



UNIVERSITY OF ZAGREB, FACULTY OF FORESTRY AND WOOD TECHNOLOGY

Undergraduate Study Wood Technology

Syllabus from Acad. Year 2021/22



UNIVERSITY OF ZAGREB, FACULTY OF FORESTRY AND WOOD TECHNOLOGY

LIST OF COMPULSORY AND ELECTIVE COURSES WITH CLASS HOURS AND ECTS CREDITS

Year of study: I										
Semester: Winter										
COURSE	COURSE TEACHER	L	Е	F	e- learning	ECTS	Compulsory / Elective			
Mathematics	Asst. Prof. Maja Moro, PhD	45	45			7	Compulsory			
Physics	Asst. Prof. Kristijan Radmanović, PhD	30	30			5	Compulsory			
Wood chemistry	Assoc. prof. Alan Antonović, PhD	45	45			7	Compulsory			
Wood anatomy	Asst. Prof. Iva Ištok, PhD Prof. Jelena Trajković, PhD	45	60			8	Compulsory			
Basics of design drawing	Assoc. prof. Danijela Domljan, PhD	15	30			2	Compulsory			
Physical and health education 1	Davor Pavlović M.Ed., professor of kinesiology		30			1	Compulsory			
In total						30				

Year of study: I										
Semester: Summer										
COURSE	COURSE TEACHER	L	E	F	e- learning	ECTS	Compulsory / Elective			
Engineering mechanics	Asst. Prof. Branimir Šafran, PhD	30	30			5	Compulsory			
The basics of dendrology	Prof. Marilena Idžojtić, PhD Asst. Prof. Igor Poljak, PhD	15	30			3	Compulsory			
Applied technical graphics	Prof. Anka Ozana Čavlović, PhD	15	45			5	Compulsory			
Wood industry mechanical engineering	Asst. Prof. Branimir Šafran, PhD	30	30			5	Compulsory			
Fundamentals of electrotechnics	Asst. Prof. Kristijan Radmanović, PhD	30	30			4	Compulsory			
Technical properties of wood I	Prof. Tomislav Sinković, PhD Asst. Prof. Tomislav Sedlar, PhD	45	60			7	Compulsory			
Physical and health education 2	Davor Pavlović M.Ed., professor of kinesiology		30			1	Compulsory			
In total						30				



Year of study: II										
Semester: Winter										
COURSE	COURSE TEACHER	L	Е	F	e- learning	ECTS	Compulsory / Elective			
Woodworking machinery I	Assoc. prof. Igor Đukić, PhD	45	45	2		6	Compulsory			
Technical properties of wood II	Asst. Prof. Tomislav Sedlar, PhD Prof. Tomislav Sinković, PhD	30	30	2		5	Compulsory			
Pathology and wood protection	Assoc. prof. Marin Hasan, PhD	45	45	2		7	Compulsory			
Sawmilling technology	Assoc. prof. Josip Ištvanić, PhD	30	45	1		6	Compulsory			
Transport equipment in wood industry	Prof. Ružica Beljo Lučić, PhD	30	45	2		5	Compulsory			
Physical and health education 3	Davor Pavlović M.Ed., professor of kinesiology		30			1	Compulsory			
In total						30				

Year of study: II										
Semester: Summer										
COURSE	COURSE TEACHER	L	Е	F	e- learning	ECTS	Compulsory / Elective			
Wood constructions	Prof. Silvana Prekrat, PhD	45	45			7	Compulsory			
Wood drying technology	Prof. Stjepan Pervan, PhD Asst. Prof. Miljenko Klarić, PhD	30	45	1		5	Compulsory			
Vener and veneer plywood	Prof. Mladen Brezović, PhD	30	45			5	Compulsory			
Glues and wood glueing	Assoc. Prof. Goran Mihulja, PhD Asst. Prof. Josip Miklečić, PhD	30	30	1		4	Compulsory			
Panels from disintegrated wood	Prof. Vladimir Jambreković, PhD	30	45	1		5	Compulsory			
Practical work 1			75			3	Compulsory			
Physical and health education 4	Davor Pavlović M.Ed., professor of kinesiology		30			1	Compulsory			
In total						30				



Year of study: III										
Semester: Winter										
COURSE	COURSE TEACHER	L	E	F	e- learning	ECTS	Compulsory / Elective			
Production organisation	Assoc. Prof. Krešimir Greger, PhD Asst. Prof. Kristina Klarić, PhD	45	45	1		7	Compulsory			
Final wood processing	Assoc. Prof. Goran Mihulja, PhD	45	45	2		6	Compulsory			
Basic statistics	Prof. Anamarija Jazbec, PhD	30	30			4	Compulsory			
Wood in construction	Prof. Hrvoje Turkulin, PhD Assoc. Prof. Vjekoslav Živković, PhD	30	30	1		4	Compulsory			
Marketing of wood products	Assoc. Prof. Andreja Pirc Barčić, PhD Prof. Darko Motik, PhD	30	30	1		4	Compulsory			
Practical work 2			90			3	Compulsory			
Business communication in a foreign language			30			2	Compulsory			
In total						30				

Year of study: III										
Semester: Summer										
COURSE	COURSE TEACHER	L	Е	F	e- learning	ECTS	Compulsory / Elective			
Production planning and calculation	Prof. Darko Motik, PhD Assoc. Prof. Andreja Pirc Barčić, PhD	30	45	1		5	Compulsory			
Wood finishing	Prof. Vlatka Jirouš- Rajković, PhD Asst. Prof. Josip Miklečić, PhD	30	45	1		5	Compulsory			
Practice				10		3	Compulsory			
Operations management	Asst. Prof. Ivana Perić, PhD	30	30	1		3	Elective			
Technological properties of wood	Asst. Prof. Tomislav Sedlar, PhD	30	30	1		3	Elective			
Woodworking machinery II	Assoc. Prof. Igor Đukić, PhD	30	30	2		3	Elective			
Furniture constructions	Assoc. Prof. Zoran Vlaović, PhD	30	30	2		3	Elective			
Upholstered furniture	Assoc. Prof. Zoran Vlaović, PhD	30	30	2		3	Elective			
Furniture design	Assoc. Prof. Danijela Domljan, PhD	30	30	2		3	Elective			
Bachelor thesis						8	Compulsory			
In total						30				



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UNDERGRADUATE STUDIES OF WOOD TECHNOLOGY - I. SEMESTER

1. GENERAL INFORMATION										
1.1. Course lecturer(s)	Asst. Prof. Maja Moro, PhD	1.7. Number of ECTS credits	7							
1.2. Course title	Mathematics	 1.8. Number of hours in a semester (L+E+F+e-learning) 	45+45+0							
1.3. Course code	33556	1.9. Expected enrolment in the course	70							
1.4. Study programme	University Undergraduate Studies of Wood Technology	1.10. Level of application of e-learning (level 1, 2, 3)	2							
1.5. Course type	Compulsory	1.11. Language of instruction	Croatian							
1.6. Year of the study	1	1.12. Possibility of instruction in English	NO							
2. COURSE DESCRIPTION										
2.1. Course objectives	The course content is adapted for students of wood technology studies. Efforts are made to preserve the overall material relating to the function, differential and integral calculus, such that the approach to all the most important concepts is maximally simplified. The emphasis is placed on mastering the skills of steps in mathematical models, the development of abstract thinking and analytical thinking, the precision of expression, and noticing the substantially.									
2.2. Enrolment										
entry competencies	-									
required for the course										
2.3. Learning outcomes at the level of the programme to which the course contributes	A1 - Apply a physical approach of experimental observation and mathematical modelling, solve mathematically various research and practical problems, statistically process, present and analyse data, and reach conclusions based on analysed data; A3 - Competently maintain, work with and use the possibilities of basic technical components; E1 - Continue specialisation in University graduate studies at the Wood Technology									
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	 Department of the Faculty of Forestry and wood Technology. Define and implement the tasks in terms of mathematical logic, sets, sets of numbers and mathematical induction Define, analyse and relate the concepts and properties of applied functions of a real variable, as well as terms related to sequences (limit of a sequence, limit of a function) Define and apply the concepts of tasks derivatives, indefinite and definite integrals Define, analyse and apply the tasks in terms of functions of two variables Define the term and solve differential equations using a method of separation of variables 									
2.5. Course content (syllabus)	 6. Define and apply the tasks from introductory elementary algebra (vectors and matrices) 1. Sets of numbers and points. Real numbers. Infimum and supremum expensive. 2. Inequalities (linear, quadratic, exponential, trigonometric, etc.). 3. Functions (algebraic and transcendent). 4. Limes function. Continuity of a function. 5. The notion of derivation. Derivation of elementary functions. 6. Differential calculus. 7. Analysis of algebraic functions using differential calculus. 8. Analysis of transcendent functions using differential calculus. 9. Functions of two variables. 10. Indefinite integral. Some methods of integration. 11. Certain integral-surface problems. 									



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	13. Differential	equatio	ons							
	14. Vectors in p	lane an	d space	. Vector operation	ons.					
	15. Matrices an	d matri	x calcul	us.						
2.6. Format of instruction	⊠ lectures			🖾 independent			2.7. Comments:			
	🗆 seminars an	d works	hops	assignments						
	🖾 exercises			🛛 🛛 multimedia	and the					
	□ online in entirety internet									
	⊠ partial e-learning □ laborato		□ laboratory	ry						
	☐ fieldwork		🛛 🛛 work with r	mentor						
				🗌 (other)						
2.8. Monitoring student work	Class attendance	YES		Research		NO	Oral	exam	YES	
	Experimental work		NO	Report		NO	(othe	er)		
	Essay		NO	Seminar paper		NO	(othe	er)		
	Preliminary exam	YES		Practical work		NO	(othe	er)		
	Project		NO	Written exam	YES		ECTS credi (tota	ts I)	7	
2.9. Assessment methods	Assessment is	conduc	ted in	accordance with	n Assess	ment n	nethod	s and cr	iteria f	or the
and criteria	current academ	nic year.								
2.10. Student	Writing homew	vork, pa	rticipati	ing in classes du	ring lect	ures an	d exerc	cises, tak	king coll	oquia,
responsibilities	taking the oral	exam.								
2.11. Required literature										
(available in the library		Tit	le		Av	ailabilit	у	A	vailabili	ty
and/or via other media)					in the library			via c	other m	edia
	Bradić, T. i	sur. 19	998: M	atematika za	NO					
	tehnološke fak	ultete, E	lement	, Zagreb						
2.12. Optional literature	Moro, M.: Zbirl	a ispitn	ih zadat	taka (radni mate	rijal)					

1. GENERAL INFORMATION								
1.1. Course lecturer(s)	Asst. Prof. Kristijan Radmanović, PhD	1.7. Number of ECTS credits	5					
1.2. Course title	Physics	 1.8. Number of hours in a semester (L+E+F+e-learning) 	30+30+0					
1.3. Course code	33557	1.9. Expected enrolment in the course	70					
1.4. Study programme	University Undergraduate Studies of Wood Technology	1.10. Level of application of e-learning (level 1, 2, 3)	1					
1.5. Course type	Compulsory	1.11. Language of instruction	Croatian					
1.6. Year of the study	1	1.12. Possibility of instruction in English	NO					
2. COURSE DESCRIPTION								
2.1. Course objectives The course gives the fundamentals laws of physics and practical applications needed to make the students understand other domains in their specialities. Moreover, the physics course develops facilities in critical (exactly) thinking, reasoned argumentation, evaluation of evidence, mathematical modelling, and ethical values.								



2.2. Enrolment requirements and/or								
entry competencies	-							
required for the course	A1 - Apply a physical approac	h of experimental observation a	and mathematical modelling,					
	solve mathematically various research and practical problems, statistically process, present							
2.3. Learning outcomes at	and analyse data, and reach conclusions based on analysed data;							
the level of the	A2 - Apply basic laws of physics that present the basis of wood technology, understand							
programme	inewton's axioms and apply them to solve technical problems, explain phenomena in the field of electrical engineering, and make accurate and optimal use of electric energy							
to which the course	A3 - Competently maintain,	A3 - Competently maintain, work with and use the possibilities of basic technical						
contributes	components;	·						
	A4 - Apply skills in solving prac calculations or testing verificat	tical issues in the business, eithions.	er by control measurements,					
	1. Identify the vector and scala	r quantities.						
	2. Explain the physical quantiti	es that describe the translationa	al motion					
	3. Different types of transla	ational motion and performin	g kinematic expressions of					
	translational motions.	· • • • • • • • •						
	4. Analyse the graphic descript	ion of the translational motion.	r motion Describe the effects					
	of centripetal and centrifugal f	orces.	motion. Describe the cheets					
2.4. Expected learning	6. Analyse the horizontal, verti	cal and piece shot						
the course (3 to 10	7. Explain Newton's laws of mo	otion. Explain Newton's general	aw of gravitation.					
learning	8. Distinguish the fundamental	forces in nature. Sketch and ana	alyse the action of more force					
outcomes)	9. Derive expressions for the in	npulse force and momentum.	u the amount of motion.					
	10. Analyse the graphical description of the isothermal, arsenic and isobaric changes in the							
	state of ideal gases.							
	11. Interpret the concept of work in the isobaric, isothermal and adiabatic change of state							
	of an ideal gas							
	12. Explain and analyse Carrier 13. Handle Mollier's h-x diagra	m.						
	The methods of physics resea	rch. Physical quantities, units a	nd dimensions. Errors in the					
	measurements. Motions. Kine	ematics: Rectilinear motion (ur	niform motion, non-uniform					
	motion, uniformly accelerated,	, free fall), Circular motion, Moti	on of bodies in a gravitational					
	field. Dynamics: Force, Lows of	dynamics (Newton's first law, N	lewton's second law, impulse					
	momentum). The density of	a substance. Tables for density	of various substances and					
	species of wood. Force of gravi	ity (weight). Friction forces, Resi	stance of the medium. Work,					
	Energy, and Power. Dynamics	of rotation: Centripetal force, N	Noment of a force, Newton's					
2.5. Course content	second law for rotational mo	otion, Moment of inertia, Angu	llar momentum. Mechanical					
(syllabus)	forced oscillations and waves: Harmo	Wayes Sound the intensity of s	ound ultrasound Mechanics					
	of liquids and gases: Pressure	e, Statics (Pascal's law, hydro-	and aerostatics, Archimedes					
	principle), Dynamics (ideal fluid	d, viscous fluid, motion of an ide	al fluid, Bernoulli's equation,					
	motion of a viscous fluid). Inter	rnal friction. The surface tension	of liquids. Capillarity.					
	Heat: Measurement of tempe	rature, Thermal expansion of so	blids and liquids, Quantity of					
	Real, Heat Capacities, First law of thermodynamics, ideal gas laws, Mixtures of ideal g							
	vapour (steam), Humid air (basic concepts, guantities, h-x diagram), Heat of combustion							
	fuels.							
2.6. Format of instruction	⊠ lectures	□ independent	2.7. Comments:					
	☐ seminars and workshops	assignments						
	☑ exercises	internet						
	□ online in entirety							
	☐ fieldwork	\Box work with mentor						



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				🗌 (other)						
2.9. Monitoring student	Class					1				
work	attendance	YES		Research		NO	Oral	exam	YES	
	Experimental work		NO	Report		NO	(othe	er)		
	Essay		NO	Seminar paper	YES		(othe	er)		
	Preliminary exam	YES		Practical work		NO	(othe	er)		
	Project		NO	Written exam	YES		ECTS credi (tota	ts I)	5	
2.9. Assessment methods	Assessment is conducted in accordance with Assessment methods and criteria for the									
and criteria	current academic year.									
responsibilities	Regular attendance and active participation in lectures and exercises. Taking colloquia and exams									
2.11. Required literature (available in the library and/or via other media)		Tit	le		Availability in the library			Availability via other media		
	Petar Kulišić i Školska knjiga Z	dr., " Zagreb,	Mehani 2005.	ika i toplina",	YES					
	Nedjeljka Pet Martinac, "Teł Split, 2007.	ric, Iv nnička	/o Vo termod	jnović, Vanja linamika", KTF	NO			Online	edition	l
	Petar Kulišić i d	r. "Riješ ska knije	eni zada za Zagre	aci iz mehanike 2007	NO					
	E. Babić, R. Krs	nik, M.	Očko "Z	Zbirka riješenih	YES					
	zadataka iz fiz 1988	:ike", Š	kolska	knjiga Zagreb,						
2.12. Optional literature	1. Antonije Dul	čić "Me	hanika"	, PMF Zagreb, 20	019. (onli	ine izda	nje)			
	Charles Kittel and all "Mehanika", Tehnička knjiga Zagreb, 1982.									
	3. F. Bošnjakov	3. F. Bošnjaković, "Nauka o toplini I i II, Tehnička knjiga Zagreb, 1976. i 1978.								
	4. Jakov Labor ,	"FIZIKA 1 Szakiely	L", Alta	a.a., 2019. ka iz fizika" LUK		001				
	5. Naua Brković	. "ZDIFKa	a zarata	Ka IZ IIZIKE LUK	u.u.0., 20	JUT.				

1. GENERAL INFORMATION								
1.1. Course lecturer(s)	Assoc. Prof. Alan Antonović, PhD	1.7. Number of ECTS credits	7					
1.2. Course title	Wood chemistry	 1.8. Number of hours in a semester (L+E+F+e-learning) 	45+45+0					
1.3. Course code	228982	1.9. Expected enrolment in the course	70					
1.4. Study programme	University Undergraduate Studies of Wood Technology	1.10. Level of application of e-learning (level 1, 2, 3)	2					
1.5. Course type	Compulsory	1.11. Language of instruction	Croatian					
1.6. Year of the study	1	1.12. Possibility of instruction in English	YES					
2. COURSE DESCRIPTION								



2.1. Course objectives	Knowledge seen to be gained by the "Wood chemistry" programme enables students of wood technology studies to connect it with that gained in programmes of main expert subjects.								
2.2. Enrolment requirements and/or entry competencies required for the course	-								
2.3. Learning outcomes at the level of the programme to which the course contributes	A4 - Apply skills calculations or B1 - Identify par identify and exp like species ba practical knowl shrubbery; E1 - Continue Department of	 A4 - Apply skills in solving practical issues in the business, either by control measurements, calculations or testing verifications; B1 - Identify parts and shapes of trees, macroscopic, physical and chemical wood properties, identify and explain the anatomic structure of the xylem of wood-like plants, identify wood-like species based on different morphological characteristics, and apply theoretical and practical knowledge of commercially important indigenous and foreign species of wood and shrubbery; E1 - Continue specialisation in university graduate studies at the Wood Technology Department of the Faculty of Forestry and Wood Technology 							
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	 Use the know and qualitative Explain the c basic working a Analyse and related to deter 	 Use the knowledge acquired in different wood technology areas and solve technological and qualitative tasks and problems in the wood industry. Explain the chemical composition and properties of wood and apply the same during the basic working and processing of wood Analyse and isolate all chemical components, whether analytically or instrumentally, related to determining different properties of for further working and processing of wood 							
2.5. Course content (syllabus)	Wood structure, the density of wood, water content, the chemical composition of wood, analysis of elements in wood, analysis of wood age, inorganic substances in wood, content and role of inorganic substances, wood ash, chemical reaction of wood, fundamentals of carbohydrate chemistry, monosaccharides, oligosaccharides, polysaccharides, cellulose, molecular and supramolecular properties, nature and classification of polyose, xylans, mannans, glucans, galactans, pectins, fundamentals of aromatic compounds, phenols, precursors of lignin, synthesis and role of lignin, structure and properties of lignin, instrumental and chemical methods analyses of cellulose and lignin, extractives, extractives of softwood, extractives of hardwood, extractives from foliage, buds and fruits, the acidity of wood, measuring the pH of wood, the chemical composition of bark, cellulose, polyose, lignin, polyphenols, suberin, extractives, combustion and pyrolysis of wood, degradation of								
2.6. Format of instruction	 ☑ lectures ☑ seminars an ☑ exercises ☑ online in ent ☑ partial e-leat ☑ fieldwork 	d works <i>irety</i> rning	hops	 ☑ independer assignments ☑ multimedia internet ☑ laboratory ☑ work with r ☑ (other) 	nt and the mentor		2.7. Commer	nts:	
2.8. Monitoring student work	Class attendance Experimental	YES		Research	YES		Oral exam	YES	
	work	YES	NO.	Report Seminar		NO	(other)		
	Preliminary	YES	NO	paper Practical		NO	(other)		
	Project	exam YES work NO (other) Project YES Written exam YES ECTS credits 7							
2.9. Assessment methods and criteria2.10. Student responsibilities	Assessment is current academ Regular attenda	conduc nic year. ance an	ted in dactive	accordance with participation in	n Assess	ment n and ex	nethods and c	riteria f	or the



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2.11. Required literature (available in the library and/or via other media)	Title	Availability in the library	Availability via other media
	A. Antonović (2018): Kemija drva (interna skripta). Šumarski fakultet, Zagreb	NO	YES
	D. Fengel, G. Wegener (1989): Wood – chemistry, ultrastructure, reactions. Walter de Gruyter, Berlin-New York.	NO	YES
	T. Higuchi (1997): Biochemistry and molecular biology of wood. Springer-Verlag, Berlin Heidelberg.	NO	YES
2.12. Optional literature	 E. Sjostrom, R. Alen (1999): Analytical papermaking, Springer Verlag, T. D. NS. Hon, N. Shiraishi (2001): Wood and E. Sjostrom (1993): Wood chemistry – Fun Inc. T. Higuchi (1985): Biosyinthesis and biod Press, Inc. 	methods in wood ch nd cellulosic chemistry. damentals and applicat egradation of wood co	Marcel Dekker, Inc., tions. Academic Press,

1. GENERAL INFORMATIO	N					
1.1. Course lecturer(s)	Asst. Prof. Iva Ištok, PhD Prof. Jelena Trajković, PhD Assoc. Prof. Bogoslav Šefc, PhD	8				
1.2. Course title	Wood anatomy	 1.8. Number of hours in a semester (L+E+F+e-learning) 	45+60+0			
1.3. Course code	228983	1.9. Expected enrolment in the course	70			
1.4. Study programme	University Undergraduate Studies of Wood Technology	1.10. Level of application of e-learning (level 1, 2, 3)	1			
1.5. Course type	Compulsory	1.11. Language of instruction	Croatian			
1.6. Year of the study	1	1.12. Possibility of instruction in English	YES			
2. COURSE DESCRIPTION						
2.1. Course objectives	One of the aims is to learn to recognise the xylem anatomy of woody plants as a prerequisite for understanding the basic properties of wood. The second aim is to attain professionalism in identifying important commercial wood species.					
2.2. Enrolment requirements and/or entry competencies required for the course	-					
2.3. Learning outcomes at the level of the programme to which the course contributes	B1 - Identify parts and shapes of trees, macroscopic, physical and chemical wood properties, identify and explain the anatomic structure of the xylem of wood-like plants, identify wood-like species based on different morphological characteristics, and apply theoretical and practical knowledge of commercially important indigenous and foreign species of wood and shrubbery.					
2.4. Expected learning outcomes at the level of the course (3 to 10 learning	 Explain the main terms of macroscopic, microscopic and submicroscopic characteristics of wood structure helpful in identifying and technical wood properties. Differentiate native commercial wood species based on their microscopic and macroscopic characteristics with the help of wood identification keys. 					



