

# Transilvania University of Braşov, Romania

## Study program: Wood Products Engineering and Design

Faculty: Furniture Design and Wood Engineering

Study period: 4 years

### 1<sup>st</sup> Year, 1<sup>st</sup> Semester

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Mathematical Analysis	DF	5	3	3	-	-

**Course description (Syllabus):** Sequences and Series of Real Numbers: definitions; convergence of sequences; Cauchy's criterion; series with nonnegative terms; absolute convergence; alternating series. Functions of a Real Variable: limit of a function; continuity of a function; derivative of a function; application of derivatives and Taylor's series. Functions of Several Real Variables: functions of two variables; partial derivatives; higher order partial derivatives.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Fundamentals of Wood Production and Environmental Protection 1	DF	5	3	-	2	-

**Course description (Syllabus):** The discipline acquaints the students with their main topic of study: wood. The current structure of the lecture contains two distinct chapters: **1- Wood Biogenesis:** role, importance and forest distribution, trees growth and wood formation, the influence of environmental factors on the tree shape and wood quality, treatments, particularities, classification, analysis; **2- Wood Harvesting:** the structure of the production process, harvesting methods and technology, gathering and storing operations. The practical applications envisage the determination of the most usual tree species in their natural environment, explaining how to determine the diameter of a standing tree and how to measure the height.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Descriptive Geometry 1	DF	5	2	-	2	-

**Course description (Syllabus):** Introduction: notations used in descriptive geometry, the object of descriptive geometry, brief history, projection systems; Representation of a point; Representation of a straight line; Representation of a plane; The methods of descriptive geometry; Polyhedral; Cylindrical and conical surfaces; Intersection of polyhedral; Intersection of cylindrical and conical surfaces; Technical applications of descriptive geometry.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Applied Informatics	DF	5	2	-	3	-

**Course description (Syllabus):** Computer architecture. General concepts of operating systems: MS-DOS, Windows, UNIX, LINUX. Presentation of the utility of the programs, archiving, management and anti-virus. How computer networks work. General knowledge on using the MS-Office package and the main applications in wood engineering. General concepts about algorithms and programming languages. Presentation of the basic elements of Pascal and C. Presentation of data types and structures, instructions, procedures, functions, routines, files, etc.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Wood Chemistry	DF	4	2	-	1	-

**Course description (Syllabus):** Introduction- course structure and importance. Organic chemistry: Structure of organic compounds, Alcohols and phenols; Aldehydes and ketones; Carboxylic acids and derivatives; Macromolecular compounds; Carbohydrates. Basics of wood chemistry: Chemical composition of wood; Cellulose; Hemicelluloses; Lignin; Secondary wood components.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Physical Training 1	DC	1	-	1	-	-

**Course description (Syllabus):** Order exercises and front – terminology, shares and motion, changes of achievements and bands, number in figures. Exercises EFG - the fundamental positions of the body and derivatives; positions and movements' segmentation, the methodological rules of training and teaching exercises simple and compound. The foundations of the body movement.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Ethics and Academic Integrity	DC	3	1	-	-	-

**Course description (Syllabus):** Introduction (what is ethics, what is academic integrity). Ethics in research (principles). Principles and characteristics of academic writing. The writing process: documentation and citation systems. Types of academic writings: the scientific report, the scientific article. Types of presentations. What is plagiarism and how do we avoid it?

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Package of optional disciplines: English Language 1 /French Language 1	DC	2	1	1	-	-

**Course description (Syllabus):** The main objectives of the foreign language course are: developing the students' fluency language skills and techniques by further exposure to the other language context; exposing them to advanced-level and listening samples from real newspapers and magazines, to engage both listening and understanding skills. At the seminars, students work on vocabulary & grammar, and on incorporating new items into their speech and writing.

