

Transilvania University of Braşov, Romania

Study program: Forest Engineering

Faculty: Silviculture and Forest Engineering

Study period: 4 years (bachelor)

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

Course description (Syllabus): Vectors and linear analytical geometry; Calculus; Linear algebra; Applications.

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

Course description (Syllabus): The introduction in the main statistical indicators; Fitting distributions; Correlation analysis; Regression analysis; Analysis of variance (one-way-ANOVA, two-way ANOVA); Sampling designs.

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

Course description (Syllabus): Orthogonal projection; Multiview projection; Axonometric projection; Architectural drawing; Engineering drawing; Cartography; Map projections; Topographic map; Map design.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Forest Informatics	INFF	5	2	-	2	-

Course description (Syllabus): This course has a dual purpose: teaching aspects relating to the spreadsheet software Microsoft Excel and the workflow of Autodesk AutoCAD. The course starts with general notions about the generations of computers and numerical systems, from their beginning up to the present time. The second part has to do with spreadsheet calculations and gives the students an introduction to working with Microsoft Excel. Various features are considered such as: spreadsheet editing, data series, working with commentaries, data linking, spreadsheet formatting, registry formatting and printing, implementing technical and scientific projects. The last part of the course has to do with the AutoCAD software package. It addresses the following: using commands, specifying coordinates, drawing configuration, drawing lines, splines and points, displaying drawings, editing drawings, drawing management using layers, colors, line types and weights, obtaining information from drawings, dimensioning, creating dimension styles, drawing complex objects and printing.

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

Course description (Syllabus): The course targets the following main aspects: The introduction in biochemistry of plants (structure and properties of the biochemical compounds from plants, biochemical processes and reactions, water - medium of plants life, structure and properties); Description of simple and complex carbohydrates from plants (structure, physical, chemical and biochemical properties); Carbohydrate metabolism (anaerobic metabolism-glycolysis, aerobic metabolism-citric acid cycle, fermentations, photosynthesis, light reactions, the Calvin cycle); Description of simple and complex lipids from plants (structure, physical, chemical and biochemical properties); Lipid metabolism (fatty acids synthesis and degradation, phospholipids metabolism); Description of peptides and proteins (amino acid, peptides and protein structure and properties); Protein metabolism (amino acids biosynthesis and

biodegradation, protein turnover, nucleotide degradation); Nucleic acids (DNA structure and properties, RNA structure and properties); Hydro-soluble vitamins and fat-soluble vitamins (structure, characteristics, functions); Enzymes (classification, structure, properties, biocatalytic mechanisms in plants); Correlations between the carbohydrate metabolism, lipid metabolism and protein metabolism.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Soil Science with an Introduction to Geology and Geomorphology	PEGG	5	2		2	

Course description (Syllabus): Terrestrial cover; Chemical, mineralogy and lithology composition; Internal and external processes driving the orography; Genetic factors and the main orography types; Morpho-structural units and the classification of Romanian orography. Soil genesis processes; Physical, mechanical, chemical, hydrologic, aeration and thermal properties of the soils.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Academic Writing	SAC	1	1	-	-	-

Course description (Syllabus): The focus of this course is to understand how to search and present scientific data in forest sciences. Main issues to be discussed: searching for scientific articles in databases, writing a scientific paper, making a PowerPoint presentation and a poster.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Forest Soils and Sites	SSFOR	5	2	-	3	-

Course description (Syllabus): Classification, characterization and systematics of forest soils in Romania; Knowledge on forest sites as integrated systems and as subsystems of forests ecosystems.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Forest Meteorology and Climatology	METEO	4	2	-	2	-

Course description (Syllabus): The atmosphere; Radiation energy; Heating and cooling processes at the subjacent surface level, in the active layer and in the air; Air movements; The atmospheric water; Notions of synoptic meteorology; Climatology's basic issues; Climatic elements and factors; Regional and local climate, the microclimate; Climate genesis; Climate classifications; Climate peculiarities in steep terrain areas; The climate-forest relationships; The possible climate changes and their effects on forests and Romanian silviculture.