3 Evolain varia	tions in	n wood	anatomy struct	ure with	in the	troo h	etween	trees c	of each
species and exp	plain the	e influer	nce of variations	in wood	structu	ire on t	echnical	prope	rties of
wood and its us	e.							P P -	
. Explain the origin of natural wood "defects", recognise them and explain their influence									
on selected tec	n selected technical properties.								
5. Explain the ir	Explain the influence of wood anatomy structure on its technical properties								
Introduction: T	troduction: The aims of wood anatomy. The origin of wood in the plant kingdom.								
Commercial uti	ommercial utilisation. Methods in wood anatomy. Coarse structure of wood. Structure of							ture of	
vascular plants:	basic	parts of	a vascular plan	t, primar	y and s	econda	ary grow	th. The	e origin
narts divisions	deve	lonmen	t of cell wall	Compos	ition a	nd dist	ribution	of ce	oll wall
components in	woodc	ells. Sub	microscopic stru	icture an	d organ	isation	of cell w	all. Scu	lptures
of the cell wall	: pits,	perforat	tions of vessel r	nembers	, spiral	thicke	nings an	d dent	ations,
warty structure	s and w	arty pits	s. The macroscop	pic and m	icrosco	pic stru	cture of	conifer	wood:
types of cells ar	nd tissu	es, their	distribution and	l shape, l	nelpful f	feature	s in iden	tifying	conifer
wood, compara	ative ar	natomy	of different kin	ids of co	nifer w	oods.	The mad	croscop	pic and
helpful feature	ucture (s in id	or narov ontifyin	woods: types of a	Cells and	tissues, tive an	their d	of diffe	on and ront ki	snape,
hardwoods. Gu	ide thro	ough th	e hand-lens kev	for ident	ifving s	elected	l wood s	pecies.	Wood
identification:	method	ds, limit	ting conditions,	wood i	dentifica	ation k	eys. Wo	od str	ructure
variations with	in the	species	and the tree. F	Physical	nature	of woo	od, mois	ture co	ontent,
dimensional changes, specific weight and density, porosity, permeability. The influence of							ence of		
vood structure on shrinking, density, permeability and final utilisation of wood. rregularities of wood structure.									
☑ lectures □ independent 2.7. Comments:									
🗆 seminars and	d works	shops	assignments						
\boxtimes exercises			🛛 🗆 multimedia	and the					
online in ent	irety		internet						
partial e-lear	rning		□ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □						
☐ fieldwork			\Box (other)	nentor					
Class	VEC		Bosoarch		NO	Oral	ovom		NO
attendance	TES		Research		NO	Ular	exam		NO
Experimental		NO	Report		NO	othe	er)		
work			Seminar	-					
Essay		NO	paper		NO	(othe	er)		
Preliminary	VEC		Practical			(h .	- m)		
exam	TES		work		NO	lothe	:r)		
			Written			ECTS			
Project		NO	exam	YES		(total	ts IV	8	
Assessment is	conduc	ted in	accordance with	1 Assess	nent m	1 ethod	s and cr	iteria f	for the
current academ	ic year								
Regular attenda	ance an	d active	e participation in	lectures	and ex	ercises	. Taking	colloqu	uia and
exams.							1		
				A.,	ailabilit	.,		ailahili	+
	Tit	le		in t	he libra	y rv	via o	ther m	nedia
						.,			culu
Predavanja iz	predm	neta Ar	natomija drva	NO			YES		
(skripta, autori	: Jelena	a Trajko	rredavanja iz predmeta Anatomija drva NO YES (skripta, autori: Jelena Trajković i Bogoslav						
skripta, autori: Jelena Trajković i Bogoslav sefc, pdf dokument oko 3 MB) i Atlas slika uz									
Šefc, pdf dokun	efc, pdf dokument oko 3 MB) i Atlas slika uz redavanja (Ilustracije uz predavanja,								
Šefc, pdf dokun predavanja (I sabrali: Jelena -	nent ok lustraci Traikov	o 3 MB) ije uz ić i Bogy) i Atlas slika uz predavanja, oslav Šefc. odf						
	B. Explain varia species and exp wood and its us Explain the of the selected tech Explain the indi- introduction: T Commercial utives and developments parts, divisions components indi- of the cell wall warty structure types of cells andi- wood, compara- microscopic struc- helpful feature hardwoods. Gu identification: variations with dimensional ch- wood structure trregularities of lectures seminars and exercises online in ent partial e-lead fieldwork Class attendance Experimental work Essay Preliminary exam Project Assessment is current academ Regular attenda exams. Predavanja iz (skripta, autori	B. Explain variations in species and explain the species and explain the wood and its use. A. Explain the origin of on selected technical p. Explain the influence introduction: The aim Commercial utilisation vascular plants: basic and development of vorts, divisions, development of vorts, divisions, developments in wood c of the cell wall: pits, warty structures and witypes of cells and tissue wood, comparative an microscopic structure on helpful features in id hardwoods. Guide three dimensional changes, wood structure on Irregularities of wood structure on Irregulari at the structure o	3. Explain variations in wood 3. Explain variations in wood species and explain the influer wood and its use. 4. Explain the origin of natura on selected technical properti 5. Explain the influence of wood Introduction: The aims of w Commercial utilisation. Method vascular plants: basic parts of and development of wood cells. Sub of the cell wall: pits, perforative warty structures and warty pit types of cells and tissues, their wood, comparative anatomy microscopic structure of hardwoods. Guide through th helpful features in identifyin hardwoods. Guide through th identification: methods, limit variations within the species dimensional changes, specific wood structure on shrinkir Irregularities of wood structur lectures seminars and workshops experimental work Class attendance Experimental work Essay Project NO Assessment is conducted in	3. Explain variations in wood anatomy struct species and explain the influence of variations wood and its use. 4. Explain the origin of natural wood "defects" on selected technical properties. 5. Explain the influence of wood anatomy struct Introduction: The aims of wood anatomy. Commercial utilisation. Methods in wood anatomy. Commercial utilisation. Methods in wood anatomy struct Introduction: The aims of wood calls. Tissues. Camparts, divisions, development of cell wall. components in wood cells. Submicroscopic structures and warty pits. The macroscop types of cells and tissues, their distribution and wood, comparative anatomy of different kir microscopic structure of hardwoods: types of cells and tissues, their distribution and wood, scomparative anatomy of different kir microscopic structure on shrinking, density, petregularities of wood structure. ⊠ lectures □ independer □ seminars and workshops □ multimedia □ anline in entirety □ laboratory □ partial e-learning □ laboratory □ paper Prectical Project NO Research Experimental work	3. Explain variations in wood anatomy structure with species and explain the influence of variations in wood wood and its use. 4. Explain the origin of natural wood "defects", recogn on selected technical properties. 5. Explain the influence of wood anatomy structure on Introduction: The aims of wood anatomy. The origin commercial utilisation. Methods in wood anatomy. Corvascular plants: basic parts of a vascular plant, primar and development of wood cells. Tissues. Cambium. Coparts, divisions, development of cell wall. Compos components in wood cells. Submicroscopic structure an of the cell wall: pits, perforations of vessel members warty structures and warty pits. The macroscopic and metypes of cells and tissues, their distribution and shape, I wood, comparative anatomy of different kinds of comicroscopic structure of hardwoods: types of cells and the species and the tree. Physical dimensional changes, specific weight and density, por wood structure on shrinking, density, permeabilit rregularities of wood structure. I lectures independent assignments online in entirety internet partial e-learning I aboratory patiel e-learning I aboratory class attendance YES Research Experimental work NO Seminar paper Project NO Seminar paper Project NO Seminar work with mentor internet internet work Research NO Seminar paper	3. Explain variations in wood anatomy structure within the species and explain the influence of variations in wood structure wood and its use. 4. Explain the origin of natural wood "defects", recognise there on selected technical properties. 5. Explain the influence of wood anatomy structure on its tech introduction: The aims of wood anatomy structure on its tech introduction: The aims of wood anatomy. The origin of w Commercial utilisation. Methods in wood anatomy. Coarse structure land: basic parts of a vascular plant, primary and s and development of wood cells. Tissues. Cambium. Cell and parts, divisions, development of cell wall. Composition a components in wood cells. Submicroscopic structure and organ of the cell wall: pits, perforations of vessel members, spiral warty structures and warty pits. The macroscopic and microsco types of cells and tissues, their distribution and shape, helpful flwood, comparative anatomy of different kinds of conifer w microscopic structure of hardwoods: types of cells and tissues, helpful flymood. Guide through the hand-lens key for identifying s identification: methods, limiting conditions, wood identification within the species and the tree. Physical nature dimensional changes, specific weight and density, porosity, p wood structure on shrinking, density, permeability and tregularities of wood structure. □ lectures □ independent assignments □ serimars and workshops □ multimedia and the internet □ and ine entirety □ independent assignments □ and if elearning □ independent assignments □ serimars and workshops Research NO Essay NO Remain and the internet	3. Explain variations in wood anatomy structure within the tree, b 3. Explain the influence of variations in wood structure on t wood and its use. 4. Explain the origin of natural wood "defects", recognise them and e 5. Explain the influence of wood anatomy structure on its technical properties. 5. Explain the influence of wood anatomy. The origin of wood in commercial utilisation. Methods in wood anatomy. Cearse structure and development of wood cells. Tissues. Cambium. Cell and cell was parts, divisions, development of cell wall. Composition and dist components in wood cells. Submicroscopic structure and organisation of the cell wall: pits, perforations of vessel members, spiral thicke warty structures and warty pits. The macroscopic and microscopic structure of hardwoods: types of cells and tissues, their distribution and shape, helpful features in identifying hardwoods. Comparative anatomy hardwoods. Guide through the hand-lens key for identifying selected identification: methods, limiting conditions, wood identification k variations within the species and the tree. Physical nature of wood direntification is assignments □ lectures □ independent 2.7.0 □ services □ in	3. Explain variations in wood anatomy structure within the tree, between species and explain the influence of variations in wood structure on technical wood and its use. 4. Explain the origin of natural wood "defects", recognise them and explain to neelected technical properties. 5. Explain the influence of wood anatomy structure on its technical properties introduction: The aims of wood anatomy. The origin of wood in the pl Commercial utilisation. Methods in wood anatomy. Carse structure of wood vascular plants: basic parts of a vascular plant, primary and secondary grow and development of wood cells. Tissues. Cambium. Cell and cell wall: dimer parts, divisions, development of cell wall. Composition and distribution components in wood ells. Submicroscopic structure and organisation of cell w of the cell wall: pits, perforations of vessel members, spiral thickenings an warty structures and warty pits. The macroscopic and microscopic structure of hardwoods: types of cells and tissues, their distribution and shape, helpful features in idem wood, comparative anatomy of different kinds of conifer woods. The macroscopic structure of hardwoods. Guide through the hand-lens key for identification keys. Waraitations within the species and the tree. Physical nature of wood, mois dimensional changes, specific weight and density, porrosity, permeability. The work with mentor internet indem work with mentor internet indentification keys. Waraital e-learning independent exercises inductory internet internet internet internet internet internet internet internet work with mentor internet exam YES work work internet is conducted in accordance with Assessment methods and created work is credits (totat)). Assesssment is conducted in accordance with Asse	3. Explain variations in wood anatomy structure within the tree, between trees of species and explain the influence of variations in wood structure on technical propervise. 3. Explain the origin of natural wood "defects", recognise them and explain their influence of wood anatomy structure on its technical properties. 5. Explain the influence of wood anatomy structure on its technical properties. 5. Explain the influence of wood anatomy. The origin of wood in the plant kin Commercial utilisation. Methods in wood anatomy. Coarse structure of wood. Struct vascular plants: basic parts of a vascular plant, primary and secondary growth. The and development of wood cells. Tissues. Cambium. Cell and cell wall: citemensions, parts, divisions, development of cell wall. Composition and distribution of cell model wall: pits, perforations of vessel members, spiral thickenings and dent warty structures and warty pits. The macroscopic and microscopic structure of conifer woods. The macroscopic structure of conifer woods. The macroscopin model cell wall. Scuences and wood identification was their distribution and shape, helpful features in identifying hardwoods. Comparative anatomy of different kinds of conifer woods. The macroscopin microscopic structure of hardwoods: types of cells and tissues, their distribution and helpful features in identifying hardwoods. Comparative anatomy of different kinds of conifer woods modes. The macroscopin macroscopic structure on shrinking, density, permeability and final utilisation of tree gluants and workshops



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	Anatomija drva e-kolegij na sustavu za udaljeno učenje.		YES, Merlin
	Z. Špoljarić 1978: Anatomija drva, Šumarski fakultet, Zagreb.	YES	NO
2.12. Optional literature	 Panshin, A. J.; de Zeew, 1980: Textbook of v Schweingruber, F.H., 1990: Anatomy of Euro Publishers, 800 str. Špoljarić, Z.; Petrić, B.; Šćukanec, V., 1969: drva, Poslovno udruženje šumskoprivrednih o 4. Šumarska enciklopedija, HLZ Miroslav Krleža 5. Pojmovnik hrvatskoga drvnotehnološkog na 6. 2019: Vrste drva s naslovnica časopisa Sveučilišta u Zagrebu, str. 212. 	vood technology, McGr opean woods, Paul Hau Višejezični rječnik struč rganizacija, Zagreb, 85 s a, Zagreb azivlja (2018) Drvna industrija (201	aw-Hill, Inc. 722 str. pt Berne and Stuttgart čnih izraza u anatomiji str. 9), Šumarski fakultet

1. GENERAL INFORMATIO	N					
1.1. Course lecturer(s)	Assoc. Prof. Danijela Domljan, PhD	1.7. Number of ECTS credits	2			
1.2. Course title	Basics of design drawing	15+30+0				
1.3. Course code	228984	1.9. Expected enrolment in the course	70			
1.4. Study programme	University Undergraduate Studies of Wood Technology	1.10. Level of application of e-learning (level 1, 2, 3)	1			
1.5. Course type	Compulsory	1.11. Language of instruction	Croatian			
1.6. Year of the study	1	1.12. Possibility of instruction in English	NO			
2. COURSE DESCRIPTION						
2.1. Course objectives	Developing basic drawing ski through mastering basic drawing and spatial sketching and dra dimensional to the two-diment the observed. The aim is to e creatively and to create a found and overall product development	Ils, artistic perception and vision ng skills. Master the skills of obse awing, and methods and techn isional surface of the paper with nable students to express their dation for monitoring the process ent.	ual thinking and expression rvation, viewing, observation iques of transferring three- n clarity of representation of ideas in later years of study ss of design and construction			
2.2. Enrolment requirements and/or entry competencies required for the course	-					
2.3. Learning outcomes at the level of the programme to which the course contributes	C5 - Size constructions, define systems of construction compositions as a prerequisite for product construction, define the basic construction documentation and develop it systematically, apply CAD systems in the wood industry and 2D modelling with the help of AutoCAD; E1 - Continue specialisation in university graduate studies at the Wood Technology Department of the Faculty of Forestry and Wood Technology.					
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	 Master the methods, techni Master the perception, prop and spaces and their transfer t Analyse and draw the obser in spatial dawn (perspective) a Draw an object according aesthetic order 	ques and materials of freelance ortion, composition and observa o paper ved object in proportion using c nd orthogonal projection to visual memory with the ap	design drawing ition and analysis of products lifferent drawing techniques, plication of the principle of			



	5. Master critical thinking and visual expression on given examples									
	Introduction to	design	drawing	g. Types of graph	nics and o	drawing	techni	ques. W	hat is a	design
	drawing? Exam	ples of p	oroduct	development ar	nd the rol	e of des	ign dra	wing. Kr	oki, funo	ctional
	drawing, conce	eptual o	drawing	, technical dra	wing, pr	esentat	ion dra	awing. 1	Techniq	ues in
	design drawing	g. Intro	duction	to the princi	ples of	aesthet	ic ord	er and	basic d	lesign.
2.5. Course content	Application of r	plication of methods and motives. Drawing on a given topic. Development of drawing and							ng and	
(syllabus)	visual ability, p	ual ability percention, proportions and composition. Drawing on visual memory Linear							Linear	
(0)	display and ton	solar ability, perception, proportions and composition. Drawing on visual memory. Elice						olume		
	on a surface. (a surface. Orthogonal projection of objects and spatial representation (perspective)						ctive).		
	Display of obje	nlay of objects of everyday use. Visual interpretation of a given message. Measures and							es and	
	relationships T	he relat	ionshin	between man	obiect (fi	irniture) and ir	nterior (s	snace)	co una
2.6 Format of instruction		ine relat	lonsinp		nt		270	Commen	ts:	
	\square seminars an	dworks	hons	assignments			2.7.0	Johnnen		
			nops		and the					
					and the					
	online in ent	rirety								
	D partial e-lea	rning								
	🗆 fieldwork				mentor					
				some of the	e tasks a	re				
				performed in a						
		1	1	practicum/wo	rksnop				1	1
2.8. Monitoring student	Class	YES		Research		NO	Oral	exam	YES	
WORK	attenuance						Mana			
	Experimental		NO	Deport			iviapa	1	VEC	
	work						radov	/a (_)	TES	
							(crtez	za)		
	Essay		NO	Seminar		NO	(othe	er)		
	Proliminany		NO	Practical						
	exam			work	YES		(othe	er)		
	ckam		NO	WORK			FCTS			
	Project			Written		NO	credi	ts	2	
				exam			(tota	1)		
2.9. Assessment methods	Assessment is	conduc	ted in a	accordance wit	h Assess	ment n	hethod	, s and cr	riteria f	or the
and criteria	current academ	nic year.								
2.10. Student	Mandatory atte	, endance	at lect	ures and exercis	ses. deliv	erv of n	nateria	ls and ac	cessori	es and
responsibilities	, execution of as	signed t	asks wi	thin the set dead	dline.	,				
2.11. Required literature		•								
(available in the library		T:+			Av	ailabilit	у	A	vailabili	ty
and/or via other media)		III	le		in t	he libra	ry	via c	other m	edia
	Apah, (2004):	Elemer	nts and	Principles of	NO			YES, M	lerlin	
	Design									
	Arnheim, R. (19	74): Art	and Vis	ual Perception	NO			YES, M	lerlin	
	Richards, J. Free	ehand D	rawing	and Discovery:	NO			YES, M	lerlin	
	Urban Sketchir	ng and	Concep	t Drawing for						
	Designers									
	Grey, J., Ard	ley, S.	i sur.	(2001): Dizajn	YES					
	stanovanja; Zna	anje, Zag	greb, 20							
	Neufert, E. (20	UU): Ele	menti a	arnitektonskog	YES					
	projektiranja, G	olden n	narketir	ng, Zagreb						
2.12. Optional literature	Kiley, N. /ed/ (2	2003): T		ients of Design						a sala
	Panero, J. i Zeln	ик, IVI. (: Голиса	1987): A	ntropoloske me	ere i inter	ijer, Zbi	rка pre	poruka z	a stand	arde u
	projektiranju, li		aevinsk	a knjiga", Beogr	a0	ages -	Kolel-	lunii		
	Damjanov, J., (1	1991) VI	zaini jez	21K TIIKOVNA UMJO	ethost Z	agreb, S	окоїsка	knjiga Skalater t		
	Bacic, NI. I Mire	enic Bac	IC J., (19	994) UVOQ U liko	vno misij	jenje, Za	agreb, S	okoiska k	njiga	
	kraigner Hozo,	raigher Hozo, M.(2008): Metode slikanja i materijali" Sarajevo, Kult-B						в		



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Itten. J.(1973) Umetnost boje, priručnik, Beograd, Umetnička akademija u Beogradu Bogdanović, K.(1986) Uvod u vizuelnu kulturu, Beograd, Zavod za udžbenike i nastavna sredstva Lefteri C. (2014). Materials for Design, UK: Laurence King Publishing, Ltd Ashby, M., Johnson, K.(2002). Materials and Design, The Art and Science of Matreial Selection in Product Design. Oxford, UK: Elsevier Butterworth-Heinemann How to Draw drawing and sketching objects and environments from your imagination: https://www.pdfdrive.com/how-to-draw-drawing-and-sketching-objects-and- environments-from-your-imagination-e158148887.html Open University: Art – Using sketching effectively in design: Drawing, sketching and designing: https://www.youtube.com/watch?v=aqKdUXtJTHg&ab_channel=OpenLearnfromTheOpen University
University One Day Video: https://www.youtube.com/watch?v=ACoMMj1C94o&ab_channel=OneDayVideo

1. GENERAL INFORMATIO	N					
1.1. Course lecturer(s)	Davor Pavlović M.Ed., professor of kinesiology	1.7. Number of ECTS credits	1			
1.2. Course title	Physical and health education 1	0+30+0				
1.3. Course code	226038	1.9. Expected enrolment in the course	70			
1.4. Study programme	University Undergraduate Studies of Wood Technology	1.10. Level of application of e-learning (level 1, 2, 3)	2			
1.5. Course type	Compulsory	1.11. Language of instruction	Croatian			
1.6. Year of the study	1	1.12. Possibility of instruction in English	NO			
2. COURSE DESCRIPTION						
2.1. Course objectives	The course Physical and Health Culture aims to acquire theoretical and practical kinesiological knowledge to train students for independent physical exercise and adopt healthy living habits. Through various forms of physical activity, the goal is to meet the daily needs for movement and improve the student population's motor, functional, and cognitive abilities. By attending classes, students are educated about the importance of daily physical exercise and all the good things physical activity means for a person and his health. The aim is to simultaneously acquire knowledge about the harmfulness of various forms of addiction to health, especially their impact on intellectual and physical capabilities, the importance of quality nutrition and the most interesting results of previous research on the student population in the segment: physical activity as disease prevention, healthy eating, sports					
2.2. Enrolment requirements and/or entry competencies required for the course	Health status.					
2.3. Learning outcomes at the level of the programme to which the course contributes	E1 - Continue specialisation in university graduate studies at the Wood Technology Department of the Faculty of Forestry and Wood Technology.					
2.4. Expected learning	 Describe the structure of the physical exercise class. Explanation of the impact of physical exercise on health 					

1898 ARKUTET STATUS

SVEUČILIŠTE U ZAGREBU, FAKULTET ŠUMARSTVA I DRVNE TEHNOLOGIJE

outcomes at the lovel of	2. Change fitness oversizes designed to strengthen individual muscle groups								
the course (2 to 10	4. Domonstrate	A Demonstrate specific exercises concerning kinesiologic activity							
loarning	4. Demonstrate	 Demonstrate specific exercises concerning kinesiologic activity. Organise constructive free time 							
	5. Organise con	S Assess personal diet and physical exercise babits							
outcomesy	7 Demonstrate	Demonstrate general preparatory exercises and stretching exercises							
	8 Understandi	Understanding kinesiology programs and their target orientation							
	9 Control emo	Control emotions and strengthen self-control							
	Athletics	control entendito una sa enginen sen control.							
	Walking - walki	ng at di	fferent	baces. Nordic wa	lking, br	risk walk	king, hiking:		
	Running - theo	retical I	knowled	ge and divisions	. cvclic	mover	ents at differe	nt pace	s. fast
	running short	distanc	es, runi	ning down a slo	pe, rur	nning d	own a slope, i	interval	cyclic
	movements, di	fference	es in rur	nning long, medi	um and	short d	istances, runni	ng with	loads,
	relay running, h	nurdles	running	different height.					
	Martial arts								
	Basic judo tech	nniques	- falls,	hand throws, be	elt thro	ws, leg	throws, chokin	ig techn	iques,
	levers;								
	Basic technique	es of kar	ate - kio	ks, punches, def	ence.				
	Sports games								
	Basketball - kee	eping th	e ball in	n place, keeping	the ball	in moti	on, basic throv	ving, piv	oting,
	Jumping shot, p	assing i	n place	and moving;			waaring waaring to be	- 11 + 14	
	FOOTDall - pass	sing in	place, p	bassing to the fi	rst, pas	sing in	movement, b	all tech	ho ball
	is added volley		hots st	phone the hall.	guainu	in the n	un, shot on goa	i aiter ti	
2.5. Course content	Volleyball - nag	sing wi	th two	hands above the	- head	nassing	with the fore	arms se	ervice
(syllabus)	passing behind	the he	ead. rec	eiving service. b	locks. r	passing	technique in a	ttack. p	laving
	technique in de	fence;	,	0	/	., 0		, ,	7 0
	Handball - guid	ing the	ball in a	straight line and	l with a	change	of direction. Pa	asses in	place,
	pass in motion	, crosse	s, passe	s for counteratta	acks, co	operatio	on of two and	three pl	layers,
	shot on goal aft	ter the l	ead, sho	ot on goal on the	added l	ball.			
	Racket sports								
	Badminton - fo	rehand	punch (under the arm, fo	orehand	l punch	es above the h	ead, for	ehand
	lob above the h	nead, ba	ickhand	kick under the a	rm, higł	n serve,	backhand serve	e, short	serve,
	field moves, sin	igle play	, pair pl	ay;					
	Shooting - clas	sificatio	on of sh	nooting discipline	es and	equipm	ent, weapons	mainter	nance,
	breathing tech	niques, a	air rifle :	10 m.					
	Pilatos progran	ns - Cir	cuit stre	up and proparing		a trainii	system stratch		rcisos
	muscle strengt	es ioi w	vercise	s evercises to re		bcutane	System, stretci	es to in	rease
	muscle endura	iching c	rcises to	o increase muscle	mass	exercise	s stretching		cicase
	Hiking tours - h	iking on	flat ter	rain, hiking tours	. interva	al hiking	methods.		
	Dance structure	es - Engl	ish walt	z, Viennese walt	z, disco	fox, jive	, salsa.		
2.6. Format of instruction	Iectures			🗌 independen	t		2.7. Commen	ts:	
	🗆 seminars an	d works	hops	assignments					
	🖾 exercises			🗆 multimedia	and the				
	🗆 online in ent	irety		internet					
	🗆 partial e-lea	rning		Iaboratory					
	🗆 fieldwork			🗆 work with m	nentor				
				🗆 (other)					
2.8. Monitoring student	Class	YES		Research		NO	Oral exam		NO
work	attendance	5							····
	Experimental			Dana i			Мара		
	work		NO	кероrt		NO	radova		NO
				Seminar					
	Essay		NO	paper		NO	(other)		
	Preliminary		NO	Practical			(- +		
	exam			work		NO	(other)		



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	Project		NO	Written exam		NO	ECTS credi (tota	ts I)	1	
2.9. Assessment methods and criteria	Assessment is current academ	Assessment is conducted in accordance with Assessment methods and criteria for th current academic year.						or the		
2.10. Student responsibilities	Regular attenda	Regular attendance and active participation in exercises.								
2.11. Required literature (available in the library and/or via other media)		Tit	le		Av in t	ailabilit he libra	y ry	A via c	vailabilit other mo	ty edia
	 D. Pavlović Šumarskog fa zdravstvena ku 	(2010): kulteta ltura	Skript koleg	a za studente ij Tjelesna i	NO			YES, M	lerlin	
2.12. Optional literature	 Z. Šatalić, M. B.Neljak, R.C Bos, K. (2004 Sertić, H. (20 Ćurković, S. Kineziološki fak 	Sorić, N aput-Jo .) Hoda 05) Osn (2010) ultet Sv	1 Mišigo gunica: njem do ove bo ove bo Kinezi eučilišt	j-Duraković (202 Kineziološka me o zdravlja, Mozai ilačkih vještina, ološke aktivnost a u Zagrebu	L5): Spor todika u k knjiga Kineziolo i i rizičr	tska pre visokor 2. Colwi oški faku na pona	hrana, n obraz n, C., N Iltet Sv šanja s	Znanje, ovanju A. (1998) eučilišta studenat) u Zagre a, Diser	ebu rtacija.

UNDERGRADUATE STUDIES OF WOOD TECHNOLOGY - II. SEMESTER

1. GENERAL INFORMATIO	N						
1.1. Course lecturer(s)	Asst. Prof. Branimir Šafran, PhD Marko Rastija, mag. ing. mech.		5				
1.2. Course title	Engineering mechanics	 1.8. Number of hours in a semester (L+E+F+e-learning) 	30+30+0				
1.3. Course code	33627	1.9. Expected enrolment in the course	70				
1.4. Study programme	University Undergraduate Studies of Wood Technology	1.10. Level of application of e-learning (level 1, 2, 3)	1				
1.5. Course type	Compulsory	1.11. Language of instruction	Croatian				
1.6. Year of the study	1	1.12. Possibility of instruction in English	NO				
2. COURSE DESCRIPTION							
2.1. Course objectives The course's main objective is the correct understanding of Newton's three fundamental laws of mechanics and their application to the solution of engineering problems. The students get the ability to analyse any problem logically and straightforwardly. They become able to design mechanical structures, e.g. to determine such cross-sectional and material properties that the structures subjected to given loading, can perform without failure							
2.2. Enrolment requirements and/or entry competencies required for the course	-						
2.3. Learning outcomes at the level of the programme	A2 - Apply basic laws of physics that present the basis of wood technology, understand Newton's axioms and apply them to solve technical problems, explain phenomena in the field of electrical engineering, and make accurate and optimal use of electric energy:						



to which the course	A4 - Apply skills	s in solv	ing prac	ctical issues in the	e busine	ess, eith	er by control m	neasurer	ments,		
contributes			vernicat				an a badu				
	1. Determine tr	ie result	tant for	ce of the system	of force	s acting	on a body				
	2. Calculate the	mome	nt of the	e force around ar	1 axis						
	4. Write conditions (equations for the equilibrium of forece exting on a heavy										
	4. Write conditions/equations for the equilibrium of forces acting on a body										
	5. Calculate reactive forces to keep the body in equilibrium										
	6. Calculate the force of friction										
	7. Determine the forces of belt friction										
2.4. Expected learning	8. Determine axial forces and draw an axial forces diagram for axially loaded rods										
outcomes at the level of	9. Determine shear forces and bending moments and draw diagrams of shear forces and										
the course (3 to 10	bending mome	nts on a	beam								
learning	10. Calculate tv	visting r	noment	ts of torsionally -	loaded	shaft a	nd draw diagra	ms of tv	visting		
outcomes)	moments										
	11. Determine stress and deformation of the axially loaded rod										
	12. Determine	shear st	ress								
	13. Calculate th	e stress	and de	formation of a sl	haft sub	jected t	o torsion				
	14. Determine	bending	stress								
	15. Determine	dimen	sions of	f cross-sections	of stru	ctural n	nembers based	d on m	aterial		
	strength criteria										
	16. Examine the	e stabili [.]	ty of col	lumns							
	The course cov	ers the	statics o	of rigid bodies an	d the st	rength	of the material	. The fir	st part		
	contains the fundamental knowledge of statics as follows: the representation of the force										
	and the moment of a force, the reduction of a system of forces, the equilibrium conditions										
	for rigid bodies, free-body diagrams, dry friction, the Coulomb law as a limit case for										
	impending motion, belt friction, internal forces in beams and normal force, shear force and										
	bending moment diagrams.										
	The second part begins with the difference between rigid and deformable bodies and the										
	definition of stress. The stresses in point depend on the orientation of the surface on which										
	they are computed. The stress-strain relationship (Hooke law), the ultimate strength, the										
2.5. Course content	allowable stres	s. the er	ngineeri	ng stress. and th	e safetv	factor	are derived fror	n the m	aterial		
(syllabus)	testing.	-,			,						
	The following le	ectures	are dev	oted to the analy	/sis of tl	he stres	ses and of the	correspo	onding		
	deformations in	n variou	s struct	ural members. c	onsideri	ng succ	essively axial lo	ading. t	orsion		
	and hending. Each analysis is based on the conditions of equilibrium of the forces everted										
	on the membe	r. the H	looke la	w. and the men	nber's lo	bading.	A large numbe	r of exa	mples		
	complements t	he study	v of eac	h type of loading							
	Statically indete	erminat	e proble	ems are solved us	ing the i	method	which combin	es the a	nalvsis		
	of deformation	s with c	onventi	onal analysis of f	orces us	sed in st	atics.		,		
	Finally, the basi	ic conce	pts of t	he stability of col	umns (b	ouckling) are given.				
2.6. Format of instruction	⊠ lectures			☐ independen	t	0	2.7. Commen	ts:			
	□ seminars an	d works	hons	assignments	-						
			nops		and the						
	\square onling in ont	irotu		internet							
		irety									
		rning			antar						
	L fieldwork				ientor						
				🗆 (other)		1		1	1		
2.8. Monitoring student	Class	YES		Research		NO	Oral exam	YES			
work	attendance										
	Experimental		NO	Report		NO	(other)				
	work			Comita ca							
	Essay		NO	Seminar		NO	(other)				
				paper							
	Preliminary	YES		Practical		NO	(other)				
	exam			work							
	Project		NO	Written	YES		ECIS	5			
	-	I	I	exam	1	1	credits	1	1		



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							(total)			
2.9. Assessment methods	Assessment is	Assessment is conducted in accordance with Assessment methods and criteria for the									
and criteria	current academ	current academic year.									
2.10. Student	Regular attenda	Regular attendance and active participation in lectures and exercises. Taking colloquia and									
responsibilities	exams.	exams.									
2.11. Required literature											
(available in the library		Title					Availability			ty	
and/or via other media)							in the library			via other media	
	Damić V.: Sta	atika,	Hrvatsk	a sveučilišna							
	naklada, Zagreb	2000.									
	Matejiček F., Se	menski	D., Vnu	ičec Z.: Uvod u							
	statiku sa zl	birkom	zadat	aka, Golden							
	marketing, Zagr	eb 199	1.								
	Alfirević I.: Naul	ka o čvr	stoći, Te	ehnička knjiga,							
	Zagreb 1989.										
2.12. Optional literature	1. Beer F., John	ston R	: Vecto	r Mechanics for	Enginee	ers, Stati	ics, M	cGraw-l	Hill, Nev	w York	
	1988.										
	2. Beer F., Johns	ston R.:	Mecha	nics for Material	s, McGra	aw-Hill,	New Yo	ork 1992			