### 1<sup>st</sup> Year, 2<sup>nd</sup> Semester

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Linear Algebra, Analytical Geometry and Differential Equations	DF	4	2	2	-	-

**Course description (Syllabus):** Linear algebra and free vectors; Analytic geometry in space; Conics and quadrics; Generated surfaces (cylinders, cones and surfaces of rotation); Plane curves and curves in space; Surfaces.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Physics	DF	4	2	-	1	-

**Course description (Syllabus):** Introduction. Kinematics of the material point. Theory of restrained relativity. Motion dynamics. Gravitation. Oscillations. Molecular physics. Thermodynamics. Electromagnetism and electromagnetic waves. Ondulatory and corpuscular optics. Notions of cuantic mechanics.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Technical Drawing and Infographics 1	DF	5	2	-	2	-

**Course description (Syllabus):** The course is structured on two parts: general rules for technical drawing and technical drawing in wood industry. The content is as follows: **Part I.** Rules and general rules of representation in technical

drawing. Layout projections. Representation in technical drawing views. Representation of sections and breaks in technical drawing. Sizing in technical drawing. Threads and gear fixing. Grooves and gears. Overall drawing. Representation rules, positioning and dimensioning. **Part II.** Symbols of materials used for representation of wood and wooden based products. Representation of wooden parts. Representation of complexes. Representation of sub-assemblies. Representation of assemblies.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Mechanics	DF	5	2	2	-	-

**Course description (Syllabus):** Static: the equilibrium of rigid bodies and systems of rigid bodies, without taking into account the shape and the dimensions of the bodies. Kinematics: the mechanical motion of the rigid bodies and of the systems of rigid bodies, from the geometrical point of view (trajectory, velocities and accelerations of different body particles) without considering the forces which are acting upon the bodies. Dynamics: the mechanical motion of the rigid bodies, taking into account the forces which are acting on the bodies, calculating the dynamical reactions (the forces in the mechanical connections).

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Wood Anatomy	DF	5	3	-	2	-

**Course description (Syllabus):** The *Wood Anatomy* course presents the fundamentals about microscopic (chemical composition of wood, cell wall structure, major cell types) and macroscopic (sapwood, heartwood, annual rings, pith, vessels or wood pores, rays, fiber and parenchima zones, pith flecks, etc) structures of wood as well as knowledge about wood defects which are abnormal deviations of trees related to growing, wood structure, aspect and chemical composition and they conduct to the decrease of wood technical quality.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Materials Used in Wood Industry	DF	4	1	-	2	-

**Course description (Syllabus):** The course offers the basic knowledge on the wood materials used in wood engineering, including a short description, classifications, characteristics and applications. The materials presented are: round wood, timber, veneer and wood-based panels (PB, MDF, OSB, plywood, blockboard, cellular panels, reconstituted panels and structural panels).

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Physical Training 2	DC	1	-	1	-	-

**Course description (Syllabus):** Order exercises and front – terminology, shares and motion, changes of achievements and bands, number in figures. Exercises EFG – the fundamental positions of the body and derivatives, positions and movements segmentation, the methodological rules of training and teaching exercises simple and compound. The foundations of the body movement.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Package of optional disciplines: English Language 2 /French Language 2	DC	2	1	1	-	-

**Course description (Syllabus):** The main objectives of the foreign language course are: developing the students' fluency language skills and techniques by further exposure to the other language context; exposing them to advanced-level and listening samples from real newspapers and magazines, to engage both listening and understanding skills. At the seminars, students work on vocabulary & grammar, and on incorporating new items into their speech and writing.

## 2<sup>nd</sup> Year , 3<sup>rd</sup> Semester

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Descriptive Geometry 2	DF	4	1	-	2	-

**Course description (Syllabus):** Double and triple orthogonal projection. Isometric axonometry. Representation of different elements parallel to a plane or inclined relative to the plane. Intersections.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Technical Drawing and Infographics 2	DF	4	1	-	2	-

**Course description (Syllabus):** Use of AutoCAD 2D. Drawing a simple frame; a profiled frame; an edged panel; a milling cutter; a checking device; a drawer; a table; a stool; a wardrobe.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Strength of Materials	DF	5	2	-	2	-

**Course description (Syllabus):** Introduction. Stresses in bars and static determined systems. Static moments and inertia moments of plane sections. Stress and strain in bars subjected to tensile and compression loads. Shearing of thin parts. Wood elasticity. Torsion of straight bars. Stresses in bending of straight wooden bars.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Wood Physics and Mechanics	DF	5	3	-	2	-

**Course description (Syllabus):** The *Wood physics and mechanics* course presents the physical (moisture, swelling and shrinkage coefficients, density) and mechanical (bending strength and shock resistance, tensile strength parallel and perpendicular to the grain, shearing strength, torsion, spitting, hardness) properties of solid wood and also notions about thermal, electric and acoustic properties of this material. The course contains both the strength analysis in relation with the influencing factors and the reciprocal relations between different properties and the use of this knowledge to solve some practical and important issues for the specialists in the wood domain.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Wood Preservation	DF	5	2	-	2	-

