MODERN GREEN CONSTRUCTIONS

Department of Technology and Design of Wood Products

Educational and Research Institute of Forestry and Landscape-Park Management

Lecturer:	Andrii Spirochkin
Semester:	2
Degree level:	Master’s
ECTS Credits:	3
Form of assessment:	Exam
Contact hours:	30 (16 hours of lectures, 14 hours of practical classes)
Self-study:	60 hours

General Course Description

The course is designed at the master's level primarily for students in woodworking and furniture technology programs, building on their fundamental knowledge of wooden materials and processing technologies. It integrates advanced concepts of energy-efficient, low-carbon, and circular construction systems, preparing graduates for professional roles in green building design, timber construction engineering, and sustainable material innovation. The course is also relevant for students in construction, architecture, and environmental engineering master's programs, particularly those focusing on building physics and sustainable design.

Students will develop interdisciplinary skills enabling collaboration among architects, engineers, and wood technologists in the design and construction of environmentally responsible buildings. The integration model allows participation from various master's programs through elective pathways, promoting cross-faculty cooperation and project-based learning.

Lecture Topics

1. Energy-efficient building materials and low-carbon technologies.
2. Incorporating sustainable development principles into wooden building construction technologies.

3. Innovative materials (bio-based, recycled, and adaptive materials) and their technologies.
4. Ultimate limit states – joints.
5. Modern construction systems: modular timber buildings, prefabrication, off-site manufacturing, hybrid systems.
6. Protection of timber structures.
7. Environmental policies, green certifications (LEED, BREEAM, DGNB), and EU Green Deal goals.

Practical Class Topics

1. Material testing and assessment of building components.
2. Determination of the dynamic modulus of elasticity of a wood specimen during free transverse vibrations.
3. Determination of the dynamic modulus of elasticity of a wood specimen during free longitudinal vibrations.
4. Research on the relationship between the modulus of elasticity and the strength of wood specimens.
5. Design of water and waste management systems in buildings.
6. Thermal performance of the wooden building envelope by thermal conductivity of structural members.