1. GENERAL INFORMATIO	N							
1.1. Course lecturer(s)	 Prof. Marilena Idžojtić, PhD Asst. Prof. Igor Poljak, PhD Antonio Vidaković mag. ing. silv. 	1.7. Number of ECTS credits	3					
1.2. Course title	The basics of dendrology	15+30+0						
1.3. Course code	33628	628 1.9. Expected enrolment in the course 70						
1.4. Study programme	University Undergraduate Studies of Wood Technology	1.10. Level of application of e-learning (level 1, 2, 3)	2					
1.5. Course type	Compulsory	1.11. Language of instruction	Croatian					
1.6. Year of the study	1	1.12. Possibility of instruction in English	NO					
2. COURSE DESCRIPTION								
2.1. Course objectives	2.1. Course objectives The students acquire theoretical and practical knowledge about economically most important autochthonous and allochthonous tree species. The theoretical knowledge includes biological features, morphological characteristics, intra-species variability, natural range, special characteristics, as well as the economic and ecological importance of species. Practically, the students acquire the ability to recognise tree species based on different morphological characteristics: habit, bark, leaves, twigs of deciduous species in winter, flowers finite and baseds							
2.2. Enrolment requirements and/or entry competencies required for the course	-							
2.3. Learning outcomes at the level of the programme to which the course	B1 - Identify parts and shapes of identify and explain the anator like species based on differentiated based on differentiated based on differentiated based	of trees, macroscopic, physical ar nic structure of the xylem of woo nt morphological characteristics	d chemical wood properties, od-like plants, identify wood- , and apply theoretical and					



contributes	practical knowl	edge of	comme	ercially importan	nt indigen	ous and	d foreig	n specie	s of woo	od and
	snrubbery.	d ovolaii	n hiolog	ical features and	Imorpho	logical	haract	oristics c	ftha ca	loctod
	genera of auto	chthonc	ous and	allochthonous	zymnosp	erms ar	id angio	sperms		lecteu
2.4. Expected learning	2. To identify	and de	escribe	economically in	nportant	autoch	thonou	is and a	, allochth	onous
outcomes at the level of	gymnosperm a	ind ang	iospern	n tree species a	ccording	to bar	k, twigs	s and bu	uds in v	vinter,
the course (3 to 10	leaves, cones, f	ruits an	d seeds	;	-		-			
learning	3. To use deter	minatio	n keys;							
outcomes)	4. To group au	tochtho	nous ai	nd allochthonou	s gymno	sperm	and an	giospern	n tree s	pecies
	according to b	iologica	l featur	es, morphologic	al charac	cteristic	s, distri	bution a	and eco	nomic
	Basic botanical	and de	ndrolog	ical definitions e	essential	for und	erstand	ing the g	whiert	
	Biological features, morphological characteristics, number of species and the									
	of some of the genera of gymnosperms and angiosperms. Morphological characteristics,									
	natural range,	special o	charact	eristics and ecor	nomic and	d ecolog	gical im	portance	e of indi	ividual
2.5. Course content	species among	g these	genera	a. The genera l	pelong to	o the f	ollowin	g famili	es: Pin	aceae,
(syllabus)	Taxodiaceae,	Taxacea	ie, Plat	anaceae, Ulma	iceae, N	loracea	e, Jugl	andacea	ie, Fag	aceae,
	Aceraceae, II	llaceae,	Salica	d Oleaceae	, гарасе	ae, wy	/rtacea	е, пірро	ocastan	aceae,
	Activities and allochthonous a									
	species, and th	e topics	of the	lectures follow a	systema	tic orde	er.			
2.6. Format of instruction	⊠ lectures			⊠ independe	nt		2.7.0	Commen	ts:	
	🗆 seminars an	d works	shops	assignments						
	⊠ exercises ⊠ multimedia				a and the					
	🗆 online in en	internet								
	⊠ partial e-lea	rning			montor					
				\Box (other)	mentor					
2.8. Monitoring student	Class	VEC					Oral avera		VEC	
work	attendance	YES		Research		NO	Orale	exam	YES	
	Experimental		NO	Report		NO	 (othe	r)	YES	
	work			, Consinon			· · · · ·	,		
	Essay		NO	paper		NO	(othe	r)		
	Preliminary		NO	Practical		NO	(
	exam		NO	work		NU	(othe	r)		
				Written			ECTS			
	Project		NO	exam	YES		credit	ts V	3	
29 Assessment methods	Assessment is	conduc	ted in	accordance wit	 h Δεερεε	ment n) and cr	iteria f	or the
and criteria	current acaden	nic year		accordance wit	11 753535		ictilou.			or the
2.10. Student	Regular attend	, ance at	lecture	s and exercises.	Making	and sub	mitting	exercis	es. Colle	ection,
responsibilities	production and	l deliver	y of he	rbariums. Makin	g and tak	ing hor	nework	. Taking	exam.	
2.11. Required literature						-: - -: :+		۸.	نا داند.	L
(available in the library		Tit	le		AV in t	allabilit ho libra	y n	A	/allabilli	iy adia
and/or via other media)							ıy	via C		eula
	Idžojtić, M., 20	05: Listo	padno	drveće i grmlje	YES					
	u zimskom r	azdoblju	u. Šum	arski fakultet						
	Sveučilišta u Za	grebu. 2	256 pp.	1						
	ldžojtic, M., Šumorski fokuli	2009:	Dendro	logija – List.	YES					
		iei svel	icilista l	a zagrebu. 904						
	Idžojtić. M. 2	2013: D	endrol	ogija – Cviiet.	YES					
	češer, plod,	sjeme.	Šum	arski fakultet	_					
	Sveučilišta u Za	grebu. (672 pp.							



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2.12. Optional literature	1. Anić, M., 1946: Dendrologija. Šumarski priručnik I, Zagreb. 475-582 pp.
	2. Bean, WJ, 1989: Trees and shrubs hardy in the British Isles. John Murray Publ., Ltd.,
	London.
	3. Fitschen, J., 2007: Gehölzflora. Quelle und Meyer Verlag, Wiebelsheim. 915 pp.
	4. Herman, J., 1971: Šumarska dendrologija. Stanbiro, Zagreb. 470 pp.
	5. Hillier, J., Coombes, A. (Eds.), 2007: The Hillier manual of trees and shrubs. A David and
	Charles Books, Cincinnati.
	6. Idžojtić, 2019: Dendrology: Cones, Flowers, Fruits and Seeds. Elsevier – Academic Press,
	London, San Diego, Cambridge, Oxford. 800 pp.
	7. Roloff, A., A. Bärtels, 2008: Flora der Gehölze. Bestimmung, Eigenschaften und
	Verwendung. Eugen Ulmer KG, Stuttgart. 853 pp.
	8. Roloff, A., Weisgerber, H., Lang, U.M., Stimm, B. (Eds.), 1994–weiter: Enzyklopädie der
	Holzgewächse: Handbuch und Atlas der Dendrologie. Wiley-VCH.
	9. Šilić, Č., 1973: Atlas drveća i grmlja. Zavod za izdavanje udžbenika, Sarajevo. 218 pp.
	10. Vidaković, M., 1993: Četinjače – morfologija i varijabilnost. GZH i Hrvatske šume, Zagreb.
	744 рр.

1. GENERAL INFORMATIO	N							
1.1. Course lecturer(s)	Prof. Anka Ozana Čavlović, PhD	1.7. Number of ECTS credits	5					
1.2. Course title	Applied technical graphics	 1.8. Number of hours in a semester (L+E+F+e-learning) 	15+45+0					
1.3. Course code	228985	1.9. Expected enrolment in the course	70					
1.4. Study programme	University Undergraduate Studies of Wood Technology	1.10. Level of application of e-learning (level 1, 2, 3)	2					
1.5. Course type	Compulsory	1.11. Language of instruction	Croatian					
1.6. Year of the study	1 1.12. Possibility of NO							
2. COURSE DESCRIPTION								
2.1. Course objectives	Students acquire basic knowledge of orthogonal and 3D projection. This course offers all elements of technical drawing and geometrical basics needed for using the AutoCAD drawing computer program. Through drawing, students practice technical perception and proportional transfer of seen or imagined objects.							
2.2. Enrolment requirements and/or entry competencies required for the course	-							
2.3. Learning outcomes at the level of the programme to which the course contributes	C5 - Size constructions, define product construction, define systematically, apply CAD syste AutoCAD; E1 - Continue specialisation Department of the Faculty of F	e systems of construction compo- the basic construction docu ems in the wood industry and 2 in university graduate studies forestry and Wood Technology.	ositions as a prerequisite for imentation and develop it D modelling with the help of at the Wood Technology					
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	 Apply the technical standard of lines, technical letter, paper or model measurement; Apply the technical standard Apply basics of drawing pro text writing and dimensioning, Construction model sketch i 	Department of the Faculty of Forestry and Wood Technology. 1. Apply the technical standards of orthogonal projection drawing (T, N, B, T1, N1, B1) (type of lines, technical letter, paper format, scale, dimensioning) according to the given 3D sketch or model measurement; 2. Apply the technical standards for drawing the cross-sections; 3. Apply basics of drawing program AutoCAD (templates, drawing tools and modify tools, text writing and dimensioning, print);						



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	5. Construction	5. Construction perspective projection of model and room with one or two points of view.									
	Introduction to	AutoC	AD cor	nputer drawing	program	n. Intro	ductior	to dra	wing do	omain,	
	selection line a	nd tools	, dialog	ue frames. Mea	sure stan	dard. C	hoice o	f drawin	g units.	Paper	
	area placemen	t, drawi	ng limit	ts and measure	units. Lir	ne type	and la	yer prop	erties c	orders.	
	Introduction to x,y coordinates systems of AutoCAD – WCS and UCS. Absolute and relative										
	coordinate system. Orthogonal drawing and tools. Movement, selection, and modification										
	of drawing ord	ers. The	point,	line, construction	on line ar	nd ray d	rawing	. Cutting	g, copyir	ng and	
2.5. Course content	moving of obje	ct order	s. Trimr	ning, stretching	and exte	nding of	f object	orders.	Text cre	eation,	
(syllabus)	text style, one	e or tw	o-line t	ext writing. Po	olygons a	nd cur	ves dra	awing w	ith Aut	oCAD.	
	Dimension line	s, layou	t and p	rint order. Orth	ogonal p	rojectio	n, sect	ions A-A	, В-В, С	-C. 3D	
	projection. Inti	oductio	on to x,	y,z coordinates	system	for isor	netric,	dimetrio	c and o	blique	
	projection. 3D	projection. Su projection of basic geometry objects determined by orthogonal project									
	Isometric draw	ing of ba	asic and	complex geome	etry objec	ts with	AutoCA	AD. Cent	ral proje	ection.	
	Perspective co	nstructi	on of a	point. Perspec	tive cons	truction	n of ba	sic geor	netry ol	ojects.	
2.6. Format of instruction	Perspective cor	Instruction of a room determined by orthogonal sections									
2.6. Format of instruction					nt		2.7.0	lommen	ts:		
	seminars an	d works	nops	assignments			The	lecture	on a s	pecific	
	⊠ exercises	🖾 exercises					topic	must	preced	e the	
				exerc	ise in	which	the				
	🖾 partial e-lea	□ fieldwork					lectu	ie s com	entisa	plieu.	
					lassroom						
2.8 Monitoring student	Class			I							
work	attendance	ttendance YES Research NO		NO	Oral exam		YES				
	Experimental						(- +)				
	work		NO	Report		NO	(othe	er)			
	Eccav NO Se		Seminar	NO		(otho	ur)				
	Loody		NO	paper							
	Preliminary	YES		Practical		NO	(othe	er)			
	exam			work	_		(*****				
				Written	1		ECIS		_		
	Project		NO	exam	YES		credi	ts	5		
2.0 According to the de	Assossment is	conduc	tod in	l accordanco wit	h Accorc	 mont r		i) s and cr	itoria f	ar tha	
and criteria	current academ	ic vear	leu m	accordance wit	II A33633		lethou			Ji the	
2.10. Student	Regular attend	ance a	nd activ	ve participation	in lectu	res and	exerc	ises, pre	paratio	n and	
responsibilities	submission of e	exercise	s within	the set deadlin	e. Taking	exam.	ener e	, p. c	.purutio		
2.11. Required literature											
(available in the library		Ti+	lo		Av	ailabilit	y	A	vailabilit	:y	
and/or via other media)		III	ie		in t	he libra	ry	via c	other me	edia	
	×										
	Cavlović, A.O.:	Uvod	u Aut	oCAD 2018,	NO			YES, M	lerlin		
	interna skripta,	2019.		×1 C·1							
	A.O.: Primije	enjena	tenni	cka grafika,	NO			YES, M	erlin		
	Prokrat C	vni mat	erijai, 2	.012. 	NO				orlin		
	prekrat, S., C modolirania dii		, A.U.: sklanov	osnove 3D				1 ES, IVI	lenin		
		la nasta	skiupuv svni ma	terijal 2021							
2.12. Optional literature	Kliaiin, M. On	alić. M	(2012)	Inženierska gra	i Ifika, Osii	ek: Str	piarski	l fakulteti	u Slavo	nskom	
	brodu i Grafika	d.o.o.	(2012)				- ,	andict			
	Kljajin, M., Kara	kašić M	. (2012) Modeliranie pr	imjenom	računa	la. Osii	ek: Stroia	arski fak	ultetu	
	Slavonskom bro	odu i Gr	afika d.	0.0.				- - -			
	-										



1. GENERAL INFORMATION									
1.1. Course lecturer(s)	Asst. Prof. Branimir Šafran, PhD Marko Rastija, mag. ing. mech.	1.7. Number of ECTS credits	5						
1.2. Course title	Wood industry mechanical engineering	30+30+0							
1.3. Course code	33630	1.9. Expected enrolment in the course	70						
1.4. Study programme	University Undergraduate Studies of Wood Technology	1.10. Level of application of e-learning (level 1, 2, 3)	2						
1.5. Course type	Compulsory	1.11. Language of instruction	Croatian						
1.6. Year of the study	1	1.12. Possibility of instruction in English	NO						
2. COURSE DESCRIPTION									
2.1. Course objectives	It is specific for this course that it involves parts of technical knowledge aimed at acquiring proficiency in procedures and processes of the woodworking industry - means of work means for handling supplies, gaining competence in their maintenance, getting familiar with ways of accreditation/certification, scope and possibilities of the basic components of technology and mechanisation as comprehensive means of work and woodworking production. Within the programme framework, the skill in mastering the practical side of this activity will also be developed by use of control measurements, calculations, testing, etc.								
2.2. Enrolment requirements and/or entry competencies required for the course	-								
2.3. Learning outcomes at the level of the programme to which the course contributes	 A3 - Competently maintain, components; A4 - Apply skills in solving practical calculations or testing verifications 	A3 - Competently maintain, work with and use the possibilities of basic technical components; A4 - Apply skills in solving practical issues in the business, either by control measurements, calculations or testing verifications.							
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	 Define mechanical propertie Compare effects of heat and machine elements Analyse the use of tool state processing Identification of connecting Calculate load magnitude at Check main quantities in we velocity, speed frequency, torce Calculate power transfer elee Construct machine elements Apply basic technical criteria safety) Analysis of piping, stop, safe Check and compare workint Differ types and characteri Analyse the operation of the consumption considering the top 	es and testing nd chemical-heat treatment of eels and new materials in prod elements, power and motion tra- non-separable and separable jo york with rotation motion elem que ements by friction and engageme s and define their application a for designing and dimensioning fety and regulating organs from e (friction) welding methods in a features of turbopumps on Q stics of turbine plants in WI plan ne internal combustion engine fr gravelled distance oblems in WI and make plans for s)	F steel on a dynamic load of uction phases of mechanical ansmission elements ints ents, peripheral and angular ent g machine elements (factor of the point of pressure loss WI plants and calculation of - H, $Q - \eta$, $Q - P$ diagrams ts rom the standpoint of energy the application of renewable						

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2.5. Course content (syllabus)	Classification of engineering. Pr Metal material engineering iro products. Heat metals and th ceramics, hard application. Fri Devices for oil and position. Separable and design. Journal Chain drive. Fr lubrication, and elements and Processes of w and special fac Suction pump ventilators. Air in WI. Interna application in V of power issues	Metal materials for the building of wood industry tools and products. Classification of engineering iron: steel, cast iron. The most common steels in the building of WI-tools and products. Heat treatment and chemical and heat treatment of steels. Light and non-ferrous metals and their properties. Application in the building of WI-products. Engineering ceramics, hard metals, composite materials, metal foams, polymers – properties and application. Friction and lubrication of WI-devices. Lubricants. The quality of lubricants. Devices for oil and grease lubrication. Tolerances and joint tolerances. Tolerances of shape and position. Properties and the quality of the treated surface. Connecting elements. Separable and non-separable joints. Rotary motion elements. Axles and shafts and their design. Journals. Sliding and rolling bearings. Couplings. Flat belt, V-belt and time belt drives. Chain drive. Friction drives. Gears. Types of gears, their shapes, transmissions, efficiency, lubrication, and materials used to manufacture gears. Worm drives. Piping. Flow regulation elements and pressure regulation elements. Mechanical engineering technologies in WI. Processes of welding and allied processes. Soldering. Sticking to metals. Machining metals and special facing methods. Fundamental laws of fluid mechanics. Fluid machinery in WI. Suction pump. Performances of turbine pumps. Hydraulic motors. Radial and axial ventilators. Air (pneumatic) motor drives. Compressors: features and types of compressors in WI. Internal combustion engines. Steam generators in WI plants. Application. Overview of power issues in the wood industry.									
2.6. Format of instruction	⊠ lectures	☑ lectures ☑ independent					2.7.0	Commen	its:		
	 seminars and workshops exercises online in entirety partial e-learning fieldwork 			assignments ☐ multimedia internet ⊠ laboratory ☐ work with r ☐ (other)							
2.8. Monitoring student	Class	YES		Research		NO	Oral	exam	YES		
WOIK	Experimental work		NO	Report		NO	(othe	er)			
	Essay		NO	Seminar paper	YES		(othe	er)			
	Preliminary exam	YES		Practical work		NO	(othe	er)			
	Project		NO	Written exam	YES		ECTS credi (tota	ts I)	5		
2.9. Assessment methods	Assessment is	conduc	ted in	accordance with	h Assess	ment n	nethod	s and ci	riteria f	or the	
2 10 Student	Regular attend	lance a	nd activ		in lectu	res and	l everc	ises nre	enaratio	n and	
responsibilities	submission of e	exercise	s within	the set deadline	e. Taking	exam.		15C5, pro	epuratio		
2.11. Required literature (available in the library and/or via other media)		Tit	le		Av in t	ailabilit he libra	y ry	Availability via other media			
	Perše, S. 2 Sveučilište u Z znanosti, Zagre	2000: Zagrebu b.	Osnove , Fakul	e strojarstva, tet prometnih							
	Karl-Heinz Dec	ker, 198	87: Eler	nenti strojeva,							
	Tehnička knjiga Ražnjević K (u	a Zagreb Ired 1 10	197: Kra	utov strojarski							
	priručnik, Axior	Raznjević, K. (ured.) 1997: Krautov strojarski priručnik, Axiom, Zagreb									



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	Alfirević, I., Modlić, B. (ured. biblioteke): IP 1 – Inženjerski priručnik, ŠK, Zagreb, izabrana poglavlja
2.12. Optional literature	 Dubbel Taschenbuch für den Maschinenbau, Springer. Filetin, T., Kovačiček, F., Indof, J. 2002: Svojstva i primjena materijala, Sveučilište u Zagrebu, Fakultet strojarstva i brodogradnje. Franz, M. 1998: Mehanička svojstva materijala, FSB. Kralj, S., Andrić, Š. 1992: Osnove zavarivačkih i srodnih postupaka, Sveučilište u Zagrebu, Fakultet strojarstva i brodogradnje. *** Izabrana poglavlja iz TE, LZ "Miroslav Krleža", Zagreb, sv. 1-12.

1. GENERAL INFORMATIO	N						
1.1. Course lecturer(s)	Asst. Prof. Kristijan Radmanović, PhD	1.7. Number of ECTS credits	4				
1.2. Course title	Fundamentals of electrotechnics	 1.8. Number of hours in a semester (L+E+F+e-learning) 	30+30+0				
1.3. Course code	33631	1.9. Expected enrolment in the course	70				
1.4. Study programme	University Undergraduate Studies of Wood Technology	1.10. Level of application of e-learning (level 1, 2, 3)	1				
1.5. Course type	Compulsory	1.11. Language of instruction	Croatian				
1.6. Year of the study	1	1 1.12. Possibility of NO					
2. COURSE DESCRIPTION							
2.1. Course objectives	The basis of power-generating energy of woodworking machinery and illumination is electrical energy. Reasonable management requests optimally make use of electrical energy. This calls for knowledge of the fundamental laws of electrical engineering.						
2.2. Enrolment requirements and/or entry competencies required for the course	-						
2.3. Learning outcomes at the level of the programme to which the course contributes	 A1 - Apply a physical approach of experimental observation and mathematical modelling, solve mathematically various research and practical problems, statistically process, present and analyse data, and reach conclusions based on analysed data; A2 - Apply basic laws of physics that present the basis of wood technology, understand Newton's axioms and apply them to solve technical problems, explain phenomena in the field of electrical engineering, and make accurate and optimal use of electric energy; B3 - Apply knowledge about the mechanical properties of wood, mechanical properties arrangement within individual trees and groups of trees, tree flaws and the influence of flaws on the mechanical properties of wood; B4 - Apply technical knowledge to master wood industry procedures and processes, means of work and material handling methods; B5 - Organise transport of wood and wooden materials, calculate and adjust the capacities of means of transport with technological procedures, calculate and analyse energy consumption, and recommend solutions for less complex wood and wooden material 						
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	 Define Coulomb's law and explain the meaning of the constants in the expression for the Coulomb force. Name and describe the physical quantity which describes the electric field. Apply the Gaussian law, for example, to determine the electric field of charged metal spheres, plates and capacitors. 						



	4. Analyse the	4. Analyse the serial and parallel condenser connections.										
	5. Explain the c	apacity	of the o	capacitor and the	e role of	the diel	ectric a	t the ca	oacitor.			
	6. Describe dire	ect curre	ent soui	rces. Demonstrat	te Kircho	ff's rule	s on an	n arbitrai	y exam	ple.		
	7. Analyse com	plex cu	rrent ci	rcuits of direct c	urrent. E	xplain t	he occ	urrence	of mag	netism		
	and electromag	gnetic in	ductior	۱.					-			
	8. Use the right	- -hand r	ule to d	etermine the dir	rection o	f Amper	and Lo	orentz's	force.			
	9. Appoint and	describ	e the pł	nysical size of the	e alternat	ting curi	ent wi	th appro	priate o	current		
	and effective va	alues.										
	10. Analyse the	RLC tit	re circle	and explain the	role of e	each ele	ment iı	n the cire	cle			
	11. Distinguish	the alte	rnating	current's active	, reactive	e, and a	oparen	t power.				
	12. Explain the	principl	e of ele	ctric motor and \mathfrak{g}	generato	r operat	tion. Ar	halyse th	e three	-phase		
	system. Interpr	et elect	rical me	easurements in v	voodwor	king pla	ints.					
	Introduction. E	lectrical	units. E	lectrostatic field	. Work a	nd volta	ge. Cap	pacitance	e. Cond	uctors,		
	insulators and semi-conductors. Effects of el. current. Electric circuit. Ohm's law. Connection											
	of resistors and sources. Work and Power of an electric current. Kirchoff's laws.											
	Electrochemical cells. Electromagnetism. Magnetic field; Magnetic fields of currents,									rrents,		
	Magnetic prop	erties of	a subs	tance; Move in t	he magn	etic field	d. Elect	romagn	etic ind	uction;		
2.5. Course content	Self-induction. Alternating current: Generation and effective value; Alternating-current									current		
(syllabus)	circuit (ohmic	resista	ince, ii	nductive and c	capacitive	e react	ances);	; Electri	c oscil	lations		
	(resonances); F	lign-fred	quency	generator; Powe	er, power	factor,	reactiv	e energy	. Three	-pnase		
	systems. Electric machines: Direct-current generators and motors; Protections;									ctions;		
	Iransformers; Synchronous machines; Induction machines; Polyphase induction motors;											
	fluorescent lamps): Quality and quantity of illumination. Electronic convertors, El											
	measurements of electrical quantities in Wood industrial plants											
2.6 Format of instruction		UI EIECI	incai qu		a muusti nt		.3.	Commen	tc·			
2.0. Format of instruction	\square seminars an	dworks	hone	assignments	ii.		2.7.0	Johnnen				
			nops		and the							
		tirotu										
		rning										
		rning			mentor							
				(other)	nentoi							
2.8 Monitoring student	Class											
work	attendance	YES		Research		NO	Oral	exam	YES			
	Experimental											
	work		NO	Report		NO	(othe	er)				
	Farmer		NO	Seminar	VEC		(a t h a					
	Essay		NO	paper	YES		(othe	er)				
	Preliminary	VEC		Practical		NO	(othe					
	exam	TLS		work		NO	louie	:)				
				Writton			ECTS					
	Project		NO	evam	YES		credi	ts	4			
				exam			(tota	I)				
2.9. Assessment methods	Assessment is	conduc	ted in	accordance with	n Assess	ment m	nethod	s and ci	riteria f	or the		
and criteria	current acaden	nic year.										
2.10. Student	Regular attend	ance an	d active	e participation in	lectures	s and ex	ercises	. Taking	colloqu	uia and		
responsibilities	exams.							1				
2.11. Required literature					Δ.,	ailabilit			vailabili	+.,		
(available in the library		Tit	le		AV in t	allabilit bo libra	y rv		valiaulii sthor m	udia.		
and/or via other media)							i y			eula		
	M. Essert.	J. Gri	lec.	Elektricitet i	NO			Online	editior	า		
	magnetizam" F	SB Zagr	eb 2009)								
	Ivan Mandić,	Veselko	Tomlj	enović, Milica	NO			Online	editior	ı		
	Pužar, "Sinkr	oni i	asinkr	oni električni								
	strojevi", TVZ Z	agreb 2	012.									



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	Ivan Felja, Danira Koračin "Zbirka zadataka i riješenih primjera iz osnova elektrotehnike" (1. i 2. dio), Školska knjiga Zagreb, 1992.	YES					
2.12. Optional literature	1.Borislav Kuzmanovič "Osnove elektrotehnike	e", Element 2000.					
	 Eugen Stanić "Osnove elektrotehnike", Školska knjiga Zagreb 2007. 						
	3. R. Stojanović: "Zbirka zadataka iz osnova ele	ektrotehnike'', Školska knj	jiga, Zagreb, 2005.				

