

**KARABÜK ÜNİVERSİTESİ**  
**LİSANSÜSTÜ EĞİTİM ENSTİTÜSÜ**

<b>DEPARTMENT OF FOREST INDUSTRY ENGINEERING</b>					
<b>Content of Master's Degree in Forest Industry Engineering with Thesis</b>					
<b>COURSE CODE</b>	<b>COURSE NAME AND CONTENTS</b>	<b>T</b>	<b>A</b>	<b>C</b>	<b>ECTS</b>
<b>OEM701</b>	<b>Introduction to Science of Wood Material</b>	<b>3</b>	<b>0</b>	<b>3</b>	<b>8</b>
<b>Purpose and Content</b>	Advertising macroscopic and microscobic structure characteristics of wood material. Advertising physical and mechanical characteristics of wood material. Relation of wood-water. General information about the wood and forming activities of cambium, wooden herbal cell and wood grains, microscobic structure of wood, cell types and features, chemical structure of wood, deficits of wood, physical features of wood and realation between wood and water, factors that affect density in wood material, thermal and sound conductivity of wood material.				
<b>OEM711</b>	<b>Wood Material Physics Laboratory Techniques</b>	<b>3</b>	<b>0</b>	<b>3</b>	<b>8</b>
<b>Purpose and Content</b>	The main aim of this course is to assist the student in understanding the physical nature of wood and important physical wood properties. The course is designed primarily for students, who intend to pursue careers in wood science or forest products. The course also provides an appropriate introduction to wood products for students of materials science and construction materials. Wooden cells and structure of cell wall; Weight-volume relationships in wood; Determination of density, Relationships of wood and water; Determination of moisture content, Sorption (Adsorption and Desorption), Sorption and equilibrium moisture content; Fiber saturation point; Thermodynamics of sorption; Shrinkage and swelling in wood; dimensional stability of wood, Capillary movement and diffusion in wood, Movement of water under Fiber Saturation Point; Drying time in wood material as a diffusion problem; Thermal conductivity of wood and determination, Acoustics and Electrical Properties of wood.				
<b>OEM710</b>	<b>Wood Mechanics and Test Techniques</b>	<b>3</b>	<b>0</b>	<b>3</b>	<b>8</b>
<b>Purpose and Content</b>	Introduce of wood mechanical quality control tests conducting destructively, to teach factors affecting these properties, determine appropriateness to the standards, display to the relationships between mechanical properties of standard and full-size wood samples, to teach relationship between mechanical properties and nondestructive values, to give information about allowable unit stress, to provide comment in terms of wood material production and uses area by using these knowledge. Mechanical tests in the product and material, full-size mechanical tests destructive and non-destructive tests, Chemistry of wood strength, elastic properties of wood, plasticity and creep, rheological models, creep, stress and changes of dimension-shape, tension, compression, static and dynamic bending, torsion, shear, cleavage strength, hardness, abrasion and other technological properties, affecting factors to mechanical properties, allowable unit stress.				

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<b>OEM707</b>	<b>Dimensional Stabilization of Wood and Wood Composites</b>	<b>3</b>	<b>0</b>	<b>3</b>	<b>8</b>
<b>Purpose and Content</b>	Advertising dimensional Stability of Wood Material. Dimensional stabilization in wood. Principles of wood plasticization. Chemical modification of wood.				
<b>OEM719</b>	<b>Wood Building Systems</b>	<b>3</b>	<b>0</b>	<b>3</b>	<b>8</b>
<b>Purpose and Content</b>	To introduce wood-based systems and discuss design possibilities. Wood-based systems and their historical evolution. General principle and material using in wood-based systems. Classification of wood-based systems: skeleton, panel, cell and the others. With wood-based systems design and detailed possibilities (modular coordination, connections, etc.).Applications from the world and Turkey.				
<b>OEM720</b>	<b>Computer Aided Modeling</b>	<b>3</b>	<b>0</b>	<b>3</b>	<b>8</b>
<b>Purpose and Content</b>	Forming of solid models with line, curve, circle, rectangular, surface etc. primitives used in computer aided design. Generation of free form surfaces. Modeling of engineering and industrial products. Right start in making part models. Assembly and technical drawing generation. 3D solid modeling methods with a current 3D design software. User interface, tool bars, file save and copy, file delete, opening off multiple file and Windows. View control, perspective mode, mouse action for object movement. Solid feature modeling: Primitive features. Secondary features. Feature modify, feature processes. Surface modeling, interactive surface modeling. Assembly, Assembly-Part processes. Drawing, dimensioning, surface roughness signs, size and geometric tolerances, drawing file generation. Industrial applications.				
<b>OEM716</b>	<b>Computer-Aided Data Analysis</b>	<b>3</b>	<b>0</b>	<b>3</b>	<b>8</b>
<b>Purpose and Content</b>	The aim of this course is to provide knowledge of basic concepts of statistics and the ability to analyse quantitative survey data using special statistical software. During the course, students will: learn how to record survey data, clean the data and transform the data. They will master procedures of descriptive analysis: univariate analysis; comparison of means; t-test. They will master procedures of analysis of variance; hypothesis testing; regression analysis. At the end of the course students will not only be able to understand data analysis, they will be able to do it by themselves. They will be able to report results of the statistical analysis.				