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

Course description (Syllabus): Part one - Plant morphology: Chapter I - Vegetal cell; Chapter II - Vegetal tissues; Chapter III - Morphology and anatomy of vegetative plant organs: root, stem, leaf; Chapter IV - Plants reproduction; Part two - Plant systematics (taxonomy): Chapter V - Introduction to taxonomy; Chapter VI - *Procariota*: *Bacteriophyta* and *Cyanophyta*; Chapter VII - *Eucariota*: *Chlorophyta*, *Mycophyta* and *Lichenophyta*; Chapter VIII - *Bryophyta*, *Pteridophyta*, *Gymnospermatophyta* and *Angiospermatophyta*.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Topography-Geodesy I	TOPO1	4	2	-	2	-

Course description (Syllabus): This course introduces fundamental principles for drawing plans and maps. Topics covered in this course include: Instruments and methods for angle measurement; Instruments and methods for

distance measurement; Instruments and methods for leveling; Principles for topographic survey; Tachymetric traverse method; Geometric leveling traverse method; Area calculation; Drawing plans and maps.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Dendrology I	DEN1	5	2	-	2	-

Course description (Syllabus): Trees and shrubs from *Ginkgoaceae*, *Pinaceae*, *Taxodiaceae*, *Cupressaceae*, *Taxaceae*, *Ephedraceae*, *Magnoliaceae*, *Ranunculaceae*, *Berberidaceae*, *Fagaceae*, *Betulaceae*, *Ulmaceae* and *Moraceae* with regard to: taxonomic classification; morphological descriptions; natural area of distribution and growing areas in Romania; species ecology and the biological characteristics.

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

Course description (Syllabus): Introduction to forest genetics - Concepts, scope and importance; Basic genetics - Tree genome, gene expression, gene structure and regulation, cytogenetics; Transmission genetics - Mendelian genetics, transmission and inheritance of chromosomes, extensions to Mendel's laws, sex determination in forest trees, types of characters; Genetic markers - morphological, biochemical and molecular markers; Population genetics - genetic structure, measurement of genetic variation within and among populations, mating system, inbreeding, mutations, gene flow, genetic drift, selection.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
English Language	LES1	2	1	1	-	-

Course description (Syllabus): The present English Language course is aimed at 1st year undergraduate students at the Faculty of Silviculture and Forest Engineering, and its main objectives are the following: to improve students' written and spoken communication skills, to enrich students' knowledge of English grammar, to identify and fix grammatical aspects which can be problematic in real-life situations (e.g. understanding or writing texts, translation). Course content: English tenses: forms and meanings; English aspects: forms and meanings, temporal-aspectual combinations in the affirmative, interrogative, and negative; English spelling rules; Passive voice; Reported speech; Conditional clauses; Revision.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
English Language	LES2	2	1	1	-	-

Course description (Syllabus): The present English Language course is aimed at 1st year undergraduate students at the Faculty of Silviculture and Forest Engineering, and its main objectives are the following: to improve students' written and spoken communication skills, to enrich students' knowledge of English grammar, to identify and fix grammatical aspects which can be problematic in real-life situations (e.g. understanding or writing texts, translation). Course content: The noun; The article; The Genitive; The adjective; The preposition; Relative pronouns; Revision.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Game Management	FAUNA	6	3	-	3	-

Course description (Syllabus): Description of main game species, ecology and ethology, distribution in Romania and management description of the mountain river fish and management techniques for increasing river productivity. Knowledge regarding game and fish farming.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Forest Constructions	CONF	5	2	-	-	2

Course description (Syllabus): Overall composition of buildings; Dimensional design and tolerances; Technical prescriptions and constructions design; Wood; Mineral binders; Natural stone building materials; Concrete with mineral binders; Ceramics; Roofs; Slabs; Walls; Foundations.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Topography-Geodesy II	TOPO2	3	1	-	1	-

Course description (Syllabus): This course introduces fundamental principles from geodesy. Topics covered in this course include: Reference surfaces; Cartographic projections; Stereographic '70 projection; Geodetic networks; Level geodetic networks; Global position systems; Coordinates transformation.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
GIS	GIS	5	1	-	3	-