1. GENERAL INFORMATIO	IN						
1.1. Course lecturer(s)	Prof. Tomislav Sinković, PhD Asst. Prof. Tomislav Sedlar, PhD Branimir Jambreković mag. ing. techn. lign.	Prof. Tomislav Sinkovic, PhD Asst. Prof. Tomislav Sedlar, PhD 1.7. Number of ECTS credits Branimir Jambreković mag. ing. techn. lign.					
1.2. Course title	Technical properties of wood I	45+60+0					
1.3. Course code	Prof. dr. sc. Tomislav Sinković Doc. dr. sc. Tomislav Sedlar Branimir Jambreković mag. ing. techn. lign.	70					
1.4. Study programme	University Undergraduate Studies of Wood Technology	1.10. Level of application of e-learning (level 1, 2, 3)	2				
1.5. Course type	Compulsory	1.11. Language of instruction	Croatian				
1.6. Year of the study	1	NO					
2. COURSE DESCRIPTION							
2.1. Course objectives	ives The course aims to acquire basic knowledge about commercial types of wood. Parts and shapes of the tree. Macroscopic and physical properties of wood. Arrangement of macroscopic and physical properties of wood within trees and trees. Basic knowledge is required as prior knowledge for basic wood technology processors of wood processing.						
2.2. Enrolment requirements and/or entry competencies required for the course	-		·				
2.3. Learning outcomes at the level of the programme to which the course contributes	B1 - Identify parts and shapes of identify and explain the anator like species based on differen practical knowledge of comme shrubbery.	of trees, macroscopic, physical ar mic structure of the xylem of woo nt morphological characteristics ercially important indigenous and	id chemical wood properties, od-like plants, identify wood- s, and apply theoretical and I foreign species of wood and				
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	 Determine parameters essential for the identification of commercial wood species, tree parts and tree modifications; Defining the structure of wood as a factor in the properties of wood; Wood cross-sectional properties; Defining and determining the physical properties of wood; Defining and determining the most significant factors that affect the physical properties of wood; Defining the distribution of physical properties of wood in the radial direction 						
2.5. Course content (syllabus)	Introduction to commercial tree modifications of the tree. Ele properties. The wood structure Sapwood and heartwood. Cla	e species. Segments and shape c mental composition of wood a as a feature of wood properties. assification. Process of heartwc	of the tree. Factors, types and and their influence on wood . Properties of wood sections. bod forming. Earlywood and				

1898 ARKUTET

SVEUČILIŠTE U ZAGREBU, FAKULTET ŠUMARSTVA I DRVNE TEHNOLOGIJE

2.6. Format of instruction	latewood and participation of latewood. The closeness of grain. The colour and lustre of the wood. The odour of wood. Wood texture. The density of wood matter. Wood density. Procedures for determining wood density. Wood density factors. Density distribution in timber and wood. Binding water to wood. Free and bound water in the wood. Methods for determining the moisture content in wood. Wood moisture conditions. Distribution of moisture content in wood and wood products. The gradient of moisture content in wood. Adsorption and desorption. Hygroscopic balance. Fibre saturation point. Maximum moisture content in wood. Heat conductivity in wood. Electrical conductivity of wood. Dielectric and piezoelectric properties of wood. Speed and sound resistance in wood. Attenuation and resonance of sound in wood. Arrangement of physical properties in wood. Diversity of physical properties between trees of the same type of wood.									
	seminars an	d works	hops	assignments			2.7.0	Jonnien		
	\boxtimes exercises	irotu		internet	and the					
	□ Online in end	rning		⊠ laboratory						
	☐ fieldwork	9		🛛 🛛 work with i	mentor					
		1	1	🗆 (other)	-				1	
2.8. Monitoring student work	Class attendance	YES		Research		NO	Oral	exam	YES	
	Experimental work	YES		Report		NO	(othe	er)		
	Essay		NO	Seminar paper		NO	(othe	er)		
	Preliminary exam	YES		Practical work		NO	(othe	er)		
	Project		NO	Written exam	YES		ECTS credi (tota	ts I)	7	
2.9. Assessment methods and criteria	Assessment is current academ	conduc nic year.	ted in	accordance wit	h Assess	ment n	nethod	s and cr	riteria f	or the
2.10. Student	Regular attend	ance at	classes	and exercises a	and prep	aration	and su	ıbmissio	n of exe	ercises
responsibilities	within the set o	leadline	. Taking	g exam.						
(available in the library		-			Av	ailabilit	v	A	vailabilit	V
and/or via other media)		IIt	le		in t	he libra	ry	via c	other m	edia
	Horvat, l.: Tehn 1976. str. 1-680	ologija).	drva I, s	kripta, Zagreb,	YES					
	Horvat, I. i dr	ugi: Os tr 28-6	snove n	nauke o drvu,	YES					
	Karahasanović,	A.:Nau	ka o dr	vetu, Sarajevo	YES					
	Ugrenović,A.; H		.: Tehno	ologija drveta,	YES					
2.12. Optional literature	1. Giordano, G.	: Tecnol	∠. logia de	l legno, Volume	l, Torino	, 1971. :	str. 1-1	086.		
	2. Giordano, G.	: Tecnol	logia de	l legno, Volume	111, Tor	ino, 197	76, str. 1	1-1351.		
	3. Kollmann F. F	R., Cote,	W A Jr	Principles of Wo	od Scien	ce and T	echnol	ogy I sol	id Wood	l, New
	тогк, 1968, str. 4. Tsoumis G	1-592. Science	and Te	chnology of Wo	od. New	York 19	91. str	1-233		
		Serence						- 200.		



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1. GENERAL INFORMATION								
1.1. Course lecturer(s)	Davor Pavlović M.Ed., professor of kinesiology	1.7. Number of ECTS credits	1					
1.2. Course title	Physical and health education 2	0+30+0						
1.3. Course code	2260421.9. Expected enrolment in the course70							
1.4. Study programme	University Undergraduate Studies of Wood Technology	1.10. Level of application of e-learning (level 1, 2, 3)	2					
1.5. Course type	Compulsory	1.11. Language of instruction	Croatian					
1.6. Year of the study	1	1.12. Possibility of instruction in English	NO					
2. COURSE DESCRIPTION								
2.1. Course objectives	The course Physical and Health Culture aims to acquire theoretical and practical kinesiological knowledge to train students for independent physical exercise and adopt healthy living habits. Through various forms of physical activity, the goal is to meet the daily needs for movement and improve the student population's motor, functional, and cognitive abilities. By attending classes, students are educated about the importance of daily physical exercise and all the good things physical activity means for a person and his health. The aim is to simultaneously acquire knowledge about the harmfulness of various forms of addiction to health, especially their impact on intellectual and physical capabilities, the importance of quality nutrition and the most interesting results of previous research on the student population in the segment: physical activity as disease prevention, healthy eating, sports discourse the more than a the physical activity as disease prevention.							
 2.2. Enrolment requirements and/or entry competencies required for the course 2.3. Learning outcomes at the level of the 	Health status.							
to which the course contributes	E1 - Continue specialisation Department of the Faculty of F	in university graduate studies Forestry and Wood Technology.	s at the Wood Technology					
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	 Describe the structure of the physical exercise class. Explanation of the impact of physical exercise on health. Choose fitness exercises designed to strengthen individual muscle groups. Demonstrate specific exercises concerning kinesiologic activity. Organise constructive free time Assess personal diet and physical exercise habits. Demonstrate general preparatory exercises and stretching exercises. Understanding kinesiology programs and their target orientation. 							
2.5. Course content (syllabus)	 9. Control emotions and strengthen self-control. Athletics Walking - walking at different paces, Nordic walking, brisk walking, hiking; Running - theoretical knowledge and divisions, cyclic movements at different paces, fast running short distances, running down a slope, running down a slope, interval cyclic movements, differences in running long, medium and short distances, running with loads, relay running, hurdles running different height. Martial arts Basic judo techniques - falls, hand throws, belt throws, leg throws, choking techniques, levers; 							



	 Basketball - keeping the ball in place, keeping the ball in motion, basic throwing, pivoting, jumping shot, passing in place and moving; Football - passing in place, passing to the first, passing in movement, ball technique, cooperation of two and three players, shots on goal from the run, shot on goal after the ball is added, volley, headshots, stopping the ball; Volleyball - passing with two hands above the head, passing with the forearms, service, passing behind the head, receiving service, blocks, playing technique in attack, playing technique in defence; Handball - guiding the ball in a straight line and with a change of direction. Passes in place, pass in motion, crosses, passes for counterattacks, cooperation of two and three players, shot on goal after the lead, shot on goal on the added ball. Racket sports Badminton - forehand punch under the arm, forehand punches above the head, forehand lob above the head, backhand kick under the arm, high serve, backhand serve, short serve, field moves, single play, pair play; Shooting - classification of shooting disciplines and equipment, weapons maintenance, breathing techniques, air rifle 10 m. Fitness programs - Circuit strength training, functional training, intensive cardio training, Pilates - exercises for warming up and preparing the locomotor system, stretching exercises, muscle strengthening exercises to increase muscle endurance, exercises to increase muscle mass, exercises stretching. Hiking tours - hiking on flat terrain, hiking tours, interval hiking methods. 									
2.6 Format of instruction	Dance structure	es - Eng	lisn war	tz, viennese wai	tz, alsco	tox, jive	2 7 (`ommen	tc۰	
	 sectures seminars and workshops exercises online in entirety partial e-learning fieldwork 			assignments multimedia and the internet laboratory work with mentor						
2.8. Monitoring student work	Class attendance	YES		Research		NO	Oral	exam		NO
	Experimental work		NO	Report		NO	Mapa radov (crtež	a va ža)		NO
	Essay		NO	Seminar		NO	(othe	er)		
	Preliminary exam		NO	Practical work		NO	(othe	er)		
	Project		NO	Written exam		NO	ECTS credi (tota	ts I)	1	
2.9. Assessment methods	Assessment is	conduc	ted in	accordance wit	h Assessi	ment m	nethod	s and cr	iteria f	or the
2.10. Student	Regular attenda	ance an	d active	participation in	exercise	s.				
responsibilities	-							1		
2.11. Required literature (available in the library and/or via other media)		Tit	le		Av in tl	ailabilit he libra	y ry	Av via c	vailabili other m	ty edia
	 D. Pavlović Šumarskog fa zdravstvena ku 	(2010) kulteta ltura	: Skript koleg	a za studente ij Tjelesna i	NO			YES, M	erlin	
2.12. Optional literature	1. Z. Šatalić, M. 2. B.Neljak, R.C 3. Bos, K. (2004	Sorić, N aput-Jo) Hoda	1 Mišigo gunica: njem do	oj-Duraković (20 Kineziološka me o zdravlja, Moza	15): Spori todika u ik knjiga 2	tska pre visokon 2. Colwi	hrana, n obraz n, C., N	Znanje, ovanju 1. (1998)		



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4. Sertić, H. (2005) Osnove borilačkih vještina, Kineziološki fakultet Sveučilišta u Zagrebu
5. Ćurković, S. (2010). Kineziološke aktivnosti i rizična ponašanja studenata, Disertacija.
Kineziološki fakultet Sveučilišta u Zagrebu

UNDERGRADUATE STUDIES OF WOOD TECHNOLOGY - III. SEMESTER

1. GENERAL INFORMATION									
1.1. Course lecturer(s)	Assoc. Prof. Igor Đukić, PhD Juraj Jovanović mag. ing. 1.7. Number of ECTS credits 6 techn. lign.								
1.2. Course title	Woodworking machinery I1.8. Number of hours in a semester45+45+16 (L+E+F+e-learning)								
1.3. Course code	239450	239450 1.9. Expected enrolment in the course 35							
1.4. Study programme	University Undergraduate Studies of Wood Technology	1.10. Level of application of e-learning (level 1, 2, 3)	2						
1.5. Course type	Compulsory	1.11. Language of instruction	Croatian						
1.6. Year of the study	2	1.12. Possibility of instruction in English	NO						
2. COURSE DESCRIPTION									
2.1. Course objectives	Acquiring the knowledge for selecting, optimal usage and maintenance of tools and machinery for wood processing. Acquiring the basics required for assigning project tasks to the manufacturers of special equipment for wood processing.								
2.2. Enrolment requirements and/or entry competencies required for the course	-								
2.3. Learning outcomes at the level of the programme to which the course contributes	C1 - Analyse the wood cutting machinery, select machinery recommend project assignmer	process, select, optimally use a working regimes and tools for nts to special equipment manufa	nd maintain primary process final wood processing, and cturers.						
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	 Distinguish characteristic types of woodworking machines and tools with and without forming wood shavings (saw blades, circular saw blades, planers, mills, drills, lathes). Explain the term elementary blade and sketch the basic geometrical cutting edge elements. Explain the difference between elemental and real blades. Identify the basic forms of tool-tip blunting and distinguish the causes of wear that cause some form of blunting. Differentiate the basic materials for making tool blades (tool steel, high-speed steel, hard alloy, hard metals, artificial diamonds) and the basic properties essential for woodworking (strength, hardness, temperature stability). Group influential variables on a tool-tip lifetime in different processing conditions and analyse their mutual relationship. Sketch and analyse forces on the tool-tip. Explain the role of individual cutting edge elements during cutting. Identify wood properties and tool-tip characteristics that affect the cutting process. Identify the basic forces on during the process. 								



	11. List the influ	uential I	parame	ters and calculat	e the spe	ecific cu	tting re	esistance	in proc	essing
	conditions.	o tochr	ologica	I paramotors for	bacic tw	oos of w	roodwa	rking m	achinos	
	12. Calculate th	ne cuttir	ng force	s in hasic types (basic typ	vorking	machir	n King III Nes	acimies	
	14. Calculate t	.4. Calculate the cutting power and electric motor power required for basic types of								
	woodworking r	voodworking machines								
	15. Calculate th	ne capad	city of b	asic types of wo	odworkir	ng mach	nines			
	16. Sketch the l	basic wo	oodwor	king tools (saw b	olades, ci	rcular s	aw blad	les, milli	ng cutte	er, drill
	bit) with all the	essenti	ial elem	ents (tool diame	eter, tool	blade a	ngles, e	etc.).		
	Basic terms. Ele	ements	and ang	les of a cutting to	ool. Real	cutting	edge. T	ool life.	Tool we	ear and
	tool wear type	s. Meth	nods for	r increasing tool	l life. The	e influe	nce of	the too	l wear	on the
	properties of w		fluence	the cutting proc		dels of s	s. me wood c	utting (utting	u. me
2.5. Course content	Work done, cu	tting no	ower, sr	pecific cutting proc	hergy and	d cuttin	g resist	ance. T	he influ	encing
(svllabus)	parameters on	specifi	c cuttin	g resistance. Ba	sic kinen	natics re	elations	during	sawing	. Band
	saws. The band	l saw b	lade. Sa	wing quality. Fr	ame saw	. Kinem	natics. F	rame sa	w blad	e. Saw
	blade lateral s	tability	and cut	tting quality. Ci	rcular sa	w. Circ	ular sav	w blade	. Machi	ne for
	planing and m	oulding	g, turniı	ng machines, m	nachines	for bo	ring ar	nd mort	ising, s	anding
	machines – too	ls, kinei	matics c	cutting quality ar	nd efficie	ncies. P	resses.	_		
2.6. Format of instruction	⊠ lectures			independe	nt		2.7.0	Commen	ts:	
	□ seminars an	d works	shops	assignments	and the					
	⊠ exercises	irotu			i and the					
	□ online in ent	rning								
	S fieldwork	iiiiig		\square work with	mentor					
				(other)						
2.8. Monitoring student	Class	VEC		Bosoarch		NO	Oral	ovam	VEC	
work	attendance	TES		Research		NU	Uran	exam	TES	
	Experimental work		NO	Report	YES		(othe	er)		
	_			Seminar				``		
	Essay		NO	paper		NO	(othe	er)		
	Preliminary	YES		Practical		NO	(othe	er)		
	exam	0		work			(00.00	,		
	Droiget			Written	VEC		ECTS	+ ~	6	
	Project		NO	exam	TES		(tota	(S)	0	
2.9. Assessment methods	Assessment is	conduc	ted in	accordance wit	h Assess	l ment n	hethod	s and ci	iteria f	or the
and criteria	current academ	nic year								
2.10. Student	Regular attend	ance a	nd activ	ve participation	in lectu	res and	exerci	ses. Tak	ing coll	loquia,
responsibilities	exams.									
2.11. Required literature					Δν	ailahilit	v	Δ.	vailahili	tv
and/or via other media)		Tit	le		in t	he libra	y rv	via d	other m	edia
							. /			
	Goglia V. (19	94) ST	ROJEVI	I ALATI ZA	YES					
	OBRADU DRVA	4 – I d	lio, Šun	narski fakultet						
	Zagreb		¥							
	Zupčević R. (:	1988) I		ZA OBRADU	YES					
	fakultet Saraio		A KEZA	ANJA, IVIƏSINSKI						
	Ettelt, B.: Gitt	еl. Н ()	2004): 9	Sägen, Fräsen	YES					
	Hobeln, Bohrer	1 - Die S	Spanung	g von Holz und						
	ihre Werkzeuge	e, DRW-	Verlag	-						
2.12. Optional literature	1. Lisičan J. (19	96) TEO	RIJA A T	TECHNIKA SPRAC	OVANIA	DREVA	, MAT-0	CENTRU	M, Zvole	en



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2. Williston E. M. (1978) SAWS – design, selection, operation, maintenance, Miller Freeman,
S.Francisco
3. Šavar Š. (1990) OBRADA METALA ODVAJANJEM ČESTICA Svezak 1, Školska knjiga Zagreb
4. Šavar Š. (1990) OBRADA METALA ODVAJANJEM ČESTICA Svezak 2, Školska knjiga Zagreb

1. GENERAL INFORMATIO	N							
1.1. Course lecturer(s)	Asst. Prof. Tomislav Sedlar, PhD Prof. Tomislav Sinković, PhD Branimir Jambreković mag. ing. techn. lign.							
1.2. Course title	Technical properties of wood II 1.8. Number of hours in a semester 30+30+16							
1.3. Course code	239398	1.9. Expected enrolment in the course	35					
1.4. Study programme	University Undergraduate Studies of Wood Technology	1.10. Level of application of e-learning (level 1, 2, 3)	2					
1.5. Course type	Compulsory	1.11. Language of instruction	Croatian					
1.6. Year of the study	2	1.12. Possibility of instruction in English	NO					
2. COURSE DESCRIPTION								
2.1. Course objectives	The course aims to acquire bat distribution of mechanical pr defects and the impact of defe required as prior knowledge fo	sic knowledge about the mechan operties of wood within the st cts on the mechanical properties or the technology of wood proce	nical properties of wood, the eem and within trees, wood s of wood. Basic knowledge is ssing.					
2.2. Enrolment requirements and/or entry competencies required for the course	-							
2.3. Learning outcomes at the level of the programme to which the course contributes	A1 - Apply a physical approach of experimental observation and mathematical modelling, solve mathematically various research and practical problems, statistically process, present and analyse data, and reach conclusions based on analysed data B1 - Identify parts and shapes of trees, macroscopic, physical and chemical wood properties, identify and explain the anatomic structure of the xylem of wood-like plants, identify wood- like species based on different morphological characteristics, and apply theoretical and practical knowledge of commercially important indigenous and foreign species of wood and shrubbery B3 - Apply knowledge about the mechanical properties of wood, mechanical properties arrangement within individual trees and groups of trees, tree flaws and the influence of							
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	 Introduction to measuring instruments for determining the mechanical properties of wood Determination of mechanical properties of wood Evaluation of wood species based on mechanical properties of wood Defining the radial distribution of mechanical properties of wood and their impact on further processing and use of wood Defining wood defects on trees and round wood Practical recognition and valorisation of wood defects on trees and round wood 							
2.5. Course content (syllabus) Mechanical properties of wood. Introduction to measuring instruments ar determining the mechanical properties of wood. Tensile strength of wood. Th strength of wood. Bending strength of wood. The twisting strength of wood.								



	strength. Impact strength of wood. The hardness of wood. Wear resistance of wood. Wood elasticity. Determination of wear resistance of wood in domestic and foreign commercial wood species. Factors affecting the mechanical properties of wood. Arrangement of mechanical properties in stem and trees. Comparison of mechanical properties of domestic and foreign commercial wood species. Rheological properties of wood. Wood defects. Classification. Wood defects caused by weather conditions. Wood defects caused by irregularities in the shape of the tree and the anatomical structure of the wood. Wood defects caused by physical and mechanical influences, changes in colour and consistency of wood. Effect of wood defects on mechanical properties of wood.									
2.6. Format of instruction	⊠ lectures			independer	nt		2.7.0	Commen	ts:	
	 seminars and workshops exercises online in entirety partial e-learning fieldwork 			assignments ☐ multimedia and the internet ⊠ laboratory ⊠ work with mentor ☐ (other)						
2.8. Monitoring student	Class	YES		Research	YES		Oral e	exam	YES	
	Experimental work	YES		Report		NO	(othe	er)		
	Essay		NO	Seminar paper		NO	(othe	er)		
	Preliminary exam	YES		Practical work		NO	(othe	er)		
	Project		NO	Written exam	YES		ECTS credit (total	ts I)	5	
2.9. Assessment methods and criteria	Assessment is current academ	conduc nic year.	ted in	accordance wit	h Assess	ment m	nethods	s and cr	iteria f	or the
2.10. Student responsibilities	Regular attendation taking colloquia	ance an a and ex	d active ams.	e participation ir	n lecture	s and ex	kercises	s. Doing	exercis	es and
2.11. Required literature (available in the library and/or via other media)		Tit	le		Av in t	ailabilit [.] he libra	y ry	Av via c	vailabili other m	ty edia
	Horvat, I.: Tehn 1976, str. 1-680	ologija).	drva I, s	kripta, Zagreb,	YES					
	Horvat,I. i dru Zagreb, 1985, s	ugi: Osi tr. 28-6	nove n 6	auke o drvu,	YES					
	Karahasanović, 1988, str. 1-426	A.:Nau 5.	ka o dr	vetu, Sarajevo	YES					
	Ugrenović,A.; H Zagreb, 1950, s	lorvat,l tr. 1-50	.: Tehn 2	ologija drveta,	YES					
2.12. Optional literature	1.Giordano, G.: 2.Giordano, G.: 3.Kollmann F. R York, 1968, str. 4.Tsoumis, G.: S 5. Walter, F.: Pr	Tecnolo Tecnolo ., Cote, 1-592. Science ruftechr	ogia del ogia del W A Jr I and Tec nikin del	legno, Volume legno, Volume Principles of Woo chnology of Woo r Holzindustrie, I	l, Torino, 111, Tori od Scienc od, New N Leipzig, 1	1971, s no, 197 ce and T /ork,199 977, str	tr. 1-10 6, str. 1 echnol 91, str. . 1-318	086. 1351. ogy I soli 1-233.	id Wood	d, New



UNIVERSITY OF ZAGREB, FACULTY OF FORESTRY AND WOOD TECHNOLOGY

1. GENERAL INFORMATION									
1.1. Course lecturer(s)	Assoc. Prof. Marin Hasan, PhD	1.7. Number of ECTS credits	7						
1.2. Course title	Pathology and wood protection	 1.8. Number of hours in a semester (L+E+F+e-learning) 	45+45+16						
1.3. Course code	239400	1.9. Expected enrolment in the course	35						
1.4. Study programme	University Undergraduate Studies of Wood Technology	1.10. Level of application of e-learning (level 1, 2, 3)	2						
1.5. Course type	Compulsory	1.11. Language of instruction	Croatian						
1.6. Year of the study	2	1.12. Possibility of instruction in English	NO						
2. COURSE DESCRIPTION	•								
2.1. Course objectives The skills in identifying the most important wood pests and wood decay fungi and recognising all damages produced by mentioned organisms. The establishing of knowledge about the basic principles of wood protection (the purpose of the wood protection and preservation, application of preventive and repressive methods and preservatives, and the influence of physical, chemical and anatomycal properties of wood on the wood preservation)									
2.2. Enrolment requirements and/or entry competencies required for the course	-								
2.3. Learning outcomes at the level of the programme to which the course contributes	B2 - Recognise and determine the most important types of xylophagous bacteria, insects, fungi and marine borers, and determine flaws on wood incurred due to their activity; learn the basic principles of wood protection based on physical, chemical and structural properties of wood, and apply basic procedures and methods for wood protection								
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	 Explain which chemical components of the wood structure and how they affect the wood's natural resistance. Distinguish the natural resistance from the natural durability of wood and define them. Analyse and describe the degree of degradation of wood by abiotic factors. Differentiate and explain defects in wood's structure and physical properties resulting from the degradation of abiotic factors from defects caused by biodegradation of wood. Differentiate and explain the bacterial degradation of wood from fungal degradation. Differentiate and explain the defects in wood's structure and physical properties resulting from the degradation of wood by certain groups (types, species) of wood-decaying fungi. Identify and distinguish insects from other arthropods. Identify and distinguish between commercially the most important species of xylophagous insects based on morphological images of adult insects. Differentiate and describe defects in the structure of wood caused by the degradation of individual groups, genera and/or species of marine pests. Analyse and describe the degree of degradation of wood caused by xylophagous organisms and assess the risk of using such wood in the manufacture of wooden products. Predict the mechanism of degradation of wood in certain use classes. Recommend an appropriate wood protection procedure under the given conditions. 								
2.5. Course content (syllabus)	Introduction to the history of v courses involved in the wood protection. Degradation and	vood protection and character a d protection. The role of natur l biodegradation of wood, g	nd role of other fundamental al wood durability in wood enerally. Biological causes;						



	morphology, anatomy, physiology, ecology, divisions and most significant representatives. Wood decay and succession: bacteria, rotting wood fungi (moulds, blue stain, soft rot fungi, basidiomycetes – decay fungi). Wood pests; primary, secondary, tertiary and quarternary insects (Coleoptera – wood-boring insects and Isoptera – termites). Marine borers. The use of physical and structural characteristics of wood in the wood preservation (porosity, permeability, diffusion, sapwood, heartwood). The fundamentals about the division and use of wood protection methods (preventive and repressive methods, surface and deep protection). Traditional preservation methods without pressure (brushing, spraying, dipping, hot-and-cold open tank processes, diffusion, penetration, absorption, adsorption), and Pressure treatment methods (full-cell method, empty-cell method, double vacuum process, penetration, max. & min. absorption & retention). Wood preservatives (traditional and new inorganic and organic preservatives, fumigant gases), the properties of wood preservatives (water repellency, vapour permeability, adhesion and its use (wood in interior and exterior, wood in the ground and above ground contact, hazard classes, penetration classes).											
2.6. Format of instruction	⊠ lectures			⊠ independent			2.7. Comments:					
	Seminars and	d works	hops	assignments	a and the							
	\square online in ent	iretu		internet								
	⊠ partial e-lea	rning										
	⊠ fieldwork	\boxtimes fieldwork \square work with				mentor						
		1	1	🗆 (other))				1			
2.8. Monitoring student	Class	YES		Research		NO	Oral	exam	YES			
WOIK	Experimental											
	work		NO	Report	YES		othe (othe	er)				
	Essay		NO	Seminar		NO	(othe	er)				
	Preliminary	VEC		Practical	VEC		()				
	exam	YES		work	YES		(othe	er)				
	Project		NO	Written exam	YES		ECTS credi (tota	ts I)	7			
2.9. Assessment methods	Assessment is conducted in accordance with Assessment methods and criteria for the								or the			
and criteria	current academ	nic year.										
2.10. Student	Regular attenda	ance an	d active	e participation in	lectures	and ex	ercises	. Taking	colloqu	ia and		
2 11 Required literature	exams.											
(available in the library		T :4	1.		Av	ailabilit	/ Availability					
and/or via other media)			in the library			via other media						
	Haran M. Dornot P. 2019: Začtita dava L. VEC						VES			YES Merlin		
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	skripta za stu	tehnologije iz										
	predmeta Zast	atologija drva. arski fakultet										
	Zagreb, 2018.											
	Špoljarić, Z.	ŠTITA DRVA	YES									
	(Impregnacija),											
	VII stupnja nast 1973.											
	Glavaš, M.	ČNE BOLESTI	YES									
	ŠUMSKOG DRV											
	Sumarski fakult											
	pogiavija).											

SVEUČI UNIVERS

RSTVAIDRY

SVEUČILIŠTE U ZAGREBU, FAKULTET ŠUMARSTVA I DRVNE TEHNOLOGIJE

UNIVERSITY OF ZAGREB, FACULTY OF FORESTRY AND WOOD TECHNOLOGY

2.12. Optional literature	Vasić, K. 1971: ZAŠTITA DRVETA 1: KSILOFAGNI INSEKTI, Naučna knjiga, Beograd, 1971						
	(odabrana poglavija).						
	Petrović, M. 1980: ZAŠTITA DRVETA 2: TRULEŽ I OBOJENOST DRVETA, Naučna knjiga						
	Beograd, 1980. (odabrana poglavlja).						
	Zbornici radova s međunarodnih savjetovanja WOOD IN THE CONSTRUCTION						
	INDUSTRY,(Despot, R. i Jambreković, V. Editors); (2000, 2001, 2002, 2003 i 2004), Zagreb: Šumarski fakultet.						
	Eaton, R.A., Hale, M.D.C.1994: WOOD, DECAY, PESTS AND PROTECTION, Chapman & Hall,						
	1994. United Kingdom.						
	Bravery, A.F., Berry, R.W., Carey, J.K., Cooper, D.E.1992: RECOGNISING WOOD ROT AND						
	INSECT DAMAGE IN BUILDINGS, BRE Bookshop, Seconfd edition, 1992. Garston, Watford,						
	United Kingdom.						