**Course description (Syllabus):** Introduction- course structure and importance Wood preservation: Biotic degradation of wood - factors and phenomena; Natural durability of wood; Use classes and natural durability – biological hazard correlations; Biocides and wood preservatives; Treating technologies: surface and impregnation treatments, efficiency. Wood fire protection: Wood combustibility; Principles of wood fire protection; Fire retardants; Evaluation of efficiency of fire protection products and technologies. Weathering protection: Degradation of wood under the action of climatic factors; Principles of weathering protection; Coating materials for exterior use.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Drives in Wood Industry	DF	4	2	-	2	-

**Course description (Syllabus):** Metals and alloys. Non-dismountable machine assemblies. Dismountable machine assemblies. Couplings. Bearings. Mechanical transmissions. Gears. Electric drives. Hydraulic drives. Pneumatic drives.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Physical Training 3	DC	1	-	1	-	-

**Course description (Syllabus):** Order exercises and front – terminology, shares and motion, changes of achievements and bands, number in figures. Exercises EFG - the fundamental positions of the body and derivatives, positions and movements segmentation, the methodological rules of training and teaching exercises simple and compound. The foundations of the body movement.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Package of optional disciplines: English Language 3 /French Language 3	DC	2	1	1	-	-

**Course description (Syllabus):** The main objectives of the foreign language course are: developing the students' fluency language skills and techniques by further exposure to the other language context; exposing them to advanced-level and listening samples from real newspapers and magazines, to engage both listening and understanding skills. At the seminars, students work on vocabulary & grammar, and on incorporating new items into their speech and writing.

## 2<sup>nd</sup> Year, 4<sup>th</sup> Semester

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Technical Drawing and Infographics 3	DF	4	2	-	2	-

**Course description (Syllabus):** Use of AutoCAD 3D. Modelling wood objects.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Wood Structures for Constructions	DF	4	2	-	2	-

**Course description (Syllabus):** Wood constructions – short history; Wood materials used in constructions; Common building systems for wood construction.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Wood Structures for Furniture	DF	4	2	-	2	-

**Course description (Syllabus):** Materials; classification of fixed joints; joints for frames and legged-frames; edge and end joints; assembling joints; classification of frames and panels; simple frame; glass frame; simple and double faced-frame; frame with panel fixed between mouldings; framed panel; normal and false panel board; panelled frame; curve panels; legged-frame; box structures; dismountable joints; fittings; threaded joints; joints with eccentric housings; dismountable joints for legged-frames; dismountable joints with plastic mounts.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Technological Materials in Wood Industry	DF	4	2	-	2	-

**Course description (Syllabus):** Introduction- course structure and importance; Adhesives: Basics of adhesion: terminology and adhesion theories; Factors affecting wood gluing and performance of glued joints; Vinyl and acrylic adhesives; Hot-melt adhesives; Contact adhesives; Polycondensation adhesives (urea-formaldehyde, phenol-formaldehyde); Polyurethane and epoxy adhesives; Coating materials: Wood finishing- general aspects and materials; Surface preparation by sanding, bleaching and staining; Composition and classification of coating materials; Coating materials with organic solvents: nitrocellulose, polyurethane, acid catalyzed; Coating materials without volatile organic solvents; Basic ecological aspects of wood coating.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
General Economy	DC	1	1	-	-	-

**Course description (Syllabus):** Principles of economic thinking. The market. Company costs. Macro-economic concepts. Cyclic fluctuations of economy.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Fundamentals of Wood Production and Environmental Protection 2	DF	2	1	-	1	-

**Course description (Syllabus):** Environment protection. Forest-Ecosystem natural land. The causes of forest degradation. Solutions for combat forest degradation. Technologies to reduce emissions of volatile organic compounds (COV) in the wood industry. Legal concept of environmental protection activities.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Study of Wood Properties	DF	4	2	-	2	-

**Course description (Syllabus):** The discipline is complementing the general knowledge about wood physical, mechanical and biological properties with other properties having a practical applicability. One of such properties refers to wood behaviour to thermal flow and its applications as thermal insulator, wood calorific power and its potential of conversion into energy. Wood acoustical properties, including acoustic of resonance wood, acoustic insulation, nondestructive testing using sound, ultrasound, acoustic emission, acoustic-ultrasounds and high-power ultrasounds represent other important chapters. Other properties envisaged are: wood electric properties in AC and DC, wood magnetic behaviour and their applications. Final chapters are studying the behaviour of wood when exposed to electromagnetic radiation of various wavelengths and frequencies and their multiple applications in wood industry, including the nondestructive testing of wood and wood panels (nuclear magnetic resonance, microwave, infrared, visible light, ultraviolet, X-ray, gamma-ray and neutron radiation).