Course description (Syllabus): Basic concepts of Geographic Information Systems and applications for management of forest resources; Models in internal representation of the digital maps in raster and vector format; Technology used to create digital cartographic databases; Applications in cartographic projects.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Dendrology II	DEN2	5	2	-	2	-

Course description (Syllabus): Trees and shrubs from *Juglandaceae*, *Grossulariaceae*, *Rosaceae*, *Cesalpiniaceae*, *Fabaceae*, *Anacardiaceae*, *Simaroubaceae*, *Aceraceae*, *Hippocastanaceae*, *Staphyleaceae*, *Celastraceae*, *Rhamnaceae*, *Loranthaceae*, *Elaeagnaceae*, *Tamaricaceae*, *Salicaceae*, *Cornaceae*, *Tiliaceae*, *Ericaceae*, *Caprifoliaceae*, *Oleaceae*, *Solanaceae*, *Bignoniaceae* and *Scrophulariaceae* with regard to: taxonomic classification; morphological description; natural area of distribution and growing areas in Romania; species ecology and the biological characteristics.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Forest Entomology	ENTO	4	2	-	2	-

Course description (Syllabus): Insect morphology: Head (Antennae, Mouthparts); Thorax (Legs, Wings); Abdomen; Exoskeleton; Internal structure and function; Digestive, circulatory, respiratory, excretory, nervous and reproductive system; Reproduction types (sexed, parthenogenesis, polyembryony and pedogenesis); Insect development (embryonal, postembryonal and postmetabolic development); Generation and biological cycle of insects; Outbreaks of insects; Population dynamics of forest insects; Insect detection and forecast; Prevention and control of insects; Preventive measures; Mechanical, chemical, biological and integrated control; Damaging insects; Insect biology and control; Defoliating insects (*Lepidoptera*, *Coleoptera*); Terminal, shoot, twig and root insects (*Coleoptera*, *Lepidoptera*, *Ensifera*); Phloem boring insects (*Coleoptera*); Wood boring insects (*Coleoptera*, *Lepidoptera*, *Hymenoptera*); Seed and cone insects (*Coleoptera*, *Lepidoptera*); Gall makers (*Hemiptera*, *Hymenoptera*, *Diptera*).

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Afforestation I: Forest seed. Forest Nursery Production	IMP1	4	2	-	2	-

Course description (Syllabus): Fundamentals of seed production; Harvesting, processing and storage of fruits and seeds; Seed testing; Characteristics of seed germination process; Organization of forest nursery; Soil preparation and

plant nutrition; Production of bare-root and container seedlings from seed; Vegetative production of seedlings; Forest seedling cultivation and maintenance, lifting, storage and handling.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Dendrometry I	DENDR1	4	2	-	2	-

Course description (Syllabus): Theory of stem form; Stem profile models; Taper functions; Theory of bole and sections volume computation; Theory of tree measurement; Diameter measuring instruments; Instruments for measuring tree height; Measurement of standing trees; Breast height diameter; Basal area; Tree height; Tree volume; Bark thickness; Tree crown and foliage; Measurement of felled trees; Stand structure; Diameter and height distributions; Fitting height curves; Tree volume equations with one, two or three predictor variables.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Forest Ecology	ECOL	4	2		2	

Course description (Syllabus): Ecology is a science of relationships between biological systems and their environment. Students will gain theoretical knowledge and a general overview of the forest as an ecosystem. They will understand how forest functions and the way it reacts to human interventions or to natural disturbances. The following main topics are covered by this course: Introduction; Definition and divisions of ecology; Organization of the living world; Types of systems; Levels of organization in the living world; Population in ecology; Population parameters and demographic strategies; Ecological niche and Growing space; Laws of ecology; Biocenosis (i.e. the living community) and its trophic structure; The environment of the biocenosis (i.e. the biotope); Ecological factors with direct and indirect action; The ecosystem / structure, function, dynamics; Production and flux of organic matter within the ecosystem; Intraspecific and interspecific relationships inside the forest ecosystem; Forest ecosystem dynamics; Disturbance - essential element in ecosystem dynamics; Types of disturbances and their effects on forest ecosystems; Structures of the forest ecosystem after disturbance; Models regarding forest dynamics following disturbances; Developmental stages of the forest ecosystem; Succession - essential process in ecosystem dynamics; Successional seres; Successional models; Succession of fauna species; Ecosystem stability; Forest management and ecosystem stability; Biological diversity; Types of biological diversity and evaluation methods; Natural resources management and biodiversity conservation; Ecology and forest management; Silviculture - applied forest ecology and adaptive management of forest ecosystems; Sustainable management of forests.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Forest Products I	PROD1	4	2	-	2	-

