Transilvania University of Braşov, Romania
Study program: Wood Processing Engineering

Faculty: Furniture Design and Wood Engineering
Study period: 4 years (bachelor)

1st Year, 1st 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.

1st Year, 2nd 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. Mollecular physics. Thermodynamics. Electromagnetism and electromagnetic waves. Ondullatory 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.

2nd Year , 3rd 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.

2nd Year, 4th 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	-	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.

3rd Year, 5th Semester

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

Course description (Syllabus): Basic design of a timber drying kiln. Kiln dimensioning. Calculusof heating surface. Aerodynamic calculus and dimensioning of the fans. Economic calculus. Critical anaysis of a kiln offer.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Wood Cutting and Cutting Tools 1	DF	3	1	-	1	-

Course description (Syllabus): The basis of wood cutting methods. 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. The interaction between tool and wood. The assembly of interaction forces, the quality of cutting. Dynamic parameters of 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. Wood cutting methods (sawing, milling, drilling, turning, peeling, slicing, sanding).

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Machine Tools and Units in Wood Industry 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 creation 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
3D Modeling	DS	4	1	-	2	-

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

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

Course description (Syllabus): This course provides information on softwood and hardwood timber technology, including: General considerations on sawmill industry: Sawmills evolution and structure. Technology in the log yard: Sawmill raw material, species, assortments, supply and preparation of the raw material, logs manipulation. Technology in the processing hall: Sawing of logs, methods of sawing and equipment and timber processing. Technology in the timber yard: Timber grading, stacking and storage. Management and organization issues.

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

Course description (Syllabus): Strength calculus of structural wood elements. Combined loads. Stresses in plane curved bars. Calculus of displacements in straight beams. Energetic methods for calculus of displacements in bars and bar systems. Stability and buckling of wooden bars. Dynamic loads. Variable loads. Fatigue behavior of wood. Calculus of tubes with thin walls. Calculus of tubes with thick walls. Experimental methods for the stress and strain study of deformable mechanical structures.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Package of optional disciplines: Wood Bending and Molding / Furniture Accessories	DS	3	2	-	-	1

Wood Bending and Molding. Course description (Syllabus): Elasticity, plasticity and deformability of wood. The theory of wood bending. Wood bending technology. Unconventional bending technologies. Unconventional technologies for bending wood-based panels. Finishing curved wooden surfaces. Bent wood usage and cost price calculation. The theory of wood molding. Molding of veneer elements. Molding elements from chips. Molding wood fiber elements. Ennobling the surfaces of molded elements made of chips. Finishing molded wood surfaces. Molded wood usage and cost price calculation.

Furniture Accessories. Course description (Syllabus): Metals - Identification of metal accessories. Representation in drawing. Leather -Identification of leather types. Applications. Textiles - Identification of textile materials used for upholstery. Glass and precious materials - Identification of materials used in decorative techniques.

3rd Year, 6th Semester

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Thermal Treatments of Wood 2	DF	3	2	-	1	-

Course description (Syllabus): Timber steaming. Heat treatments performed in bentwood furniture. Heat treatments performed in veneer industry. Heat treatments performed in the manufacturing of wood-based composite materials. Thermo-treatment technologies for lumber.

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

Course description (Syllabus): Tool materials. Construction, geometry and peculiarities of different wood tools: frame saw blades, circular saw blades, milling cutters, router bits, cutter heads, drills, knives. Methods to increase tool durability.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Machine Tools and Units in Wood Industry 2	DF	5	3	-	2	-

Course description (Syllabus): Working principle, construction, functioning, characteristics and application of the main types of woodworking machines: Frame saws, Band saws, Circular saws, Straightening and thicknessing machines, Milling machines, Drilling machines, Lathes, Sanding machines.

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

Course description (Syllabus): The main aim of this discipline is to develop the students' competencies regarding the construction, adjustment and design of wood-processing machine-tools through practical activities and design exercises.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Furniture Design, Manufacture and Viability 1	DS	4	2	2	-	-

Course description (Syllabus): General quality features related to furniture. Furniture structure, shape and functions. Typization. Ergonomic principles. Storing furniture. Sitting furniture. Processing precision. Calculus of processing allowance.