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<b>LUEE701</b>	<b>Scientific Research Techniques and Science Ethics</b>	<b>3</b>	<b>0</b>	<b>3</b>	<b>8</b>
<b>Purpose and Content</b>	The purpose of this course is to be able to work with scientific research methods, finding research questions, generating hypothesis, collecting data, analyzing and writing reports with in scientific ethic rule, investigating and publishing the code of ethics, investigating and publishing unethical works and examining the methods of preventing them and determining infringements. Work methods, Obtaining data, Documentation, Analyzing and examining, Determining the strategy, Critical evaluation within an ethical framework, and reaching a conclusion.				
<b>OEM733</b>	<b>Statistics in Scientific Researches</b>	<b>3</b>	<b>0</b>	<b>3</b>	<b>8</b>
<b>Purpose and Content</b>	In addition to statistical theories and methods based on mathematical foundations, it aims to train statisticians who can conduct research and development in areas such as Operations Research, Risk Analysis, Actuarial Sciences, Quality Management, Computer Science and Statistical Information Systems. The concept of statistics and its functions, the place of statistics in the research process, types of variables, types of scales, selection of appropriate statistics for data analysis, creating a data file in a statistics program.				
<b>FBE701</b>	<b>Entrepreneurship</b>	<b>3</b>	<b>0</b>	<b>3</b>	<b>8</b>
<b>Purpose and Content</b>	The concept of entrepreneurship, importance and historical development, The entrepreneur personality characteristics, Entrepreneurial culture, and benefits, Entrepreneurial processes, Entrepreneurship in Turkey, Basic business functions in enterprise, Foundation stages, Business idea, Business plan, Project preparation, Sections of the business plan, Business plan writing and presentation, Sample business plan. who graduate from college, and the courage to give the method needed to establish their own businesses. Instead of individual runs is necessary to provide an enterprise to teach the methods. Individuals building of the business idea is simple and easy to comprehend.				
<b>OEM715</b>	<b>Advanced Stratified Wood Materials Technology</b>	<b>3</b>	<b>0</b>	<b>3</b>	<b>8</b>
<b>Purpose and Content</b>	Teaching of a variety of wood veneer and laminated wood materials such as plywood, LVL, sandwich panels and glulam, production techniques and technological properties of these materials the finding. Wood veneer and laminated wood materials, the definition, classification and usage, tree species and their properties used in the production of plywood, Requirements for roundwood used in the production of the plywood, the preparation for roundwood used in the production of veneer and veneer logs is stored, Wood veneer sheet production methods, Drying of veneers, Plywood production technology, Properties of adhesives, application of the adhesive on the veneers, the mat forming of the plywood, production of plywood.				

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<b>OEM734</b>	<b>Computer Aided Finite Element Analysis of Composite Materials</b>	<b>3</b>	<b>0</b>	<b>3</b>	<b>8</b>
<b>Purpose and Content</b>	To gain the ability to create theoretical models of engineering problems of wood composite materials using finite element method. Composite materials, Classification of composite materials, Wooden composite materials, Finite Element Method (FEM). Advantages and disadvantages of the Finite Elements Method. Analysis types. Modeling stages. Element types. . Introduction of material properties. Modeling the part. Mesh application. Determination of boundary conditions, application of loads. Linear and nonlinear analysis. Evaluation of the results				
<b>OEM721</b>	<b>Mathematical Modeling</b>	<b>3</b>	<b>0</b>	<b>3</b>	<b>8</b>
<b>Purpose and Content</b>	Solve the problem of machine elements and engineering using the finite element method. Finite element method (fem), advantage and disadvantage of fem. Modeling, phase, element types, real constants, material properties. Modeling, meshing. Apply boundary conditions and forces, pressure. Linear and nonlinear solving. General postprocessors. Static analysis, crack and fatigue analysis.				
<b>OEM704</b>	<b>Furniture Construction Applications</b>	<b>3</b>	<b>0</b>	<b>3</b>	<b>8</b>
<b>Purpose and Content</b>	Advertising and designing construction of wood furniture. Kinds of furniture and basic constructions, combination of width and length, combination of treadle, combination of demonte furniture, on frame and case furniture. massive furniture, frame and corner combinations, massive furniture case construction corner and T combinations, combination of table width cordon, profile long strip of wood, to get thickened exercise, preparation technics of sample.				
<b>OEM726</b>	<b>Furniture Design and Ergonomics</b>	<b>3</b>	<b>0</b>	<b>3</b>	<b>8</b>
<b>Purpose and Content</b>	The aim of this course is to increase knowledge and abilities in ergonomic subjects for furniture and workplace design. Ergonomics approach and basic coverage. Design of man-environs interface. Anthropometrics. Work station. Posture, sitting surface. Standing and half standing working. Indoor climate. Noise and vibration. Illuminate and visual comfort. Psychological ergonomics. Coloring. Information and safety ergonomics. Ergonomics on furniture design. Ergonomics on indoor design.				

