

METU AH PROG
GRADUATE SEMINARS

AH 504 Fall Semester 2024-25

AH 504



This is the official document prepared for the graduate seminar course of AH 504.

Fall 2024 Semester

Date of the Meeting: 20.01.2025
at Kubbealtı, Faculty of Architecture

Online Meeting Link:
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Meeting ID: 398 902 868 569
Passcode: 2AS3JU7n

Course Instructor: Assist. Prof. Dr. Ekin Pınar

09:00 – 09:30

Cinema Cities: Architectural Examination of 20th Century European Film Studio Complexes

İlkmen Verda Azkar

09:30 – 10:00

Reflections Of The ‘Hybrid’ Monasticism: The Architecture of The Yediler Monastery in Lake Bafa

Ufuk Tanyeri

10:00 – 10:30

Yıldız Apartment Blocks and Architect Yıldız Tolun Akarun: Designing A House in Mid-Twentieth Century Ankara

Hazal Yüksekaya

10:30 – 11:00

Professional Architecture Organizations in Turkey during the late 20th Century

Elif Nur İpek

11:00 – 11:30

Tandoğan District in Ankara: An Analysis of Urban and Architectural Transformation in 20th Century

Nuri Cem Kulaksız

09:00 – 09:30

Cinema Cities: Architectural Examination of 20th Century European Film Studio Complexes

Author: **İlkmen Verda Azkar**
Supervisor: **Assist. Prof. Dr. Ekin Pınar**
Jury Members: **Prof. Dr. Esin Boyacıođlu**
Assoc. Prof. Dr. Pelin Yoncacı Arslan

The term studio is often used to describe a workshop or rehearsal space for professions such as artists, photographers, actors, etc. In the context of the film field, however, the term covers a broader definition; it refers to the entire set of stages and buildings located on the film company's site. Although these sites have the potential to offer further insight into the history of architecture, politics, and technology, existing studies on the history of studios have mostly focused on the films produced in these places, overlooking the architecture of the studios. Thus, this study examines the studio architecture between the 1930s and 1950s in Europe. It aims to examine what kind of facilities these complexes included, the interior environment intended to be created, how these spaces affected the employees, and their sociohistorical significance. The thesis argues that with their architectural layout and wide range of facilities, these film studio complexes acted as isolated, self-sufficient cities within cities which, in turn, made them ideal spaces to repurpose in times of crisis like the Second World War. For this study, three major European studio complexes built before the Second World War, Studio Babelsberg in Germany, Pinewood Studios in the UK, and Cinecitta in Italy are examined as case studies. By approaching studios from an architectural point of view, the paper aims to highlight the intersection of architecture, cinema, and politics within the layered history of film studios.

09:30 – 10:00

Reflections Of The 'Hybrid' Monasticism: The Architecture of The Yediler Monastery in Lake Bafa

Author: **Ufuk Tanyeri**
Supervisor: **Assoc. Prof. Dr. Pelin Yoncacı Arslan**
Jury Members: **Prof. Dr. Lale Özgenel**
Assoc. Prof. Dr. Fatma Gül Öztürk

The architectural composition of the Yediler Monastery (Kellibaron) in Lake Bafa, Turkey, presents a compelling case study of how monastic practices shaped Byzantine religious architecture. This study examines the monastery's unique architectural features that reflect a "hybrid" monastic model—a distinctive approach combining hermitic (lavratic) and cenobitic (communal) practices first established by Paul of Latros. Drawing on the foundational research of Theodor Wiegand, Urs Peschlow and Anneliese Peschlow-Bindokat, and Zeynep Mercangöz, this investigation analyzes how the monastery's design principles accommodated and expressed this dual nature of religious life. This research contextualizes the Yediler Monastery within the broader landscape of monastic settlements in Mt. Latros, including Stylos, Kahvehisar, İkiz, Kapıkırı, and Kirselik. Yediler's architectural layout departs significantly from these monastic complexes in the region. Instead of organizing spaces around a central Catholicon, it features a terraced structure with scattered cells and multiple small chapels—architectural elements that foster both individual contemplation and communal worship. Through comparative analysis, the study demonstrates how the monastery's hybrid architectural layout distinguished it from contemporaneous religious complexes. Ultimately, this investigation advances our understanding of the intricate relationship between monastic practices and architectural design in Byzantine Asia Minor, revealing how built environments were shaped to accommodate diverse forms of religious life.

10:00 – 10:30

Yıldız Apartment Blocks and Architect Yıldız Tolun Akarun: Designing A House in Mid-Twentieth Century Ankara

Author: **Hazal Yüksekaya**
Supervisor: **Prof. Dr. T. Elvan Altan**
Jury Members: **Prof. Dr. Lale Özgenel**
Assist. Prof. Dr. Elif Selena Koçyiğit

This study focuses on Yıldız Apartment Blocks in Ankara's Çankaya district, designed by architect Yıldız Tolun Akarun in 1955. The aim is to discuss the architectural and urban context of the mid-twentieth century modernization process in Turkey. The case of Yıldız Apartment Blocks will offer insights into Turkey's post-war economic, social, and aesthetic dynamics while the architect Yıldız Tolun Akarun will also provide important clues about the visibility of women architects in this context, constituting one of the research gaps that this study aims to fulfill. The research will utilize a combination of literature review, spatial analysis, oral history, and archival research methods. In the light of the economic and political transformations of the period, the design decisions, spatial organization, and user experiences of Yıldız Apartment Blocks will be examined. The aim is to provide a comprehensive understanding of mid-twentieth modern architecture in the case of housing design in relation to urban and social developments, and the role of women architects in this context.

10:30 – 11:00

Professional Architecture Organizations in Turkey during the late 20th Century

Author: **Elif Nur İpek**
Supervisor: **Prof. Dr. T. Elvan Altan**
Jury Members: **Prof. Dr. Lale Özgenel**
Assoc. Prof. Dr. Bilge İmamoğlu

This thesis will examine professional architectural organizations in Turkey during the late 20th century. The period following the military intervention of September 12, 1980, until the 2000s is in the scope of the thesis to maintain a focused and comprehensive analysis of the impacts of socio-political and economic developments on architecture. Contemporary political agendas and the subsequent neoliberal economic reforms reshaped architecture by mainly fostering depoliticization and market liberalization. The study aims to understand the roles, responsibilities, and influence of professional architectural organizations, i.e. Chamber of Architects, Architects' Association 1927, and Turkish Association of Architects in Private Practice, in navigating these challenges. The study will analyze how these organizations adapted to the restrictive political climate and new economic pressures while striving to uphold professional ethics and maintain quality in the built environment. By investigating archival materials and personal accounts, the research will highlight the intellectual and ethical transformation of architectural practice, the shifts in professional autonomy, and the emergence of new organizational structures. Thus, the thesis will attempt to provide a comprehensive understanding of the interplay between socio-political changes and professional identity, aiming to contribute to the broader understanding of the relation between political and economic contexts and professional practices.

11:00 – 11:30

Tandođan District in Ankara: An Analysis of Urban and Architectural Transformation in 20th Century

Author: **Nuri Cem Kulaksız**
Supervisor: **Prof. Dr. T. Elvan Altan**
Jury Members: **Prof. Dr. Neđe Grallar**
Assist. Prof. Dr. Ekin Pinar

This study focuses on the architectural and urban transformation of the Tandođan district of Ankara in the 20th century, which is considered within the broader framework of Turkey's modernization process and related socio-political changes. Tandođan is critical to Ankara's urban development, and its rich urban and architectural fabric provides a microcosm for examining the interplay of social and spatial features. 1924 Lrcher, 1932 Jansen, 1957 Ycel-Uybadin and 1990 Ankara Master Plans will be studied in order to understand how the spatial features of the area was formed in the early Republican period with initial interventions, and transformed until the radical change in its identity during the late 20th century. These plans also reflected the modernization ideals, aspirations and constraints of the Republic, (trans)forming the social identity of the district throughout the period. Buildings in the district will also be analyzed in order to evaluate the chronological transformation of different functions from public open space to housing in the district during the 20th century in relation to socio-political and urban/architectural characteristics of Republican modernization.



METU ARCH PROG
GRADUATE SEMINARS

ARCH 604 Fall Semester 2024-25

ARCH 604



This is the official document prepared for the graduate seminar course of ARCH 604.

