

TU Berlin Summer Tailored Summer Course for Vishwaniketan Institute

Proposal (subject to change and revision)

Description

In this intensive six-week project-based course (3 ECTS), students from architecture, design, and various engineering disciplines will investigate the intersection of sustainable architecture and *Industry 4.0*. Participants will engage in a project-based learning environment that balances theoretical insights with practical project development. The course emphasizes minimizing negative environmental impact through principles of sustainability and technology. It aims to empower future professionals to devise innovative, eco-friendly solutions for the built environment.

Throughout the course, students will participate in weekly assignments that gradually build up to a cohesive final project, showcasing real-world design workflows. They will explore how technologies such as AI, IoT, digital modeling, renewable energy, and advanced materials can enhance overall sustainability of the human environment. Lectures, discussions, and weekly reviews will focus on generative design strategies, energy-efficient systems, and resource-conscious methods, demonstrating how technology-driven processes can improve both environmental performance and user experience.

The seminar format supports interdisciplinary collaboration, integrating perspectives from engineering, design, and architecture to tackle complex challenges. Students will refine their communication and critical-thinking skills by actively participating in group critiques, workshops, and design scenarios. They will learn to balance aesthetic, functional, and ecological considerations in every design decision. Throughout the course, participants will gain insights into sustainable design and how Industry 4.0-driven processes can improve the human environment.

By the end of the course, students will have created a comprehensive, collaborative final project that demonstrates their understanding of sustainable design principles and technological applications. Armed with this experience, course graduates will be prepared to engage with new standards for eco-conscious architecture, engineering, and design.

Project: Template House

The goal of this project is to develop a hypothetical prototype house emphasizing building form, energy efficiency, and material selection. Designed as a template for diverse housing needs, it underscores sustainability and resource conservation. For the scope of this course, each prototype is envisioned as a compact, efficient single-family home of approximately 40 m² for one occupant, plus 20 m² for each additional occupant. Each group will refine the project's details based on personal experiences and observations.

Project Timeline

Week 1: Strategies

Week 2: Problem Statement

Week 3: Energy and Materials

Week 4: Construction

Week 5: Conclusion

Week 6: Prospectus Presentation

Learning Objectives

Upon completion of the course, the students should be able to

- Grasp and apply the principles of sustainable development.
- Understand and apply user-centered, parameter-driven project methodologies.
- Position architecture, design, and engineering projects to emphasize sustainability within the framework of Industry 4.0.
- Cultivate skills for interdisciplinary collaboration in project development and design.
- Develop sustainable materials and construction strategies.
- Develop cohesive project proposals.

Prerequisites

Students enrolled in the course should be familiar with various graphic programs (e.g., Photoshop, Illustrator, etc.). The course also requires knowledge of presentation software (e.g., PowerPoint, Keynote, or similar). Familiarity with CAD programs (e.g., AutoCAD, Revit, Rhino, or similar) is beneficial but not essential.

Every student should have their own laptop computer.

Final Presentation

At the end of the course, each group presents their project, which consists of two parts: the project abstract and the production. The project should be given in prospectus format.

The project abstract includes a problem statement, the project's objectives, the methodology, and its contributions to the broader context.

The production features demonstrative and representational materials, including diagrams, drawings, and models.