

General Information	Subject name, code and number of credits	DSN531, Sustainable design, 8 ECTS
	Department	Architecture and design department
	Program (undergraduate, graduate)	Graduate
	Academic semester	Fall 2025
	Instructor(s)	Prof.Dr. Pınar Dinç Kalaycı
	E-mail:	pdinc@gazi.edu.tr/ pinarpinardinc@gmail.com
	Lecture Room/Schedule	On-line
	Office hours	At times agreed upon with students
Prerequisites	-	
Language of instruction	English	
Type of subject (compulsory, elective)	Elective	
Textbooks and additional literature	<p>1.Iyengar, K. (2015). Sustainable Architectural Design: An Overview (1st ed.). Routledge.</p> <p>2.Ching, F. D. K., & Shapiro, I. M. (2014). Green Building Illustrated (1st ed.). Wiley.</p> <p>3.Block, M., & Bokalders, V. (2009). The Whole Building Handbook: How to Design Healthy, Efficient and Sustainable Buildings (1st ed.). Routledge.</p> <p>4.Bauer, M., Möslle, P., & Schwarz, M. (2009). Green Building: Guidebook for Sustainable Architecture. Springer Publishing.</p>	
Course outline	<p>The elective course “Sustainability in Design” offered at the master’s level of the Environmental Design program aims to familiarize students with the principles of sustainable development in design and enable them to effectively apply these principles in contemporary design projects. The course is centered on exploring the concept of sustainability and the principles of sustainable design by engaging students in a hands-on, small-scale design project. The course presents the latest trends and approaches in environmental design by considering ecological, social, and economic sustainability factors. Students will develop the ability to create energy-efficient, environmentally friendly, and health-conscious design solutions by utilizing sustainable materials and technologies.</p>	
Course objectives	<p>The main objective of the course is to teach students the fundamental principles and approaches to sustainable design, informing them about important topics such as environmental balance, reuse, and recycling. Additionally, students will learn how to incorporate social responsibility into the design process and develop design solutions that meet the needs of diverse communities.</p> <p>In this course, students will develop the skills to create projects based on sustainability principles and apply them in real-life situations, while balancing aesthetic and functional requirements to ensure both contemporary relevance and long-term value of their designs. The course will also provide students with practical skills for planning and implementing environmental design projects that integrate social, economic, and ecological factors.</p>	

Results of teaching (learning)	<p>General / Soft Skills:</p> <ol style="list-style-type: none"> 1. By learning the concept of sustainability in design, students will analyze the main factors driving demand for this type of design and understand the importance of sustainable design in their projects. 2. Students will develop an understanding of the features of sustainable design, applying eco-design principles. 3. By presenting sustainable design projects, students will enhance their communication skills and learn to express their ideas clearly. 4. By applying various principles of sustainable design, students will gain the ability to develop creative and innovative solutions. <p>Specialized / Hard Skills:</p> <ol style="list-style-type: none"> 1. Students will learn the concept of sustainability in design and the main factors influencing the demand for such designs. 2. Apply basic requirements for green building design within eco-design projects. 3. Gain knowledge about construction materials, consider their eco-efficiency, and understand their areas of application. 4. Learn to plan interior eco-design requirements to improve energy efficiency in buildings. 5. Analyze the social and economic impacts of sustainable design. 6. Study principles and methods for water and waste management in buildings and urban projects. 7. Develop communication and presentation skills specific to sustainable design. 		
Teaching methods	Lecture	+	
	Practical tasks	+	
	Analysis of practical issues	+	
Evaluation	Components	Date/Deadline	Percentage (%)
	Presentations		30
	Attendance		5
	Midterm exam		30
	Final exam		35
	Total		100
Rules (Education policy and conduct)	<p>Presentation: During the semester, each student must conduct detailed research on their project and prepare a corresponding presentation every week. The presentations should reflect the requirements for the school project design, as well as a thorough study of the styles and materials the student will use in the design process. All referenced sources must be listed in a bibliography at the end of the presentation in a single slide. Evaluation criteria include the reliability and number of references and the completeness of the presented information. Each student is allocated a minimum of 20 and a maximum of 30 minutes for their presentation, and exceeding this time is not allowed. The purpose of this task is to develop the student's short-term research and presentation skills.</p> <p>Attendance: The maximum score for class attendance is 5 points. Scoring is as follows:</p>		

if a student attends all classes for the subject during the semester, they receive 5 points; 1 point is deducted for every 2 classes missed. If the total number of missed classes during the semester exceeds 25% of the norm (due to illness, family situation, etc.), the student will not be admitted to the exam session, and a corresponding decision will be made.