Fall 2024 Semester

Date of the Meeting: 20.01.2025
at Kubbealti, Faculty of Architecture

Online Meeting Link:
<https://meet.google.com/mvq-djnt-buw>

Course Instructor: Prof. Dr. İpek Gürsel Dino

11:30 - 12:00

**Rebuilding Resilience in the
Aftermath of 2023 Earthquake:
Alternative Housing Models in Hatay**
Buse Demir

12:00 - 12:30

**Enhancing User Interaction to Inform
Architectural Decisions on Climate
Adaptation and Mitigation: An
Exploration of Large Language Models
(LLM)**
İlkim Canlı

11:30 - 12:00

Rebuilding Resilience in the Aftermath of 2023 Earthquake: Alternative Housing Models in Hatay

Author: **Buse Demir**
Supervisor: **Prof. Dr. Celal Abdi Güzer**
Jury Members: **Prof. Dr. Lale Özgenel**
Assoc. Prof. Dr. Bülent Batuman

The 2023 Earthquake in Turkey revealed the vulnerabilities of urban and rural settlements across a vast region, simultaneously affecting multiple historic, traditional, and identity-rich centers. The widespread destruction, along with its geographic and economic implications, underscored the urgent need for radical planning approaches. This research investigates post-disaster reconstruction efforts through the comparative analysis of key actors in housing production. Through an evaluation of their organizational models, project development processes, and final outputs, the research examines their approaches to sustainability, urban typologies, and cultural context. Centering on Hatay, the research combines field analysis, document review and stakeholder interviews to propose a comprehensive framework for resilient and context-sensitive housing production in earthquake-prone regions.

keywords: housing, resilience, post-disaster reconstruction, urban planning

12:00 - 12:30

Enhancing User Interaction to Inform Architectural Decisions on Climate Adaptation and Mitigation: An Exploration of Large Language Models (LLM)

Author: İlkim Canlı
Supervisor: Prof. Dr. Ipek Gursel Dino
Jury Members: Prof. Dr. Arzu Gönenç Sorguç
Assoc. Prof. Dr. Ayşem Berrin Çakmaklı

Cities are the main contributors to global energy consumption and the resulting carbon emissions, making it increasingly urgent for urban areas to prioritize climate change adaptation and mitigation (CCAM) strategies. CCAM strategies require a comprehensive quantitative analysis of urban building energy systems. Artificial intelligence (AI) is promising for quick and high-precise feedback. However, as these tools and scenarios become more complex, user interaction and results' interpretation become problematic. Large Language Model (LLM)-based user interfaces (i.e. ChatGPT enable) interactive analysis of data-driven strategies for carbon neutrality supporting the decision-making process. This study presents a systematic literature review of the existing AI approaches for decision-making, identifying research gaps and possible solutions particularly related to user interaction.

keywords: performative architecture, large language models, artificial intelligence, building energy prediction, climate change, building renovation



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Online Meeting Link:
<https://meet.google.com/mvq-djnt-buw>

Course Instructor: Assoc. Prof. Dr. Ela Alanyalı
Aral

12:30 – 12:55

**Identity in Liminality of Architecture,
and Speed: A Study on Söğütözü
District**

Merve Altuntaş

12:55 – 13:20

**Urban-Scale Techno-economic
Assessment Using UBEM: Exploring
Trade-offs between Cost-effective
Retrofit Actions and Decarbonization
with Visualization Techniques for
Decision-Makers and End Users**

Cihat İlkbahar

13:20 – 13:45

**Net-Zero Energy Communities:
Advancing Building Performance
with Microgrids and Peer-to-Peer
Energy Exchange**

Fatma Ece Gürsoy

13:45 – 14:10

**A Review of Design Strategies for
Climate-Resilient Architecture in
Response to Rising Temperatures**

Mehmet Furkan Güler

14:10 – 14:35

**Display Environments:
Designing Space for Mode**

İdil Bilici

14:35 – 15:00

**Commodifying Commons:
a Critical Reading of Galataport**
Can Kayaaslan

15:00 – 15:25

**Lost Heritage, Found Ideologies:
The Transformation of The Bazaar
of Prishtina into The Square of
Brotherhood and Unity**
Sümeyye Şirin

15:25– 15:50

**A Multiscalar Inquiry of Space in
Virtuality**
Elif Didem Demir

15:50– 16:15

**Living Without Walls: Homelessness
as a Civil Disobedient Act**
Ezgi Özçete

16:15 – 16:40

**Poetry of Architecture:
The Dialogue between Architecture
and Art**
Ece Özsel

16:40 – 17:05

**Negotiating Boundaries to Experience
Transparency in the Context of Public
Space: Kızılay District**
Elif İymen

12:30 – 12:55

Identity in Liminality of Architecture, and Speed: A Study on Söğütözü District

Author: **Merve Altuntaş**
Supervisor: **Prof. Dr. İnci Basa**
Jury Members: **Assoc. Prof. Dr. Ela Alanyalı Aral**
Dr. Berrak Erdal

Along with urbanization, architecture also became something dynamic in the cities' identity and users' experience, with the speed of the change and the movement of users. Rather than spaces of places; spaces of flows occurred, and architectural forms turned into non-architectural things. "Liminal spaces" emerged, in-between spaces, third spaces, and transitory spaces appeared as well as placeless-ness. Overall, the dimensionality of architectural design has changed, due to its ephemeral nature.

Even though the "liminal space" and mobility in architecture have been touched upon, the investigation of the identity of the cities, people's memory, and the new design process of architecture has not been addressed concerning liminality. In this thesis, the liminality of architecture will be discussed based on the emerging spaces and designs, the identity, and the user's memory of the cities. The thesis' case study will be on Söğütözü District, Ankara, for its specific design for passer-byers, being a transitory space, not having an identity and a quality for public space, with visual explanations, and interviews.

12:55 – 13:20

**Urban-Scale Techno-economic Assessment Using UBEEM:
Exploring Trade-offs between Cost-effective Retrofit
Actions and Decarbonization with Visualization Techniques
for Decision-Makers and End Users**

Author: **Cihat İlkbahar**
Supervisor: **Prof. Dr. İpek Gürsel Dino**
Jury Members: **Assoc. Prof. Dr. Berrin Çakmaklı**
Assoc. Prof. Dr. Koray Pekerçli

Urban areas account for a significant share of global energy consumption and greenhouse gas emissions, making building retrofitting a critical strategy in the face of climate change. Energy-efficient retrofitting has long-term environmental and economic effects that must be evaluated to develop more accurate and feasible solutions. An urban-scale methodology is being developed to consider the climate mitigation actions and cost-benefit of implemented systems based on changing thermal and electricity loads, CO₂ intensity, and changing climate conditions.

This thesis presents a methodology that enables the analysis of the financial cost burden and operational carbon emission reduction of implemented scenarios at an urban scale by using physics-based urban building energy models that include different pilot areas with varying typologies of building and user profiles. The methodology is implemented in existing urban areas, namely Çamlık district and Kadıköy neighborhood in Turkey, which include 257 and 2,455 buildings

respectively. Energy models are made considering parameters as such envelope properties and internal loads with different weather files consisting of the years 2025 and 2050. The scenarios are developed consisting envelope insulation(ER), heat pump (HP) implementation and integration of rooftop photovoltaics (PV). Depending on the energy model results, current and future financial costs and carbon emissions are calculated for each scenario to determine the most optimum energy-efficient solutions. For each scenario, net present value and payback period, return of investment (ROI) and nonlinear or "adjustment costs" are also taken into account, as the timing of low-carbon investments significantly affects their total costs. Abatement costs are also becoming significant to analyze trade-offs between cost-benefit actions and carbon emission reductions. In addition, the visualization of outcomes with different tools such as ArcGIS and VR integration would provide better understanding and decision-support for both policymakers and end-users. The results enable comprehensive understanding of trade-offs and benefit of implemented scenarios for long-term, impactful action on climate changes.

Net-Zero Energy Communities: Advancing Building Performance with Microgrids and Peer-to-Peer Energy Exchange

Author: **Fatma Ece Gürsoy**
Supervisor: **Prof. Dr. İpek Gürsel Dino**
Jury Members: **Assoc. Prof. Dr. Berrin Çakmaklı**
Assoc. Prof. Dr. Koray Pekerçli

The built environment is a critical focus area for global sustainability and carbon emission reduction, with buildings accounting for 30% of the world's energy consumption as key end users of the energy network (United Nations Environment Programme, 2023). The growing population and increasing energy demands necessitate active network participation and integration of buildings. Net zero energy communities (NZECs) offer a holistic solution by optimizing energy use, promoting energy efficiency, and enabling local energy generation.