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Internship 1	DS	4	-	3 weeks x 30h/week = 90 h		

**Course description (Syllabus):** Work safety rules – general and specific for wood-processing machines. Presentation of raw materials. Hand tools. Effective work.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Physical Training 4	DC	1	-	1	-	-

**Course description (Syllabus):** Order exercises and front – terminology, shares and motion, changes of achievements and bands, number in figures. Exercises EFG - the fundamental positions of the body and derivatives, positions and movements segmentation, the methodological rules of training and teaching exercises simple and compound. The foundations of the body movement.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Package of optional disciplines: English Language 4 /French Language 4	DC	2	1	1	-	-

**Course description (Syllabus):** The main objectives of the foreign language course are: developing the students' fluency language skills and techniques by further exposure to the other language context; exposing them to advanced-level and listening samples from real newspapers and magazines, to engage both listening and understanding skills. At the seminars, students work on vocabulary & grammar, and on incorporating new items into their speech and writing.

### 3<sup>rd</sup> Year, 5<sup>th</sup> Semester

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Thermal Treatments of Wood	DF	5	2	-	2	-

**Course description (Syllabus):** Theoretical basics of wood drying; wood-moisture-heat relations; The mechanism of water removal from wood during drying and associated stresses and strains; Phases of the drying process; Principles of elaborating rational drying schedules; Drying time estimation. Timber drying in practice: methods, kilns, technological phases, computer-aided kiln control, drying quality.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Basics of Wood Cutting and Cutting Tools	DF	4	2	-	1	-

**Course description (Syllabus):** The basis of wood cutting- machining methods, definitions, presentations; The elements of the cutting process, motions in the cutting process, chip geometry; Tool geometry, fundamental cases of cutting, elementary cutting; The influencing factors of the cutting process; Interaction between tool and wood (wood and cutting edge; wood and rake face; wood and clearance face); The ensemble of interaction forces, the quality of cutting, The dynamic parameters produced in the cutting process, parameters of the cutting process (chip thickness, cutting angle, dynamic angle etc); Tooth wear, problems occurring in the cutting process with circular saw, cutting with positive and negative rake angles, chips formation in transversal cutting; Cutting processes, Wood cutting with frame saw; Cutting with band saw, Cutting with circular saw; Wood milling, Wood boring, Wood turning, Peeling and slicing of wood, Wood sanding.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Wood-Processing Machine-Tools and Units 1	DF	5	2	-	2	-

**Course description (Syllabus):** The structure and content of this discipline aim at the achievement of basic knowledge related to the generation of wooden surfaces; Definition and analysis of kinematic structures of wood-processing machine-tools; Knowledge related to the control and adjustment of machines; Kinematic chains and their command systems.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Design of Wood Products	DS	3	1	-	-	2

**Course description (Syllabus):** The learning outcome of this discipline consists of the abilities to create through design, as a complementary part of the competencies necessary to furniture design engineers, through developing creative skills and innovative visions. It is a process which means also the development of practical skills and personal means of expression in design. This learning process is based upon elements like engineering design analysis by using the relation between functionality and beauty or appeal, the knowledge of both classical design methods (sketching and drawing) and modern methods of the design process focused towards product systems and functional groups. The students are expected to use fundamental knowledge and skills regarding the analysis of two-and three-dimensional space, as well as the relations between form and space, form and function, structure and expression, as instruments of the design and creation process, together with the understanding and practice of visual communication and composition, for achieving furniture projects.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Furniture Design I	DS	4	2	-	-	2

**Course description (Syllabus):** Students approach 20th and 21st century design concepts, creators and trendsetters; they acquire basic skills regarding the functional, structural and esthetic requirements of furniture design activities: sketching and drawing - 2D and 3D representation, modeling.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Finishing Technologies in Wood Industry	DS	2	1	-	1	-