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<b>OEM712</b>	<b>Laboratory Techniques in Wood Anatomy</b>	<b>3</b>	<b>0</b>	<b>3</b>	<b>8</b>
<b>Purpose and Content</b>	The goals of this course are to give an advanced information about, (i)Laboratory techniques used in the study of the microscopic structure of wood, (ii) Microscopic techniques used in the wood identification, (iii) Photography techniques used in wood anatomy. Anatomical features using identification of softwoods and hardwoods. , Parts of microtome and working techniques, sectioning with sliding microtome, pre-treatment applied to the preparation of microscopic slides (softening, fixation, dehydration, sectioning and staining methods), maceration methods, permanent preparations of macerated wood fibres, Microscope types, their working techniques and uses areas, working principles of light microscope, measurement techniques of the cell dimensions with a light microscope photography techniques used in wood anatomy.				
<b>OEM727</b>	<b>Carbon Transfer Via Trade Of Wood Derived Products</b>	<b>3</b>	<b>0</b>	<b>3</b>	<b>8</b>
<b>Purpose and Content</b>	Learning the resulting carbon flux with the trade of wood-derived products. Climate change and carbon dioxide relationship; wood material carbon sequestration; carbon markets and carbon trading; carbon transport through the wood trade.				
<b>OEM722</b>	<b>Instrumental Analysis Techniques in Wood Chemistry</b>	<b>3</b>	<b>0</b>	<b>3</b>	<b>8</b>
<b>Purpose and Content</b>	To introduce the sophisticated analysis often used in industrial engineering of forestry and to teach how and where to use this equipments. FT-IR analysis of unmodified and modified forest products. Thermal behaviour of unmodified and modified forest products by using DSC. Determination of curing time and curing temperature of commercial and new adhesives by using DSC. Determination of thermal resistance of unmodified and modified forest products by TGA. Determination of pyrolysis products by using GC, GC-MS, NMR and FT-IR.				
<b>OEM718</b>	<b>Thermal Conductivity of Wood and Wood Based Products</b>	<b>3</b>	<b>0</b>	<b>3</b>	<b>8</b>
<b>Purpose and Content</b>	Determination of thermal conductivity properties of wood and wood-based products. General definition of thermal properties, classification, thermic expansion, specific heat, thermal conductivity, factors on the thermal conductivity coefficient of wood, thermal rays, comparing the differences of wood according to thermal conductivity.				

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<b>OEM713</b>	<b>Effect of Growth Stresses on Wood Structure</b>	<b>3</b>	<b>0</b>	<b>3</b>	<b>8</b>
<b>Purpose and Content</b>	The goals of this course are to give an advanced information about, (i) Causes of the growth stresses formation in trees, (ii) The nature of growth stresses, (iii) Manifestation of stresses, (iv)The effects of growth stresses on wood structure and their usage, (v) Measurement techniques used for growth stresses, (vi) Methods used for reducing the undesirable effects of growth stresses. Causes of the growth stresses formation in trees, the nature of growth stresses,manifestation of stresses,the effects of growth stresses on wood structure and their usage,measurement techniques used for growth stresses,methods used for reducing the undesirable effects of growth stresses				
<b>OEM728</b>	<b>Wood-boring Insects</b>	<b>3</b>	<b>0</b>	<b>3</b>	<b>8</b>
<b>Purpose and Content</b>	Learning that identification of wood harmful insects, and protection from the effects of them. Identification of wood harmful insects; The damages of insects in wood material; The preservation of wood material against insect damage				
<b>OEM723</b>	<b>Energy and Chemical Feedstock Production Methods from Woody Biomass</b>	<b>3</b>	<b>0</b>	<b>3</b>	<b>8</b>
<b>Purpose and Content</b>	Biomass, one of the fuel alternatives of the future, is at the top of the list of renewable energy resources. Chemical and energ production from wood and its components as a renewable energy source. Thermal degradation of wood companents, thermochemical conversion of wood, liquefaction of wood, pyrolysis, utilization of cellulose and hemicellulose for the chemical and energy production.				
<b>OEM708</b>	<b>Fire Protection of Wood</b>	<b>3</b>	<b>0</b>	<b>3</b>	<b>8</b>
<b>Purpose and Content</b>	To gain knowledge about fire protection of wood. Combustion properties of wood, ignitability of wood, fire retardant chemicals, preparing of fire models by using wood samples, fire resistance tests and interpretations of results, fire resistance of wood preservatives, using of boron chemicals in order to protect against fire, economic aspect of wood protected against fire, changes on the mechanical properties of wood treated with fire retardant chemicals				