1. GENERAL INFORMATIO	1. GENERAL INFORMATION							
1.1. Course lecturer(s)	Assoc. Prof. Josip Ištvanić, PhD	1.7. Number of ECTS credits	6					
1.2. Course title	Sawmilling technology	 1.8. Number of hours in a semester (L+E+F+e-learning) 	30+45+8					
1.3. Course code	236171	1.9. Expected enrolment in the course	35					
1.4. Study programme	University Undergraduate Studies of Wood Technology	1.10. Level of application of e-learning (level 1, 2, 3)	2					
1.5. Course type	Compulsory	1.11. Language of instruction	Croatian					
1.6. Year of the study	2	1.12. Possibility of instruction in English	NO					
2. COURSE DESCRIPTION								
2.1. Course objectives	Area Sawmilling products, knowledge of sawmilling raw materials and practical abilities for their gradings and measurements. Knowledge and use of sawmilling machines, sawmilling technologies, sawing logs and sawn wood methods. Knowledge of sawmilling technology efficiency criteria.							
2.2. Enrolment requirements and/or entry competencies required for the course	-							
 2.3. Learning outcomes at the level of the programme to which the course contributes 2.4. Expected learning 	C1 - Analyse the wood cutting process, select, optimally use and maintain primary process machinery, select machinery working regimes and tools for final wood processing, and recommend project assignments to special equipment manufacturers; C2 - Recognise and assess sawmilling raw material and products, conduct the categorisation and measurements of sawmilling raw material and products, apply basic skills of wood sawmilling technology and techniques of log and board sawing, and identify factors of successful sawmilling wood processes; D1 - Plan and organise the time study, work rationalisation, and perform quality control in technological processes and on finished products, maintain supply, stock and logistic support optimization, plan and calculate the production, calculate basic business KPIs, write basic financial reports, recognise types of expenses.							
outcomes at the level of the course (3 to 10 learning	 Distinguish the type and quality of oak, beech, fir and spruce sawmilling raw material Distinguish the type and quality of oak, beech, fir and spruce sawmilling products Measure the dimensions of the round wood (diameter and length) 							
1898 ARKULTET STATUS

SVEUČILIŠTE U ZAGREBU, FAKULTET ŠUMARSTVA I DRVNE TEHNOLOGIJE

eutcomes) 4. Calculate individual volumes of round wood shavings based on the measurement of their dimensions (diameter and length) 5. Estimate (calculate) the volume of the stack, or the volume of the round wood in the stack 6. Calculate individual volumes of sawmilling products by measuring their dimensions (thickness, width and length) 7. Estimate the (computed) volume of the stack, or the volume of sawmilling products by the stack or the volume of sawmilling products by measuring their dimensions (thickness, width and length) 7. Estimate the (computed) volume of the stack, or the volume of sawmilling products by the stack or the volume of sawmilling products by the stack or the volume of sawmilling products by the stack or the volume of sawmilling products by the stack by the s											
2.5. Course content (yilabus) 0. Second Se	outcomes)	4. Calculate ind dimensions (dia 5. Estimate (cal	ividual v ameter a culate) t dividual	volumes and leng the volu	s of round wood s gth) ime of the stack, o les, of sawmilling	shavings	s based plume o	on the measure f the round woo	ement o od in the	of their e stack	
stack 8. Calculation of oversizes on sawmilling products 9. Distinguish types and application of the frame saws 10. Distinguish types and application of of the frame saws 11. Distinguish types and application of secondary sawing circular saws specializing in cross- cut sawing 13. Different types and applications of secondary sawing circular saws specializing in rip sawing 14. Link different types of asplications of secondary sawing circular saws specializing in rip sawing 15. Calculate the success of sawing of certain wood species according to the criteria of the quantitative yield of round and sawn wood. 15. Calculate the success of sawing togs 18. Use the basic methods of sawing togs 19. Plan and organize day-to-day sawmilling production. Introduction to sawmilling production. Short overview of a sawmilling plant. Unterpreting of the sawmilling nuburty. Sawmilling productis and residues. Main characteristics of sawn wood. Quality and characteristic defects of ur most important wood species. Standard rules for sawmilling plant. Cation of the sawmilling plant. Size of sawn wood. Sawmilling plant. Main parts of the sawmilling plant. Size of sawn wood. Sawmilling plant. Main parts of the sawmilling plant. Size of sawn wood. Conversation achieves saw. Ego chaping machines. Selection and working conditions of sawmill machines. Criteria for sawmill production flow and technical charts processing fir and spruce logs and hardwood logs. Log conversation. Sawn wood conversation methods. Methods. Methods. Methods of sawing of more important work 2.6. Format of instruction Eletures <t< th=""><th></th><th>(thickness, widt 7. Estimate the</th><th>th and le (compu</th><th>ength) ited) vol</th><th>lume of the stack</th><th>, or the</th><th>volume</th><th>of sawmilling p</th><th>roducts</th><th>in the</th></t<>		(thickness, widt 7. Estimate the	th and le (compu	ength) ited) vol	lume of the stack	, or the	volume	of sawmilling p	roducts	in the	
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UNIVERSITY OF ZAGREB, FACULTY OF FORESTRY AND WOOD TECHNOLOGY

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	2.Gornik Bučar,	D.; Me	erzelj, F.	. 1998: Žaga	arski p	oraktiku	im, Un	iverza v	Ljubljan	i, Biote	hniška
	fakulteta, Odde	lek za le	esarstvo).							
	3.Nikolić, M. 20	04: Pre	rada drv	veta na pilar	nama,	udžber	nik, Uni	iverzitet	u Beogr	adu, Šu	marski
	fakultet, Beogra	ld									

1. GENERAL INFORMATION								
1.1. Course lecturer(s)	Prof. Ružica Beljo Lučić, PhD Asst. Prof. Matija Jug, PhD	1.7. Number of ECTS credits	5					
1.2. Course title	Transport equipment in wood industry	1.8. Number of hours in a semester (L+E+F+e-learning)	30+45+16					
1.3. Course code	239685	1.9. Expected enrolment in the course	35					
1.4. Study programme	University Undergraduate Studies of Wood Technology	1.10. Level of application of e-learning (level 1, 2, 3)	2					
1.5. Course type	Compulsory	1.11. Language of instruction	Croatian					
1.6. Year of the study	2	1.12. Possibility of instruction in English	YES					
2. COURSE DESCRIPTION								
2.1. Course objectives This course aims to acquire basic technical and technological knowledge related to monitoring and control of the work of transport equipment in the wood industry, as well as to assess and adapt the capacity of means of transport and their coordination with technological procedures. The course provides primary ground for solving less complex tasks and issues related to the transport of wood and wooden materials.								
2.2. Enrolment requirements and/or entry competencies required for the course	-							



2.3. Learning outcomes at the level of the programme to which the course contributes	 All - Apply a physical approach of experimental observation and mathematical modeling, solve mathematically various research and practical problems, statistically process, present and analyse data, and reach conclusions based on analysed data; A4 - Apply skills in solving practical issues in the business, either by control measurements, calculations or testing verifications; B4 - Apply technical knowledge to master wood industry procedures and processes, means of work and material handling methods; B5 - Organise transport of wood and wooden materials, calculate and adjust the capacities of means of transport with technological procedures, calculate and analyse energy consumption, and recommend solutions for less complex wood and wooden material transport projects. 									
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	 important for transport and storage: volume, mass, density, bulk density, bulk angle, and granulation. 2. Analyze influential factors on the basic characteristics of transported materials. 3. Calculate the required capacity of transport equipment in the woodworking and processing industry: conveyors capacity (belt conveyors, scraper conveyors, elevators, roller conveyors, chain conveyors), cranes and industrial vehicles depending on the parameters of the technical processing of wood. 4. Evaluate the transport losses expressed in percentage relative to the transported weight. 5. Calculate the required driving power of the transport equipment in the woodworking process. 6. Calculate the dimensions (diameter, cross-sectional area) and select the steel rope and chain components according to the appropriate standards depending on the load weight, rope and chain strength, and load mode. 7. Control the operation of the air conveyor system – determine static pressure drop in the system, dynamic pressure, and airflow rate, and calculate the fan's utility and system utility. 8. Select the ventilator for the air conveyor system depending on the system parameters. 									
2.5. Course content (syllabus)	Purpose and task of transport. Historical development of transport. Basic forms of transport and transport equipment. Maximum load and capacity of means of transport of periodical and continuous supply. Measures of assessment of transport activities. Equivalent resistance coefficient. Characteristics of transported materials in the wood industry. Types of loads of transport constructions. Components of transport equipment. Driving mechanism of the means of transport in the wood industry. Means of transport in the wood industry. Means of periodical supply. Winches. Lifts. Cranes. Industrial vehicles. Hand-operated industrial vehicles. Motor-operated industrial vehicles. Road vehicles. Manipulators, industrial robots. Means of continuous supply. Conveyors. Mechanical conveyors with a hauling element (belt conveyors, track conveyors, chain conveyors, elevators). Mechanical conveyors without a hauling element (roller, vibrating, worm, and gravity conveyors). Air conveyors. Components of air conveyors. Control of an exhaust system. A mean of transport in the function of the technological production process. Transport systems in a sawmill, in production plants of particle boards, in production plants of veneer and plywood and production plants of furniture. Characteristics of transport equipment are essential in terms of choice and									
2.6. Format of instruction	⊠ lectures			⊠ independen	t		2.7. Commen	ts:		
	 □ seminars an ○ exercises □ online in ent ○ partial e-lea ○ fieldwork 	d works <i>irety</i> rning	hops	assignments ☐ multimedia internet ⊠ laboratory ☐ work with m ☐ (other)	and the nentor					
2.8. Monitoring student	Class	YES		Research		NO	Oral exam	YES		
work	attendance Experimental work	YES		Report		NO	(other)			
	Essay		NO	Seminar paper		NO	(other)			



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	Preliminary exam	YES		Practical work	YES		(othe	er)		
	Project		NO	Written exam	YES		ECTS credi (tota	ts I)	5	
2.9. Assessment methods	Assessment is	conduc	ted in	accordance wit	h Assess	ment n	nethod	s and cr	riteria f	or the
and criteria	current academ	nic year.								
2.10. Student responsibilities	Regular attend preparation of	dance a exercise	and act es and ta	ive participatio aking exams.	n in lea	ctures a	and ex	ercises.	Indepe	endent
2.11. Required literature										
(available in the library		Tit	le		Av	ailabilit	y	A'	vailabili	ty
and/or via other media)					in the library via othe				other m	edia
	Sever, S. 1988:	NO			YES, M	lerlin				
	autorizirani ruk									
	Hamm, Đ. 1	1987:	Transpo	ortni uređaji,	YES			YES, M	lerlin	
	Šumarska end	cikloped	lija, sv	vezak 3, JLZ						
	"Miroslav Krlež	a", Zagr	eb, 521	-529.						
	Oluić, Č. 199	91: Tra	insport	u industriji,	YES					
	Rukovanje ma	terijalor	m I. di	o, Sveučilišna						
	naklada, Zagret	o, 1 – 27	/8.							
	Beljo Lučić, R.:	Transpo	ortna te	hnika u drvnoj				YES, M	lerlin	
	Industriji, preze	entacije	u Powe	r Pointu, 2020.				000 at a	246.25	7
2.12. Optional literature	1. Biljan, IVI.: Di	zalice, S	umarsk	a encikiopedija,	svezak 1	., JLZ, Za iga 7ag	greb, 1	.980, str.	. 346-35 1 <i>176</i>	7.
	2. Iviadjarevic, B.: Kukovanje materijalom, Tennicka knjiga, Zagreb, 1972, str. 1-476.								grehu	
	Fakultet stroia	rstva i l	orodogr	adnie. Zagreh	1993.: P	hvsiolog	rical Pla	ant Ecol	ngv. Sn	ringer
	Berlin.			aaje, _ugreb,		,		2001	-67. op	

1. GENERAL INFORMATION									
1.1. Course lecturer(s)	Davor Pavlović M.Ed., professor of kinesiology	1.7. Number of ECTS credits	1						
1.2. Course title	Physical and health education 3	 1.8. Number of hours in a semester (L+E+F+e-learning) 	0+30+0						
1.3. Course code	226043	1.9. Expected enrolment in the course	35						
1.4. Study programme	University Undergraduate Studies of Wood Technology	1.10. Level of application of e-learning (level 1, 2, 3)	2						
1.5. Course type	Compulsory	1.11. Language of instruction	Croatian						
1.6. Year of the study	2	1.12. Possibility of instruction in English	NO						
2. COURSE DESCRIPTION									
2.1. Course objectives The course Physical and Health Culture aims to acquire theoretical and practical kinesiological knowledge to train students for independent physical exercise and adopt healthy living habits. Through various forms of physical activity, the goal is to meet the daily needs for movement and improve the student population's motor, functional, and cognitive abilities. By attending classes, students are educated about the importance of daily physical exercise and all the good things physical activity means for a person and his health. The aim is to simultaneously acquire knowledge about the harmfulness of various forms of addiction to health, especially their impact on intellectual and physical capabilities, the importance of quality nutrition and the most interesting results of previous research on the student									



	population in the segment: pl diagnostics, stress management	hysical activity as disease prevents, physical activity as a means o	ention, healthy eating, sports					
2.2. Enrolment requirements and/or entry competencies required for the course	Health status.							
2.3. Learning outcomes at the level of the programme to which the course contributes	E1 - Continue specialisation Department of the Faculty of F	in university graduate studie Forestry and Wood Technology.	s at the Wood Technology					
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	 Describe the structure of th Explanation of the impact of Choose fitness exercises des Demonstrate specific exerci Organise constructive free t Assess personal diet and ph Demonstrate general prepa Understanding kinesiology p Control emotions and strenge 	 Explanation of the impact of physical exercise on health. Explanation of the impact of physical exercise on health. Choose fitness exercises designed to strengthen individual muscle groups. Demonstrate specific exercises concerning kinesiologic activity. Organise constructive free time Assess personal diet and physical exercise habits. Demonstrate general preparatory exercises and stretching exercises. Understanding kinesiology programs and their target orientation. Control emotions and strengthen self-control. 						
2.5. Course content (syllabus)	Athletics Walking - walking at different Running - theoretical knowled running short distances, run movements, differences in run relay running, hurdles running Martial arts Basic judo techniques - falls, levers; Basic techniques of karate - kid Sports games Basketball - keeping the ball in jumping shot, passing in place Football - passing in place, p cooperation of two and three is added, volley, headshots, sto Volleyball - passing with two passing behind the head, red technique in defence; Handball - guiding the ball in a pass in motion, crosses, passes shot on goal after the lead, sho Racket sports Badminton - forehand punch lob above the head, backhand field moves, single play, pair p Shooting - classification of sl breathing techniques, air rifle Fitness programs - Circuit stro Pilates - exercises for warming muscle strengthening exercises thiking tours - hiking on flat ter Dance structures - English wal	paces, Nordic walking, brisk wall dge and divisions, cyclic mover ning down a slope, running d nning long, medium and short d different height. hand throws, belt throws, leg cks, punches, defence. n place, keeping the ball in mot and moving; bassing to the first, passing in players, shots on goal from the r opping the ball; hands above the head, passing ceiving service, blocks, playing a straight line and with a change es for counterattacks, cooperation of on goal on the added ball. under the arm, forehand punch kick under the arm, high serve, lay; nooting disciplines and equipm 10 m. ength training, functional traini up and preparing the locomotor s, exercises to reduce subcutane o increase muscle mass, exercise rain, hiking tours, interval hiking ta Viennese waltz disco fox jive	king, hiking; hents at different paces, fast own a slope, interval cyclic listances, running with loads, throws, choking techniques, ion, basic throwing, pivoting, movement, ball technique, un, shot on goal after the ball g with the forearms, service, technique in attack, playing e of direction. Passes in place, on of two and three players, es above the head, forehand backhand serve, short serve, hent, weapons maintenance, ng, intensive cardio training, system, stretching exercises, eous fat, exercises to increase es stretching. g methods.					
2.6. Format of instruction		independent	2.7. Comments:					



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2.8 Monitoring student	 seminars and workshops exercises online in entirety partial e-learning fieldwork Class 			assignments multimedia and the internet laboratory work with mentor (other)						
work	attendance	YES		Research		NO	Oral	exam		NO
	Experimental work		NO	Report		NO	Mapa rado (crte	a va ža)		NO
	Essay		NO	Seminar paper		NO	(othe	er)		
	Preliminary exam		NO	Practical work		NO	(othe	er)		
	Project		NO	Written exam		NO	ECTS credi (tota	ts I)	1	
2.9. Assessment methods	Assessment is	conduc	ted in	accordance wit	h Assess	ment n	nethod	s and cr	riteria f	or the
and criteria	current acaden	nic year								
2.10. Student responsibilities	Regular attend	ance an	d active	participation in	exercise	S.				
2.11. Required literature (available in the library and/or via other media)		Tit	le		Av in t	ailabilit he libra	y ry	Av via c	vailabili other m	ty edia
	1. D. Pavlović (2010): Skripta za studente NO Šumarskog fakulteta kolegij Tjelesna i zdravstvena kultura							YES, M	lerlin	
2.12. Optional literature	1. Z. Šatalić, M. 2. B.Neljak, R.C 3. Bos, K. (2004 4. Sertić, H. (20 5. Ćurković, S. Kineziološki fak	zdravstvena kultura 1. Z. Šatalić, M.Sorić, M Mišigoj-Duraković (2015): Sportska prehrana, Znanje, 2. B.Neljak, R.Caput-Jogunica: Kineziološka metodika u visokom obrazovanju 3. Bos, K. (2004.) Hodanjem do zdravlja, Mozaik knjiga 2. Colwin, C., M. (1998) 4. Sertić, H. (2005) Osnove borilačkih vještina, Kineziološki fakultet Sveučilišta u Zagrebu 5. Ćurković, S. (2010). Kineziološke aktivnosti i rizična ponašanja studenata, Disertacija								ebu rtacija.

UNDERGRADUATE STUDIES OF WOOD TECHNOLOGY - IV. SEMESTER

1. GENERAL INFORMATION								
1.1. Course lecturer(s)	Prof. Silvana Prekrat, PhD Assoc. Prof. Vjekoslav Živković, PhD	1.7. Number of ECTS credits	7					
1.2. Course title	Wood constructions	 1.8. Number of hours in a semester (L+E+F+e-learning) 	45+45+0					
1.3. Course code	235953	1.9. Expected enrolment in the course	35					
1.4. Study programme	University Undergraduate Studies of Wood Technology	1.10. Level of application of e-learning (level 1, 2, 3)	1					
1.5. Course type	Compulsory	1.11. Language of instruction	Croatian					



1.6. Year of the study	2	1.12. Possibility of instruction in English	NO				
2. COURSE DESCRIPTION							
2.1. Course objectives	Mastering the advanced 2D m wood industry. Tasks of th preconditions for products cor approach to its development.	nodelling with AutoCAD. Learnir e constructor. Mastering the nstruction. Basic construction do	ng about CAD systems in the construction systems and ocumentation and systematic				
2.2. Enrolment requirements and/or entry competencies required for the course	Computer classroom equippe programs for 2D drawing and p Passed exam in the course Ap in exact and sketching in a par	ed with graphic workstations a parametric 3D modelling. plied Technical Graphics. Master ametric CAD program.	and general CAD computer ring the basics of 2D drawing				
2.3. Learning outcomes at the level of the programme to which the course contributes	C5 - Size constructions, define product construction, define systematically, apply CAD syst AutoCAD.	e systems of construction components the basic construction docu ems in the wood industry and 2	ositions as a prerequisite for imentation and develop it D modelling with the help of				
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	 Recognition of different wood species and types of wooden and non-wooden materials in the construction of furniture and furnishing. Make a technical drawing of the element and the assembly in terms of and cross-section according to norms Use technological labels, adhesive joints, mechanical and surface treatments Apply tolerances - tolerances on wood products. Calculate the percentages on wood assemblies Choose characteristic views and cross-sections by determining the plane position Apply simple calculations for dimensioning construction elements. Make a technical description of the product. Describe and recognize the constructional forms of the assembly system on the products. Sketching and technical drawing in orthogonal and axonometric projections showing different forms of construction of wooden structures. Separate joints and assemblies and use fitting and joining elements in wooden structures. Design longitudinal assemblies, width and angle assembly and edge and corner assembly 						
2.5. Course content (syllabus)2.6. Format of instruction	Construction venue and tasks. Wood, wooden and non-wooden materials as furniture and equipment construction materials. Technical drawing of wooden products. Technical drawing according to the standards. Deviations from measures, tolerances and fits. Technological markings for the mechanical finish, connecting with glue, surface finish, upholstery. Control of drawings. Selection of characteristic views and cuts by determining the position of the cut plane, demonstration of parts, product assemblies and details views and cuts. System of constructional forms for joining wooden constructions. Longitudinal, latitudinal, plain and mitre joints of the elements of solid wood and wood-based panels. Corner joints of wooden elements. Computerized construction. Advanced mastering of AutoCad in 2D projection. Products designing for information processing. CAD/CAM system and its importance, designing equipment and computerized construction. Functional description of a CAD system. Assembling and connecting elements. Construction principles for wooden products.2.7. Comments: Exercises are performed in						
	 □ online in entirety ☑ partial e-learning ☑ fieldwork 	xercises Imultimedia and the internet a computer classr nline in entirety internet Therefore, students artial e-learning laboratory have computers with current version of the computer program for drawing and 3D mod					



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2.8. Monitoring student work	Class attendance	YES		Research		NO	Oral	exam	YES	
	Experimental work		NO	Report		NO	(othe	er)		
	Essay		NO	Seminar paper		NO	(othe	er)		
	Preliminary exam	YES		Practical work	YES		(othe	er)		
	Project		NO	Written exam	YES		ECTS credi (tota	ts I)	5	
2.9. Assessment methods and criteria	Assessment is conducted in accordance with Assessment methods and criteria for current academic year.							or the		
2.10. Student responsibilities	Regular attend exercises and le	Regular attendance and active participation in classes. Independent learning, exercises and learning outside of regular classes. Regular lectures on deadlines.						rning, s s.	olving	
2.11. Required literature (available in the library and/or via other media)		Title					y ry	Availability via other media		ty edia
	Tkalec, S. Pre proizvoda od konstrukcija, S fakultet i Znanj	krat, S drva veučiliši e, Zagre	(2000) - os ni udžb b, str. 1	: Konstrukcije snove drvnih enik Šumarski 308	YES			YES, M	lerlin	
	Prekrat, S., Čav modeliranja dij drvnih proizvoo	lović, A elova i la, priru	.O. (202 sklopov čnik, sti	1): Osnove 3D ra namještaja i r. 1-135	NO			YES, M	lerlin	
2.12. Optional literature	1. Noll, T.: (200 2. Nutsch, W. (304	2.): Join 2017.):	t book, Handbu	Quatro Publishi uch technisches	ng, Londo Zeichner	on, str. : und Er	1-187 ntwerfe	en, DRW	verlag,	str. 1-
	3. Nutsch, W. (2 432	2018.): I	Handbu	ch der Konstrukt	tion: Möl	pel und	Einbau	schränke	e, DRW,	str. 1-
	 4. Rogowski, G. 5. Antonović, A Sveučilište u Za 6. Autodesk Inv 	: (2002. A i ostal grebu, s ventor F) Joiner i (2018 Sumarsk or Begir	y, The Taunton F 3) : Pojmovnik h ki fakultet ; Instit nners (2020): Tu	Press, str rvatskog :ut za hrv torials, K	. 1-390 drvnot atski je ishore	ehnolo zik i jez	škog na: ikoslovlj	zivlja, ri e, str.1-	ječnik, 424

1. GENERAL INFORMATION								
1.1. Course lecturer(s)	Prof. Stjepan Pervan, PhD Asst. Prof. Miljenko Klarić, PhD	1.7. Number of ECTS credits	5					
1.2. Course title	Wood drying technology	 1.8. Number of hours in a semester (L+E+F+e-learning) 	30+45+8					
1.3. Course code	235955	1.9. Expected enrolment in the course	35					
1.4. Study programme	University Undergraduate Studies of Wood Technology	1.10. Level of application of e-learning (level 1, 2, 3)	2					
1.5. Course type	Compulsory	1.11. Language of instruction	Croatian					
1.6. Year of the study	2	1.12. Possibility of instruction in English	YES					
2. COURSE DESCRIPTION								



2.1. Course objectives	The course aim process of solid	s to qu wood,	alify an veneer	expert for self-go and chipped woo	overning od.	g monit	oring and cont	The course aims to qualify an expert for self-governing monitoring and control of a dryi process of solid wood, veneer and chipped wood.							
2.2. Enrolment requirements and/or entry competencies required for the course	-														
2.3. Learning outcomes at the level of the programme to which the course contributes	C3 - Monitor an special drying p	C3 - Monitor and control processes of massive wood, veneer and wood particle drying, other special drying processes, and wood steaming.													
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	 Define the basics of wood chemistry and its impact on the drying process Define the basics of wood technology and the impact of technological properties on the drying process Define the anatomical basics of wood and their influence on the drying process Explain the theoretical basics of the drying process, the relationship between water and wood Describe the hygroscopicity of wood concerning the surrounding climate, the negative phenomena of shape change (shrinkage and swelling) while drying the most commonly used commercial wood species in Croatia Identify the impact of process errors on wood and finished products quality Provide methods for measuring water content during the wood drying process and explain their industrial application Describe the natural drying - basics, storage yard of raw and dried material Describe the basics of technical drying of massive wood Categorize the types of technical drying of the massive wood according to the technica criteria Categorize and apply types of wood drying regimes Distinguishing wood drying kilns according to the type of process and the level o equipment Describe and use of kiln control systems in industrial conditions Group and identify wood faults in the drying process to reduce the share of wood defects. Choose the most economical wood drying method without defects (natural drying technical drying or a combination of both types) 								on the er and egative y used explain chnical evel of wood drying,						
	17. Explain the 18. Group and i	process dentify	es and t	techniques of ver drying defects	neer tec	hnical d	lrying	-							
2.5. Course content (syllabus)	The theoretical properties of w measuring and lumber stockya drying schedule wood defects i schedules for cl	basics cood, sl control rd, basi es, kiln o n the c hipped	of the v hrinkago Iling in cs and r dryers: 1 drying p wood di	vood drying proc e and swelling in the wood drying neans of technica types and equipn process, diminish rying, processes a	ess, wo the dry process al drying nent, dr ing of v and sche	od - mo ing proo s, air dr g of solio ying co vood di edules fo	bisture relation cess, wood mo ying – basics, g d wood, types a ntrol systems – rying defects, g or veneer dryin	s, hygro isture co green an and use basics processe g.	ontent ontent nd dry of kiln usage, es and						
2.6. Format of instruction	⊠ lectures			independen	t		2.7. Commen	its:							
	 Iectures seminars and workshops exercises online in entirety partial e-learning fieldwork 			assignments ⊠ multimedia internet □ laboratory ⊠ work with m □ (other)	assignments ⊠ multimedia and the internet □ laboratory ⊠ work with mentor										
2.8. Monitoring student	Class	YES		Research		NO	Oral exam	YES							
work	attendance Experimental work		NO	Report		NO	(other)								
	Essay		NO	Seminar		NO	(other)								



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				paper						
	Preliminary exam	YES		Practical work		NO	(othe	er)		
	Project		NO	Written exam	YES		ECTS credi (tota	ts I)	5	
2.9. Assessment methods and criteria	Assessment is conducted in accordance wit current academic year.				h Assess	ment m	nethod	s and cr	riteria f	or the
2.10. Student responsibilities	Regular attenda exams.	Regular attendance and active participation in exams.				and ex	ercises	. Taking	colloqu	iia and
2.11. Required literature (available in the library and/or via other media)	Title			Availability in the library			Availability via other media		ty edia	
	Pervan, S. (20 sušenje drva. 2	000): P 72. str. S	riručnik SAND.	za tehničko	YES					
	Simpson W.T. manual. 274 str	(1991) . USDA,	: Dry l Madiso	kilns operator on, Wisconsin	NO			Intern	et	
•	Conners, T. (2010): Hardwood dry kiln operation: A manual for operators of small dry kilns. University of Kentucky, Kentucky			NO			Intern	et		
	Simpson W.T. manual. 274 str 274 p.	(1991) r. USDA	: Dry l , Madiso	kilns operator on, Wisconsin,	NO			Intern	et	
2.12. Optional literature	Ross, R. J. (201) Wisconsin, 508	0): Woo p.	d handl	book-Wood as a	in engine	ering m	aterial	. USDA,	FPL, Ma	adison,

1. GENERAL INFORMATIO	N					
1.1. Course lecturer(s)	Prof. Mladen Brezović, PhD	1.7. Number of ECTS credits	5			
1.2. Course title	Vener and veneer plywood	 1.8. Number of hours in a semester (L+E+F+e-learning) 	30+45+0			
1.3. Course code	33644	1.9. Expected enrolment in the course	35			
1.4. Study programme	University Undergraduate Studies of Wood Technology	1.10. Level of application of e-learning (level 1, 2, 3)	2			
1.5. Course type	Compulsory	1.11. Language of instruction	Croatian			
1.6. Year of the study	2	1.12. Possibility of instruction in English	NO			
2. COURSE DESCRIPTION						
2.1. Course objectives	A course objective is to acqui veneer and veneer plywood production control in veneer a	re knowledge of a manufacturir and use that knowledge for ir nd veneer plywood plants.	ng process in the industry of ndependent supervision and			
2.2. Enrolment requirements and/or entry competencies required for the course	-					
2.3. Learning outcomes at the level of the programme	C4 - Recognise particular types of veneer and wood panel, analyse the basic structural components of wood panels, explain the interdependency of structural components and technical properties of wood panels, monitor and control the manufacturing process in					
to which the course	wood board factories, select a	nd use wood panels with optima	li properties.			



