

Examination topics within the subject areas approved by Council of Study Program

Wood sciences (Dr inż. Przemysław Mania)

1. Micro and macrostructure of coniferous wood.
2. Micro and macrostructure of deciduous wood (ring and diffuse porous).
3. Micro- and macrostructural diversity of exotic wood species.
4. Wood hygroscopicity (sorption isotherms and equilibrium moisture content).
5. Water in wood and methods of its determination.
6. Wood moisture deformations (swelling, shrinkage, their anisotropy, methods of determining these parameters, sample values).
7. Wood density and its influence on mechanical properties (elasticity, strength, hardness, anisotropy of these values).
8. Influence of wood moisture on its mechanical properties (compressive, tensile, bending, impact strength).
9. Method of determining compressive, tensile, bending strength and modulus of elasticity. Sample values of these parameters.
10. Creep and stress relaxation in wood - influence of constant and time-varying wood moisture.

Wood chemistry (Prof. dr hab. Magdalena Zborowska)

1. Main and minor components of wood - percentages, place of occurrence in the wood tissue, functions.
2. Differences in the chemical composition of softwood and hardwood.
3. Types of chemical bonds occurring in wood between chemical components. Their influence on reactivity.
4. Wood carbohydrate components - percentages, occurrence, classification, functions.
5. Difference between chemical composition of cellulose and hemicelluloses.
6. Reactivity of cellulose.
7. Lignin - percentages, occurrence, classification, functions.
8. Lignin - possibilities of industrial use.
9. Wood extractives- classification, functions.
10. Recent studies on condensed tannins

Wood protection and modification (Prof. dr hab. Bartłomiej Mazela)

1. Biological factors acting indoors and outdoors and their effect on wood.
2. Non biological factors acting indoors and outdoors and their effect on wood.
3. Natural durability of wood.
4. Chemical protection of wood – preservatives versus coatings.
5. Transport of liquids in wood structures – penetration versus retention of wood preservatives.
6. Industrial wood treatment methods.
7. Methods of chemical wood modification – reactions and their influence on wood properties
8. Methods of thermal wood modification – influence on wood properties.
9. Process of thermal decomposition of wood and its main structural components.
10. Mechanism of action of fire retardants.

Timber drying (Prof. dr hab. Wiesław Olek)

1. Construction and basic functional elements of convection drying kilns.
2. Moist air processes in convection drying kilns.
3. Heartwood formation and its influence on wood properties related drying.
4. Constant drying rate period – basic features.
5. Falling drying rate period – basic features.
6. Stress development during convection drying.
7. Basic features characterizing drying quality.
8. Moisture content related drying schedules - basic characteristics.
9. Vacuum drying – basic concepts.
10. Heat-pump drying – basic concepts.

Gluing and finishing of wood (Dr hab. Tomasz Krystofiak)

1. Wood as material for gluing and finishing.
2. Adhesives for wood.
3. Resins for wood based composites.
4. Adhesives for furniture production.
5. Surface activation methods before gluing and finishing.
6. Lacquer products for wood and wood based composites.
7. HOT COATING technology.
8. Laminating, veneering and edgebanding technologies.
9. Powder coatings.
10. UV lacquer systems for woodworking industry.

Wood machining (Dr inż. Bartosz Pałubicki)

1. Theory of wood and wood-based Materials cutting.
2. Waviness of wood surface after planing, influencing parameters and ways to improve the surface quality.
3. Quality of edgebanding and related machine parameters.
4. The goal of wood sanding, ways to achieve it and technical solutions in wide belt sanders to improve the quality.
5. Problem of chipping of laminated particleboard in sawing and ways to minimize.
6. Structure and basic functions of a G-code programme for CNC machining.
7. CNC programming procedure in Workshop Oriented Programming.
8. Constructions types of CNC machine tools.
9. Number, types and machining possibilities of CN controlled axes.
10. Tool holder types in CNC machining centers.

Furniture design (Dr Beata Fabisiak)

1. The features of universal design.
2. The concept of a “new product” from the perspective of a furniture manufacturer and a customer.
3. Design thinking methodology in the furniture design.
4. The science-push theory of innovation in the furniture design.
5. The science-pull theory of innovation in the furniture design.
6. The biggest challenges in the design of furniture for seniors.
7. The biggest challenges in the design of furniture for children.
8. The levels of “expanded product” and “real product” in the comprehensive furniture design process.
9. Visible and silent design in furniture manufacturing companies.
10. Principles of design in creation of an external form of a piece of furniture.

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