Course description (Syllabus): Woody plants - source for raw material for industrial applications; Anatomical constitutive parts of stems and branches; Secondary xylogenesis mechanism; Seasonal activity of the cambium; Wood architecture (morphological and chemical) at submicroscopic, microscopic and macroscopic levels - interspecies variations; Wood identification; Physical properties of the wood, mechanical properties, acoustic properties and wood burning; Wood natural durability and its improvement means; Products from or with wood participation: sawn timber, veneers, composites and coal; Timbers from forest: silver fir, spruce, resonance spruce, pines, larch, yew, Douglas-fir, oaks, black locust, sweet chestnut, ash, elms, wild cherry, walnut, beech, linden, maple, alder, silver birch, poplars, hornbeam.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Silviculture I	SILV1	4	2	-	2	-

Course description (Syllabus): The course targets the knowledge of: the extent, role and multiple functions played by the forest; forest structure (phytocoenosis - tree layer, shrub layer, seedling layer, herbal layer, microphytocoenosis - and zooocoensis); ecosystem processes taking place in the life community of forests (e.g., natural regeneration of

forest; completion of establishment phase; growth and increment of trees and stands; development of trees and stands; natural pruning of forest trees; tree differentiation and natural mortality in the forest; succession of forest vegetation).

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Introduction to Machines	CGM	4	2	-	2	-

Course description (Syllabus): Introduction to study of materials; Main body parts of mechanical engineering; Metallic joining: dismountable and undismountable; The mechanical engineering and the use of internal combustion engines; The dynamics of forestry machines; Engineering and use of transmissions.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Mechanics and Strength of Materials	MRMS	4	2	2	-	-

Course description (Syllabus): Course objectives: Mechanical modeling of real structures; Analysis and design of structures using principles of the strength of materials; Main issues: Statics; Equilibrium of rigid bodies; Traction - compression; Shearing; Torsion; Bending Displacement evaluation.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
English Language	LES3	2	1	1	-	-

Course description (Syllabus): The present English Language course is aimed at 2nd year undergraduate students at the Faculty of Silviculture and Forest Engineering, and its main objectives are the following: to improve students' written and spoken communication skills, to enrich students' specialized vocabulary, to offer students the proper instruments to use specialist terminology in coherent written and oral communication. Course content: Pedology - English terminology; Dendrology / Topography - English terminology; Ecology - English terminology; Botany - English terminology; Fauna / Atmospheric physics – English terminology; Entomology / Astronomy - English terminology; Revision.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
English Language	LES4	2	1	1	-	-

Course description (Syllabus): The present English Language course is aimed at 2nd year undergraduate students at the Faculty of Silviculture and Forest Engineering, and its main objectives are the following: to improve students' written and spoken communication skills, to consolidate students' academic writing skills, to offer students the proper instruments to write coherent academic texts. Course content: Academic writing as a process: planning and organizing a text; Elements of writing: logical connectors, style; Accuracy in writing; Writing models: abstracts; Writing models: CVs; Writing models: cover letters; Revision.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Forest Management Planning I	AMEN 1	4	2	-	2	-

Course description (Syllabus): The course is concerned with the organization, optimization, management and regulation of structural and functional features of the forest in the complex socio-economic environment and forestry ownership. Topics covered in this course include: introduction, principles, means and possibilities of forest territorial organization, basic criteria used in organization and structural-functional management of forest stands, timber production.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Silviculture II	SILV2	5	2	-	1	1