**Course description (Syllabus):** The course offers the students the theoretical knowledge and skills to conceive and put in practice finishing technologies adapted to the type of finite product, the desired aspect and the actual environmental conditions this will be used in (interior versus exterior finishes), in order to satisfy imposed quality requirements and market demands. Emphasis is put on understanding the successive phases of finishing technologies, the selection of adequate finishing materials, the application techniques, the curing mechanisms and the corresponding technological equipment to accelerate curing. These are bases needed to design finishing lines and conduct finishing processes in practice. Evaluation of the quality of the finished surfaces by standardized tests is included, as well as environmental issues related to wood finishing (solvents emissions, possible risks of safety and pollution). Novel technologies, such as UV coating and powder coating are compared to classical technologies in terms of efficiency, quality of surfaces and ecological impact.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Package of optional disciplines: 3D Modelling /Interior Design Modelling	DS	4	1	-	2	-

**3D Modeling. Course description (Syllabus):** The discipline "3D modeling" allows obtaining some skills necessary in the design of furniture wooden products. The students learn how to use AutoCAD 2D for achieving technical documentations (views, sections, details, etc.), creation of realistic 3D models and interior design. This discipline requires knowledge of using computers and general technical drawings and specific technical drawings for wood.

**Interior Design Modelling. Course description (Syllabus):** Modelling steps in SolidWorks, Creating and editing parameterized sketches - Examples, Constraints applied to sketches - Examples, Creating and editing elements - Examples, Creating added elements - Examples Creating open profiles - Examples, CAD modeling using Sweet Home 3D program.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Package of optional disciplines: Ornamental Drawing / Color and Texture in the Design of Wood Products	DS	3	1	-	2	-

### **Ornamental Drawing**

**Course description (Syllabus):** The learning outcome of this discipline consists of the abilities to use the means and methods for expressing 2D and 3D space, as well as their formal and objectual content, through the developing of knowledge and practical abilities of representing furniture. The learning process comprises the knowledge of the visual language of arts and design, the ability to represent real elements in two-dimensional space by using specific regulations and standards for furniture and other wood finite products design, the ability to transpose forms in three-dimensional space by using graphic constructions of specific design programs.

### **Color and Texture in the Design of Wood Products**

**Course description (Syllabus):** Color theories. Chromatic schemes. Contrasts and harmonies. The expressive character of color. Color and light. Color and texture in architectural spaces. Color compositions, rules and principles.



### 3<sup>rd</sup> Year, 6<sup>th</sup> Semester

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Technology of Engineered Wood Products	DS	3	2	-	1	-

**Course description (Syllabus):** The discipline presents the manufacturing technologies and products for the timber industry and decorative veneers. Main products of the timber industry, i.e. boards, beams, planks, staves for barrels and friezes for parquet are detailed. Timber technology is divided into three parts, namely storage of logs, production hall and storage timber, each of them with their specific operations. The technology of decorative veneers synthesizes the main operations, namely the storage, preservation and preparation of logs, cutting by slicing or eccentric rotary peeling, as well as operations in preparation for expedition. In practical works, some cutting models used on the vertical frame saw, for species as beech, oak and softwoods are analyzed.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Wood-Processing Machine-Tools and Units 2	DF	4	2	-	2	-

**Course description (Syllabus):** The structure and content of this discipline aim at the achievement of basic knowledge related to the machine-units used in the woodworking industry (working principle, construction, set-up, characteristics and application): frame-saws, bandsaws, circular saws, thicknessing and planing machines, milling machines, drilling machines, lathes, sanding machines.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Furniture Styles and Ornaments 1	DS	4	2	-	2	-

**Course description (Syllabus):** Students are expected to learn basic skills of stylistic, esthetic and ornamental analysis of historic furniture; they acquire theoretical and practical knowledge regarding the history of furniture, from ancient times to mid-20th century design.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Numerical Control Technique in Wood Industry	DF	4	2	-	2	-

**Course description (Syllabus):** The structure and content of this discipline aim at the achievement of knowledge related to the numerical control of wood processing machines; Structure and classification of numerical control systems; Kinematic characteristics of machine-tools and centre with numerical control; Knowledge related to the computer programming of machines.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Furniture Design 2	DS	2	2	-	-	-