This thesis investigates the potential of decentralized energy systems to enhance the energy performance of buildings while creating sustainable and resilient urban systems through NZECs that integrate microgrids and peer-to-peer (P2P) energy sharing strategies. Microgrids support local energy production, strengthen energy independence and increase grid resilience by turning buildings both energy-producing and consuming units. In parallel, P2P energy sharing enables the direct exchange of surplus energy between community members, accelerating decarbonization at the urban scale, increasing energy efficiency and promoting the adoption of renewable energy systems. The research addresses how these systems can improve building energy efficiency, reduce operational carbon emissions and improve grid resilience through case studies. It highlights the interplay between energy systems and building design, emphasizing adaptive strategies that improve occupant comfort, energy flexibility and environmental performance by innovative, community-oriented solutions that integrate microgrids and P2P energy exchange into the design and operation of high-performance buildings. These strategies offer a pathway to resilient, net-zero and regenerative building practices in an era of growing climate and energy challenges.

13:45 – 14:10

A Review of Design Strategies for Climate-Resilient Architecture in Response to Rising Temperatures

Author: **Mehmet Furkan Güler**
Supervisor: **Prof. Dr. İpek Gürsel Dino**
Jury Members: **Assoc. Prof. Dr. Berrin Çakmaklı**
Assoc. Prof. Dr. Koray Pekerçli

The global effects of climate change are expected to increase the frequency and intensity of extreme heat-related events, which will have significant consequences for buildings, systems, and occupants. This necessitates a shift toward climate-resilient architectural practices. Rising global temperatures and prolonged heatwaves lead to higher cooling energy demands and diminished occupant comfort, particularly in thermally inefficient buildings, and contribute to heat-related illnesses and mortality. Consequently, buildings must be designed and operated to be resilient to climate change, ensuring indoor thermal comfort while mitigating the effects of rising temperatures. To create a climate-resilient design framework, architects can focus on strategies such as passive architecture, resilient cooling methods, and active systems, which can reduce the impacts of extreme heat and lower energy consumption. This study aims to investigate effective strategies for climate-resilient architecture in response to rising temperatures by reviewing recent studies on various design approaches. The focus is on identifying strategies to mitigate heat-related issues both in the present and in future scenarios, considering the increasing trend toward a warmer world characterized by longer, more frequent, and more intense heatwaves. Through this analysis, the research seeks to provide valuable insights into best practices for adapting buildings to a rapidly changing climate.

14:10 – 14:35

Display Environments: Designing Space for Mode

Author: **İdil Bilici**
Supervisor: **Prof. Dr. Ayşen Savaş**
Jury Members: **Prof. Dr. Jale Erzen**
Yasemin Dermancı

Exhibition space and fashion design share a dialogue shaped by the transformative potential of display environments such as museums and art galleries. This dialogue generates an opportunity for this study to explore the dynamic interplay between exhibition space and fashion design. Fashion objects, designed to be both seen and experienced, are challenging architectural boundaries through their unique aesthetics, tectonics, and production methods. Runways, as spatial contexts for experimentation, embody the principles of both architecture and fashion design, serving as creative, immersive, and engaging grounds for innovation. This research investigates how the dynamic, non-static nature of fashion can project and transform architectural spaces by examining the potential display environments, their aesthetic and formal aspects.

This interdisciplinary inquiry highlights how fashion objects exceed their functional roles, drawing from historical, political, and sociological contexts to enhance their spatial impact. Inspired by British fashion designer and couturier Lee Alexander McQueen's vision of beauty and spatial aesthetics, this research explores unconventional display environments, uncovering the potential of fashion to reshape even the most deformed architectural contexts. By integrating architectural thinking with case studies and spatial experimentation, this study aims to reveal hidden connections between exhibition space and fashion design, proposing new methods for redefining spatial boundaries and creating transformative environments.

14:35 – 15:00

Commodifying Commons: a Critical Reading of Galataport

Author: **Can Kayaaslan**
Supervisor: **Prof. Dr. İnci Basa**
Jury Members: **Prof. Dr. Güven Arif Sargın**
Assoc. Prof. Dr. Bülent Batuman

This study is on understanding misunderstandings of public space in Turkey, focusing on its political value in shaping the urbanscape. Open public spaces are the only commonly accessible spaces to express democracy. Thus a proper understanding of their nature is critical in the formation of a civilised built environment. To comprehend the changing approaches toward public space, this research examines the Galataport project in Karaköy, Istanbul, as a multilayered case study. This redevelopment project exemplifies broader trends in Turkey's neoliberal urban policies towards public space. The characteristics of the case study is observed as, privatization of public land, fetishization of security and the commodification of architectural heritage. The case of Galataport reveals the dominance of capital-oriented decision-making processes and the prioritization of "tourist gaze" centred design. This results in public spaces primarily built for capital rather than democratic engagement. Research finds the roots of these actions in "a fear of disorder" taking reference from the works of Richard Sennett. The study seeks to create awareness for the possible repetition of these such tendencies in Turkey by examining Galataport's subjects, process and context. In a time of neoliberal transformation, it highlights the necessity of critically evaluating urban practices in order to rebuild the social and political role of public space.

15:00 – 15:25

Lost Heritage, Found Ideologies: The Transformation of The Bazaar of Prishtina into The Square of Brotherhood and Unity

Author: **Sümeyye Şirin**
Supervisor: **Prof. Dr. F. C n  Bilsel**
Jury Members: **Prof. Dr. Haluk Zelef**
Assoc. Prof. Dr. B lent Batuman

This study explores the dynamic relationship between destruction and construction in shaping collective memory and identity, focusing on the transformation of Prishtina's Ottoman Bazaar into the Brotherhood and Unity Square during the socialist era of Yugoslavia. By replacing a historically significant urban space with a modernist square, the socialist regime exemplifies the ideological use of architecture to construct and redefine the city's urban fabric, collective memory and urban identity.

Through archival analysis, spatial mapping, and oral histories, the study investigates how these spatial interventions influenced collective memory, identity, and a sense of belonging among the city's inhabitants. This case study aims to contribute to the broader discourse on the role of architecture in sociopolitical transformations, revealing how urban spaces are manipulated to construct, erase and redefine historical narratives and identities within the context of modernist ideologies.

15:25 – 15:50

A Multiscalar Inquiry of Space in Virtuality

Author: **Elif Didem Demir**
Supervisor: **Prof. Dr. F. C n  Bilsel**
Jury Members: **Assist. Prof. Dr. Ekin Pınar**
Lect. Doruk Hasdođan

Understanding and exploring space through virtuality as a new medium emerges as a contemporary approach to the concept of space within the context of real-world architecture and society. This new conceptualization holds considerable potential for the architectural world, offering insights that allow two separate realities to engage in a meaningful dialogue. This research acknowledges the increasing influence of video games as a sociocultural artifact and their potential to enhance the existing architectural norms and transcend the limitations of physicalities. Decoding the notion of space in digital narratives regarding the relation between virtual reality in games and urban reality is the focus point for the lens of a new image of a space, city, and thus architecture. This research analyzes the experiential nature of game spaces, fostering the evaluation of the representation of architecture in games, its atmosphere, tectonic quality, and visual characteristics in communication, which draw parallels with the phenomenology of space in architecture. This analysis has potential to open a new perspective on the discipline of architecture. For this reason, this research employs a multiscalar inquiry into virtual space with the aim of representing progress in overcoming impossibilities and envisioning unexplored possibilities. The methodology is grounded on a comprehensive examination of different frameworks focusing on examining theoretical foundations, the architectonics of game spaces, and interdisciplinary studies integrating architecture and games, with analyzing user observation and case studies. The study intends to contribute to the evolving discourse on the future of architecture in the digital age.

