"FOREST UTILIZATION TECHNOLOGY" SYLLABUS

Basic data of the subject	
Academic Unit:	**University "Ukshin Hoti" Prizren**
Course title:	**Forests utilization technology**
Program:	**Forestry and Environmental Sciences**
Level:	**Bachelor**
Course status:	**Oblicative (O)**
Study year:	**Second year, third semester**
Number of hours per week:	**3+2**
Credit value – ECTS:	**6**
Time / location:	**To be announced**
Lecturer:	**Prof. Ass.dr.Ylli Kortoçi**
Contact details:	**Email: ylli.kortoci@uni-prizren.com; Tel: +38345846817**
Course description:	The Forest utilization technology module addresses topics that help students prepare as future technicians for sustainable forestry and the environment as a whole. Forest utilization technology, through the utilization of the trees that have reached the age of maturity, creates the conditions for restoring the forest, the basic elements for a good ecological equilibrium. Thinning operations and sanitary cuttings operations are other competitive factors with the same objective. Forest cutting will serve the students to equip them and enable them with basic theoretical and practical knowledge of the application of technology and projection of a wide range of forest works and forest cutting. Further, students gain deep theoretical knowledge for the construction, operation, maintenance and use of machines and tools for performing of forest operations, which are essential to the growth of labor productivity, creating favorable conditions for safety and health at work. The use of mechanization at the proper level not only increases incomes for workers but also protects the forest environment from damages. The lectures addresses problems such as: cutting and wood first processing in the forest; different technological ways for extracting wood material from parcels to motorways, near which it is stored and then loaded to the receiving places or further processing sites; basic principles, design of projection tasks; organization of labor force, utilization and evaluation of forest trees through the implementation of the most advanced and effective technologies. Selection of a forest utilization system, focusing in particular on technical and economic factors and silvicultural rules; organization and planning of works; measuring time and productivity in wood utilization.

	Productive and unproductive times. Work planning and practical implementation at the site. The simple tools are treated like; lever, wedge, fixed pulley, movable pulleys, winches and slope plan. Besides terrestrial transport operation which is carried out with tractors and their equipment, forest mechanization also treats the air transport as the friendliest to the forest environment and wider. For this type of transport are studied in details the traditional and mobile winches and forest cable cranes. About these machineries there are provided knowledge not only for the construction and functioning of the cable crane line but also for their main components like steel ropes, pillar and trolley, while helicopters are treated only to acquire some basic knowledge about them. Forest mechanization does not leave out of attention the operations mechanization in young natural and artificial forests. Finally, mechanization of forest fire protection.
Course objectives:	Through the "Forest utilization technology" module program students will receive the necessary information in: means of intervention through cuttings in forest; designing the parcel where it will be intervened by cuttings; using the technologies adapted to Kosovo, and the advanced technologies used today in the world; equipment and cutting technologies. Modification of traditional working systems with innovative working systems and techniques; usage of released energy with low costs; the usage of complex tools that significantly help in carrying out work but always this is associated with great risks of physical, ecological and economic nature. Knowing the tools to be used, as well as the possibilities, limitations and systems of their use. Harvesting of forest products or their utilization, while today the work is transferred by paying more attention to the cultivation of the forest for protection of the land from erosion, preservation of the water regime and the creation of social and aesthetic functions. Timber extraction roads and the ways they are used. Productive and unproductive times, avoiding lost time. Organization of the site etc.
Learning outcomes:	After completing this course, students should be able to: ✓ Identify technologies and technological systems of forest cutting. ✓ To describe the organization of the cutting, felling and bucking of wood.

	✓ Use the general principles of felling and bucking. Notch. Felling of large trees. ✓ Choose the felling, limbing, bucking and cutting tools. Measuring equipment. Arm and mechanized wood transport vehicles such as tractors, motorcycles, harvester and their auxiliary equipment. ✓ Design the collection, extraction of wood material (internal transport), transport on the highway (external transport) and the factors that influence the choice of the forest machine and the implemented work system.

Contribution on student load (must correspond with learning outcomes)			
Activity	**Hours**	**Days/week**	**Total**
Lectures	3	13	39
Exercise theoretical/laboratory	2	13	26
Practice work	-	-	-
Contact with lecturer/consultations	1	15	15
Field exercises	2	8	16
Mid-terms, seminars	2	1	2
Homework	-	-	-
Individual time spent studying (at the library or home)	2	15	30
Final preparation for the exam	2	8	16
Time spent in evaluation (tests, quiz, final exam)	2	2	4
Projects, presentations, etc.	2	1	2
Total			**150 hours (6 ECTS)**

Teaching methods :	Lectures, discussions, laboratory exercises, expeditions consultations, seminars, independent projects, homework assignments, colloquium, course assignments, exams
Evaluation methods:	First assessment (colloquium): 10%, Second assessment (colloquium): 10%, Seminars or other engagements: 10%, Regular active attendance: 10% Final exam: 60%, Total: 100%.
Literature	
Basic Literature:	Mine V. Leksionet Mekanizimi Pyjor (2014) Qendro at al "Mekanizimi i Shfrytezimit Pyjor". Haxhi Avram. (2014) "Teknologjia e Shfrytezimit Pyjore" Kortoçi,Y.,Kellezi, M. (2012):Shfrytezimi i pyjeve te ahut te Shqiperise me nje silvikulture te qëndrueshme.
Additional Literature:	Ylli Kortoci , Mirvjena Kortoci (2020). "Comparison of time consumption and productivity during beech forest felling and processing in two different working conditions", Bilge

	International Journal of Science and Technology Research, Volume: 4, Issue: 1, 43-47. Ylli Kortoçi, Mirvjena Kortoçi. (2021) "Time Consumption and Productivity in Wood Extraction Using Traditional Cable Car". Prizren Social Science Journal, Volume 5, Issue 2, pp. 39-45.