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
Package of optional disciplines: Technological Devices in Wood Industry / Work Protection and Protection against Fire	DS	4	2	-	2	-

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.

Work Protection and Protection against Fire. Course description (Syllabus): Rules and regulations in work safety and health. Work accidents and occupational diseases . Work tasks. Noxes. Work environment. Lightning and colours. Noise and vibrations. Electromagnetic fields. First aid in case of accidents. Fire prevention.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Internship 2	DS	4	-	90 h		

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

4th Year, 7 th Semester

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Finished Wooden Products 1	DS	5	2	-	-	2

Course description (Syllabus): The main objectives of the discipline are focused on giving the knowledge to the students on designing and manufacturing of various wooden products, other than furniture and to present the technical and technological particularities of these types of products (as doors and windows are) in order to develop skills of designing and engineering. At the end of this course, the students have knowledge on structures and constructive solutions of doors and windows produced on the industrial production lines The course presents two main chapters, first *Windows* and the second one, *Doors*, and they include design, technology and testing of products issues.

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

Course description (Syllabus): Types of technological processes in the furniture industry .Wharehouses - 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 Design, Manufacture and Viability 2 - Project	DS	2	-	-	-	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
Parametric Design in Wood Industry	DS	4	1	-	2	-

Course description (Syllabus): Modelling 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.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Wooden Composite Materials 1	DS	4	2	-	1	-

Course description (Syllabus): Veneers. Plywood. Laminated wood. Other engineered wood products.

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 systems. *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
Non – Conventional Technologies	DS	4	2	-	2	-

Course description (Syllabus): Technologies for wood and wood based panels conversion into energy (direct combustion, thermo chemical, biochemical and biological conversion). Technologies of recycling wood and wood based panels waste, to new. Less conventional technologies for wood bending (Compwood, Bendywood). Wood modification by thermal treatment (Thermowood). Recent advances in finishing (powder coating, inkjet printing) and gluing (green

gluing, wood welding). Unconventional approaches in wood mechanical processing (microwave, laser, water jet, punching, ultrasonic, thermo smoothing).

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Finishing Technologies in Wood Industry	DS	3	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.

4th Year, 8th Semester

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Finished Wooden Products 2	DS	4	2	-	-	2

Course description (Syllabus): The discipline introduces knowledge on the wooden products design and technology, other than furniture components. It also presents particular characteristics of technical and technological issues in case of these products (floors and packages, musical instruments). The course contains the following chapters: Wood floors. Classification 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
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: Wooden Composite Materials 2 / Wooden Biomass and Regenerable Energy	DS	4	2	-	2	-

Wooden Composite Materials 2. Course description (Syllabus): The discipline presents the basic operations from wood particle and fiber board manufacturing, including: raw material preparation, particle generation, wood chips defibration, drying, grading, gluing, mat formation and pressing. The course presents also other boards used in furniture manufacturing like: light panels, sandwich panels, reconstituted panels etc.

Wooden Biomass and Regenerable Energy.Course description (Syllabus): Wooden Biomass – classification. Calorific power. Valorisation technologies. Renewable energy sources.

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 detacheable 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: Quality of Wooden Products and Quality Management / Programming, Launching and Supervising Manufacturing in Wood Industry	DS	3	2	1	-	-

Quality of Wooden Products and Quality Management

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; consumers; basic elements of quality system; the guide manual of quality; procedures; responsibilities; relations; management analysis; total quality and its management; costs; management of standardization; products on UE and AELS markets; technical documentation.

Programming, Launching and Supervising Manufacturing in Wood Industry

Course description (Syllabus): General consideration concerning the programming and launching of manufacturing; the role of the planning department; the functions of the planning department; programs with items of operation line, manufacturing time, number of personnel, working instructions, proposals of improvement, carrying capacity of machines, consumption of raw materials and materials, planning of production, control of stocks, definition of a production line, algorithm of production, technical preparation of production, analysis of contract, design and technical

planning of production, launching of products manufacturing, economic documents, production control, machines control, operative methods.

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

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.

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.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Internship 3	DS	4	-	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
Elaboration of the Diploma Project	DS	4	-	4	-	-

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