contributes										
	1. Identification	n, descri	be and	distinguish vene	ers acco	rding to	the typ	e of woo	od from	which
	they are made									
	2. Identify and o	describe	e the teo	chnological phas	es, mach	nines, de	evices a	nd equip	oment u	ised to
	manufacture veneers and veneer plywood.									
	3. Choose optimum methods and parameters for making a veneer of more excellent									
2.4. Expected learning	qualitative and	quantit	ative yi	eld.		-				
outcomes at the level of	4. Distinguish t	he mali	, functior	n that arises in t	he parti	cular te	chnolo	gical sta	ges of v	veneer
the course (3 to 10	production and	identif	y the ca	uses of these de	fects.			0	0	
learning	5. Choose, expl	ain adh	esive pr	operties and cor	npare sy	nthetic	resins ı	used in t	he prod	uction
outcomes)	of veneer plywood.6. Identify different types of veneer plywood and explain their properties.7. Apply the rules for stacking veneer plywood construction and determine								•	
·										
									the op	timum
	construction of the veneer plywood.									
	8. Calculate and choose the appropriate parameters for pressing veneer plywood.								ood.	
	9. Differentiate	9. Differentiate the methods and reasons for the optimization of veneer plywood.								
	Veneers. Wood	as a rav	w matei	rial. Plant log sto	rage yar	d. Log p	rotecti	on in the	storage	e yard.
	The mechanica	l proces	s of ver	neer logs. Defect	s of vene	er logs	due to	a mecha	nical pr	ocess.
	Veneer logs hea	ating wi	th hot v	water or steam. I	leating	orocess	and de	fects of	veneer	logs.
	Veneer slicing.	Veneer	slicing n	nachine. Defects	due to v	eneer sl	icing. V	eneer pe	eeling. V	/eneer
	peeling machir	ne. Ven	eer pe	eling - centric.	Centring	g a log.	Venee	er peelir	ng - eco	centric
	(cutting). Defec	ts due t	o venee	er peeling. The fir	nal proce	ss of ve	neer. V	eneer jo	inting. \	/eneer
2.5. Course content	classification. V	eneer s	toring. (Other types of ve	eneer. Co	bloured	veneer	s. Micro	-veneer	s. Fine
(syllabus)	line veneers.	Sawn v	eneers.	Veneer plywo	od. Mai	nufactui	re line	of ven	eer ply	wood.
(0)	Adhesives for	veneer	plywoo	od. Adhesive spr	eading.	Adhesiv	ve mix	tures. D	efects o	due to
	adhesive sprea	ding. Pr	essing o	of veneer plywoo	od. Press	ses. Pre-	-pressir	ng. Parar	neters o	of pre-
	pressing and pressing of veneer plywood. The final process of veneer plywood. Defects due									
	to the final pro	cess of v	veneer	plywood. The uti	lisation	of raw n	nateria	I in the r	nanufac	turing
	of peeling vene	er and v	/eneer	olywood. Veneer	plywoo	d for sp	ecific u	se. Moul	ided ply	wood.
	veneer plywoo	d With	a non-s	tandard constru	ction. U	veriald	piywoc	a. Chem	lically t	reated
2.6 Format of instruction		u. Optin	lisation		perties.		270	Common	ter	
2.6. Format of instruction		مرا بر مرب ا			it.		2.7.0	Johnnen	ts.	
	□ seminars and	a works	nops		and the					
	\boxtimes exercises				and the					
	online in ent	irety								
		rning								
	L fieldwork				nentor					
2.8 Manitaring student	Class		1							1
2.8. Wontoning student	Class	YES		Research		NO	Oral	exam	YES	
WOIK	Exportmontal									
	work		NO	Report		NO	Brief	test	YES	
	WORK			Seminar						
	Essay		NO	naner		NO	(othe	er)		
	Preliminary			Practical						
	exam	YES		work		NO	(othe	er)		
	chain			WORK			FCTS			
	Project		NO	Written	YES		credi	ts	5	
	,			exam			(tota	I)		
2.9. Assessment methods	Assessment is	conduc	ted in	accordance with	ו Assess	ment m	hethod	s and cr	iteria f	or the
and criteria	current academ	nic year.								-
2.10. Student	Regular attenda	ance an	d active	participation in	lectures	and exe	ercises.	Taking I	orief tes	sts and
responsibilities	colloquia (exam	ns).						5		
2.11. Required literature										
(available in the library		т;+	ما		Av	ailabilit	у	A	vailabili	ty
and/or via other media)		i IL	iC .		in t	he libra	ry	via c	other m	edia



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	Mešić, N.,1998.: Furniri, furnirske i stolarske ploče. Grafika Šaran, Sarajevo	YES	
	Furniri i furnirske ploče e-kolegij na sustavu	NO	YES, Merlin
	za udaljeno učenje:		
	https://moodle.srce.hr/2020-		
	2021/course/view.php?id=75377		
2.12. Optional literature	Drvna industrija. Znanstveni časopis za pitanja	drvne tehnologije.	

1. GENERAL INFORMATIO	N				
1.1. Course lecturer(s)	Assoc. Prof. Goran Mihulja, PhD Asst. Prof. Josip Miklečić, PhD Tomislav Gržan, mag. ing. techn. lign.	4			
1.2. Course title	Glues and wood glueing	 1.8. Number of hours in a semester (L+E+F+e-learning) 	30+30+8		
1.3. Course code	33642	1.9. Expected enrolment in the course	35		
1.4. Study programme	University Undergraduate Studies of Wood Technology	1.10. Level of application of e-learning (level 1, 2, 3)	2		
1.5. Course type	Compulsory	1.11. Language of instruction	Croatian		
1.6. Year of the study	2	1.12. Possibility of instruction in English	NO		
2. COURSE DESCRIPTION					
2.1. Course objectives	The course aims to acquire knowledge about the technology of wood glueing. Preparation of surfaces prior to glueing. Choice of glues for individual processes of glueing. Preparation of glues. Process of glueing. Parameters that affect the toughness and durability of joins.				
2.2. Enrolment requirements and/or entry competencies required for the course	-				
2.3. Learning outcomes at the level of the programme to which the course contributes	C6 - Use wood glueing techno final processing, and apply sim	logy, select materials with optin pler technological methods in fin	nal properties important for nal wood processing.		
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	 Explain the basic theory of adhesion present in wood glueing; Distinguish and categorize glue according to the source of raw material, hardening method (thermosetting and thermoplastic adhesive groups), and usage (constructive and nonconstructive purposes); Repeat the measurement of the basic adhesive properties such as viscosity, density and solid content and explain their significance for the bonding process; To know, check and control glue factors, substrates, and bond formation processes; Suggest the type of adhesive for each material and application of the adhesive assembly; Explain the anatomy of the bonded joint, distinguish the factors of strength and durability and formulate their impact on product quality; Evaluate the quality of adhesives according to EN and ISO test methods; Identify, check and recommend basic adhesion parameters (glue application, application uniformity, pressure and compression temperature) and adhesive technology (type of press, 				



2.5. Course content (syllabus) 2.6. Format of instruction	Image products. Greening structures of final products. Measuring the density of the glue. Measuring the viscosity of the glue. Measuring dry matter in the glue. Measuring the pH value of the glue. Measuring inner stresses in joins. Measuring resistance to high and low temperatures. Production of tests for analyzing toughness. Testing toughness to shear. Testing toughness to bending. Testing joins on glued sponges. Stresses in a join. Trends and attributes of glued joins. Quality of joins. The durability of joins. Exposure and mechanical testing. Attributes of glueing. Anatomy of joins. Glueing bent and layered elements. Formation of joins using different methods. Glueing final products. Joint geometry. Properties of joins. Attributes of joins depending on the adherent. Attributes of joins depending on the adhesive. Attributes of joins concerning processes of glueing. Attributes of joins depending on conditions during usage. Procedures of gluing final products. Lengthwise glueing of wood. Widthwise glueing of wood. Thickwise glueing of wood. Chair glueing. Corpus glueing. Lipping surfaces and edges with veneer, foil or laminates. Glueing framework and hexagonal constructions. Glueing in the production of padded furniture. Glueing of bent and layered elements. Recording the process of glueing solid wood. Recording the process of veneering. Recording the process of glueing bent and layered elements. Recording the process of glueing solid wood. Recording the process of veneering. Recording the process of glueing bent and layered elements. Recording the process of glueing in the production of padded furniture. Image: Proceuting the process of glueing									
2.6. Pormat of instruction	□ independent □ seminars and workshops □ seminars and workshops □ assignments □ online in entirety □ partial e-learning □ fieldwork □ (other)				mentor		2.7.0	Johnmen		
2.8. Monitoring student work	Class attendance	YES		Research		NO	Oral	exam	YES	
	Experimental work		NO	Report	YES		(othe	er)		
	Essay		NO	Seminar paper		NO	(othe	er)		
	Preliminary exam	YES		Practical work		NO	(othe	er)		
	Project		NO	Written exam	YES		ECTS credi (tota	ts I)	5	
2.9. Assessment methods and criteria	Assessment is current academ	conduc nic year	ted in	accordance wit	h Assess	ment m	nethod	s and ci	riteria f	or the
2.10. Student	Regular attend	ance an	d active	e participation ir	n lectures	and ex	ercises	. Taking	colloqu	ia and
2.11. Required literature (available in the library and/or via other media)		Tit	le		Av in t	ailabilit he libra	y ry	A via c	vailabili other m	ty edia
	Ljuljka, B.,: Lije proizvoda Zagr	epljenje eb 197	u tehn 8. str 1	ologiji finalnih -219.	YES					
	Obućina, M.: 2014. str. 1-142	Lijeplje	nje drv	eta, Sarajevo,	NO					
	Backović, M.: prerade drveta	Lijeplji , Saraje	nje u vo, 1997	tehnologijama 7, str. 1-394.	NO					
	Mezger, G.T.: A Anton Paar Gm poglavlja.	pplied F nbH, Au	Rheolog stria, 2	y (edition 6th). 019, odabrana	NO					



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2.12. Optional literature	1. Bandel, A.: Gluing wood, CATAS, Udine, 1995.: Physiological Plant Ecology. Springer.
	Berlin.
	2. COST Action E34: Bonding of Timber, University of Natural Resources and Applied Life
	Sciences Resources, Vienna, 2008

1. GENERAL INFORMATIO	N					
1.1. Course lecturer(s)	Prof. Vladimir Jambreković, PhD Asst. Prof. Nikola Španić, PhD	1.7. Number of ECTS credits	5			
1.2. Course title	Panels from disintegrated wood	30+45+8				
1.3. Course code	33643	1.9. Expected enrolment in the course	35			
1.4. Study programme	University Undergraduate Studies of Wood Technology	1.10. Level of application of e-learning (level 1, 2, 3)	2			
1.5. Course type	Compulsory	1.11. Language of instruction	Croatian			
1.6. Year of the study	2	1.12. Possibility of instruction in English	NO			
2. COURSE DESCRIPTION						
2.1. Course objectives	The aim of this course is gaining of knowledge about the processes of industrial production of panels made from disintegrated wood, together with the application of obtained knowledge for autonomous supervision and control of production processes in factories for the production of panels made from disintegrated wood. The aim is also to learn about the properties of panels made from disintegrated wood to achieve the capability of choosing and applying panels of optimal characteristics.					
2.2. Enrolment requirements and/or entry competencies required for the course	-					
2.3. Learning outcomes at the level of the programme to which the course contributes	C4 - Recognise particular typ components of wood panels, technical properties of wood wood board factories, select a	es of veneer and wood panel, explain the interdependency or panels, monitor and control th nd use wood panels with optima	analyse the basic structural f structural components and ne manufacturing process in Il properties.			
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	 To explain the significance of fragmented wood panels To anticipate the guidelines of panel development To interpret the geographic distribution of production areas and panel consumption in the global contexts To identify the basic board types To identify the basic raw materials for panel manufacturing To describe the characteristics and evaluate the quality of lignocellulosic raw materials To select the chemical components for panel manufacturing To describe the properties of formaldehyde resins (UF, MF, FF) and other types of binders To evaluate the resins for panel manufacturing (formaldehyde, polyurethane, tannin and lignosulfonate based resins) To explain the free formaldehyde emission To choose an adhesive for the production of a particular board type To use primary and auxiliary raw materials for panel manufacturing To list and explain the specificity of properties and application of mineral binders 					



	 16. To explain the basics of the fragmented wood panels production 17. To analyse the basic technological parameters in panel production 18. To identify surface coating materials 19. To describe the properties and application of fragmented wood panels 20. To show the significance of panels with horizontally oriented particles 21. To recognize the specificity of the production and characteristics of the panels with the vertically oriented particles (extrusion panels) 22. To explain the structure specificity panels made from macroparticles (OSB) 23. To identify special types of panels and trusses for construction made of fragmented wood 24. To recommend the use of panels coated with natural veneer and decorative synthetic 								
	materials (HPL,	DPL, CP	PL, 3D C	pating foils, ABS f	foils)				
2.5. Course content (syllabus)	Introduction to: the importance of panel development, basic panel types, raw materials for panel production, the basics of panel production, materials for panel overlaying, properties and use of panels from disintegrated wood. In that course the following panel types will be reconsidered: panels with horizontally oriented particles; panels with vertically oriented particles (extrusion panels); one layered, threelayer, multi layer and panels with gradual transition of section structure; light weight, medium-heavy, and heavy boards; working panels and frontal panels; postforming variation; compact medium layered, and middle layer with holes, the panels with macroparticles (OSB); stone-wood panels; lightweight construction panels bounded with plaster; cardboard panels bounded with plaster, lightweight construction panels bounded with cement, concrete particleboard; particleboard bounded with cement, magnesite or plaster; particleboard reinforced with synthetic or mineral fibres; Triboard, Woodmat, Spaceboard, Lignoplast mouldings, Werzalit mouldings, Collipress mouldings; LSL, LFL; hard boards (HB), medium boards, medium boards of low density (MBL), medium boards of high density (MBH), porous boards (SB); dry process (MDF, HDF MDF; lightweight MDF, ultra-lightweight MDF, isolation boards, tarred fibreboard, fibreboard bounded with cement, fibreboard bounded with plaster. The topics will also be the boards coated with veneer, synthetic material, HPL, DPL or CPL decorative laminate, decorative paper impregnated with synthetic resins, varnishes and enamel.								
2.6. Format of instruction		/	0,	☐ independen	ht		2.7. Commer	nts:	
	 □ seminars an □ exercises □ online in ent ⊠ partial e-leat ⊠ fieldwork 	d works <i>irety</i> rning	hops	assignments multimedia internet laboratory work with n (other)	and the nentor				
2.8. Monitoring student work	Class attendance	YES		Research		NO	Oral exam	YES	
	Experimental work		NO	Report		NO	(other)		
	Essay		NO	Seminar paper		NO	(other)		
	Preliminary exam	YES		Practical work		NO	(other)		
	Project		NO	Written exam	YES		ECTS credits (total)	5	
2.9. Assessment methods	Assessment is	conduc	ted in	accordance with	Assess	ment m	nethods and c	riteria f	or the
and criteria	current academ	nic year.							
2.10. Student	Regular attend	ance an	d activ	e participation ir	n lecture	es, exerc	cises and field	vork. Ta	iking a
responsibilities	colloquium (3 c	olloquia	a), exam	ıs.					



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2.11. Required literature (available in the library and/or via other media)	Title	Availability in the library	Availability via other media				
	Jambreković, V.: Drvne ploče i emisija formaldehida, Sveučilišni udžbenik, Šumarski	YES	YES				
	fakultet, Zagreb, 2004.						
	Bruči, V., Jambreković. V.: Ploče iverice i	YES	YES				
	vlaknatice. Sveučilišni udžbenik, Šumarski						
	fakultet, Zagreb, 1996.						
2.12. Optional literature	1. Ćehić, M.; Omer, S.E.: Pločasti materijali na	bazi drveta. Univerzitet	u Bihaću, Bihać, 2018.				
	2. Wood Handbook: Wood as an Engineering Material. Forest Products Society, Madison,						
	2011.						

1. GENERAL INFORMATIO	N					
1.1. Course lecturer(s)	-	1.7. Number of ECTS credits	3			
1.2. Course title	Practical work 1	cal work 1 1.8. Number of hours in a semester (L+E+F+e-learning) 15+7				
1.3. Course code	2359561.9. Expected enrolment in the course35					
1.4. Study programme	University Undergraduate Studies of Wood Technology	University Undergraduate 1.10. Level of application of Studies of Wood Technology e-learning (level 1, 2, 3)				
1.5. Course type	Compulsory	1.11. Language of instruction	Croatian			
1.6. Year of the study	2 1.12. Possibility of instruction in English NO					
2. COURSE DESCRIPTION						
2.1. Course objectives	Application of acquired knowledge and skills on a real example of a product, material or less demanding manufacturing process. Preparation and organization of essential documentation for project development. Making models, mock-ups or wood products. Project report.					
2.2. Enrolment requirements and/or entry competencies required for the course	-					
2.3. Learning outcomes at the level of the programme to which the course contributes	B4 - Apply technical knowledge for the purpose of mastering wood industry procedures and processes, means of work and material handling methods; C4 - Recognise particular types of veneer and wood panel, analyse the basic structural components of wood panels, explain the interdependency of structural components and technical properties of wood panels, monitor and control the manufacturing process in wood board factories, select and use wood panels with optimal properties; C5 - Size constructions, define systems of construction compositions as a prerequisite for product construction, define the basic construction documentation and develop it systematically, apply CAD systems in the wood industry and 2D modelling with the help of					
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	 Apply the acquired knowledge and skills to a realistic model of wood products or wood technology process Solve the given problem under defined conditions and deadlines To form a sense of personal responsibility for the execution of assigned tasks on more minor demanding projects 					



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2.5. Course content (syllabus)2.6. Format of instruction	 4. Prepare and 5. Make a mode 6. Develop three 7. Prepare a reprocedure Preparation and models, mock-tep and text and the seminars an a seminars an an exercises □ online in ent 	 A Prepare and organize essential documentation for project development 5. Make a model, model or product from wood according to the prepared documentation 6. Develop three-dimensional dawn on made models, models or wood products 7. Prepare a report on the professional project or presentation of the product, material or procedure Preparation and organization of essential documentation for project development. Making models, mock-ups or wood products. Preparation of a report on the developed project. I comments I comments								
	☐ partial e-lea	rning		\boxtimes work with \square (other)	mentor					
2.8. Monitoring student work	Class attendance		NO	Research	YES		Oral	exam		NO
	Experimental work	YES		Report		NO	(othe	(other)		
	Essay		NO	Seminar paper		NO	(othe	er)		
	Preliminary exam		NO	Practical work	YES		(othe	er)		
	Project	YES		Written exam		NO	ECTS credi (tota	ts I)	3	
2.9. Assessment methods and criteria	Assessment is current academ	conduc nic year.	ted in	accordance wit	h Assess	ment n	nethod	s and cr	riteria f	or the
2.10. Student responsibilities	Mandatory exe	cution o	of assigr	ned tasks within	the set c	leadline	2.			
2.11. Required literature (available in the library and/or via other media)		Tit	le		Av in t	ailabilit he libra	y ry	A via c	vailabili other m	ty edia
	Priručnik za stru	učnu pra	aksu		NO			YES, M	lerlin	
	Priručnik za rad	l na sigu	ıran nač	tin	NO			YES, M	lerlin	
2.12. Optional literature	-									

1. GENERAL INFORMATION								
1.1. Course lecturer(s)	Davor Pavlović M.Ed., professor of kinesiology	1.7. Number of ECTS credits	1					
1.2. Course title	Physical and health education 4	 1.8. Number of hours in a semester (L+E+F+e-learning) 	0+30+0					
1.3. Course code	226045	1.9. Expected enrolment in the course	35					
1.4. Study programme	University Undergraduate Studies of Wood Technology	1.10. Level of application of e-learning (level 1, 2, 3)	2					
1.5. Course type	Compulsory	1.11. Language of instruction	Croatian					
1.6. Year of the study	2	1.12. Possibility of instruction in English	NO					



2. COURSE DESCRIPTION	
2.1. Course objectives	The course Physical and Health Culture aims to acquire theoretical and practical kinesiological knowledge to train students for independent physical exercise and adopt healthy living habits. Through various forms of physical activity, the goal is to meet the daily needs for movement and improve the student population's motor, functional, and cognitive abilities. By attending classes, students are educated about the importance of daily physical exercise and all the good things physical activity means for a person and his health. The aim is to simultaneously acquire knowledge about the harmfulness of various forms of addiction to health, especially their impact on intellectual and physical capabilities, the importance of quality nutrition and the most interesting results of previous research on the student population in the segment: physical activity as a means of relief.
2.2. Enrolment requirements and/or entry competencies required for the course	Health status.
2.3. Learning outcomes at the level of the programme to which the course contributes	E1 - Continue specialisation in university graduate studies at the Wood Technology Department of the Faculty of Forestry and Wood Technology.
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	 Describe the structure of the physical exercise class. Explanation of the impact of physical exercise on health. Choose fitness exercises designed to strengthen individual muscle groups. Demonstrate specific exercises concerning kinesiologic activity. Organise constructive free time Assess personal diet and physical exercise habits. Demonstrate general preparatory exercises and stretching exercises. Understanding kinesiology programs and their target orientation. Control emotions and strengthen self-control.
2.5. Course content (syllabus)	Athletics Walking - walking at different paces, Nordic walking, brisk walking, hiking; Running - theoretical knowledge and divisions, cyclic movements at different paces, fast running short distances, running down a slope, running down a slope, interval cyclic movements, differences in running long, medium and short distances, running with loads, relay running, hurdles running different height. Martial arts Basic judo techniques - falls, hand throws, belt throws, leg throws, choking techniques, levers; Basic techniques of karate - kicks, punches, defence. Sports games Basketball - keeping the ball in place, keeping the ball in motion, basic throwing, pivoting, jumping shot, passing in place and moving; Football - passing in place, passing to the first, passing in movement, ball technique, cooperation of two and three players, shots on goal from the run, shot on goal after the ball is added, volley, headshots, stopping the ball; Volleyball - passing with two hands above the head, passing with the forearms, service, passing behind the head, receiving service, blocks, playing technique in attack, playing technique in defence; Handball - guiding the ball in a straight line and with a change of direction. Passes in place, pass in motion, crosses, passes for counterattacks, cooperation of two and three players, shot on goal after the lead, shot on goal on the added ball. Racket sports Badminton - forehand punch under the arm, forehand punches above the head, forehand lob above the head, backhand kick under the arm, high serve, backhand serve, short serve, field moves, single play, pair play;



2.6. Format of instruction	Shooting - class breathing techr Fitness prograr Pilates - exerciss muscle strengtl muscle endurar Hiking tours - h Dance structures	Shooting - classification of shooting disciplines and equipment, weapons maintenance, breathing techniques, air rifle 10 m. Fitness programs - Circuit strength training, functional training, intensive cardio training, Pilates - exercises for warming up and preparing the locomotor system, stretching exercises, muscle strengthening exercises, exercises to reduce subcutaneous fat, exercises to increase muscle endurance, exercises to increase muscle mass, exercises stretching. Hiking tours - hiking on flat terrain, hiking tours, interval hiking methods. Dance structures - English waltz, Viennese waltz, disco fox, jive, salsa.								
	 seminars and workshops exercises online in entirety partial e-learning fieldwork 			 assignments multimedia and the internet laboratory work with mentor (other) 						
2.8. Monitoring student work	Class attendance	YES		Research		NO	Oral	exam		NO
	Experimental work		NO	Report		NO	Mapa radov (crtež	a /a źa)		NO
	Essay		NO	Seminar paper		NO	(othe	(other)		
	Preliminary exam		NO	Practical work		NO	(other)			
	Project		NO	Written exam		NO	ECTS credi (tota	ts I)	1	
2.9. Assessment methods	Assessment is	conduc	ted in	accordance wit	h Assess	ment n	nethod	s and cr	riteria f	or the
2.10. Student responsibilities	Regular attenda	ance an	d active	participation in	exercise	s.				
2.11. Required literature (available in the library and/or via other media)		Tit	le		Av in t	ailabilit he libra	y Availability ry via other media		ty edia	
	 D. Pavlović Šumarskog fa zdravstvena ku 	(2010): kulteta ltura	Skript koleg	a za studente ij Tjelesna i	NO			YES, M	lerlin	
2.12. Optional literature	 Z. Šatalić, M. B.Neljak, R.C Bos, K. (2004 Sertić, H. (20 Ćurković, S. Kineziološki fak 	Sorić, N aput-Jo .) Hoda 05) Osn (2010). ultet Sv	1 Mišigo gunica: njem do ove bor . Kinezi eučilišta	oj-Duraković (20 Kineziološka me o zdravlja, Moza rilačkih vještina, ološke aktivnos a u Zagrebu_	15): Spor etodika u ik knjiga Kineziolo ti i rizičn	tska pre visokor 2. Colwi oški faku ia pona	hrana, n obraz n, C., N Iltet Sv šanja s	Znanje, ovanju 4. (1998 eučilišta tudenat) u Zagre a, Dise	ebu rtacija.



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UNDERGRADUATE STUDIES OF WOOD TECHNOLOGY - V. SEMESTER

1. GENERAL INFORMATIO	N								
1.1. Course lecturer(s)	Assoc. Prof. Krešimir Greger, PhD Asst. Prof. Kristina Klarić, PhD	1.7. Number of ECTS credits	7						
1.2. Course title	Production organisation	Production organisation 1.8. Number of hours in a semester 45+45+8 (L+E+F+e-learning)							
1.3. Course code	33645	36451.9. Expected enrolment in the course30							
1.4. Study programme	University Undergraduate Studies of Wood Technology	1.10. Level of application of e-learning (level 1, 2, 3)	2						
1.5. Course type	Compulsory	1.11. Language of instruction	Croatian						
1.6. Year of the study	3	1.12. Possibility of instruction in English	NO						
2. COURSE DESCRIPTION	•								
2.1. Course objectives	Students gain general and sport rationalisation, quality contro organisation and stock optimis	ecialist knowledge in the follow ol in technological processes ation, and logistic support.	ing fields: work-study, work and final products, supply						
2.2. Enrolment requirements and/or entry competencies required for the course	-	-							
2.3. Learning outcomes at the level of the programme to which the course contributes	D1 - Plan and organise the time study, work rationalisation, perform quality control in technological processes and on finished products, maintain supply, stock and logistic support optimization, plan and calculate the production, calculate basic business KPIs, and write basic financial reports, recognise types of expenses.								
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	 Define the concepts of an or Identify organizational and furniture manufacturing. Plan and analyse the time st Review and recommend the Distinguish the characteristi Distinguish the processes in new products. Distinguish processes in recommend a procurement m Evaluate the capacities of te Use the principles of designi Prepare production and m Conceive quality control in Distinguish processes in maintenance Analyze the production pro- of finished products. Evaluate accounting process 	rganization as a science and prof technological specifics of produc work rationalization. c production processes in wood research and development and procurement, storage and lo odel, and lead procurement and chnological processes. ng technology systems in indust anage production processes. the technological process and fo aintaining devices and plants in t of devices and plants. ogram, conduct the sales process sses.	ression. ction in wood processing and processing. suggest the development of ogistics, plan procurement, storage. rial wood processing. or finished products. the wood processing industry and manage the distribution						
2.5. Course content (syllabus)	An organisation as science Organisation as a part of wood in wood processing and furnite	and profession; Development technology; Specific features of are manufacture.	t of organisation sciences; organisation and technology						



	Basics of mode furniture man management p Process-oriente Processes in ma programmes; distribution; P Development o Processes in s processes; Logi processing Basics of produ processing; Pla Characteristic p wood processir the maintenand applied in indu: Processes in qu control system: Bookkeeping p applied to spec and furniture n	furniture manufacture; Business and production logistics; Systematic approach to management process in industrial firms for wood processing and furniture manufacture; Process-oriented organisation of structures of wood-processing business systems. Processes in marketing, sales and distribution; Products and services; Analysis of production programmes; Management of sales processes; Logistic management of final product distribution; Processes in research and development; Development of new products; Development of production and business; Development of wood technology. Processes in supply, storage and logistics; Supply preparation; Management of supply processes; Logistics of supply and storage; Specific features of materials in industrial wood processing Planning capacities of technological processes. Characteristic production processes in wood processing; Planning capacities of technological processes; Work study; Processes in the maintenance of devices and machines in industrial wood processing; Concept and model applied in industrial wood processing. Processes as preconditions of products, production and business; Quality control systems; Methods of quality control in wood processing and furniture manufacture; Bookkeeping processes as preconditions of realistic and objective financial reporting as applied to specific conditions of production and production programmes in wood processing and furniture manufacture.								ng and act to acture; luction roduct oducts; supply I wood I woodi woodi woodi i woodi i woodi woodi i wo
2.6. Format of instruction	 ☑ lectures ☑ seminars an ☑ exercises □ online in entional e-lea ☑ partial e-lea ☑ fieldwork 	 independent assignments multimedia and the internet laboratory work with mentor exercises in computer 			2.7. (Commer	its:			
2.8. Monitoring student work	Class attendance	YES		Research		NO	Oral	exam	YES	
	Experimental work		NO	Report		NO	(other)			
	Essay		NO	Seminar paper	YES		(othe	r)		
	Preliminary exam	YES		Practical work		NO	(othe	r)		
	Project		NO	Written exam	YES		ECTS credi (tota	ts)	7	
2.9. Assessment methods and criteria	Assessment is current acaden	conduo nic year	cted in	accordance wit	h Assess	ment n	nethod	s and c	riteria f	or the
2.10. Student	Regular attend	lance a aration	nd acti	ve participation	n in lect	ures ar rk. Taki	nd exer	cises, p oquia an	oreparat d exam	ion of
2.11. Required literature (available in the library and/or via other media)		Tit	tle		Av in t	ailabilit he libra	y ry	A via o	vailabili other m	ty edia
	Figurić, M. 2 procesi u p namještaja, Svo fakultet, Zagrel	000: P reradi eučilište o.	Proizvod drva e u Zagr	ni i poslovni i proizvodnji rebu, Šumarski	YES					
	Greger, K. 2000 u preradi drv (zbirka zadata Šumarski fakult): Proizv va i pi ka), Sv :et, Zag	vodni i p roizvodr veučilišt reb.	oslovni procesi nji namještaja e u Zagrebu,	YES					



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2.12. Optional literature	 Sikavica, P., 2011: Organizacija, Školska knjiga d.d., Zagreb. Inženjerski priručnik IP4, Proizvodno strojarstvo, Organizacija proizvodnje, Školska knjiga 2002.
	3. Taboršak D.: Studij rada, Orgadata, Zagreb 1994
	4. Daft, R. L.: Organizational Theory and Design; 13th edition; Cengage Learning, 2020.