Course description (Syllabus): The course aims at presenting three important issues: Natural regeneration of forests (e.g., regeneration under shelter; regeneration on bare land; regeneration in the forest boundary); Tending operations (i.e. classification of tending operations; description of various tending operations: release cutting, cleaning-respacing, thinning, hygiene cutting, artificial pruning, removal of epicormic branches, tending of forest boundary. The effect and intensity of tending operations); Regeneration methods and silvicultural systems (e.g., terminology, classification of regeneration methods and silvicultural systems; description of main silvicultural systems: clear-felling, strip felling, uniform shelterwood system, group shelterwood system, selection system, irregular shelterwood system, low coppice, pollarding, coppice-with-standards; selection of regeneration method and choice of silvicultural system; special conservation fellings).

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Forest Products II	PROD2	4	1	-	2	-

Course description (Syllabus): Wood grading; Edible and non-edible mushrooms in forest - biology, ecology and uses; Berries - taxa, properties and uses; Forest medicinal and aromatic plants - active ingredients and products; Bee products.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Afforestation II: Afforestation and Ecological Restoration	IMP2	4	2	-	1	1

Course description (Syllabus): Course objective: Knowledge of the aspects regarding installing woody vegetation. Main issues: The choice and association of species in forest cultures; Choice of species; Installing woody vegetation; Installing forest vegetation through planting; Installing woody vegetation by direct sowing; Tending operations in forest cultures; Cutting-back planted seedlings; Forest crops in extreme conditions; Forest shelterbelts.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Timber Harvesting Technology I	TEL 1	4	2	-	2	-

Course description (Syllabus): The course targets the following main aspects: Introduction and description of the timber harvesting process (technology, work, operations, work elements); Timber and stand descriptors and their importance for harvesting (species, density, shape, type of interventions, extracted volumes etc.); Harvesting methods (whole tree, tree length, cut-to-length), systems (mechanized and non-mechanized based systems) and procedures; Tree felling, delimiting and crosscutting procedures using chainsaws; Tree felling, delimiting and crosscutting procedures using multifunctional machines (fellers, feller-bunchers, processors, harvesters) - conditions in which they are applied, setups, applied procedures correlated with stand characteristics).

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Forest Management Planning II	AMEN 2	5	2	-	-	2

Course description (Syllabus): The course is concerned with the organization of sustainable forest holdings, modeling structure and size of forest production, design of management measures in relation to the functions assigned to forest stands and development of forest management plans. Topics covered in this course include: planning methods, methods for structure normalization, harvesting schedule, setting allowable cut, revising the management and new project organization.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Forest Bridges and Culverts	PODF	4	2	-	-	2

Course description (Syllabus): General composition of the bridges and related terminology; Site location for bridges; Hydraulic calculation of bridges and culverts; Basic elements regarding bridges design and related calculus; Superstructure - composition, calculus and design; Calculation of reinforced concrete superstructure beams; Infrastructure - composition, calculus and design; Culverts.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Cable Yarders I	FUNIC1	4	2	-	2	-

Course description (Syllabus): Introduction to cable yarding, planning and design, construction and features, management and maintenance. The aim is to acquire knowledge regarding the design, planning, construction and management of cable yarders. The course covers: Introduction to cable yarding; Cable yarding systems; Cables and main cable mechanics; Carriages; Supports, anchors & Rigging; Power sources; Planning & Design; Safety in cable yarding.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Forest Roads I	DRUM1	4	2	-	1	-

Course description (Syllabus): The course targets the following main aspects: introduction in forest roads and the particularities of wood transport; geometry of forest roads, with accent on the components of the roads in horizontal plane, and also in the longitudinal and transversal profiles; alignment and curves, forest road planning; cut-and-fill works.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Forest Economy and Forest Management	MECFOR	4	2	2	-	-

