstanbul. * Artistik Seramik Sırları (2022). Soner Genç, Ülku Ofset, Eskişehir	The glaze recipe created during the application stage is then carried into the production phase. In this section, the glaze mixture is prepared according to the designated formula, and the mixture is adjusted to achieve the appropriate consistency for application. The prepared glaze is applied to the test samples, and firing is carried out according to the predetermined firing schedule. After firing, the behavior of the glaze on the surface is observed and evaluated. Temel sır bileşenlerini kullanarak pratik sır reçeteleri oluşturmayı öğrenir. Uygulamada: temel sır yapısını oluşturan bileşenlerin (cam yapıcı, stabilizatör, akıcı) birlikte nasıl çalıştığı değerlendirilir. Öğrencilere farklı amaçlara yönelik örnek temel reçeteler verilir (mat, parlak, şeffaf, opak, renkli vb.). Seger formülü yardımıyla sıranın genel karakterinin nasıl belirlendiği gösterilir; ancak uygulamada formülün yorumlanması ve pratik reçeteye dönüştürülmesine odaklanılır. Öğrenciler kendi seçtikleri veya verilen bir Seger formülünü inceleyerek, ona uygun kullanılabilir bir sır tarifi oluşturur. Reçetenin yüzeyde hangi sonucu verebileceğine dair öngörüler yapılır: akıcılık, matlık-parlaklık, opaklık, uyum, pişirim sıcaklığı vb. Sır reçetesinin dengelenmesi, uyum sorunlarının tahmin edilmesi ve formül değiştirildiğinde yüzeyin nasıl etkileneceğinin değerlendirilmesi üzerinde durulur. Bu uygulama, öğrencilerin teorik bilgiyi pratiğe dönüştürmesini sağlar ve temel sır geliştirme yetkinliği kazandırır.	Lecture Method, Question and Answer, Problem Solving, Individual Work, Discussion	Calculating the Seger formula from the prescription Seramik Teknolojisi (2021). Ateş Arcasoy, Hasan Başkırkan, Literatür Yayıncılık, İstanbul.p.265	The functions and effects of the oxides specified in the formula are evaluated within the glaze structure. The raw materials corresponding to these oxides are selected, and the fundamental composition of the glaze is established. By interpreting the given formula, students develop an understanding of whether the glaze will be matte or glossy, fluid or non-fluid, transparent or opaque. The necessary steps for converting the formula into a practical recipe such as material selection, proportioning, and balancing the formula are demonstrated. Examples are provided to illustrate how different formulas can be modified and adapted.

Temel sır bileşenlerini kullanarak pratik sır reçeteleri oluşturmayı öğrenir. Uygulamada: temel sır yapısını oluşturan bileşenlerin (cam yapıcı, stabilizatör, akıcı) birlikte nasıl çalıştığı değerlendirilir. Öğrencilere farklı amaçlara yönelik örnek temel reçeteler verilir (mat, parlak, şeffaf, opak, renkli vb.). Seger formülü yardımıyla sıranın genel karakterinin nasıl belirlendiği gösterilir; ancak uygulamada formülün yorumlanması ve pratik reçeteye dönüştürülmesine odaklanılır. Öğrenciler kendi seçtikleri veya verilen bir Seger formülünü inceleyerek, ona uygun kullanılabilir bir sır tarifi oluşturur. Reçetenin yüzeyde hangi sonucu verebileceğine dair öngörüler yapılır: akıcılık, matlık-parlaklık, opaklık, uyum, pişirim sıcaklığı vb. Sır reçetesinin dengelenmesi, uyum sorunlarının tahmin edilmesi ve formül değiştirildiğinde yüzeyin nasıl etkileneceğinin değerlendirilmesi üzerinde durulur. Bu uygulama, öğrencilerin teorik bilgiyi pratiğe dönüştürmesini sağlar ve temel sır geliştirme yetkinliği kazandırır.