**Course description (Syllabus):** Students develop abilities and skills for designing furniture meeting the demands of manufacturers as well as design studios regarding function, dimensioning, composition, proportion, color, structure, materials and technical details.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Furniture Design 2 - Project	DS	2	-	-	-	2

**Course description (Syllabus):** The project development is meant to enhance the students' skills regarding furniture design, from concept to the finite product, and is supported by technical drawings, posters and scale models of at least

two related pieces of furniture. The project has to be orally presented and the final products are exhibited at the end of the year.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Furniture Technology 1	DF	4	2	2	-	-

**Course description (Syllabus):** General furniture quality characteristics. Furniture classification. Structure of furniture products made of solid wood, molded veneer, wood-based panels. Laws of composition applied in furniture. Typification in furniture design. Ergonomics in furniture. Storage furniture design (structure and dimensions). Sitting and resting furniture design (structure and dimensions). Working precision and its applications in furniture. Calculation of oversize dimensions for furniture parts made of solid wood and wood-based panels.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Internship 2	DS	4	-	3 weeks x 30h/week = 90 h		

**Course description (Syllabus):** Work safety. Practical experience in a furniture/veneer/composites manufacturing enterprise: product description, technological flow, machines, packaging, quality system.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Package of optional disciplines: Technological Devices in Wood Industry / Techniques and Methods for Quality Assessment in Wood Industry	DS	3	2	-	1	-

**Technological Devices in Wood Industry. Course description (Syllabus):** Structure and classification of technological devices; Basic principles in the design and exploitation of technological devices; Positioning regulations of the parts in the device. Bearings for positioning: plane, cylindrical, conical and spherical surfaces; Positioning precision of the parts in the device. How to determine the positioning errors; Fixing the parts in the device; Stretcher mechanisms. The calculation of the stretcher mechanism; Drive systems. Construction of devices for the wood cutting with saw blade and circular saw, for the wood milling, wood sanding, wood veneer cutting, wood turning and wood finishing. Throughout the course methods for dimensioning and optimization of devices are presented.

**Techniques and Methods for Quality Assessment in Wood Industry. Course description (Syllabus):** Theoretical basics of quality; concepts; the functions and indicators of quality; determination of products quality; indicators of maintenance and availability; quality management; methods; ISO 9000/2000 standards; internal quality control; external quality control; relations with contractors; guide manual regarding the quality management in wood industry; techniques for evaluation of product quality in specialized testing laboratories; product certification.

#### 4<sup>th</sup> Year, 7<sup>th</sup> Semester

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Technology and Design of Wood Products 1	DF	4	2	-	-	2

**Course description (Syllabus):** The main objectives of the discipline are to complete the knowledge of the students regarding the design and manufacture of other wooden products except the furniture and to present the technical and technological particularities of these types of products (as doors and windows) in order to develop skills of product design in this field. The students are able at the end of this course to use structures and constructive solutions found on the production lines in the industrial organized systems. The course presents two main chapters, first Windows and the second one, Doors, which include design issues, technology and testing of products.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Furniture Styles and Ornaments 2	DS	3	2	-	1	-

**Course description (Syllabus):** Students develop abilities and skills to understand and recognize the ornamental, structural, technical and functional characteristics of historic furniture, especially European styles from Romanesque to Art Déco (11th-20th century), becoming also able to design historic furniture.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Furniture Technology 2	DF	4	2	-	1	-

**Course description (Syllabus):** The discipline offers the know-how of the furniture technology and gives the necessary knowledge needed in engineering design. Thus, after completing the course, the students will be able to elaborate the technological process and to complete the technical documentation of the furniture product, showing the process of transforming the raw materials into the final product. The course contains the following issues: Types of technological processes in the furniture industry; Warehouses. Structure and calculus; Cutting process; Solid wood processing. Straightening and planning; Size and shape processing of solid wood components; Joints processing; Technology of veneered components; Sanding technology; Finishing technology; Complex parts processing.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Furniture Technology 2 - Project	DF	3	-	-	-	2

**Course description (Syllabus):** The discipline is an application on the furniture design and technology. The discipline is structured on two parts: **Part I.** Technical Project, including the assembly drawing, the technical description of the product, the list of component parts, packaging and the packaging bill of materials; **Part II.** Technological project, including the calculus of the raw materials, the calculus of the technological surfaces, bill of materials and technological sheets of the component parts.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Art Furniture Technology 1	DS	4	2	-	2	-