Course description (Syllabus): The basics of forest economy and forest management. Forecast, planning, and organisation in the forest sector. Decision (in certain and uncertain conditions, and risk). Leadership. Human resources management. Particularities of the forest sector. The business environment. The Markets. Forestry marketing. Business strategies in the forest sector. Business plan. Organisational behaviour. Social responsibility. Assessment and control. Quality assurance. Entrepreneurship. Concepts. The entrepreneurial company. Entrepreneurial strategies.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Computer Aided Design in Forest Engineering	DISA	4	1	-	2	-

Course description (Syllabus): Following this course, the students will acquire knowledge in the following CAD practices. The course contents are the following: 1. Introduction to AutoCAD Civil 3D; 2. Using Survey data; 3. Using Surfaces to model the terrain; 4. 2D design using Alignments; 5. Vertical design using Profiles; 6. 3D design using Corridors; 7. Design of Cross Sections; 8. Designing new terrain; 9. Analyzing surfaces; 10. Moving from design to construction. Practical activities of this discipline consist of designing a forest road using the knowledge acquired in the lecturing activities. Practical activities will enable the students to acquire the basic skills and competences needed to master AutoCAD Civil in design activities. The laboratory contents are the following: 1. Getting familiar with AutoCAD Civil 3D; 2. Importing survey data to model the terrain; 3. Using external data to model the terrain; 4. Building a terrain model using Surfaces; 5. Designing a forest road alignment; 6. Using Profiles to design vertical features; 7. Using Corridors to design a forest road; 8. Extracting the Cross Sections; 9. Designing new terrain; 10. Building production data and reports.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Dendrometry II	DENDR2	4	1	-	2	-

Course description (Syllabus): The course aimed at acquiring theoretical knowledge and practical skills in biometric measurement and modeling of trees and forest stands in terms of structure, size and production growth. Topics covered in this course include: forest inventory, estimation of stand volume, timber sorting at stand level, tree and stand increment and growth, dendrochronology.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Machines for Forest Constructions	MACO	5	2	-	2	-

Course description (Syllabus): The course targets the following main aspects: machineries used in road constructions works and the proper vehicles for wood transport, as principal components, active working equipment and productivities; possible works for different types of machineries, according to the construction of forest roads; security in operation and ergonomics aspects related to the machineries used in road construction and wood transport.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Equipment for Forest Constructions	UTICO	5	2	-	2	-

Course description (Syllabus): Issues addressed during the courses: the equipment necessary for forest roads construction; the principal components of those equipment, their actuation systems and the technology of working; the machinery and equipment used in the preparatory work; the machinery and equipment used for cut-and-fill work; the machinery and equipment used for compaction.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Electrical Applications in Forest Engineering	UEF	4	2	-	2	-

Course description (Syllabus): The course includes the main laws and theorems in electrotechnics, applied in the forestry sector, related to the use of micro-hydropower plants, design of light and power installations in timber harvesting sites, remote control of harvesting machines. The objectives of the course are: Understanding and using the machines and electrical installations in timber harvesting processes; Designing and setting up the electrical installations for primary processing of the wood; Correct choice of the motors and electric appliances used for the cutting and primary processing of the wood.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Automation in Forest Operations	EMAUS	4	2	-	2	-

Course description (Syllabus): An introduction to automation, types and classification of automation, technology readiness level, concept of Industry 4.0, concept of Forestry 4.0, robotics, artificial intelligence, internet of things and their application in forest engineering. Laboratory consists of case studies on the subjects covered in the course which include the preparation of a paper on the mechanization level at international level and of a paper on the automation level of a Romanian company.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Forest Railways	CFFOR	2	1	-	1	-

Course description (Syllabus): Introduction, planning and design, construction and features, management and maintenance. The aims is to acquire knowledge regarding the design, construction and management of forest railways in Romania that is available to all sectors of the forest industry - both public and private, foresters and landowners, engineers and contractors, as well as students forest engineering.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Timber Harvesting Technology II	TEL 2	5	2	-	-	2