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<b>OEM729</b>	<b>Business Economics and Management in Forestry and Forestry Industry</b>	<b>3</b>	<b>0</b>	<b>3</b>	<b>8</b>
<b>Purpose and Content</b>	To teach the basic principles of forestry business economics. General business, Basic concepts, Objectives of business, Classification of businesses, Business functions, Business size, Business size, Capacity concept and types, Rationality criteria in business, Costs and revenues of business, Criteria for evaluating investment projects, Definition and scope of forestry and forest enterprises, characteristics of forest enterprises, business functions in forest enterprises, rationality criteria in forest enterprises, costs and revenues, economic purpose in forest enterprises, management period in forest enterprises, value determination in forest enterprises, determination of economic success in forest enterprises, public goods and externalities, total economic value approach.				
<b>OEM731</b>	<b>Marketing Principles and Management in Forestry and Forestry Industry</b>				
<b>Purpose and Content</b>	In accordance with the contemporary content of the concept of marketing, it is to enable the student to recognize the marketing principles and to have the necessary infrastructure to prepare a marketing management plan. General marketing, marketing in the forestry sector.				
<b>OEM730</b>	<b>Cost Accounting in Forestry and Forestry Industry Enterprises</b>	<b>3</b>	<b>0</b>	<b>3</b>	<b>8</b>
<b>Purpose and Content</b>	The aim of this course is to provide students knowledge about cost calculation, cost control, planning and decision making in manufacturing companies. Cost concept, Purpose of Cost Accounting, Role of Cost Accounting In Business Chart Of Accounts, Types Of Cost: Material Costs, Labor Costs, General Production Expenses, Cost Calculation Methods and Developing Costing System.				
<b>OEM724</b>	<b>Park and Garden Furniture Design</b>	<b>3</b>	<b>0</b>	<b>3</b>	<b>8</b>
<b>Purpose and Content</b>	With this course, students produce outdoor furniture against adverse environmental conditions and able to take measures to increase the strength of the product. Park, garden furniture design, application and solution methods of identifying problems from occurring.				
<b>OEM709</b>	<b>Earthquake Reality and Wooden Structures in Turkey</b>	<b>3</b>	<b>0</b>	<b>3</b>	<b>8</b>
<b>Purpose and Content</b>	Gives general information about the use of earthquake-resistant wood material. Basic concepts related to wood structures.The importance of earthquake-resistant wooden structures and use the general criteria of the regions.Earthquake-resistant wood material properties of wood construction used to obtain.Allowable stresses of wood used in timber construction.				

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<b>OEM797</b>	<b>Graduate Seminar</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>6</b>
<b>Purpose and Content</b>	The seminar course is a practical class designed for graduate students under the supervision of a faculty member. It involves conducting comprehensive research on a certain topic related to their thesis area, compiling this research into a report, and presenting the findings orally.				
<b>OEM798D</b>	<b>Course Specialised Field</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>4</b>
<b>Purpose and Content</b>	Course Specialised Field is a theoretical course proposed by a faculty member to share their knowledge, experience, and expertise in their scientific field with graduate students under their supervision. This course aims to educate students on scientific ethics and instil a strong work discipline.				
<b>OEM798T</b>	<b>Thesis Specialised Field</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>4</b>
<b>Purpose and Content</b>	Thesis Specialised Field is a theoretical course that the faculty member proposes to the graduate students he/she supervises in order to share the methods of conducting research in the current literature, following and evaluating the literature, and to establish and carry out the scientific foundations of the student's thesis / exhibition / project work.				
<b>OEM799</b>	<b>Master's Thesis Study</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>26</b>
<b>Purpose and Content</b>	The Thesis Course is a practical class designed for graduate students under the supervision of a faculty member. It includes guidance on various aspects of their thesis work, such as literature review, methodology, fieldwork, and laboratory research. This course provides the necessary information and direction for the students to prepare their theses following the "Graduate Thesis Writing Guidelines and Templates," as well as guidance on defending and submitting their theses.				

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