15:50 – 16:15

Living Without Walls: Homelessness as a Civil Disobedient Act

Author: **Ezgi Özçete**
Supervisor: **Assoc. Prof. Dr. Esin Kömez Dağlıoğlu**
Jury Members: **Prof. Dr. Güven Arif Sargın**
Assist. Prof. Dr. Mehmet Barış Kuymulu

One of the fundamental tasks of architecture is to provide housing as shelter for people. However, in the contemporary era, capitalist systems and neoliberal housing policies have driven architecture to produce housing as hyper-commodified, profitable products, instead of spaces intended for habitation. Despite the right to shelter is a legally recognized civil right, the ongoing global housing crises and increasing homelessness demonstrate the failure of authorities to meet this obligation. This research delves into the current mode of housing, which results in neoliberal cities— where newly constructed vacant luxury housing coexists with homeless population seeking shelter— and offers a perspective that acknowledges alternative forms of living. Furthermore, it argues homelessness as a form of civil disobedience that challenges the commodification of shelter. This study focuses on Türkiye, specifically Ankara, where homelessness is increasing and under-researched, with a particular emphasis on homeless individuals who regularly inhabit the Ankara Bus Terminal (AŞTİ). Through semi-structured interviews with homeless individuals, I will map their multi-scale territorial mobility to get an in-depth understanding of the spatial and temporal dimensions of homelessness. By scrutinizing alternative living practices, this study seeks to contribute to discourses on inclusive housing and the right to the city.

16:15 – 16:40

Poetry of Architecture: The Dialogue between Architecture and Art

Author: **Ece Özsel**
Supervisor: **Prof. Dr. Ayşen Savaş**
Jury Members: **Prof. Dr. Belgin Turan Özkaya**
Prof. Dr. Ali Cengizkan

The visibility and representational nature of the architectural production process and what Robin Evans calls the transformation from the architectural set (projections) to the final product (building) are where abstraction takes root. Abstraction and transformation form the basis of the juxtapositions on which the relationship between architecturer and art is situated. However, in addition to the question of visibility, the long-standing problem of interpreting art is of great importance for establishing a comprehensive relationship between art and architecture. In this context, Leo Tolstoy's critical work *What is Art?* not only provides the reader with a summary of the different schools of thought that have been put forward in the attempt to define art, but also introduces the term art imitation (in the sense of art-like). After considering the visual, ethical, political and religious characteristics of all kinds of art (visual, performative, literary arts), Tolstoy's art-like creates the necessary broad intellectual space within which the qualities of architecture can be discussed and an argumentative framework can be constructed regarding its relationship to art.

16:40 – 17:05

Negotiating Boundaries to Experience Transparency in the Context of Public Space: Kızılay District

Author: **Elif İymen**
Supervisor: **Assoc. Prof. Dr. Ela Alanyalı Aral**
Jury Members: **Prof. Dr. F. C n  Bilsel**
Assoc. Prof. Dr. Fulay Uysal Bilge

Public space enables the emergence of the social realm for people to socialize, gather, oppose and be free in a city as a quality design urban place. This emergence becomes possible when activity and people come together in line with various requirements, rules, intentions and potentials within certain boundaries. These mostly invisible boundaries play a crucial role in revealing the possibilities of the public spaces. This study aims to explore these boundaries and negotiate how they can be stretched while maintaining to experience transparency in the form and context of public spaces. The study will develop around the areas where architecture touches the boundaries of the public space that can foster or hinder the cohesiveness of public activity and human interaction. Later on these areas will be evaluated towards Kızılay District that has the potential to become a phenomenally transparent (Rowe & Slutzky, 1963) and inviting public space as the case study. This case study will contribute to the field of architecture as a district full of potentials that may arise from stretching its boundaries.



METU CONS PROG
GRADUATE SEMINARS

CONS 604 Fall Semester 2024-25

CONS 604

This is the official document prepared for the graduate seminar course of CONS 604.

Fall 2024 Semester

Date of the Meeting: 21.01.2025
at Kubbealtı, Faculty of Architecture

Course Instructor: Assoc. Prof. Dr. Özgün
Özçakır

14:10 – 14:40

**Seeking the Notions of Authenticity in
Post-Disaster Contexts: Zenginler
District in the Historic City Center of
Antakya (Antioch), Türkiye**

Parnian Nemati

14.10 - 14:40

Seeking the Notions of Authenticity in Post-Disaster Contexts: Zenginler District in the Historic City Center of Antakya (Antioch), Türkiye

Author: **Parnian Nemati**
Supervisor: **Assoc. Prof. Dr. Pınar Aykaç Leidholm**
Jury Members: **Prof. Dr. Neriman Şahin Güçhan**
Prof. Dr. A. Güliz Bilgin Altınöz

Historical districts are contexts where tangible and intangible heritage evolve together constantly. When an unexpected and destructive event such as a natural disaster disrupts this balance, healing the trauma becomes a multifaceted and complex process. The concept of authenticity as the continuous relationship between people, place and meaning is a key factor in the healing process. However, authenticity is a multifaceted and inherently controversial concept and dealing with it in post-disaster contexts makes it even more complex and controversial. This article aims to discuss different notions of authenticity in the post-disaster historical districts. It identifies these notions of authenticity as physical, functional and social authenticity, and proposes a holistic approach to authenticity in the reconstruction efforts in post-disaster contexts. By examining the Zenginler District in Antakya, southeast of Türkiye, which experienced almost the total loss of its physical heritage during the 2023 earthquake, the article discusses the implications of a holistic approach to authenticity in the district's post-disaster recovery efforts.

keywords: different notions of authenticity, historical districts, post-disaster reconstruction and recovery, Antakya (Antioch)



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at Kubbealtı, Faculty of Architecture

Course Instructor: Assoc. Prof. Dr. Özgün
Özçakır

13:30 – 13:50

**Integrated Documentation and
Presentation of Archaeological Sites
in the Digital Era:
The Church in Kadıkalesi/Anaia in
Kuşadası**

M. Alp Yılmaz

13:50 – 14:10

**Virtual Reconstruction as A Tool for
Presenting Historical Evolution of
Archaeological Sites: The Case of
Ancient City Library of Nysa Ad
Maeandrum**

Tuba Ünal

14:40 – 15:00

**Determination of Conservation
Parameters of Soap Making Factories
in Industrial Landscape of Ayvalık**

Feyza Ümmü Çelik

15:00 – 15:20

**Construction Techniques of
Traditional Houses in Diyarbakir**

Eren Özyol

15:20 – 15:40

**Understanding the Construction
Technique and Building Process of
Traditional Ayvalık Houses**

Doğa Deniz Yıldırım

15:40 – 16:00

**Architecture and Construction
Techniques of Traditional Edirne**

Öykü Su Usman

16:00 – 16:20

**An Analysis of the Construction
Techniques of Traditional Houses in**

Beyzanur Yüksel

13:30 – 13:50

Integrated Documentation and Presentation of Archaeological Sites in the Digital Era: The Church in Kadıkalesi/Anaia in Kuşadası

Author: **M. Alp Yılmaz**
Supervisor: **Assoc. Prof. Pınar Aykaç Leidholm**
Co-Supervisor: **Assoc. Prof. Suna Çagaptay**
Jury Members: **Prof. Dr. A. Güliz Bilgin Altınöz**
Assoc. Prof. Dr. Pelin Yoncacı Arslan

The application of digital tools and new technologies in the documentation and interpretation of archaeological sites has paved the way for new presentation methods. A comprehensive digital documentation approach becomes reachable through the integrated use of various digital documentation tools on archaeological heritage. Digitizing heritage in this manner has contributed to the expansion and diversification of digital presentation methods as alternatives and complements to physical presentations. The Church at Kadıkalesi stands out as an example of archaeological heritage where historical continuity and the multi-layered structure of the site reflected on its archaeological remains. As a rare example of Byzantine architecture, the church and the site are closed to the visitors; however, systematic archaeological research continues. This thesis aims to document the church using various digital tools in an integrated manner, ranging from the element to the site scale, in coherence with further physical interventions. The digital presentation methods to be produced as a result of the documentation and evaluation phases will aim to convey the site's significance and meaning through different interpretive themes.

keywords: digital presentation, integrated documentation, digital heritage, archaeological heritage

13:50 – 14:10

Virtual Reconstruction as A Tool for Presenting Historical Evolution of Archaeological Sites: The Case of Ancient City Library of Nysa Ad Maeandrum

Author: **Tuba Ünal**
Supervisor: **Assoc. Prof. Pınar Aykaç Leidholm**
Co-Supervisor: **Prof. Dr. Serdar Hakan Öztaner**
Jury Members: **Prof. Dr. A. Güliz Bilgin Altınöz**
Assoc. Prof. Dr. Pelin Yoncacı Arslan

With the rapid development of technology, virtual reconstruction as a digital presentation method is becoming a prominent method in promoting and conserving cultural heritage places. However, during virtual reconstruction, the transformations of the site or building over time and accordingly its different periods are not accurately conveyed. Instead, the most prominent period of the building or site is presented. Therefore, these virtual reconstructions do not create scientific accuracy and transparency and lead to the creation of images that contain incorrect or incomplete information. For these sites to be understood correctly by the public, their historical evolution should be conveyed in a transparent manner based on scientific data.