1. GENERAL INFORMATIO	N								
1.1. Course lecturer(s)	Assoc. Prof. Goran Mihulja, PhD Tomislav Gržan, mag. ing. techn. lign.	6							
1.2. Course title	Final wood processing	inal wood processing 1.8. Number of hours in a semester 45+45+16 (L+E+F+e-learning)							
1.3. Course code	33646	1.9. Expected enrolment in the course	30						
1.4. Study programme	University Undergraduate Studies of Wood Technology	1.10. Level of application of e-learning (level 1, 2, 3)	2						
1.5. Course type	Compulsory	1.11. Language of instruction	Croatian						
1.6. Year of the study	3	1.12. Possibility of instruction in English	NO						
2. COURSE DESCRIPTION									
2.1. Course objectives	The course aims to acquire production and the propertie acquire the knowledge and sk wood production.	knowledge about technologic s of materials important in fin ills needed for managing the teo	al processes in final wood al production. Students will chnological processes in final						
2.2. Enrolment requirements and/or entry competencies required for the course	-	-							
2.3. Learning outcomes at the level of the programme to which the course contributes	C6 - Use wood glueing techno final processing, and apply sim	logy, select materials with optir pler technological methods in fir	mal properties important for nal wood processing.						
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	 Explain the basic concepts a Distinguish and categorize p Evaluate, draw up a budg materials needed for the produted for the production of the production of the order of joining of wood elements in the order of joining elements into a finished prodution. Use essential measuring comparator and line, to make the working print 7. Identify and distinguish fact particular wood processing; Evaluate the production productin	bout the technological processe rimary final products (e.g. chair, et and recommend the quanti uction of certain final products of se the most technologically acc the production of final products; g assemblies and assemblies a ct; equipment, e.g. measuring easure dimensions and proce ciple of modern measuring instr ors that have the most significa of applying new technologies a gram and existing manufacturing	s of final wood processing bed, table, wardrobe etc.); ty of wood and non-woven r elements of final products; eptable (optimal) formatting nd the order of assembling strip, calliper, micrometre, ssing accuracy. To acquire uments such as 3D scanners; nt impact on the quality of a and technological processes g technology of the company;						



2.5. Course content (syllabus)	Introduction: b equipment and processing at h Material: mate- lumber and wo synthetic mate- textile material Shaping wood parts for assem Process precisio precision, subst Analysis of the c and pressing. Edge banding: e Upholstering th Production pro The technology technological p Technology tr Relationship b Perspective, ter ecological stand	Processing at home and abroad. Material: material used in final products and its technological and exploiting properties lumber and wood material, synthetic-wood material, soft synthetic sponge material, sol synthetic material of the porous and solid structure, springs and springy cores, mount textile material, leather and other. Shaping wood and other materials: massive wood, boards, fabric, sponges. Processing of parts for assembly. Assembling. Process precision: technological base, shaping and dimensioning, factors affecting proces precision, substituting, tolerances, hardness of different joints, measuring equipment. Analysis of the cutting and shaping processes: saw shaping, routing, lathing, drilling, bendir and pressing. Edge banding: edges veneering, "post-forming", "soft forming", membrane pressing. Upholstering the final products: shaping and joining parts, assembling parts, covering. Production processes: cabinet furniture, solid wood furniture, chairs and other products. The technology of final products. Technological task. Complex solutions in developing th technology transfer. Development of technology and technological forecastin Relationship between material technology - and equipment. Flexible technolog Perspective, technological processes, future equipment. Technology development from a ecological standpoint. Image lectures							essing, wood erties - l, solid iounts, sing of process t. ending g, icts. ng the asting. hology. om an	
2.6. Format of instruction	⊠ lectures			independe	nt		2.7.0	Commer	nts:	
	 □ seminars and workshops ○ exercises □ online in entirety ○ partial e-learning ○ fieldwork 			assignments ⊠ multimedia and the internet □ laboratory □ work with mentor						
	Class									
2.8. Monitoring student	Class attendance	YES		Research	NO Oral			exam	YES	
	Experimental work		NO	Report		NO	(othe	er)		
	Essay		NO	Seminar paper		NO	(othe	er)		
	Preliminary exam	YES		Practical work	YES		(othe	er)		
	Project		NO	Written exam	YES		ECTS credi (tota	ts I)	6	
2.9. Assessment methods	Assessment is	conduc	ted in	accordance wit	n Assess	ment n	nethod	s and c	riteria f	or the
and criteria	current academ	nic year								Talina
z.10. Student	colloquia and e	ance an xams	u active	participation in	ectures	and exe	rcises, o	uoing ex	ercises.	raking
2.11. Required literature		Xums.								
(available in the library and/or via other media)		Tit	le		Av in t	ailabilit he libra	:y iry	A via	vailabili other m	ty edia
	Ljuljka, B.:	Tehn	ologija	proizvodnje	YES					
	namještaja, Zag	greb <i>,</i> 19	80, str.	1-257.						
	Skakić, D. i K drveta. Šumars 1-403.	rdžović, ki fakult	A.: Fi et, Beo	nalna prerada grad, 2002, str.						
	Backović, M.:	Lijeplji	nje u	tehnologijama						
	prerade drveta	, Saraje	vo, 199	7, str. 173-286.						
2.12. Optional literature	1. Ljuljka, B.: Na	amješta	j, Šuma	rska enciklopedi	ja II, JLZ,	Zagreb	, 1983,	str. 436	-490.	



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2. Ljuljka, B., Bogner, A., Turkulin, H., Grbac, I., 1986.: Ispitivanje mogućnosti primjene VF
struje za plastifikaciju i savijanje masivnog drva. (znanstvena studija), str. 1-63, Šumarski
fakultet, Zagreb.
3. Sandberg, D., Kitek Kuzman, M., Gaff, M.: Engineered Wood Products I. Wood as an
engineering and architectual material. Czech University of Life Sciences Prague, 2018., str.
1-181.

1. GENERAL INFORMATIO	N		
1.1. Course lecturer(s)	Prof. Anamarija Jazbec, PhD Asst. Prof. Maja Moro, PhD	1.7. Number of ECTS credits	4
1.2. Course title	Basic statistics	 1.8. Number of hours in a semester (L+E+F+e-learning) 	30+30+0
1.3. Course code	33636	1.9. Expected enrolment in the course	30
1.4. Study programme	University Undergraduate Studies of Wood Technology	1.10. Level of application of e-learning (level 1, 2, 3)	3
1.5. Course type	Compulsory	1.11. Language of instruction	Croatian
1.6. Year of the study	3	1.12. Possibility of instruction in English	NO
2. COURSE DESCRIPTION			
2.1. Course objectives	The objective of this course analyze, present and analyze c on already analyzed data.	is to teach students to compile compiled data, as well as discuss	e independently, statistically and make conclusions based
2.2. Enrolment requirements and/or entry competencies required for the course	-		
2.3. Learning outcomes at the level of the programme to which the course contributes	A1 - Apply a physical approac solve mathematically various r and analyse data, and reach co	h of experimental observation a research and practical problems, onclusions based on analysed da	and mathematical modelling, statistically process, present ta.
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	 Identify and distinguish nu dichotomous, nominal, ordina Calculate the central tendency and analyze them. Calculate m Apply the basics of probabil Differentiate, sketch, and ap Apply different sampling m main essence of the central bc Estimate (point estimate) proportions of the population Calculate and interpret the and population proportions. Calculate, draw and interpret Interpret and draw the linea equation. 	meric and categorical variables I). Choose the appropriate grap y measures and analyze them. C redian and quartiles and analyze ity. Calculate probabilities. oply theoretical distribution: nor nethods: a random, stratified, s bundary theorem and the standa) the arithmetic mean, the s interval estimate of the arithmet et individual index numbers. r trend equation. Calculate the p	types (continuous, discrete, hs. Create a frequency table. alculate variability measures them. mal, T, and binomial. ystematic sample. Know the rd error. tandard deviation and the tic mean, standard deviation, prediction using a linear trend
2.5. Course content (syllabus)	Types of Variables. Scales of distributions. Measures of Cen Empirical distribution. A Surve Random Variables. Binomial,	Measurement. Graphic Presenta tral Tendency and Dispersion. M by of Probability Concepts. Discr Normal and T Probability Distri	ations. Frequency tables and leasures of Relative Standing. ete Random and Continuous buitions. Sampling Methods.



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	Sampling Distr	ibution. ion and	Point a	and interval est rd deviation Sta	Sampling Distribution. Point and interval estimations. Interval estimation of population								
2.6. Format of instruction	⊠ lectures		Standa	independe	nt	dunty co	2.7. Comments:						
	🗆 seminars an	□ seminars and workshops			assignments								
	exercises			🛛 🗆 multimedia	and the								
	□ online in ent	irety		internet									
	🛛 partial e-lea	rning											
	⊠ fieldwork	☐ fieldwork			□ work with mentor □ (other)								
2.8. Monitoring student work	Class attendance	YES		Research		NO	Oral	exam	YES				
	Experimental work	YES		Report		NO	(othe	er)					
	Essay		NO	Seminar paper	YES		(other) (other)						
	Preliminary exam	YES		Practical work	YES								
	Project		NO	Written exam	YES		ECTS credi (tota	ts I)	4				
2.9. Assessment methods and criteria	Assessment is current academ	conduc nic year.	ted in	accordance wit	h Assess	ment n	nethod	s and ci	riteria f	or the			
2.10. Student	Regular attenda	ance an	d active	participation in	lectures	and exe	ercises.	Indeper	ndent le	arning			
responsibilities	solving exercise	es outsio	de of re	gular classes. Ta	king collo	oquia ar	id exan	ns if nec	essary.				
2.11. Required literature					A.,	ailahilit			vailahilit	tv.			
and/or via other media)		Tit	le		in t	he libra	y ry	via d	other m	edia			
	Jazbec, A (2009) OSNO	VE STA	TISTIKE, drugo	YES			YES, N	Ierlin				
	izdanje, Šun (sveučilišni udž	narski benik)	fakult	et, Zagreb.									
2.12. Optional literature	1. Bahovec V, E	rjavec N	I. et al.	(2018) STATISTII	KA, Elem	ent, Zag	reb.						

1. GENERAL INFORMATIO	N		
1.1. Course lecturer(s)	Prof. Hrvoje Turkulin, PhD Assoc. Prof. Vjekoslav Živković, PhD	1.7. Number of ECTS credits	4
1.2. Course title	Wood in construction	 1.8. Number of hours in a semester (L+E+F+e-learning) 	30+30+8
1.3. Course code	33647	1.9. Expected enrolment in the course	30
1.4. Study programme	University Undergraduate Studies of Wood Technology	1.10. Level of application of e-learning (level 1, 2, 3)	2
1.5. Course type	Compulsory	1.11. Language of instruction	Croatian
1.6. Year of the study	3	1.12. Possibility of instruction in English	YES
2. COURSE DESCRIPTION			
2.1. Course objectives	Learning about the specific cor Learning about the functional r of products: windows, doors, f Designing simple constructions	nditions of using specific wood sp requirements, classes and techni loors, and overview of other type s and construction products.	ecies in building applications. cal details of the main groups es of wood building products.



2.2. Enrolment								
entry competencies	-							
required for the course								
2.2 Learning outcomes at	 B2 - Recognise and determine the most important types of xylophagous bacteria, insects, fungi and marine borers, and determine flaws on wood incurred due to their activity; learn the basic principles of wood protection based on physical, chemical and structural properties of wood, and apply basic procedures and methods for wood protection; B3 - Apply knowledge about the mechanical properties of wood, mechanical properties arrangement within individual trees and groups of trees, tree flaws and the influence of 							
the level of the programme to which the course contributes	flaws on the mechanical proper C6 - Use wood glueing techno final processing, apply simpler C7 - Define the specifics of wo of a particular type of wood for construction solutions, explain solutions for main product gro C8 - Recommend materials ar interior and the exterior, an	erties of wood; logy, select materials with opti- technological methods in final v od usage in construction, recom- building purposes, recommend and ensure functional requirem ups; nd procedures applied in the w d operate the wood finishing	mal properties important for vood processing; mend adequate applications the basic shape, physical and nents, types and construction vood finishing process in the process starting from base					
	preparation to the hardening of	of the material.	ts and connect their and use					
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	 Identify the prominent families of wood construction products and connect their end-use requirements with design and construction types and material properties. To appoint and explain the ecological features of wood as a building material, the importance of maintaining its durability and the possibilities of wood recycling. To explain the dimensional and structural limitations of wood and propose and evaluate their improvement methods (laminating, structural and engineering connections). To distinguish, group, and argument the technical properties of wood essential for construction. To identify, explain and evaluate the aesthetic, economic and traditional values of wood for construction. To identify, explain and group factors of durability and risk classes to the durability of construction products and wood buildings and suggest and design the measures to overcome these risks. To adapt or design a set of details and measures of integral (physical, structural, surface and biological) protection of a simple wood building or wood construction product. Connect the type of window and door with basic functional requirements, connect the details into a functional unit, and design and illustrate the final product. 							
2.5. Course content (syllabus)	Significance of wood building of exterior application of wood: s factors. Risk classes and tech construction products. Technical properties of importa properties and durability. Prin durability: physical protection, renovation of weathered prod Dimensional and structural lim lamination, structural and engi Windows and doors: function a Wood flooring – types, technic building products: houses, lar cladding and facades etc.	components in Croatia and Euro synergistic actions of light, climat nical solutions for their eliminat ance for building applications, av nciples of the technical design technical detailing, surfacing an ucts. nitations of wood and methods ineering connections. and design, forms and types, gen al and functional properties. Oven ninated beams, wooden struct	pe. Specific requirements for tic and biological degradative ation in buildings and wood ailability of the species: wood of wood products for their ad finishing, maintenance and of improving wood products: eral functional requirements. erview of other types of wood ures, bridges, noise barriers,					
2.6. Format of instruction	⊠ lectures	⊠ independent	2.7. Comments:					
	\Box seminars and workshops	assignments						
	⊠ exercises	\Box multimedia and the						
	□ online in entirety	Internet						



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	⊠ fieldwork			 work with mentor (other) 						
2.8. Monitoring student work	Class attendance	YES		Research		NO	Oral	exam	YES	
	Experimental work		NO	Report		NO	(othe	er)		
	Essay		NO	Seminar paper		NO	(othe	er)		
	Preliminary exam		NO	Practical work	YES		(othe	er)		
	Project		NO	Written exam	YES		ECTS credi (tota	ECTS credits (total)		
2.9. Assessment methods and criteria	Assessment is conducted in accordance with Assessment methods and criteria for the current academic year.									
2.10. Student responsibilities	Regular attend Taking exam.	ance ar	nd activ	ve participation	in lectur	es and	exercis	ses, mak	king exe	ercises.
2.11. Required literature (available in the library and/or via other media)		Tit	le		Av in t	ailabilit he libra	y ry	y via other media		ty edia
	Turkulin, H.; L građevna stola Zagreb	₋juljka, rija, 182	B. 198 2 p. Šur	88. Lamelirana marski fakultet						
	Turkulin i dr. pročeljima. Drv 44-54.	2002: vna ind	Postoja . 53(1):	anost drva na :33-48 i 53(3):						
	Tomašević, J. konstrukcijama	(1996 Zagreł .	5): Drv 5: nakla	o u podnim da autora.						
	*** 2020: Zbii površinskoj obr fakultet	rka člar adigrać	naka o đevnog	postojanosti i drva. Šumarski						
	*** 2001. Teł Zagreb: Mozaik	nnologij knjiga	a drvei	nih građevina.						
2.12. Optional literature	1. Liesse, B. (20 2. Erler, K. (200 3. *** (2002): Products Lab	02): Ho 2): Holz Wood	lzbaute im im / as an	ile. Leinfelden-Ed Aussenbereich. E engineering mat	chterdin Basel-Bos terial. M	gen: DR ston-Bei ladison,	W-Verl rlin: Bir WI: U	ag khäuser ISDA Foi	Verlag r. Ser.,	Forest

1. GENERAL INFORMATIO	1. GENERAL INFORMATION								
1.1. Course lecturer(s)	Assoc. Prof. Andreja Pirc Barčić, PhD Prof. Darko Motik, PhD	1.7. Number of ECTS credits	4						
1.2. Course title	Marketing of wood products	 1.8. Number of hours in a semester (L+E+F+e-learning) 	30+30+8						
1.3. Course code	33648	1.9. Expected enrolment in the course	30						
1.4. Study programme	University Undergraduate Studies of Wood Technology	1.10. Level of application of e-learning (level 1, 2, 3)	2						
1.5. Course type	Compulsory	1.11. Language of instruction	Croatian						



1.6. Year of the study	3 1.12. Possibility of NO							
2. COURSE DESCRIPTION								
2.1. Course objectives	The aim of the subject is the ec and skills from the wood and work not only as purchasing a plans, presentation, marketing	ducation of students in order to g wood products trade. It means and sales agents but also in the gresearch, etc.	set all the needed knowledge that they should be able to field of products processing					
2.2. Enrolment requirements and/or entry competencies required for the course	-							
2.3. Learning outcomes at the level of the programme to which the course contributes	D2 - Perform wood industry-sp conduct distribution, promo programmes, form product co wooden products.	pecific calculations, define and an tion and market research, p st and selling prices, organise an	alyse expenses, organise and alan products and product d conduct sales of wood and					
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	 To carry out a market research process using the customer survey methodology and to evaluate the demand for wood products based on the derived consumption method To decide about marketing strategies in woodworking and furniture manufacturing companies and design strategic product planning processes To establish a business portfolio of business attractiveness business and business power of companies and to create a multifactor portfolio matrix To plan the life span of the best-selling products in the production program To create a product marketing strategy at each stage of the product life cycle To analyze wood products customers' behaviour based on information in the recent years To develop a market prediction of furniture sales and to plan furniture consumption based on the determined quantity of products sold in the past period To design wood products and furniture distribution channels and to recommend the application of the appropriate distribution channels To suggest cost allocation concerning stages in the product development process and form the price of a particular product based on price and competitiveness To develop a promotional plan for a wood industry company To assess the most common business, merchandise and financial risks in industry company and to suggest transportation documentation for wood products 							
2.5. Course content (syllabus)	 11. To assess the most common business, merchandise and financial risks in industry company and to suggest transportation documentation for wood products Notion, meaning and trade function. Trade division. The ways of selling wood and wood products. Wood market. Retail trade and wholesale. Wood products classification. Supply and demand for wood products. Trade usages and incoterms. Complete processing of inland and foreign trade documentation. Trade operations risks and risks insurance. Customs duty and other restrictions. Products transportation to customers Forwarding. The marketing meaning and role in the enterprises for manufacture and sale of wood and wood products. The enterprise orientation to the market. The management of products and production programmes in the furniture industry. Products or production programmes plar strategy. The analysis of marketing possibilities. The characteristics of wood product a customer. The development of wood products. Products life cycle in the furniture industry. Devolutes life cycle in the furniture industry. Distributional channels in the wood trade. Distributional channels agents. Presentation of furniture and other wood products. Market research of enterprises for manufacture and sale of wood products. Stablishing prices of wood products. The analysis of marketing information in the trade of wood and wood products. The development in the process of enterprises for the usage. Presentation of furniture and other wood products. Market research of enterprises for manufacture and sale of wood products. Market research of enterprises for manufacture and sale of wood products. Market research plan. Data resources. The usage of marketing information in the trade of wood and wood products. The analysis of customers' behaviour The factors that affect behaviour in the process of buying. 							
2.6. Format of instruction	⊠ lectures	oxtimes independent	2.7. Comments:					



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	🛛 seminars an	d works	hops	assignments							
	\boxtimes exercises			🗆 multimedia	and the						
	🗆 online in ent	irety		internet							
	🛛 partial e-lea	rning		Iaboratory							
	🛛 fieldwork	U		\Box work with mentor							
				🗆 (other)							
2.8. Monitoring student work	Class attendance	YES		Research		NO	Oral	exam	YES		
	Experimental work		NO	Report		NO	(othe	er)			
	Essay		NO	Seminar paper	YES		(othe	er)			
	Preliminary exam	YES		Practical work		NO	(othe	er)			
	Project		NO	Written exam	YES		ECTS credi (tota	ECTS credits (total)			
2.9. Assessment methods	Assessment is	Assessment is conducted in accordance with Assessment methods and criteria for th									
and criteria	current academ	nic year.									
2.10. Student	Regular attend	ance a	nd activ	e participation	in lectu	res and	exerc	ises, pre	eparatio	n and	
responsibilities	submission of exercises within the set deadline. Preparation of seminars on specific thema									ematic	
	units and partic	cipation	in field	work. Taking coll	oquia ar	nd exam	s.	1			
2.11. Required literature					A.,	ailabilit			ailabilit	: _ - : : t	
(available in the library		Tit	le	in the lik			Ý	A	a other media		
and/or via other media)							y via other media		eula		
	Kotler, P., Won	g, V., Sa	unders,	J., Armstrong,				Online	edition		
	G. (2006). Osno	ve mark	ketinga.	Mate, 4th ed.,							
	Schiffman, L.G., potrošača. Mat	, Kanuk <i>,</i> e.	L.L. (200	04): Ponašanje				Online	edition		
	Renko, N. (201	0): Marl	keting m	nalih i srednjih				Online	edition		
	poduzeća. Ljeva	ak	_	-							
	Pirc, A., D, Mo	otik, M.	Moro,	S. Posavec, A.				Online	edition		
	Kopljar, 2010:	Analiza	pokazat	telja stanja na							
	tržištu drvnih p	roizvod	a Reput	olike Hrvatske,							
	Drvna industrija	a, 61(4):	229-23	8.							
2.12. Optional literature	1. Hansen, E., R	anwar,	K., VIOS	ку, К. (2014): The	e Global	Forest S	ector.	CRC Pre	SS.		
	2. PIFC Barcic, A	., WOTIK	, D., Pail	лs, п., кiaric, К., L	, Liker, K., Oblak, L. (2016): Analysis of furniture						
	selling place in	Croatia	Sloveni	and Slovakia I	Drvna industrija. 67 (3): 257-262.						
	selling place in 3. Kaputa Vladi	Croatia, islav [.] Ba	, Sloveni Irčić Pirc	a and Slovakia. [A.: Mat'ova H	Drvna in Motik T	dustrija.).: (201)	. 67 (3) 8): Con	: 257-26 sumer P	2. referen	ces for	

1. GENERAL INFORMATIO	1. GENERAL INFORMATION									
1.1. Course lecturer(s)	-	1.7. Number of ECTS credits	3							
1.2. Course title	Practical work 2	 1.8. Number of hours in a semester (L+E+F+e-learning) 	90 independent work in the workshop							
1.3. Course code	236194	1.9. Expected enrolment in the course	30							
1.4. Study programme	University Undergraduate Studies of Wood Technology	1.10. Level of application of e-learning (level 1, 2, 3)	-							
1.5. Course type	Compulsory	1.11. Language of instruction	Croatian							



1.6. Year of the study	3	3 1.12. Possibility of NO									
2. COURSE DESCRIPTION				•			•				
2.1. Course objectives	Application of a technology pro recognize woo criteria. Prepar presentation of presentation.	acquirec cess. So d and n ation ar the pro	d knowle lving te non-woo nd organ ject. Pro	edge and skills or chnical and techr od materials and nization of prima oduct design and	n a real o nological technol ry docur project r	exampl proble logical mentati report, p	e of wood proc ms. Developing processes base on for the dev product process	ducts or g the ab ed on d elopme sor inno	wood ility to efined nt and vation		
2.2. Enrolment requirements and/or entry competencies required for the course	-										
2.3. Learning outcomes at the level of the programme to which the course contributes	B4 - Apply tech processes, mea C4 - Recognise components of technical prope wood board fac C5 - Size constr product constr systematically, AutoCAD; C6 - Use wood final processing C8 - Recommer the interior ar preparation to	 B4 - Apply technical knowledge for the purpose of mastering wood industry procedures and processes, means of work and material handling methods; C4 - Recognise particular types of veneer and wood panel, analyse the basic structural components of wood panels, explain the interdependency of structural components and technical properties of wood panels, monitor and control the manufacturing process in wood board factories, select and use wood panels with optimal properties; C5 - Size constructions, define systems of construction compositions as a prerequisite for product construction, define the basic construction documentation and develop it systematically, apply CAD systems in the wood industry and 2D modelling with the help of AutoCAD; C6 - Use wood glueing technology, select materials with optimal properties important for final processing, apply simpler technological methods in final wood processing; C8 - Recommend materials and procedures that are applied in the wood finishing process in the interior and the exterior, operate the wood finishing process starting from base preparation to the hardening of the material. 									
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	 Apply the actechnology pro Solve design Develop th technological p Define varia processes base Prepare and of the project Prepare a pr product, mater exhibition 	 Apply the acquired knowledge and skills to a realistic model of wood products or wood technology process Solve design and technological problems independently or as a team Develop the ability to recognize variants of wood and non-wood materials and technological processes Define variants of materials, product construction and technological conditions and processes based on defined criteria Prepare and organize the primary documentation for the development and presentation of the project Prepare a product and a report on the professional project; prepare a presentation of a product, material or process; present a product, process or innovation at a conference or 									
2.5. Course content (syllabus)	Solving technica non-wood mate organization o project. Produc	al and te erials an f prima t design	echnolo Id techn ry docu I and pr	gical problems. D ological processe imentation for t oject report, proc	evelopir es based the deve duct pro	ng the a on defi elopme cess or	ability to recogr ned criteria. Pr nt and presen innovation pre	nize woo eparatio tation sentatio	od and on and of the on.		
2.6. Format of instruction				independen	t		2.7. Commen	ts:			
	Seminars an	d works	hops	assignments	ممطعهم						
		iretv		internet	and the						
	D partial e-lea	ning		⊠ laboratory							
	☐ fieldwork			\boxtimes work with m	nentor						
2.8. Monitoring student work	Class attendance		NO	Research		NO	Oral exam		NO		
	Experimental	YES		Report		NO	(other)				
	Essay		NO	Seminar		NO	(other)				



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				paper						
	Preliminary exam		NO	Practical work	YES		(othe	(other)		
	Project		NO	Written exam		NO	ECTS credit (total	ECTS credits (total)		
2.9. Assessment methods and criteria	Assessment is current academ	conduc	ted in a	accordance with	Assess	ment m	nethods	and cr	iteria fo	or the
2.10. Student responsibilities	Mandatory exe	Mandatory execution of assigned tasks within the set deadline.								
2.11. Required literature (available in the library and/or via other media)		Title				Availability in the library			Availability via other media	
	Priručnik za stručnu praksu Priručnik za rad na siguran način				NO			YES, M	erlin	
					NO			YES, Merlin		
2.12. Optional literature	-									