**Course description (Syllabus):** The course presents the classical and industrial methods and machines, tools and devices used to process the decorations of the art furniture, focusing on the carved furniture. The main chapters of the discipline are as follows: Copying system used for processing spatial decorations; Processing of plane and complex carved decorations; Processing of ronde-bosse decorations; Processing of flat ornaments (incrustations); Unconventional processing technologies of ornaments.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Furniture Restoration	DS	5	2	-	2	-

**Course description (Syllabus):** The course covers the main theoretical, ethical and practical aspects of furniture/wood restoration and conservation in accordance to the internationally recognized principles of good practice. The practical activity leads to formation of practical skills for approaching real restoration projects of low to medium complexity on different wooden objects. The main chapters of the discipline are as follows: Introduction - course structure and importance; The concept of conservation-restoration versus reconditioning: principles and ethics; Degradation of wood and furniture; Investigation methods; Elaboration of the restoration concept; Bio protection and consolidation of frail wood; Restoration of solid wood; Restoration of veneered surfaces; Restoration of finishes: transparent surfaces, gilded surfaces, painted surfaces; Preventive conservation of restored objects.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Package of optional disciplines: Artificial Intelligence and Digital Modelling in Wood Engineering / Virtual and Augmented Reality in Wood Engineering	DS	4	1	-	2	-

#### **Artificial Intelligence and Digital Modelling in Wood Engineering**

**Course description (Syllabus):** The course presents the application of artificial intelligence (AI) and digital modeling (DM) in wood industry. The first topic that will be covered during the course are fundamentals of artificial intelligence (AI concepts: machine learning, deep learning, computer vision, types of data, overview of main algorithms.) Moreover, some applications in wood industry of AI will be presented: log scanning and grading, machining optimization, drying optimization, production automation and quality control. In the second part of class the students will learn about the digital tools that could be used in wood industry like 3D scanning, photogrammetry, 3D printing, finite element modelling (FEM) and 3D animation.

#### **Virtual and Augmented Reality in Wood Engineering**

**Course description (Syllabus):** The discipline presents how Virtual Reality (VR) and Augmented Reality (AR) technologies can be applied in the field of Wood Engineering. In the first part of the course will be explained the main concepts like VR, AR and mixed reality (MR) and the equipments that are required. In the second part of course, the students will learn how to integrate VR/AR/MR in the wood industry field (furniture design, simulation of manufacturing, training of workers, furniture assembly).

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Package of optional disciplines: Parametric Design in Wood Industry/ CAD-CAM-BIM Modelling in Wood Engineering	DS	3	1	-	2	-

#### **Parametric Design in Wood Industry**

**Course description (Syllabus):** Modeling with Mechanical Desktop. Examples. Creating and editing the parametric sketches. Constrains applied to sketches. Examples. Creating and editing the features. Examples. Creating and editing the added features. Examples. Creating the open profiles. Examples. Creating the variables design. Creating the assembly and subassembly. Examples. Creating the 2D drawings from 3D drawings. Examples.

#### **CAD-CAM-BIM Modelling in Wood Engineering**

**Course description (Syllabus):** Modeling steps in IMOS – Examples, Designing parametric parts – Part I – Examples, Designing parametric parts – Part II – Examples, Defining connections to create assemblies for furniture parts, Creating assemblies and subassemblies. Rendering solids. Creating 2D drawings from 3D, CAM modeling through data transfer for product processing.

### **4<sup>th</sup> Year, 8<sup>th</sup> Semester**

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Technology and Design of Wood Products 2	DF	4	2	-	-	2

**Course description (Syllabus):** Wood floors. Classification of floors. Industrial wood floors. Classic parquet flooring type. Technology for parquet execution. Classification of packaging. Principles of design and packaging operation. Technical and technological directions. Calculus of sizing the chest package elements. Technology. Classification of packaging containers. Calculus of the geometry and elements of the barrel. Technology. Classification of sound box musical

instruments and structural elements and constructive solution of stringed and plucked string instruments. Technology of manufacturing the sound box musical instruments.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Automatisation in Wood Industry	DF	2	1	-	1	-