From its foundation to its abandonment, Nysa Ancient City was actively used during the Hellenistic, Roman, and Byzantine periods by transforming depending on the conditions and needs. As a reflection of the historical evolution of the ancient city of Nysa, Library was chosen as the focal point of the study. Because it is an important representative of the historical evolution of the city with its architectural and functional transformations. The function and spatial configuration of the library was transformed as a church, cemetery, chapel, and different spatial uses in the Late Antique and Byzantine periods. This historical layering provides a strong basis for the digital reconstruction of the building in terms of data diversity and scientific accuracy.

This thesis aims to present the historical evolution of the library building and its context as a reflection of Nysa's transformation through virtual reconstruction, based on available archaeological data, to create representations of the site's development over time for the public. The main scope of this thesis is how to represent the historical evolution of archaeological sites using virtual reconstruction as a presentation tool. The thesis consists of two main parts: a theoretical part and a second part where a specific case study is conducted. The first part explores the conceptual background of digital presentation methods and examines the development and use of virtual reconstruction. In the other part, by understanding the transformation of the selected study area Library structure over time from the sources, its transformation over time based on the data will be transferred through the 3D model. Selected study area will be reconstructed using solid modeling in line with its historical development and photo-based modeling for scientific reliability and transparency. Virtual reconstructions of the historical periods will be proposed by overlapping the solid modeling and photo-based modeling of the study area.

keywords: archeological site presentation, virtual reconstruction, virtual archeology, digital heritage

14:40 – 15:00

Determination of Conservation Parameters of Soap Making Factories in Industrial Landscape of Ayvalık

Author: **Feyza Ümmü Çelik**
Supervisor: **Prof. Dr. Neriman Şahin Güçhan**
Jury Members: **Assoc. Prof. Dr. Pınar Aykaç Leidholm**
Assist. Prof. Dr. Ayça Özmen

Ayvalık's industrial landscape consists of two components: natural and built environment. While the natural component is olive groves; the built environment of this landscape consists of production spaces used to process olives and their by-products. Ayvalık became a city that gained an urban identity with the industrialization of production related to olives and their by-products and was shaped by this production and production spaces. Many of the industrial buildings located on the coastline remained idle due to changing technology and the movement of production outside the city center in the 1970s. Today, some are still abandoned, while others are reused with other functions. The thesis first understands this context by associating the components with production that form the industrial landscape of Ayvalık, which maintains their physical integrity despite losing their functions. Then, it develops conservation principles to integrate soap factories, one of the building groups in this context, into current urban life while inheriting the industrial heritage to future generations.

keywords: industrial landscape, industrial heritage, soap-making factories, Ayvalık

15:00 – 15:20

Construction Techniques of Traditional Houses in Diyarbakir Suriçi

Author: **Eren Özyol**
Supervisor: **Prof. Dr. Neriman Şahin Güçhan**
Jury Members: **Assist. Prof. Dr. Ayça Özmen**
Dr. Filiz Diri

This thesis aims to understand the authentic construction techniques of traditional houses in Suriçi, Diyarbakır, to form reliable and comprehensive information by documenting and examining these buildings and create a basis for potential conservation activities.

These houses, which form an essential part of Anatolia's civil architectural heritage, offer clues about the social, aesthetic, and environmental features of the geography in which they are located. However, factors such as the 2015-16 Suriçi events, the February 6 earthquake, and urban transformation processes threaten these structures' physical and cultural sustainability, and both these structures and the information they pass down from generation to generation are in danger.

For this purpose, information on the architectural and technological features of Diyarbakır houses was compiled by scanning the literature during the research process. Together with the information from the literature, the structures in the Diyarbakır Suriçi region, which especially preserved their traditional characteristics, were examined in the field. Information about the construction technique was collected directly from the structures in the area, and system sections were created that showed these techniques. Then, through this documentation, the construction process of these buildings, from the foundation to the roof, was determined and interpreted together with the literature study.

Based on the study's findings, a building was concretized by producing it from foundation to roof using a 3D modeling method, and the logic of the construction techniques was explained.

The relationship between the materials and methods used in the construction of Diyarbakır houses and the geographical and cultural context of the region has been examined, and a comprehensive knowledge base has been created that will enable a more in-depth understanding of these houses and pass them on to future generations.

keywords: cultural heritage, traditional house, Turkish House, Ottoman House, civil architecture, construction technique, Suriçi, Diyarbakır

15:20 – 15:40

Understanding the Construction Technique and Building Process of Traditional Ayvalık Houses

Author: **Doęa Deniz Yıldırım**
Supervisor: **Prof. Dr. Neriman Şahin Güçhan**
Jury Members: **Prof. Dr. Özlem Saęıroęlu Demirci**
Dr. Filiz Diri

The reflection of tradition, culture, and social identity that passed on through generations in a certain geography and shaped by the climate and environmental factors, can be traced in the traditional housing fabrics since the day they were built. These traditional houses constructed in the Ottoman period in the Anatolian geography; despite having fundamental similarities and principles, each carry distinct information specific to its unique context, geography, period and possibilities in which time they were built. Hence, these buildings being one of the most important instances of civil architecture and heritage of our geography bring light to many topics such as daily life, social structure and perception of the society, architectural understanding and architectural taste, construction techniques, and available local materials of their time. However, these buildings whose number decreases rapidly day by day are at stake due to changing living standards and needs of modern times, evolving and changing architectural understanding and taste, and various natural disasters. In this sense, while the preservation of these buildings in parallel with their character and transmission from generation to generation takes priority, the initial step in this process is documenting and analysing these buildings. Although many studies in this field have been conducted, there are still civil architectural structures from many regions of Anatolia that have not been adequately studied. In fact, one of the examples in this sense is the traditional housing fabrics of Ayvalık.

Ayvalık and its traditional housing fabric with surrounding villages have been studied many times until today, however, there is no comprehensive and detailed study on the construction techniques of these buildings in the literature. Thus, the initial aim of this thesis is measuring and documenting in detail the architectural features, elements, spatial characteristics, and construction techniques of the traditional housing fabric in the city center of Ayvalık. Hence, while ensuring that this valuable heritage will not disappear and pass on to future generations, this study will create necessary information so that future interventions will be made in harmony with the authentic character of these buildings. To achieve this, as a starter, a literature review will be conducted to gather information about the history of Ayvalık and its traditional housing fabric, creating a general understanding of the region. Subsequently, via multiple site visits, the traditional houses selected for this study are examined based on their physical condition, architectural space, architectural elements, or construction techniques. Detailed plans and section drawings are produced for each of them and presented accordingly.

keywords: cultural heritage, traditional house, civil architecture, construction technique, Ayvalık

15:40 – 16:00

Architecture and Construction Techniques of Traditional Edirne Houses

Author: **Öykü Su Usman**
Supervisor: **Prof. Dr. Neriman Şahin Güçhan**
Jury Members: **Prof. Dr. Özlem Sağıroğlu Demirci**
Dr. Filiz Diri

One of the elements that most reflects a society's lifestyle, culture and tradition is its housing. In the Ottoman Empire, these houses were built with similar principles, but they varied according to the climate, period and available materials and spread over a very wide geography. However, these structures have begun to disappear with today's standards, economic expectations and new construction techniques. Understanding and documenting the construction techniques and construction processes of these structures is very important for the preservation of civil architecture, its correct adaptation to today's conditions and the transfer of tradition to future generations. In this context, Edirne stands out as a city that has been destroyed countless times throughout its history. This study aims to understand the construction technique and construction process of traditional houses located in the Kaleiçi region of Edirne and its immediate surroundings and provide reliable data to form the basis for conservation projects compatible with the original. For this purpose, the general characteristics of the area, its history and the processes it has gone through throughout history have been examined. As a result of the literature research and field study, the traditional housing architecture of the area has been revealed. The construction techniques of the buildings in the city centre of Edirne, which best reflect the area's architecture and whose original and traditional qualities can be read, were documented through system sections. The construction techniques and processes of the structures from their foundations to their roofs were determined with a typological study based on the collected data. The one example that best represents the traditional Edirne house was selected and modelled in 3D. The obtained data were evaluated and the construction techniques and usage patterns used in the region were determined.