Course description (Syllabus): The course targets the following main aspects: Skidding and forwarding (utilized means, applied procedures, setups, productivity, costs and ecological impact); Cable yarding (utilized means, applied procedures, setups, productivity, costs and ecological impact); Extraction using non-mechanized means (utilized means, applied procedures, setups, productivity, costs and ecological impact); Extraction using helicopters and small mechanized means (utilized means, applied procedures, setups, productivity, costs and ecological impact); Landing operations, primary processing operations, timber transport structure (utilized means, applied procedures, setups, productivity, cost and ecological impact); Productivity assessment and technical norms for timber harvesting activities; Work security in timber harvesting activity.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Forest Roads II	DRUM2	5	2	-	1	2

Course description (Syllabus): Issues addressed during the courses: materials, mineral aggregates and binders used for the construction of forest roads; the role and the way of usages of the traditional materials and the new materials in the construction of road structures; constructive solutions regarding the discharge of surface waters, the construction of the defence - consolidation works and also the construction of bridges on forest roads; techniques and technologies for construction, rehabilitation and maintenance of forest roads; security in road construction, rehabilitation and maintenance works.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Timber Harvesting Mechanization	MEF	6	4	-	4	-

Course description (Syllabus): The course targets the following main aspects: Theoretical processes of harvesting, collection and primary processing of wood; Groups of machinery and equipment used in harvesting, extraction and primary processing of wood (chainsaws, multifunction harvesting machines, forestry tractors, cable yarders, winches) presenting the most representative models in our country and abroad, their construction and operation, technical and economic parameters of use, technological possibilities and limits etc. Selection criteria of some types of equipment, depending on the needs: power, average hourly productivity, specific fuel consumption, etc. Possibilities and directions for improvement, in order to increase labor productivity.

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

Course description (Syllabus): The subject Wood Processing aims at familiarizing students with main processes, means and work techniques concerning the turning of wood into timber. The course is divided into three parts referring to: wood resources, wood sorting and timber processing. The first part contains statistical data regarding wood resources available at a certain moment and the factors which may influence it. The second part of the course describes the main wood sorting systems (the industrial and the qualitative one), the criteria which constitute the foundations of wood sorting, the main wood defects and the main measurement techniques for these. The third part, which is the longest, presents the main characteristics of timber and work technique along with timber factories organization and the description of activities characteristic of each compartment.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Management of Timber Harvesting, Transportation and Construction Enterprises	MAFE	3	1	-	1	-

Course description (Syllabus): This course addresses the forestry enterprises management challenge of designing and implementing the best combination of internal organization, market strategies and marketing actions for better facing

the market, institutional, and human resources realities. Specifically, this course seeks to develop skills in applying the analytic perspectives, decision tools, and concepts of management to the following areas: strategy formulation and implementation, human resources, operational management, financial accounting and management accounting. The following main topics are covered by this course: Management between theory and practice. Management in forestry enterprise. Financial and managerial accounting in forestry enterprises. Financial performance assessment of the companies activating in forestry. Operational management in forestry enterprises. Human Resources management in forestry enterprises. Financial management of forestry enterprises. Risk management in decision making in forestry enterprises. Case studies: i) managerial accounting – Romply Ltd case, ii) comparing financial performance of companies, iii) "Grigoriu Case" – operational management, iv) Case Study – recruiting young engineers – locus of control.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Work Science and Ergonomics	ERGOS	5	2	–	2	–

Course description (Syllabus): Issues addressed during the courses: the structure of working time; the human energy consumption and classification of activities according to it; the energy metabolism; the physiology of fatigue phenomenon, the causes that determine it and the methods of investigation; the postural stress level during working activities and its evaluation; the analysis of place of work according to the performer; the ergonomic limits of the working area; the ambient of working place through microclimate (temperature, air humidity, air flow, sounds, vibrations, light level).