Mid-term Exam:

The mid-term exam involves reviewing the project the student is working on during the semester. For this review, students are expected to prepare a presentation displaying the design concept (diagrams, site plan, plans sections, and 3Ds), the prioritized sustainability issues and their definitions, all contextual analysis, and the decisions on the materials, and the active and passive eco-design approaches. For displaying these, the project's site analysis, design solutions, interior planning, and front and side façade solutions must fully be completed.

Note:

The project design must be prepared using any computer graphics software (AutoCAD, ArchiCAD, SketchUp, Revit, 3ds Max, Rhino, Lumion, Photoshop, CorelDraw, etc.). AI tools can be used freely in experimenting with alternatives and final artistic renderings of the project.

Final Exam:

During the final exam, students will present the projects they have worked on throughout the semester. The project must be finalized, and all drawings must be presented in detail. Students will prepare a presentation displaying all sustainability-related issues and their approach to the matter, the project in all details, and short texts explaining design features.

Course Completion:

The student's knowledge is evaluated with a maximum of 100 points. A minimum overall success rate of 61% is required to complete the course. Students who fail may retake the subject in the next semester or the following year.

Student Conduct:

Students are prohibited from violating the University's internal disciplinary rules and from using mobile phones.

Schedule (subject to change)

Week	Date	Topics of the subject	Textbook/Resource/Practices
------	------	-----------------------	-----------------------------

1	<p>Introduction: Current Approaches to Resource Efficiency in Sustainable Design.</p> <p>Design of a Small Architectural Form: Planning and designing based on the principles of sustainability, supported by analysis.</p>	<p>Please find below the list of scientific journals in which you can browse for the specific sustainability topics of your concern. This list should be used for any specific topic of sustainability. Students are free to enlarge this list according to their interests and the accessibility conditions of their university.</p> <p>Students are expected to read and develop their discussions at least around 1 paper each week. That is how design can lean on scientific research.</p> <p>Here is the list of the possible journals:</p> <ul style="list-style-type: none"> -Sustainability. (n.d.). MDPI. https://www.mdpi.com/journal/sustainability -Journal of Cleaner Production. (n.d.). Elsevier. https://www.sciencedirect.com/journal/journal-of-cleaner-production -Resources, Conservation & Recycling. (n.d.). Elsevier. https://www.sciencedirect.com/journal/resources-conservation-and-recycling -Building and Environment. (n.d.). Elsevier. https://www.sciencedirect.com/journal/building-and-environment -Energy and Buildings. (n.d.). Elsevier. https://www.sciencedirect.com/journal/energy-and-buildings -Buildings. (n.d.). MDPI. https://www.mdpi.com/journal/buildings -Frontiers in Built Environment. (n.d.). Frontiers. https://www.frontiersin.org/journals/built-environment -Cities. (n.d.). Elsevier. https://www.sciencedirect.com/journal/cities -Urban Sustainability. (n.d.). Springer Nature. https://www.springer.com/journal/44223 -Environment, Development and Sustainability. (n.d.). Springer. https://www.springer.com/journal/10668 <p>Students should also consider the resources in the following links:</p> <p>https://adk.elsevierpure.com/ws/portalfiles/portal/64794301/Aechitecture_Guide_UN17_Vol.2_web_single_pages_1.pdf</p>
---	---	--