keywords: cultural heritage, traditional house architecture, Turkish House, Ottoman House, construction technique, Edirne

16:00 – 16:20

An Analysis of the Construction Techniques of Traditional Houses in Ermenek

Author: **Beyzanur Yüksel**
Supervisor: **Prof. Dr. Neriman Şahin Güçhan**
Jury Members: **Prof. Dr. Özlem Sağıroğlu Demirci**
Dr. Filiz Diri

Ermenek is a district of Karaman, located in the Central Taurus Mountains in South Anatolia, with a rich historical, architectural and cultural heritage. Traditional houses of Ermenek built with local materials such as stone, wood and mudbrick reflect the unique topography, climate and social structure of the region. These houses, especially on the southern slopes of the mountains, have a terraced settlement pattern and provide information about the cultural characteristics and construction techniques of the period in which they were built. However, they, whose numbers are rapidly decreasing day by day, are altering with changing living standards and needs today, and they are under threat from various natural disasters. In this sense, the first step that can be taken to transfer these structures from generation to generation is to analyze and document them. However, comprehensive studies on the architectural features and construction methods of these houses are quite limited. This thesis aims to document and analyze the construction techniques, architectural features and spatial organization of traditional houses in Ermenek. Using field studies, technical drawings and 3D modeling, the materials, construction processes and transformations of these houses over time will be examined and showed in detail. This research, which is conducted on various examples including abandoned houses along with restored ones, aims to understand the evolution of traditional house architecture in Ermenek. Findings will contribute to the conservation of this unique architectural heritage, shed light on future restoration and conservation works, and ensure that Ermenek's cultural and architectural heritage is passed on to future generations.

keywords: Ermenek, traditional houses, cultural heritage, construction techniques, restoration and conservation



METU BS PROG
GRADUATE SEMINARS

BS 601 Fall Semester 2024-25

BS 601



This is the official document prepared for the graduate seminar course of BS 601.

Fall 2024 Semester

Date of the Meeting: 22.01.2025
at Kubbealtı, Faculty of Architecture

Online Meeting Link:
bit.ly/4hfVzME

Meeting ID: 379 022 290 450
Passcode: Vp686kY7

Course Instructor: Assoc. Prof. Dr. M. Koray
Pekeriçi

09:00 – 09:20

Detection Methods and Predictive Models for Urban Heat Islands

Dilara Başçıl

09:20 – 09:40

Phase Change Materials, Strategies for their integration to the Built Environment

Ege Soyer

09:40 – 10:00

Structural Transformation: Robotic Coreless Filament Winding Methods for Lightweight Building Elements for Architecture

Şevval Çöloğlu

10:00 – 10:20

From Materials to Devices: Exploring Functionality-Driven Design Across Scales

Aslı Zeynep Doğan

10:20 – 10:40

Parametric Design for Circularity: Modeling Sustainable Systems in Architecture

Atike Yağmur Köseoğlu

10:40 – 11:00

Sustainable Morphing Matter: 4D Manufacturing of Biomaterials

Mehmet Oğuz Nas

09:00 – 09:20

Detection Methods and Predictive Models for Urban Heat Islands

Author: **Dilara Başçıl**
Supervisor: **Prof. Dr. Soofia Tahira Elias Özkan**
Jury Members: **Assoc. Prof. Dr. Ayşem Berrin Çakmaklı**
Assoc. Prof. Dr. Ayşegül Tereci

The Urban Heat Island (UHI) phenomenon, characterized by elevated urban temperatures compared to surrounding rural areas, stems from the complex relationships between urban design, surface properties, and atmospheric dynamics. This literature review investigates the key factors influencing UHI formation, including urban density, land use, building typologies, vegetation cover, water bodies, and transportation networks, alongside surface properties such as material composition, albedo, permeability, and thermal heterogeneity. Particular emphasis is placed on UHI detection methodologies, highlighting advancements in remote sensing technologies such as Landsat imagery and thermal infrared imaging, as well as ground-based systems, including stationary weather stations and mobile sensors. Furthermore, modeling approaches are explored in depth, encompassing Computational Fluid Dynamics (CFD), Numerical Weather Prediction (NWP) models, and Urban Climate Models (UCM). Combining findings from detection techniques and predictive models, this study aims to lay the groundwork for developing innovative, data-driven strategies to mitigate UHI effects and promote sustainable urban environments.

keywords: Urban Heat Island, Urban Characteristics, Remote Sensing, Urban Climate Models, CFD Modeling

09:20 – 09:40

Phase Change Materials, Strategies for their integration to the Built Environment

Author: **Ege Soyer**
Supervisor: **Prof. Dr. Soofia Tahira Elias Özkan**
Jury Members: **Assoc. Prof. Dr. Ayşe Duman**
Assoc. Prof. Dr. Ayşegül Tereci

The built environment faces serious challenges from climate change, necessitating creative solutions to improve thermal comfort and energy efficiency in architectural applications. With their capacity to absorb, store, and release significant amounts of latent heat during phase transitions, phase change materials, or PCMs, show promise as a remedy. Because of this special thermal characteristic, PCMs are perfect for controlling interior temperatures and decreasing building energy usage.

This presentation and study explores the potential of PCMs in the architectural research field, focusing on methods of calculating material properties, stability, and implementation methods. The study covers a number of PCM implementation typologies, such as composite systems, integration inside porous matrices or metal foams, macroencapsulation, and microencapsulation for uniform dispersion and leakage avoidance. Additional information is gathered regarding methods like adding nanoparticles to increase PCM heat conductivity. Numerical techniques, computational techniques, energy simulations, and CFD simulations from the literature were given in order to represent the use of PCM with the current methods for architectural integration. This comprehensive study highlights the versatility of PCMs and their transformative potential in architectural design and construction, paving the way for sustainable and energy-efficient building solutions.

keywords: Phase Change Material, Thermal Energy Storage Building Energy Consumption, Sustainable Built Environment

09:40 – 10:00

Structural Transformation: Robotic Coreless Filament Winding Methods for Lightweight Building Elements for Architecture

Author: **Şevval Çöloğlu**
Supervisor: **Prof. Dr. Arzu Gönenç Sorguç**
Jury Members: **Assoc. Prof. Dr. Mehmet Koray Pekerçli**
Dr. Müge Kruşa Yemişcioğlu

Nature has a remarkable way of creating efficient structures, distributing material exactly where it's needed. Areas of high stress are thickened, while low-stress regions are left lightweight, achieving strength and efficiency without a blueprint— as a response to the forces acting on them. This natural process, perfected over millions of years, inspires new ways of thinking about architecture and construction. All materials in nature are composed of fibers, their multi-functionality occurs at nano-macro scales within different levels of connectivity. They are particularly fascinating due to their strength, flexibility, and adaptability.

This research explores how we can bring this natural efficiency into architecture by combining computational design with robotic coreless filament winding. By learning from nature's principles, we use computer models to simulate and optimize material placement, ensuring fibers align with the flow of forces, as in nature. This approach not only minimizes waste but also creates a frame work for structures that are both lightweight and strong.

The research integrates these optimized designs into a robotic manufacturing process. Coreless filament winding allows for precise placement of fibers without the need for heavy molds or cores, enabling the creation of intricate and efficient architectural elements. The goal is to develop a fully integrated system where design and fabrication work seamlessly together to produce high-performance, light-weight and sustainable structures.

keywords: Biomimetics, Light-weight Structures, Coreless Filament Winding, Robotic Construction, Structural Design

10:00 – 10:20

From Materials to Devices: Exploring Functionality-Driven Design Across Scales

Author: **Aslı Zeynep Doğan**
Supervisor: **Prof. Dr. Arzu Gönenc Sorguç**
Jury Members: **Assoc. Prof. Dr. Ayşem Berrin Çakmaklı**
Dr. Müge Kruşa Yemişcioğlu

Material studies are rapidly developing and becoming more interdisciplinary thanks to their wide application areas. Recent material studies reveal a paradigm shift from property-based design to functionality-based design. Several studies mention the blurring boundary between a material and a device. This shift introduced the concept of "device-like materials," characterized by responsiveness, programmability, and multifunctionality. A material is now described as an intelligent agent, governing itself, and repeatedly optimizing its work based on in-situ conditions it encounters. Several key terminologies appeared during recent studies, such as smart, adaptive, responsive, intelligent materials, and metamaterials; some of these overlap but are not the same. These terminologies describe various design scales, from micro (atomic or molecular) to meso (microstructures) and macro (visible systems or components), including architectural applications. They sometimes refer to materials, devices, or systems, which creates ambiguity among researchers.