Order	PreparationInfo	Laboratory	TeachingMethods	Theoretical	Practise
9	* Seramik Teknolojisi (2021). Ateş Arcasoy, Hasan Başkırkan, Literatür Yayıncılık, İstanbul. * Artistik Seramik Sırları (2022). Soner Genç, Ülku Ofset, Eskişehir	Students learn to create practical glaze recipes using fundamental glaze components. In the application phase, the interaction of the basic constituents that form the glaze structure glass formers, stabilizers, and fluxes is evaluated. Sample base recipes designed for different purposes (matte, glossy, transparent, opaque, colored, etc.) are provided to the students. The general character of a glaze is demonstrated through the Seger formula; however, the practical focus is on interpreting the formula and transforming it into a usable recipe. Students examine a given or selected Seger formula and develop an appropriate, applicable glaze formulation based on it. Predictions are made regarding the potential surface outcomes of the recipe such as fluidity, matte-glossy appearance, opacity, compatibility, and firing temperature. Emphasis is placed on balancing the glaze recipe, anticipating compatibility issues, and evaluating how changes in the formula may affect the final surface. This application enables students to translate theoretical knowledge into practice and gain essential competence in fundamental glaze development.	Lecture Method, Question and Answer, Problem Solving, Individual Work, Discussion	Determination of basic glaze recipes and Seger formula calculation	Students learn to create practical glaze recipes using fundamental glaze components. In the application phase, the interaction of the basic constituents that form the glaze structure—glass formers, stabilizers, and fluxes—is evaluated. Sample base recipes prepared for different purposes (matte, glossy, transparent, opaque, colored, etc.) are provided to the students. While the overall character of a glaze is demonstrated through the Seger formula, the practical focus is on interpreting the formula and transforming it into a usable recipe. Students analyze a selected or assigned Seger formula and develop an appropriate, functional glaze formulation based on it. Predictions are made regarding the potential surface outcomes of the recipe—such as fluidity, matte-glossy quality, opacity, compatibility, and firing temperature. Emphasis is placed on balancing the glaze recipe, anticipating compatibility issues, and evaluating how changes to the formula may influence the surface results. This application enables students to translate theoretical knowledge into practice and develop essential competence in basic glaze formulation.
10	* Seramik Teknolojisi (2021). Ateş Arcasoy, Hasan Başkırkan, Literatür Yayıncılık, İstanbul. * Artistik Seramik Sırları (2022). Soner Genç, Ülku Ofset, Eskişehir	The prepared artistic glaze batches are mixed in the laboratory environment and made ready for use. The test tiles are glazed and placed into the kiln. The firing process is carried out according to the designated firing temperature. After firing, the resulting glaze surfaces are examined, and analyses are conducted regarding color, texture, and fluidity. The obtained results are recorded, and an evaluation report is prepared.	Lecture Method, Question and Answer, Problem Solving, Individual Work, Discussion	Determination of oxides to be added to basic artistic glaze recipes	Weighing the type of artistic glaze to be applied and preparing test plates
11	* Seramik Teknolojisi (2021). Ateş Arcasoy, Hasan Başkırkan, Literatür Yayıncılık, İstanbul. * Artistik Seramik Sırları (2022). Soner Genç, Ülku Ofset, Eskişehir	The prepared artistic glaze batches are mixed in the laboratory environment and brought to a usable consistency. The test tiles are glazed and placed into the kiln. The firing process is carried out according to the designated firing temperature. After firing, the resulting glaze surfaces are examined, and analyses are conducted regarding color, texture, and fluidity. The obtained results are recorded, and an evaluation report is prepared.	Lecture Method, Question and Answer, Problem Solving, Individual Work, Discussion	The determination of the oxides to be added to the basic artistic glaze recipes.	Weighing the type of artistic glaze to be applied and preparing test plates