			<p>https://sdgs.un.org/goals</p> <p>https://www.haworthtompkins.com/studio/regenerative-design/reading-research-and-tools-suggestions</p> <p>https://library.uniteddiversity.coop/Ecological_Building/Green_Building-Guidebook_for_Sustainable_Architecture.pdf</p> <p>https://library.uniteddiversity.coop/Ecological_Building/Strategies_for_Sustainable_Architecture.pdf</p> <p>https://globalawardforsustainablearchitecture.com</p> <p>For the small project selection, students are expected to browse current architectural design competitions, understand the topics and the briefs, and focus on a single competition that fulfills course requirements.</p> <p>For competitions uni.xyz, terra viva, archiol, KairoLoro, Inspirelli competitions can be used as resources.</p>
2		Introduction to the Assigned Tasks (Small Architectural Form).	Use platforms like Dezeen, ArchDaily, architectureprize, UIA, ReThinking the Future, Sustainability Magazine, etc., for finding examples of the chosen building type (small library, nursing home, house, health unit, an urban shelter, etc.) of the competition.
3		Selection and Analysis of the Site.	<p>Utilize all official open-source online maps, including NASA maps, Open Street Maps, Copernicus Urban Atlas (For Europe), Google Earth, StreetMix, and street views, etc.</p> <p>Browse online local sources for information on the users, population, and environmental conditions, and anything you can collect.</p> <p>Prepare a SWOT analysis of the site accordingly.</p>
4		Preliminary Design Solutions for the Small-Scale Architectural Form.	<p>Start with freehand sketches for developing your main concepts. Prepare at least 2 alternatives.</p> <p>Write a 2000-word text that explains each approach and the principles for the site and the design problem.</p>

5		Analysis of the Selected Site and Climate Conditions, Preliminary Design Solutions.	<p>Transform maps into communicating visuals. Run, climate, traffic, green, population, building stock, building heights, building uses, density, accessibility analysis. If needed, run extra analysis.</p> <p>Draw diagrams indicating your approach to the site, material, and the style (Modern, Post-Modern, Constructivist, etc)</p>
6		Eco-efficient Materials: Alternatives and Selection.	<p>Focus on one of the alternative designs.</p> <p>Prepare a board of possible eco-efficient materials and discuss each in terms of its suitability for your project.</p> <p>Place each material iconically on your sketches.</p>
7		Passive Sustainable/Eco-Design Ideas and Systems	<p>Using recent publications, prepare a simple list of sustainable design principles, including the passive eco-design ideas.</p> <p>Explain each principle through 2 sentences.</p> <p>Transform your diagrams according to your sustainability principles. Principles and diagrams should be placed on the same board, and checks/ticks should be marked for the fulfillment of each principle.</p>
8		Mid-Term Exam	
9		Planning the Building Envelope (Roof, Exterior Walls, etc.) Based on Sustainable Design Principles.	<p>List sustainable design principles concerning the building envelope.</p> <p>Transform your diagrams into a single building envelope on which you can experiment with various alternatives. Introduce 2 alternatives and discuss the advantages and disadvantages of each approach.</p>
10		Application of Sustainable Design Solutions to the Project's Exterior Envelope (Roof, Exterior Walls, etc.).	<p>Prepare a detailed design of your envelope.</p> <p>Introduce how you apply each sustainable design solutions to your envelope. What does this envelope mean in terms of sustainability? List the sustainability concerns.</p>

11		Active Sustainable / Eco-Design Ideas and Systems.	<p>List active eco-design systems and explain each with 2 sentences.</p> <p>Prepare plans and sections of your design according to passive + active eco-design systems.</p>
12		Introduction of renewable energy systems in the project	<p>List renewable energy systems and explain each with 2 sentences.</p> <p>Prepare plans and sections of your design according to the renewable energy systems in your list.</p>
13		Visiting Green Building Principles.	<p>List the most important 10 green building principles that can be applied to your project.</p> <p>Assess and develop your design accordingly.</p>
14		Implementation of Sustainable Design Solutions in the Project	Finalize your project so that it corresponds to each criterion and decision you made in terms of sustainability.
15		Project Completion.	Prepare your boards and write a 1000 words explanation report on how design fulfills the expectations of the current society, the sustainability issues and the competition.
Final Exam			