This study aims to provide a background on advanced materials and their applications across scales, from atomic and molecular structures to urban systems, façades, and interiors, while exploring their architectural potential. To demonstrate how their distinct features support responsive architecture, key activation mechanisms from mechanical actuation to heat transfer are examined. The objectives include reviewing existing cases and situating ourselves within the broader context of material studies and architectural applications.

keywords: Advanced Materials, Device-like Materials, Responsive Architecture

10:20 – 10:40

Parametric Design for Circularity: Modeling Sustainable Systems in Architecture

Author: **Atike Yağmur Köseoğlu**
Supervisor: **Prof. Dr. Arzu Gönenç Sorguç**
Jury Members: **Prof. Dr. Ali Murat Tanyer**
Assoc. Prof. Dr. Ayşem Berrin Çakmaklı

Circularity, which tries to extend the building lifetime while decreasing landfill usage, has grown in popularity due to increased waste and consumption in the built environment. Because of this, there is a shift from linear to circular methods, replacing the linear principles of take-build-dispose with circular approaches of reduce-reuse-recycle. As a result, the built environment has begun to adopt circularity principles to attain a sustainable environment, extend the lifetime of materials, create less waste, and reduce consumption.

In this context, with advancements in technology, parametric and adaptive buildings that focus on sustainability are also increasing. These approaches prioritize adaptability, sustainability, and efficiency in both building materials and the building as a whole. The relationship between parametric design and circularity principles requires further research, with a focus on how computational tools like Rhino and Revit can model circular systems at the building scale, whether such systems can be automated, and how successful this workflow is in determining a building's potential to achieve certification.

By utilizing parametric workflows, this study aims to optimize material reuse, adaptability, and lifecycle performance. Furthermore, it investigates how these models can align with and enhance green building certification criteria, with the potential for automating certification processes using machine learning, while exploring the link between these technological advancements and circularity.

keywords: Circular Design, Computational Tools, Green Building Rating Systems, Circular Buildings

10:40 – 11:00

Sustainable Morphing Matter: 4D Manufacturing of Biomaterials

Author: **Mehmet Oğuz Nas**
Supervisor: **Prof. Dr. Arzu Gönenç Sorguç**
Jury Members: **Prof. Dr. Ali Murat Tanıyer**
Dr. Müge Kruşa Yemişcioğlu

Adaptive architecture is increasingly recognized for its potential to enhance occupant comfort and environmental performance, yet conventional active systems often demand considerable energy, complex mechanical components, and high maintenance. In contrast, shape-changing materials—which respond autonomously to external stimuli—offer a simpler, more energy-efficient alternative. Among these, wood stands out due to its hygroscopic properties that enable natural, moisture-driven deformations without external power. Coupled with its renewability, biodegradability, and broad availability, wood-based responsive systems can contribute to sustainable architecture.

Building on my Master's research in hygroscopic wood for self-shaping shading systems, this research broadens the material palette to include new biomaterials and novel responsive composites, leveraging emerging 3D printing and additive manufacturing approaches. In particular, Liquid Deposition Modeling (LDM) supports extensive material experimentation and the fabrication of anisotropic structures—crucial for controlling shape transformations in adaptive building components. By uniting emerging biomaterials with advanced manufacturing technologies, this work aims to develop a new generation of low-energy, low-maintenance, shape-changing building systems that can be seamlessly integrated into adaptive architectural systems.

keywords: Morphing Matter, Biomaterials, Additive Manufacturing, 4D Printing



METU BS PROG
GRADUATE SEMINARS

BS 501 Fall Semester 2024-25

BS 501



This is the official document prepared for the graduate seminar course of BS 501.

Fall 2024 Semester

Date of the Meeting: 22.01.2025
at Kubbealtı, Faculty of Architecture

Online Meeting Link:
bit.ly/4hfVzME

Meeting ID: 379 022 290 450
Passcode: Vp686kY7

Course Instructor: Assoc. Prof. Dr. M. Koray
Pekeriçi

11:00 – 11:20

Assessing Ai-Generated Building Exterior Skins Based on Long-Term Building Thermal Comfort and Daylight Performance

Dican Deniz Köse

11:20 – 11:40

Carbon Footprint Calculation and Life Cycle Analysis in Construction Sites: Challenges and Solutions for Sustainable Practices

Ece Aktaş

11:40 – 12:00

Assessing the Carbon Footprint of Transmission and Distribution Networks in Türkiye for Net Zero Operational Carbon Goals

Enes İnceöz

12:00 – 12:20

Promoting Sustainable Mobility on University Campuses: The Case of Middle East Technical University

Saman Bahojb Najjariyan

12:20 – 12:40

Comparative Sky View Analysis: Pre- and Post-Earthquake Urban Zones in Elazığ

Melike Berfin Karabacak

12:40 – 13:00

**Towards Sustainable Reconstruction:
A Novel Method for Creating
Permanent Housing After Disasters**

Sena alkın

13:00 – 13:20

**Smart Wind Catchers: Harnessing
Adaptive Inlet System to Enhance
Performance in Low Wind Regions**

Paria Emami

13:20 – 13:40

**Green Building Certification Systems
for Adaptive Reuse of Industrial
Heritage: A Comparative Study of
LEED, BREEAM, DGNB, and YeS-TR**

Şimal Kol

11:00 – 11:20

Assessing Ai-Generated Building Exterior Skins Based on Long-Term Building Thermal Comfort and Daylight Performance

Author: **Dican Deniz Köse**
Supervisor: **Prof. Dr. Arzu Gönenç Sorguç**
Jury Members: **Assoc. Prof. Dr. Mehmet Koray Pekerçli**
Dr. Müge Kruşa Yemişcioğlu

AI-generated façades do not inherently hold the properties that can be manufactured or adequately perform in terms of occupant comfort, despite the critical role of the building envelope in today's changing climate and future conditions. To bridge the gap between AI-generated concepts and performance assessment, this seminar report explores the integration of AI-generated façade designs into real-world architectural applications, focusing on the challenges of manufacturability and indoor thermal comfort assessment. The study proposes a method to decode structural, material, and form-related properties of AI-generated façades and evaluate their daylighting and indoor thermal comfort, forecasting future weather conditions using established metrics. By employing prompt design for façade generation and refinement, the research aims to evaluate AI-generated designs to align with both visual and functional criteria. This work contributes to architecture and AI-driven design by demonstrating an approach that brings creative design generation closer to practical implementation.

keywords: AI-generated building envelope, indoor thermal comfort, daylight performance

11:20 – 11:40

Carbon Footprint Calculation and Life Cycle Analysis in Construction Sites: Challenges and Solutions for Sustainable Practices

Author: **Ece Aktaş**
Supervisor: **Prof. Dr. Ali Murat Tanyer**
Jury Members: **Assoc. Prof. Dr. Ayşe Duman**
Assoc. Prof. Dr. Ayşem Berrin Çakmaklı

The calculation of the carbon footprint on construction sites is a crucial process for understanding and reducing the environmental impact of construction activities. The carbon footprint refers to the amount of greenhouse gas emissions released into the atmosphere, either directly or indirectly, by a project or activity. Calculating the carbon footprint on construction sites is a means of developing sustainable methods to minimize the environmental impact of the construction process. Despite the growing focus on defining the life cycle processes of buildings, the carbon footprints and life cycle analyses of construction sites have often been overlooked, preventing a comprehensive calculation of their environmental impact. This study aims to calculate the carbon footprint by applying life cycle analysis practices across different building typologies on construction sites. Due to the neglect of issues such as energy consumption, logistics, and waste management in construction, the study intends to identify barriers and apply lessons learned from carbon footprint practices on construction sites. The objectives include identifying key factors in the use of life cycle analysis on construction sites and assessing the challenges in carbon footprint calculations at these sites. The research adopts a mixed-methods approach, encompassing an extensive literature review, construction site reports, and primary data collection through surveys and interviews with construction professionals. Ultimately, the expected findings aim to provide solutions to the identified barriers and support the integration of life cycle analysis and carbon footprint calculations in construction site activities.

keywords: Carbon Footprint, LCA, Environmental Impact, Sustainable Construction, Energy Consumption, Waste Management