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12	* Seramik Teknolojisi (2021). Ateş Arcasoy, Hasan Başkırkan, Literatür Yayıncılık, İstanbul. * Artistik Seramik Sırları (2022). Soner Genç, Ülkü Ofset, Eskişehir	The prepared artistic glaze batches are mixed in the laboratory environment and made ready for use. The test tiles are glazed and placed into the kiln, and the firing process is carried out according to the designated firing temperature. After firing, the resulting glaze surfaces are observed, and analyses of color, texture, and fluidity are conducted. The obtained results are recorded, and an evaluation report is prepared.	Lecture Method, Question and Answer, Problem Solving, Individual Work, Discussion	The determination of the oxides to be added to the basic artistic glaze recipes.	Weighing the type of artistic glaze to be applied and preparing test plates
13	* Seramik Teknolojisi (2021). Ateş Arcasoy, Hasan Başkırkan, Literatür Yayıncılık, İstanbul. * Artistik Seramik Sırları (2022). Soner Genç, Ülkü Ofset, Eskişehir	The newly prepared test tiles are glazed and fired. The results are then evaluated comparatively, and the final glaze report is prepared.	Lecture Method, Question and Answer, Problem Solving, Individual Work, Discussion	The results of the applied artistic glaze types are interpreted. If present, glaze defects (such as running, crazing, pinholes, bubbles, etc.) are theoretically explained in terms of their causes and possible solutions.	Students reformulate their successful glaze recipes and apply them using different proportions. Glazes that produced defects are revised, and a second series of test samples is prepared accordingly.
14	* Seramik Teknolojisi (2021). Ateş Arcasoy, Hasan Başkırkan, Literatür Yayıncılık, İstanbul. * Artistik Seramik Sırları (2022). Soner Genç, Ülkü Ofset, Eskişehir	The newly prepared test tiles are glazed and fired. The results are then evaluated comparatively, and the final glaze report is prepared.	Lecture Method, Question and Answer, Problem Solving, Individual Work, Discussion	The results of the applied artistic glaze types are interpreted. If present, glaze defects (such as running, crazing, pinholes, bubbles, etc.) are theoretically explained in terms of their causes and possible solutions.	Students reformulate their successful glaze recipes and apply them using different proportions. Glazes that produced defects are revised, and a second series of test samples is prepared accordingly.

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Lecture Method,
Question and
Answer, Problem
Solving, Individual
Work, DiscussionThe results of
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terms of their
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solutions.Firing of applied artistic
glazes

Workload

Activities	Number	PLEASE SELECT TWO DISTINCT LANGUAGES
Vize	1	1,00
Final	1	1,00
Uygulama / Pratik	6	2,00
Ders Öncesi Bireysel Çalışma	10	2,00
Ders Sonrası Bireysel Çalışma	10	2,00
Ara Sınav Hazırlık	5	2,00
Final Sınavı Hazırlık	5	3,00

Assesments

Activities	Weight (%)
Final	60,00
Vize	40,00

	P.O. 1	P.O. 2	P.O. 3	P.O. 4	P.O. 5	P.O. 6	P.O. 7	P.O. 8	P.O. 9	P.O. 10	P.O. 11	P.O. 12	P.O. 13	P.O. 14	P.O. 15
L.O. 1	5	4	4	2	4	2	2		3	2	5	4		4	3
L.O. 2	4	5	5	3	4	2	3		3	2	5	5		4	3
L.O. 3	5	4	5	3	5	3	3		4	3	5	4		5	4

Table :

- P.O. 1 :** Have knowledge in the fields of art, design and ceramics, as well as the skills to put this knowledge in practice
- P.O. 2 :** Have research, experimentation, analysis, evaluation and interpretation ability
- P.O. 3 :** Design and create a product / a work / a process that will meet the need or propose a solution to a problem, taking into account the restrictions arising in the field of ceramics
- P.O. 4 :** Have the ability to working groups or individually relating their field knowledge with other disciplines
- P.O. 5 :** Determine, describe and propose solutions to problems in the art and design of ceramics
- P.O. 6 :** Have professional and ethical responsibility in intellectual and artistic works
- P.O. 7 :** Communicate effectively and express themselves verbosely
- P.O. 8 :** Understand the impact of art and design solutions at a global and societal level
- P.O. 9 :** Have a full understanding of the necessity of life long learning and are equipped with the skills and an awareness of sustaining it
- P.O. 10 :** Develop a self-awareness of contemporary issues
- P.O. 11 :** Use the necessary techniques and innovations required for art and design applications
- P.O. 12 :** Sustain a strong research orientation, and show determination and willingness to adapt technological developments in ceramics
- P.O. 13 :** Share an awareness of art and design in the community with an understanding and adaption of social and cultural responsibilities
- P.O. 14 :** Show professional self-confidence with a conceptual knowledge in creativity processes
- P.O. 15 :** Follow international developments, realize art and design as a social responsibility
- L.O. 1 :** The student can prepare advanced glaze recipes and analyze their relationships with raw materials.
- L.O. 2 :** The student can evaluate surface and color changes of different glaze formulations depending on firing atmospheres.
- L.O. 3 :** The student can create aesthetically and technically functional surfaces through experimental glaze applications.