Designed study plan:		
Week	**Lectures**	**Exercises**
First week:	Introduction to the features of forest utilization technology.	Exercises on forest and forest cutting. Features of forest utilization technology.
Second week:	Familiarity with forest cutting machines. Production. Wood extraction. Mechanized felling. Wood cutting methods.	Mechanisms used on forest cutting. Production. Wood extraction. Mechanized felling. Wood cutting methods.
Third week:	Internal combustion engines Technology and technological system. Effects of technology. Technological system. Composition of a technological system. Processes.	Familiarity with mechanisms and systems of internal combustion engines. Technological system. Composition of a technological system.
Fourth week:	Manual wood production. Site organization. Felling. Preparatory work for felling. General principles of tree felling. The directional notch. Felling of large trees.	Equipment used for manual wood production. Felling general principles. The directional notch. Felling of large trees.
Fifth week:	Limbing. The need to remove branches. General principles of limbing. Limbing technique. Limbing by a chainsaw. Removal of thick tree branches.	Chainsaws and their parts. Limbing technique. Chainsaw limbing. Removal of thick tree branches.
Sixth week:	Tree debarking. Debarking of coniferous species. Wood chipping. Debarking advantages. Manual debarking tools. Mechanized debarking techniques.	Chainsaw maintenance. Familiarity with debarking and shredding machines. Trees debarking. Debarking techniques. Mechanized debarking.
Seventh week:	Bucking. Bucking techniques. Basic rules. Manual bucking. Mechanized bucking.	Timber bucking. Industrial bucking. Bucking techniques. Bucking criteria. Colloquium, first part.
Eighth week:	Sectioning. Sectioning techniques. Basic rules. The manual riving. Mechanized riving	Chainsaw sectioning in site and woodlot. Mechanisms of wood riving. Priorities that they have. Manual tools for splitting wood.
Ninth week:	Manual wood - producing equipment. Cutting equipment for	Wood producing manual additional equipment. Felling and splitting tools

	the firewood production. Measuring tools.	(axes, chisels, wedges, chainsaws, etc.). Measuring tools.
Tenth week:	Mechanized wood production (harvester). Felling - stacking. Milling machines. The saws. Harvester head. Hydraulic crane. Equipment.	Familiarity with shredding machines. Combined machines (cutting, felling, limbing, assorting and stacking) Saws. Harvester felling head. Hydraulic crane.
Eleventh week:	Stacking. Extraction of wood material (internal transport). Stacking systematization (forest winch tractor). Pulling by animals. Plastic chutes for firewood.	Familiarity with auxiliary equipment of forestry and agricultural tractors. Systematization and stacking material. Animal pulling. Forest winch tractor pulling. Sliding. Plastic chutes.
Twelfth week:	Productivity of felling works. Productive times. Unproductive times. Methodology of beech forest utilization. Beech logs. Beech stumps. Piling, stacking of wood material. Stacking on the road side. Measurement of the extracted material.	Practice on the productivity of tree felling works. Productive times. Unproductive time. Methodology of beech forest utilization. Beech logs. Beech stumps. Piling, stacking of wood material. Stacking on the road side. Measurement of the extracted material.
Thirteenth week:	Wood extraction by cable car, traditional cable cars and mobile cable cars. Sliding extraction and waterways. Road transportation.	Exercises. Calculation of the cable car bearing capacity. Calculation of line assembly forces. Cable cars with one rope, two ropes, etc. Transportation by road. Helicopter transport. Colloquium part two.
Fourteenth week:	Silvicultural interventions. Manual cleaning/thinning. Preparation of the forest plot with manual tools. Mechanized preparation of the forest plot.	General provisions. Manual and chainsaw felling cutting. Felling of hung-up trees. Manual and chainsaws limbing. Manual and chainsaw sectioning. Mechanized cutting and conversion.
Fifteenth week:	Forest utilization technology. General provisions. Manual and chainsaw felling cut. Felling of hung-up trees. Manual and chainsaw limbing. Manual and chainsaw sectioning. Mechanized cutting and conversion.	General provisions. Manual extraction. Transport by plastic chutes. Animal transport. Transport by skidder and winch. Transport by forwarder. Transportation by cable car. High risk operations. Climbing the forest trees. Utilization of wood material felled by storms.
Academic policies and rules of conduct:		
Regular and active participation of students in lectures, exercises (practical part) and in seminar work. Keeping quiet in lecture, disabling mobile phones, timely access to the classroom, etc.		