11:40 – 12:00

Assessing the Carbon Footprint of Transmission and Distribution Networks in Türkiye for Net Zero Operational Carbon Goals

Author: **Enes İnceöz**
Supervisor: **Prof. Dr. Ali Murat Tanyer**
Jury Members: **Prof. Dr. Arzu Gönenç Sorguç**
Prof. Dr. Murat Göl

Climate change and its adverse effects on human life are widely recognized. Greenhouse gases have the biggest impact on climate change. As technology develops, the growing demand for energy and electricity in buildings. However, electricity generation heavily depends on fossil fuels, gas, and coal therefore, greenhouse gas emissions from the energy sector are one of the largest sources of emissions in recent years, especially in Türkiye which is a country dependent on foreign energy sources. To reduce their emissions, many countries are formulating their climate strategies and Türkiye has declared its long-term climate strategy aiming for 2053. In the report, Türkiye's goal is for all buildings to be net zero operational carbon building by 2053. To reach this goal, all operational carbon must be known for a building. Operational carbon also includes emissions caused by transmission and distribution networks but this field in Türkiye remains understudied. Transmission and distribution networks are critical as they contribute significantly to indirect emissions in the energy sector. This study aims to calculate the carbon footprint of Türkiye's transmission and distribution network to have a better understanding of net zero operational carbon building. It is expected to conduct a comprehensive Life Cycle Assessment encompassing the infrastructure, loss rates, and SF₆ gas emissions.

keywords: Transmission and Distribution Networks, Net Zero Operational Carbon Building, Greenhouse Gases, Life Cycle Assessment

12:00 – 12:20

Promoting Sustainable Mobility on University Campuses: The Case of Middle East Technical University

Author: **Saman Bahojb Najjariyan**
Supervisor: **Assoc. Prof. Dr. Ayşem Berrin Çakmaklı**
Jury Members: **Prof. Dr. Soofia Tahira Elias Özkan**
Assoc. Prof. Dr. Mehmet Koray Pekerçiçi

The typical university campus is characterized by a high level of internal traffic and a reliance on private vehicles, which gives rise to environmental concerns. This study investigates strategies for promoting more sustainable commuting options within a university campus setting. The research employs a mixed-methods approach, combining surveys of students with an analysis of existing transportation infrastructure. The findings indicate the potential of active transportation modes, such as walking, electric scooters, cycling and campus shuttle service (Rings), as well as shared mobility services like bike-sharing and shuttle programs. Barriers to adoption, including safety concerns and limited infrastructure, are identified, along with potential solutions such as improved pathways, increased bike storage, and targeted educational campaigns. The study concludes by proposing a comprehensive framework for sustainable commuting that integrates infrastructure development, policy changes, and behavior modification initiatives to create a more environmentally friendly and efficient campus transportation system.

keywords: University Campuses, Mobility, Sustainability, Carbon Footprint

12:20 – 12:40

Comparative Sky View Analysis: Pre- and Post-Earthquake Urban Zones in Elazığ

Author: **Melike Berfin Karabacak**
Supervisor: **Assoc. Prof. Dr. Ayşem Berrin Çakmaklı**
Jury Members: **Assoc. Prof. Dr. Funda Baş Bütüner**
Assoc. Prof. Dr. Mehmet Koray Pekerçiçi

Turkey is a seismically active region and has historically experienced significant earthquakes. The 2020 Elâzığ Earthquake is one of these events. After the earthquake, due to the considerable damage and collapse of buildings, a rapid urbanization process was initiated to meet the housing needs. More than 20,000 new housing units and two different Housing Development Administration projects were started. This process of reconstruction is still ongoing. This study focuses on examining morphological changes at an urban scale and interpreting these developments from the perspective of sustainability and urban heat island generation. In the first part, the public's perceptions of the environment, climate, and thermal comfort data will be collected through a survey and presented statistically. Then, the Sky View Factor (SVF), which refers to the ratio of the visible sky area at a specific point to the total sky area and is an important concept in urban planning and urban climatology (Xia et al., 2021), will be used. SVF is related to morphological factors such as settlement density, vegetation cover, urban canyon geometry, and water bodies and it provides objective, data-driven insights to compare the urban structure before and after the earthquake. Finally, the surface temperature data of selected areas before and after the earthquake will be compared, and observations will be made regarding local climate zone mapping and sustainability.

keywords: Elazığ, Earthquake, Sky View Factor, Surface Temperature Analysis, Thermal Comfort

12:40 – 13:00

Towards Sustainable Reconstruction: A Novel Method for Creating Permanent Housing After Disasters

Author: **Sena alkın**
Supervisor: **Prof. Dr. Soofia Tahira Elias zkan**
Jury Members: **Assoc. Prof. Dr. Aysem Berrin akmaklı**
Dr. Deniz cer Erduran

The aftermath of disasters, particularly earthquakes, often leads to a severe housing crisis. Initial responses typically involve emergency shelters such as tents, followed by temporary housing solutions that fail to address long-term needs. The lack of a comprehensive strategy for transitioning from temporary to permanent housing amplifies these challenges, leaving affected communities in prolonged instability.

This research aims to eliminate or significantly reduce the transition period from temporary shelters to permanent housing in post-disaster scenarios by identifying the limitations of current incremental housing practices and uncovering its potential for an accessible, immediate, and sustainable permanent housing options. The proposed strategy is expected to introduce a novel incremental construction technique to accommodate the diverse needs of disaster-affected regions, minimizing time and financial resources spent on temporary housing, offering a resilient and efficient pathway to rebuilding communities.

Keywords: Incremental Housing, Post-disaster Accommodation, Temporary and Permanent Sheltering

13:00 – 13:20

Smart Wind Catchers: Harnessing Adoptive Inlet System to Enhance Performance in Low Wind Regions

Author: **Paria Emami**
Supervisor: **Prof. Dr. Soofia Tahira Elias Özkan**
Jury Members: **Assist. Prof. Dr. Bekir Özer Ay**
Dr. Nastaran Deljavan

Wind Catchers have been employed in order to address the challenging environmental conditions of hot and arid regions. Seasonal and diurnal winds, which are key characteristics of these regions, have traditionally governed wind catchers design and construction, aligning them with prevailing and higher-velocity winds. Given that such conditions are not consistent for all winds, researchers attempt to upgrade conventional models to enhance the effectiveness of wind catchers undergoing various wind velocity patterns and directions.

In this research, following exploration of traditional models and their function, inspired by the ancient Japanese craft of paper folding, various shapes of origami and kirigami have been explored to reveal their features, advances, and limitations in order to investigate a proper form of wind catcher's inlet design capable of self-folding adjustments to get an insight about the possibility of their integration.

This research benefits from a computational approach to design these tessellated structures. Determination of their parameters is followed by going through a Python script and a 3D simulator called Amanda Ghassef Simulator (AGS) making the generation of the corresponding 2D crease patterns and 3D folded shapes feasible, respectively.

The performance of these forms is ultimately intended to be evaluated in terms of passive cooling and natural ventilation efficiency once it is merged to a proposed model using Computational Fluid Dynamics (CFD) simulations.

keywords: Wind Catchers, Natural Ventilation, Passive Cooling, Computational Fluid Dynamics (CFD)

13:20 – 13:40

Green Building Certification Systems for Adaptive Reuse of Industrial Heritage: A Comparative Study of LEED, BREEAM, DGNB, and YeS-TR

Author: Şimal Kol
Supervisor: Prof. Dr. Soofia Tahira Elias Özkan
Jury Members: Assoc. Prof. Dr. Özgün Özçakır
Dr. Deniz Üçer Erduran

This study explores the potential for attaining green building certification through the adaptive reuse of industrial heritage buildings. The research focuses on four leading certification systems: LEED (United States), BREEAM (United Kingdom), DGNB (Germany), and YeS-TR (Turkey). By examining case studies of buildings that have successfully obtained these certifications, the study seeks to identify the key strategies and criteria involved in the certification process.

The findings will shed light on how these buildings met the necessary certification requirements and compare the strengths and limitations of each system. Based on this comparative analysis, recommendations will be proposed to enhance the YeS-TR certification framework for Turkey, with the aim of supporting more sustainable adaptive reuse practices in line with international standards. This research contributes to the field of building science by bridging industrial heritage conservation with green certification, offering a pathway for sustainable redevelopment in the Turkish context.

keywords: Adaptive Reuse, Industrial Heritage Buildings, Green Building Certification System, Sustainability, Renovation