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Forest Law and Legislation	DLF	4	2	-	2	-

Course description (Syllabus): Basic information about the modalities by which are created the regulations in Romania; Basic information about the property right; The normative system in force for forestry in Romania; The legal tasks and skills of the people involved in the Romanian forestry and forest engineering field.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Marketing of Forest Products	COMPF	3	1	-	2	-

Course description (Syllabus): This course addresses the forestry enterprises management challenge of *designing* and *implementing* the best combination of internal organization, market strategies and marketing actions for better market valuing of forest products. Specifically, this course seeks to develop skills in applying the analytic perspectives, decision tools, and concepts of marketing to the following decisions: segmentation and positioning (assessing market potential, analyzing customer behavior, focusing resources on specific customer populations and against specific competitors); product offering (including the breadth of product line, features, quality level, and customer service); pricing (capturing the value created for the customer); distribution channels (the role of distributors, retailers, and other intermediaries); marketing communications (developing an effective balance of advertising, sales promotion, and personal selling). The following main topics are covered by this course: Introductory notions. Demand and supply. Markets. Prices. Tending for selling/buying wood. SUMAL and traceability of wood. Traceability in Romania – institutional and legal. Valuing the forestry products. Sales techniques. Forestry products marketing. Market research. Non timber forest products: ecotourism, hunting, other products. Case study: wood products marketing: Munteni Forest District vs. Forestmar Ltd. Case study: ecotourism and hunting tourism – ROMSILVA.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Photogrammetry	FOTO	3	1	-	1	-

Course description (Syllabus): Frames and stereograms; Obtaining optical models. Determinations on single frames and stereograms; Restitution (recovery) photograms; Applications of photogrammetry in forestry.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Modelling Applications in Forestry	MODS	2	1	-	1	-

Course description (Syllabus): The course Modelling Applications in Forestry aims to provide students with a good understanding of the underlying statistical methods necessary to model the processes, growth, and yield in forestry. The course helps students understand various statistical tests and the general linear model but also nonlinear models that are frequently used with forestry data. All applications and exercises are performed in R.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Xylology	XILO	2	1	-	1	-

Course description (Syllabus): The methodology of investigating the properties of wood and its structure for felled and standing trees: sampling, field and laboratory work protocols; Nondestructive methods for wood traits analysis - techniques and applications in wood science; Influencing and control factors in wood formation: annual and seasonal rhythm, eco-physiology; Dendrochronology: research design and applications.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Forest Constructions and Interior Design	COLAI	3	2	-	1	-

Course description (Syllabus): The course targets follow the main aspects: Calculation methods and design principles of timber structures used in the forest sector. Interior design principle to finish the buildings from aesthetic and functional point of view. Developing the knowledge needed to design and realized of specific of wood structures in the forest sector. Developing the knowledge needed for the interior design works.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Forest Management	ADMIN	3	1	-	1	-

Course description (Syllabus): Basic information about the forestry administration; Modalities of the organization for the forestry administration in some European countries; The organization of the Romanian forestry administration; The functioning of the organizations making up the Romanian forestry administration; The functional relationships that involve the Romanian forestry administration activities.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Alternative Energy Sources in Forestry	SUAVE	3	1	-	1	-

Course description (Syllabus): Issues addressed during the courses: the role of biomass in the category of energetic materials; the technologies and the technological consumptions recorded in the process of wood harvesting; the technological process for obtaining the forest biomass; the methods of storage of the comminuted wood; ways of recovery of forestry biomass by producing pellets and briquettes; the energetic willow (*Salix viminalis var. energo*).

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Communication and Public Relations	COMUNI	3	1	1	-	-

Course description (Syllabus): The Communication and Public Relations Course is designed to: 1) introduce the students to the main concepts, types and models of communication and to familiarize the students with the main debates regarding an efficient communication; 2) make students aware of the most common barriers in communication and to apply the learnt concepts to real life situations and to forestry contexts; 3) learn the concepts related to public relations and the importance of an effective public communication within the forestry professionals and the general public. The course is structured in a classical way with lectures about the theory of communication and public relations and the seminars where the students are encouraged to develop techniques of efficient communication through lively debates, team work and student lead presentations. Some of the discussions in

seminars are addressing the most relevant and new debates in forestry studies; for examples discussions about the ecological corridors, the role of NGOs, shelter belts/wind breaks, game relocations, deforestation and legal/illegal forest harvest.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Accounting	CONTA	3	1	1	-	-

Course description (Syllabus): The course provides the following: introduction to accounting, accounting information and accounting profession in Romania; Accounts and account system; Practice of accounting; Financial statements and financial exercise; Treasury accounts.