**Course description (Syllabus):** Introduction. Temperature sensors. Humidity sensors. Wood moisture content sensors. Level and consistency sensors. Dimensional and positioning sensors. Automatisation systems.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Technological Transport in Wood Industry	DF	2	1	-	1	-

**Course description (Syllabus)** *The first part* (wood dust control) deals with: Hazards of wood dust (allergies, fire hazard and mess); strategies for controlling wood dust (masks and respirators, air filtration devices, portable shop vacuums and central dust collectors); designing and installing a central dust collection system. *The other part* (application, selection and integration of conveyers and robot manipulators) deals with: Major conveyor types (chain, belt, roller and overhead chain conveyers) and robot manipulators used in wood industry; equipment selection and calculation guide; integration and control systems; panning a technological transport system.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Art Furniture Technology 2	DS	3	2	-	1	-

**Course description (Syllabus):** The course presents the classical and industrial methods and machines, tools and devices used to process the decorations of the art furniture, focusing on the carved furniture. The main chapters of the discipline are as follows: Copying system used for processing spatial decorations; Processing of plane and complex carved decorations; Processing of ronde-bosse decorations; Processing of flat ornaments (incrustations); Unconventional processing technologies of ornaments.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Elaboration of Diploma Project	DS	4	-	4	-	-

**Course description (Syllabus):** Introduction into the approached subject. Work objectives. Present state of knowledge related to the subject – a synthesis from reference literature. Original input: product design / technology modification / experimental research. Conclusions and recommendations.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Internship 3	DS	4	-	2 weeks x 30h/week = 60 h		

**Course description (Syllabus):** Practical experience in a furniture/veneer/composites manufacturing enterprise: documentation for diploma project.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Package of optional disciplines: Management in Wood Industry/ Circular Economy and Sustainability in Wood Engineering	DS	3	2	1	-	-

**Management in Wood Industry. Course description (Syllabus):** Management systems-general considerations; the management system of change; the basic steps of a change; the subject of management; the science of management;

the management processes; the management relations; the influence of organizational variables on the management relations; the management functions; the prediction; the organization; the coordination; the function of control and evaluation; the inter-relations and the dynamics of management functions; the main principles of management; the management components; the managerial cycle; the specific methods and techniques of management; the diagnosis method; the control panel; the business plan.

#### **Circular Economy and Sustainability in Wood Engineering**

**Course description (Syllabus):** Circular Economy introduction, Legislative instruments related to the circular economy, Circular Business models, Circular design, New and sustainable materials, Key enabling technologies for circular economy, - Circular Economy Transition Strategies.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Package of optional disciplines: Technology of Upholstered Furniture/ Technology of Wooden Musical Instruments	DS	4	2	-	2	-

**Technology of Upholstered Furniture. Course description (Syllabus):** Brief history regarding the evolution of the upholstered furniture. Terminology, classification and materials used in upholstery. The technology of strength structures. The legged frame technology. The technology of filling materials. The technology of covering materials. Upholstering technology of stools and chairs. Upholstering technology of armchairs and coaches. The manufacturing technology for detachable mattresses. Assembly sequence of the upholstered furniture.

**Technology of Wooden Musical Instruments. Course description (Syllabus):** Physical, mechanical and acoustic properties of wood for musical instruments. Description of main parts of different types of wooden musical instruments (plucked strings, with bow, wind, percussion). Description of the principle of musical instruments sounds. Manufacturing technology of wooden musical instruments (study cases). Types of finishes used on wooden musical instruments. Ornaments and accessories for wooden musical instruments. Quality control of musical instruments.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Package of optional disciplines: Indoor Architecture /Ambient Architecture	DS	4	2	-	-	2

**Indoor Architecture. Course description (Syllabus):** Architectural space: general and specific concepts. Expressive organization of the interior of a dwelling and other human habitats. Integration of furniture in various architectural spaces. Ordering and structuring roles of furniture. Interior concepts and their functional, aesthetic and expressive characteristics. Structuring interior space through functional furniture groupings. Trends and tendencies in interior design.

**Ambient Architecture Course description (Syllabus):** Architectural space: general and specific concepts. Expressive organization of ambient and human habitat. Integration of furniture in various ambient spaces. Ordering and structuring roles of furniture. Ambient concepts and their functional, aesthetic and expressive characteristics. Functional groupings of furniture. Trends and tendencies in ambient design.