UNDERGRADUATE STUDIES OF WOOD TECHNOLOGY - VI. SEMESTER

1. GENERAL INFORMATIO	N		
1.1. Course lecturer(s)	Prof. Darko Motik, PhD Assoc. Prof. Andreja Pirc Barčić, PhD	1.7. Number of ECTS credits	5
1.2. Course title	Production planning and calculation	 1.8. Number of hours in a semester (L+E+F+e-learning) 	30+45+8
1.3. Course code	33649	1.9. Expected enrolment in the course	30
1.4. Study programme	University Undergraduate Studies of Wood Technology	1.10. Level of application of e-learning (level 1, 2, 3)	3
1.5. Course type	Compulsory	1.11. Language of instruction	Croatian
1.6. Year of the study	3	1.12. Possibility of instruction in English	NO
2. COURSE DESCRIPTION			
2.1. Course objectives	The target of the course subje production calculation. Stude planning, calculation of basic reports, recognising cost types	ct is to qualify students for solvi nts obtain general and speciali c indicators of successful busir , and producing specific calculat	ng problems in planning and st knowledge in production ness, making basic financial ions in the wood industry.
2.2. Enrolment requirements and/or entry competencies required for the course	-		
2.3. Learning outcomes at the level of the programme to which the course contributes	D1 - Plan and organise the tim technological processes and support optimization, plan an write basic financial reports, re	e study, work rationalisation, ar on finished products, maintair d calculate the production, calc ecognise types of expenses;	nd perform quality control in n supply, stock and logistic rulate primary business KPIs,



	D2 - Perform we conduct distril programmes, fo	D2 - Perform wood industry-specific calculations, define and analyse expenses, organise and conduct distribution, promotion and market research, plan products and product programmes, form product cost and selling prices, organise and conduct sales of wood and wooden products.										
		and cal	act tha	profile of the	compan	w's wo	od processing	and fur	nituro			
	nanufacturing	husing	s for	nossible busines		horation	hased on ca	anu rui alculater	d and			
	analyzed perfor	mance	and safe	ety performance	indicato	ors		inculated	a ana			
	2. To analyze fu	Indame	ntal prir	nciples of financia	al accou	nting (B	alance Sheet. P	rofit an	d Loss			
	Account, Cash F	-low Sta	tement	:)		- 01	,					
	3. To recomme	end the	type of	f calculation and	to calc	ulate a	cost price per	unit in	wood			
	processing											
	4. To recommend the type of calculation and to calculate a cost price per unit in furniture											
	manufacturing											
	5. To create a c	ost pric	e per or	he unit of wood p	roduct	and furr	niture by applyi	ng calcu	ilation			
2.4. Expected learning	incomplete cos	ts calcu	lation m	iethod		cnosific	ovnonce of five	- d - c - c +				
the course (2 to 10	6. To suggest a	method	i of calc	ulating depreciat	ion as a	of color	expense of fixe	ed asset	s			
learning	nrocessing and	furnitu	e mani	ifacturing compa	nies	UI SEIE			woou			
outcomes)	8. To plan prod	luction	costs cla	assification in rela	ation to	change	s in the scope	of prod	uction			
,	activities (fixed	costs, v	ariable	costs, mixed cost	s, discre	etionary	costs)					
	9. To plan pro	duction	costs c	lassification acco	ording t	o their	natural charac	teristics	(staff			
	costs, material costs, depreciation, service costs, non-material / other costs, financing co 10. To create a relationship model of costs, revenue and change in business activity 11. To analyze the company's cost structure and determine cost-related priorities evaluate the type of calculations that the company applies in the formation of the produ- cost and decide which type of calculation would be most applicable to the company b											
	12 To select I	oon rer	avmon	t models in woo	d proc	ossing a	and furniture r	nanufac	turing			
	companies		aymen	t models in woo		essing a		lialiulau	luing			
	The analysis	of the	wood-	technology proc	esses	system.	Basic knowle	edge of	f cost			
	management. System connections of financial bookkeeping with management cost											
	bookkeeping. Special features of wood article production. Raw materials and stocks. Semi-											
	products on the stock. Finished products on stock. Indicators of business success. Planning											
	concept. Purpose and tasks of production planning. Contents and structure of business plan											
	and production	n. Use a	ind con	trol of the plan.	Basic g	guidelin	es of financial	bookke	eping.			
	management (osts in	husine	s decision Tradi	tional :	aimed o	agement. App		onts of			
	management o	costs. N	lodels of	of production m	anagem	ient cos	sts in wood p	ocessin	g and			
2.5. Course content	furniture manu	facture.	Costs.	Conceptual deter	minatio	on of cos	sts. Cost divisio	า.	0			
(syliabus)	Specific costs in	n wood	proces	sing and furnitur	e manu	Ifacture	. Case study. C	alculatio	ons of			
	products and se	ervices.	Calculat	ion division in inc	lividual	product	ion types in wo	od proc	essing			
	and furniture	manufa	cture. (Oppositions of c	oncepts	S. Absor	ptive approacl	n to co	sts vs			
	marginal appro	ach; Gro	oss proti	it vs contribution	margin	with a c	ase study in wo	od proc	essing			
	and furniture m		ture. In	e integral manag	ement	model c	of production m	anagen	hent is			
	and production		lculatio	no fost calculatio	n ner r	e, emp	s and work or	lers Co	vering,			
	and recording v	vork/ma	aterial c	osts in calculation	n per pr	ocesses	and work orde	rs. Calcu	lation			
	of actual prime	costs. C	Concept	and phases of m	aking pr	oductio	on report.					
2.6. Format of instruction	⊠ lectures			independen	t		2.7. Commen	ts:				
	Seminars and	d works	hops	assignments								
	⊠ exercises			🗆 multimedia	and the							
	online in entirety internet											
	🛛 partial e-lea	□ laboratory										
	⊠ fieldwork			🗌 work with m	entor							
2.0 Manitaria atalasi	Class							1				
work	attendance	YES		Research	YES		Oral exam	YES				
	attendunce	L				1	1					

SVEUČILIŠTE U ZAGREBU, FAKULTET ŠUMARSTVA I DRVNE TEHNOLOGIJE

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	Experimental work		NO	Report		NO	(othe	er)			
	Essay		NO	Seminar paper	YES		(othe	er)			
	Preliminary exam	YES		Practical work		NO	(othe	er)			
	Project		NO	Written exam	YES		ECTS credi (tota	ts I)	5		
2.9. Assessment methods and criteria	Assessment is current academ	Assessment is conducted in accordance with Assessment methods and criteria for the current academic year.									
2.10. Student responsibilities	Regular attend submission of e units and partic	Regular attendance and active participation in lectures and exercises, preparation and submission of exercises within the set deadline. Preparation of seminars on specific thematic units and participation in fieldwork. Taking colloquia and exams.									
2.11. Required literature (available in the library and/or via other media)	Title					Availability in the library			Availability via other media		
	1.Figurić, M. (20 drvno tehnolo fakultet Sveučil	003): Mo oškim išta u Za	enadžm procesir agrebu.	ent troškova u na. Šumarski Zagreb.							
	2.Motik, D. ekonomika pro Sveučilišta u Za	(2002) Dizvodnj grebu.Z	: Zbir je. Šum agreb. F	ka zadataka Jarski fakultet Polimeni, R.S.							
	3.Polimeni, R.S (1999): Troško Zgombić Plus. Z	3.Polimeni, R.S., Handy, S.A., Cashin, J.A. 1999): Troškovno računovodstvo. Faber & Zgombić Plus. Zagreb.									
2.12. Optional literature	 Samuelson, F Liker, K., Pi konkurentnosti Competitivenes 	P. A., No rc Barč pilans ss of Sof	ordhaus, ić, A., I ke pre ftwood S	W. D. (2011): Ek Motik, D. 2015: rade četinjača Sawmilling). Drvr	konomija Proizvo (Produc na indus	a. Mate. dni tro tion Co trija, 66	Zagret škovi k osts as (4): 289). (ao osno (s a Bas ()-296	ovni čin sic Fact	nbenik tor of	

1. GENERAL INFORMATIO	N						
1.1. Course lecturer(s)	Prof. Vlatka Jirouš-Rajković, PhD Asst. Prof. Josip Miklečić, PhD		5				
1.2. Course title	Wood finishing	 1.8. Number of hours in a semester (L+E+F+e-learning) 	30+45+8				
1.3. Course code	33650	1.9. Expected enrolment in the course	30				
1.4. Study programme	University Undergraduate Studies of Wood Technology	1.10. Level of application of e-learning (level 1, 2, 3)	2				
1.5. Course type	Compulsory	1.11. Language of instruction	Croatian				
1.6. Year of the study	3	1.12. Possibility of instruction in English	NO				
2. COURSE DESCRIPTION							
2.1. Course objectives	The student gains knowledge about materials and processes in exterior and interior wood finishing. He becomes acquainted with the whole wood finishing process from surface preparation, application, and curing finishes.						



2.2. Enrolment requirements and/or entry competencies	-								
2.3. Learning outcomes at the level of the programme to which the course contributes	A1 - Apply a pr solve mathema and analyse dat A4 - Apply skills calculations or B4 - Apply tech processes, mea C8 - Recommer the interior ar preparation to E1 - Continue Department of	solve mathematically various research and practical problems, statistically process, present and analyse data, and reach conclusions based on analysed data; A4 - Apply skills in solving practical issues in the business, either by control measurements, calculations or testing verifications; B4 - Apply technical knowledge for the purpose of mastering wood industry procedures and processes, means of work and material handling methods; C8 - Recommend materials and procedures that are applied in the wood finishing process in the interior and the exterior, operate the wood finishing process starting from base preparation to the hardening of the material; E1 - Continue specialization in university graduate studies at the Wood Technology Department of the Faculty of Forestry and Wood Technology.							
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	 Differentiate the sanding materials for various types of wood, wood materials, wood finishes according to the backing, abrasive grain and grain's hardness and toughness, grit size and amount of grains. Differentiate the properties and composition of wood staining materials (water-based stains, alcohol-based stains, oil stains, reactive stains and wood bleaching materials. Compare the properties of wood coatings based on natural resins, oils and waxes with coatings based on synthetic resins. Identify the advantages and disadvantages of specific methods of applying varnishes (manual application, applying by spraying, curtain coating, dipping, roller coating, flow coating, vacuum coating). Measure the viscosity of the wood coating material, density, dry solid, film thickness, and application rate. To compare the methods of curing (drying) coatings on wood (convection drying, infrared radiation, microwaves, UV radiation, electron beam irradiation). Calculate the consumption of wood finishing materials To evaluate the safety and health risks in the finishing room (explosiveness, flammability, health hazard, danger to the environment). 								
2.5. Course content (syllabus)2.6. Format of instruction	9. Write a professional paper on a given topic in wood finishing. History of wood finishing. Trends of development. Wood and wood-bases substrates for finishing. Materials for sanding, filling, and degreasing, materials for resins removal, and glues removal. Materials for colouring of wood -stains. Materials for bleaching of wood. Organic solvent preservatives, wood primers, stains. The composition and properties of the film-forming wood finishes. Natural-resin based materials, cellulose-based coatings, alkyds coatings, polyesters coatings, acid-cured coatings, polyurethane-coatings, water-borne coatings, epoxy coatings, silicone coatings, thermoplastics-based coatings. Solvents and thinners. Additives. Methods of applying finishes: manual applying, air-assisted spraying, airless spraying, air mix spraying, hot-spraying, two - components materials spraying. Spray equipment, automatic spraying machines, and robots. Electrostatic spraying. Roller coating, curtain coating, flow coating, dipping. Drying and curing techniques of coatings. Convection drying, Cold drying, infrared drying, UV curing for the furniture and joinery industry. Microwave drying, Electron Beam (EB) curing.								
2.8. Monitoring student work	☐ fieldwork Class attendance	YES		⊠ work with m □ (other) Research	entor	NO	Oral exam	YES	
	Experimental		NO	Report		NO	(other)	Τ	Γ



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	work									
	Essay		NO	Seminar paper	YES		(other)			
	Preliminary exam	YES		Practical work	YES		(other)			
	Project	YES		Written exam	YES		ECTS credits (total)	5		
2.9. Assessment methods	Assessment is conducted in accordance with Assessment methods and criteria for the									
and criteria	current academic year.									
2.10. Student	Regular attendance and active participation in lectures and exercises, preparation and									
responsibilities	submission of exercises within the set deadline. Taking colloquia and exams.									
2.11. Required literature										
(available in the library		Tit	ما		Av	ailability		Availability		
and/or via other media)	inte				in the library		v vi	via other media		
	1. Liulika. B.:	YES								
	Sveučilište u Zagrebu. Šumarski fakultet.									
	Zagreb 1990.									
	2. Ljuljka, Boris	2. Ljuljka, Boris; Jirouš-Rajković, Vlatka			YES					
	OSNOVE POVR	ŠINSKE (OBRADE	E DRVA						
	Zagreb: Sand, c	l.o.o., 20	006							
2.12. Optional literature	Bulian F, Jon G	(2009) \	Nood co	oatings: theory a	nd pract	ice.				
	Elsevier Science, New York.									

1. GENERAL INFORMATIO	N							
1.1. Course lecturer(s)	-	1.7. Number of ECTS credits	3					
1.2. Course title	Practice	 1.8. Number of hours in a semester (L+E+F+e-learning) 	80					
1.3. Course code	236196	1.9. Expected enrolment in the course	30					
1.4. Study programme	University Undergraduate Studies of Wood Technology	1.10. Level of application of e-learning (level 1, 2, 3)	-					
1.5. Course type	Compulsory	1.11. Language of instruction	Croatian					
1.6. Year of the study	3	1.12. Possibility of instruction in English	NO					
2. COURSE DESCRIPTION	2. COURSE DESCRIPTION							
2.1. Course objectives	Application of acquired knowledge and skills gained during studies in specific situations in wood production. Recording and commenting on work procedures, wood product production and company operations. Comparison of the success of the wood-technology output according to given criteria. Preparation of a written report on the developed professional practice.							
2.2. Enrolment requirements and/or entry competencies required for the course	-							
2.3. Learning outcomes at the level of the programme to which the course contributes	 A4 - Apply skills in solving practical issues in the business, either by control measurements, calculations or testing verifications; B4 - Apply technical knowledge for the purpose of mastering wood industry procedures and processes, means of work and material handling methods; 							



	 organise transport of wood and wooden materials, calculate and adjust the capacities of means of transport with technological procedures, calculate and analyse energy consumption, and recommend solutions for less complex wood and wooden material transport projects; C1 - Analyse the wood cutting process, select, optimally use and maintain primary process machinery, select machinery working regimes and tools for final wood processing, and recommend project assignments to special equipment manufacturers; C2 - Recognise and assess sawmilling raw material and products, conduct the categorisation and measurements of sawmilling raw material and products, apply basic skills of wood sawmilling technology and techniques of log and board sawing, and identify factors of successful sawmilling wood processes; C3 - Monitor and control processes of massive wood, veneer and wood particle drying, other special drying processes, and wood steaming; C4 Recognise particular types of veneer and wood panel, analyse the basic structural components of wood panels, explain the interdependency of structural components and technical properties of wood panels, monitor and control the manufacturing process in wood board factories, select and use wood panels with optimal properties; C8 - Recommend materials and procedures that are applied in the wood finishing process in the interior and the exterior, operate the wood finishing process starting from base preparation to the hardening of the material; D2 - Perform wood industry-specific calculations, define and analyse expenses, organise and conduct distribution, promotion and market research, plan products and product programmes, form product cost and selling prices, organise and conduct sales of wood and wooden products. 1. Apply the acquired knowledge and skills gained during the study in specific situations 								
2.4. Expected learning	2. Apply the act	1. Apply the acquired knowledge and skills gained during the study in specific situations 2. Apply communication skills in a new work environment							
outcomes at the level of	3. Record and c	ommen	t on cha	aracteristics of w	vorking p	rocedui	res, wood prod	uct prod	duction
the course (3 to 10	and business		e ef we	ad production a	aaardina	ta tha a	ivon oritoria		
learning outcomes)	4. Compare the	succes nse of ri	s ot wo esponsi	bd production a bility and motivation bility and bility	ccording	to the g	given criteria	ned task	(S
	6. Prepare a written report on professional practice								
2.5. Course content	-								
(syliabus) 2.6. Format of instruction	□ lectures			⊠ independe	nt		2.7. Commer	nts:	
	Seminars an	d works	hops	assignments					
	\boxtimes exercises			🗆 multimedia	a and the	!			
	□ online in entirety internet								
	☐ partial e-lea	rning		\boxtimes work with	mentor				
				□ (other)					
2.8. Monitoring student work	Class attendance		NO	Research	YES		Oral exam		NO
	Experimental	YES		Report	YES		(other)		
	WOIK								
	Essay		NO	Seminar paper	YES		(other)		
	Essay Preliminary exam		NO NO	Seminar paper Practical work	YES YES		(other) (other)		
	Essay Preliminary exam Project	YES	NO NO	Seminar paper Practical work Written exam	YES YES	NO	(other) (other) ECTS credits (total)	3	
2.9. Assessment methods	Essay Preliminary exam Project Assessment is	YES	NO NO ted in	Seminar paper Practical work Written exam accordance wit	YES YES h Assess	NO ment n	(other) (other) ECTS credits (total) nethods and c	3 riteria	for the
2.9. Assessment methods and criteria	Essay Preliminary exam Project Assessment is current academ	YES conduc nic year.	NO NO ted in	Seminar paper Practical work Written exam accordance wit	YES YES h Assess	NO ment n	(other) (other) ECTS credits (total) nethods and c	3 riteria	for the


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2.11. Required literature (available in the library and/or via other media)	Title	Availability in the library	Availability via other media		
	Priručnik za stručnu praksu	NO	YES, Merlin		
	Priručnik za rad na siguran način	NO	YES, Merlin		
2.12. Optional literature	-	•			

1. GENERAL INFORMATIO	N							
1.1. Course lecturer(s)	Asst. Prof. Ivana Perić, PhD Karla Kremenjaš, mag. ing. techn. lign.	1.7. Number of ECTS credits	3					
1.2. Course title	Operations management	 1.8. Number of hours in a semester (L+E+F+e-learning) 	30+30+8					
1.3. Course code	236197	1.9. Expected enrolment in the course	20					
1.4. Study programme	University Undergraduate Studies of Wood Technology	2						
1.5. Course type	Elective	1.11. Language of instruction	Croatian					
1.6. Year of the study	3	1.12. Possibility of instruction in English NO						
2. COURSE DESCRIPTION								
2.1. Course objectives	Manager engineers must coord which involves planning, organ	linate the use of resources throu iizing, staffing, directing and con	gh the management process, trolling.					
2.2. Enrolment requirements and/or entry competencies required for the course	-							
2.3. Learning outcomes at the level of the programme to which the course contributes	D1 - Plan and organise the tim technological processes and support optimization, plan and basic financial reports, recogni	D1 - Plan and organise the time study, work rationalisation, and perform quality control in technological processes and on finished products, maintain supply, stock and logistic support optimization, plan and calculate the production, calculate basic business KPIs, write basic financial reports, recognise types of expenses.						
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	 Define production functions Analyze concepts for planning Prepare the technical documents Organize technological, openents Connect documentation of processing and furniture production processing and furniture production processing company Recommend a software solution Apply the acquired knowled specific task 	 Define production functions and production strategies Analyze concepts for planning and production management Prepare the technical documentation Organize technological, operational preparation of production and distribution of jobs Connect documentation of business and manufacturing systems companies wood processing and furniture production Modeling production process management systems in a wood processing and furniture manufacturing company Recommend a software solution for integrated production planning and management Apply the acquired knowledge and skills from the content of the course items to solve a 						
2.5. Course content (syllabus)	Artificial intelligence. Virtual learning. Intelligence systems. concepts in the wood indust working cell, numerically con machine (CNC) and direct num the wood industry. Theoretica	world learning environment. E On line decision. Work in Proces rry: transfer line, flexible produ- trolled machines (NC), comput- nerical control machine (DNC). C I concepts necessary to manage	Experts systems. Modell for ss. Contemporary production uction line, working centre, terized numerical controlled Characteristic technologies in the production process. The					



	Decision Suppor System. The characteristic conception of production management in the wood industry. Production management methods: Reorder Point (ROP), Material Requirements Planning (MRP), Management Resource Planning II (MRP II), Money Resource Planning (MRP III), Capacity Resource Planning (CRP), Just in Time/Total Quality Control (JIT/TQC), Bussines Requirements Planning (BRP), Enterprise Resource Planning (ERP). Network production. Production preparations aims and orders. Technological, operative production preparations and work distribution. Production preparation as a part of the management system. Work order. Primary bearer of information for production management. Planning of issuing work orders, job dispatching, execution and control of their accomplishment. Production documentation as a part of the information system. Projection of the information system. Optimisation methods and techniques as support in the production management modelling process. A development concept for computerization of the production preparation jobs. IT environment. Computer-aided business in the wood industry. Database. Characteristic necessary of information system. A computer-aided system of plan and development of the product (3D). Product database. Technology for numerically controlled machines. Directly numerically controlled machines. Adapt management. Flexible manufacturing system management.									
2.6. Format of instruction	⊠ lectures			⊠ independe	nt		2.7.0	Commen	ts:	
2.0. Format of histraction	 sectores seminars and workshops exercises online in entirety partial e-learning fieldwork 			assignments multimedia internet laboratory work with exercises ir practicum	2.7. (Sommen				
2.8. Monitoring student work	Class attendance	YES		Research		NO	Oral	exam	YES	
	Experimental work		NO	Report		NO	(othe	er)		
	Essay		NO	Seminar paper	YES		(othe	er)		
	Preliminary exam	YES		Practical work		NO	(othe	er)		
	Project		NO	Written exam	YES		ECTS credi (tota	ts I)	3	
2.9. Assessment methods	Assessment is	conduc	ted in	accordance wit	h Assess	ment m	nethod	s and cr	iteria f	or the
and criteria	current academ	nic year.			ta 1 - :			•		
2.10. Student responsibilities	presentation of	ance ai semina	nd activ ar work.	ve participation Taking exam.	in lectu	res and	exerc	ises, pre	eparatio	on and
2.11. Required literature (available in the library and/or via other media)		Tit	le		Av in t	ailabilit he libra	y ry	Av via c	vailabili other m	ty edia
	Grladinović T. sustavima u namještaja, Šu Zagrebu, Zagre	: Upra preradi marski b, 1999	avljanje drva fakultet ., str. 1-	proizvodnim i proizvodnji t Sveučilišta u 298.	NO			YES, M	lerlin	
	Jelačić, D.: sustavima u zadataka), Šun Zagrebu, Zagre	Uprav drvno narski f b, 1995.	vljanje nj indu fakultet ., str. 1-	proizvodnim ustriji (zbirka Sveučilišta u 128.t	NO			YES, M	erlin	
2.12. Optional literature	1. Jacobs, R. F., Zagreb, 2018.,3 2. Majdandžić, Brodu, Slavonsl	Chase, 96-623 N., Čul «i Brod,	R. B. : U jak, S.: 1991.	Ipravljanje opera Priprema proiz	acijama i vodnje 1 [.]	lancem -3, Stro	opsk jarski f	rbe, 13. akultet	zadnje. u Slavo	Mate, nskom





UNIVERSITY OF ZAGREB, FACULTY OF FORESTRY AND WOOD TECHNOLOGY

3. Schroeder, R.G.: Upravljanje proizvodnjom, M.E.P., Zagreb, 1999. str. 1- 672.

1. GENERAL INFORMATIO	N								
1.1. Course lecturer(s)	Asst. Prof. Tomislav Sedlar, PhD Branimir Jambreković mag. ing. techn. lign. Assoc. Prof. Bogoslav Šefc, PhD	1.7. Number of ECTS credits	3						
1.2. Course title	Technological properties of wood	 1.8. Number of hours in a semester (L+E+F+e-learning) 	30+30+8						
1.3. Course code	236198	1.9. Expected enrolment in the course	20						
1.4. Study programme	University Undergraduate Studies of Wood Technology	1.10. Level of application of e-learning (level 1, 2, 3)	2						
1.5. Course type	Elective	1.11. Language of instruction	Croatian						
1.6. Year of the study	3	3 1.12. Possibility of NO instruction in English							
2. COURSE DESCRIPTION									
2.1. Course objectives	The course aims to acquire knowledge about the characteristics of wood in primary wood processing. Influence of macroscopic, physical and mechanical properties of wood and wood defects on technological aspects of wood. Technological characteristics of some commercial, domestic and foreign types of wood								
2.2. Enrolment requirements and/or entry competencies required for the course	-	-							
2.3. Learning outcomes at the level of the programme to which the course contributes	 A1 - Apply a physical approact solve mathematically various r and analyse data, and reach co A4 - Apply skills in solving practical calculations or testing verificat B1 - Identify parts and shapes or identify and explain the anator like species based on different practical knowledge of comments shrubbery; B3 - Apply knowledge about arrangement within individua flaws on the mechanical propertical within individuating propertical propertical	h of experimental observation a research and practical problems, onclusions based on analysed dat ctical issues in the business, eithe cions; of trees, macroscopic, physical ar mic structure of the xylem of woo nt morphological characteristics ercially important indigenous and the mechanical properties of w I trees and groups of trees, tree erties of wood.	Ind mathematical modelling, statistically process, present ta; er by control measurements, id chemical wood properties, od-like plants, identify wood- s, and apply theoretical and d foreign species of wood and vood, mechanical properties e flaws and the influence of						
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	 Determining the influence of characteristics of wood proces Determining the impact of processing Determining the basic techn of mechanical wood processing Evaluation of technological of processing Practical recognition of technological wood Evaluation of wood types ac 	f physical and mechanical proper ising of wood defects on technologi nological characteristics of wood g characteristics of wood for certa chnological characteristics of do	ties of wood on technological ical characteristics of wood d important for certain types in types of mechanical wood mestic and foreign types of ceristics of wood						



2.5. Course content (syllabus) The behaviour of wood in processing, treatment, Physical and mechanical properties of wood and their influence on technological characteristics of wood. Understand their influence of technological characteristics of wood, cutting theory. Theory of wood-cutting and the impact of physical and mechanical properties of wood in the process of wood-cutting. Effect of water content on technological characteristics of wood. Influence of temperature on technological characteristics of wood on technological characteristics of wood. Effect of anatomical structure and texture of wood on technological characteristics of wood. Effect of anatomical structure and texture of wood on technological characteristics of wood. Processing and analysis of wood wear resistance. Influence of the size of the angle of the fibre direction according to the direction of the force. Factors affecting the mechanical properties and technological characteristics of wood. 2.6. Format of instruction Seminars and workshops assignments Signed analysis of wood wear resistance. Influence of wood defects on technological characteristics of wood. 2.6. Format of instruction Class Seminar assignments 2.7. Comments: Second Internet work with mentor 2.8. Monitoring student work Class YES Research YES Oral exam YES 2.9. Assessment methods and criteria Class NO Seminar work NO (other) Image credits: 2.9. Assessment methods and criteria Assessment is conducted in accordance with Assessment methods and criteria for the current academic year.											
2.6. Formation instruction	2.5. Course content (syllabus)	The behaviour characteristics is properties of v cutting theory. of wood on t characteristics Wood deforma on technologica on technologica Influence of the Factors affectin Influence of v characteristics	The behaviour of wood in processing, treatment and mechanical disintegration, and its characteristics in these processes. Wood processing and treatment. Physical and mechanical properties of wood and their influence on technological characteristics of wood. Wood-cutting theory. Theory of wood-cutting and the impact of physical and mechanical properties of wood on the process of wood-cutting. Effect of water content on technological characteristics of wood. Wood deformations at different water contents and temperatures. Impact of the load speed on technological characteristics of wood. Effect of anatomical structure and texture of wood on technological characteristics of wood. Processing and analysis of wood wear resistance. Influence of the size of the angle of the fibre direction according to the direction of the force. Factors affecting the mechanical properties and technological characteristics of wood. Influence of wood defects on technological characteristics of wood. Technological characteristics of wood.								
Seminars and workshops assignments multimedia and the interret Image: Imag	2.6. Format of instruction				⊠ independer	IL		2.7.0	Jommen	ts:	
 exercises online in entirety internet		🗆 seminars an	d works	hops	assignments						
□ online in entirety partial e-learning Mieldwork internet Mieldwork internet Mieldwork 2.8. Monitoring student work Class attendance Experimental work YES Research YES Oral exam YES Essay YES Report NO (other) Image: constraints YES Preliminary exam YES Report NO (other) Image: constraints		🛛 exercises			🗆 multimedia	and the					
		🗌 🗆 online in ent	irety		internet						
2.8. Monitoring student work Class attendance YES Research YES Oral exam YES 2.8. Monitoring student work attendance YES Research YES Oral exam YES Experimental work YES Report NO (other) Image: Constraint of the state st		🛛 partial e-lea	rning		☐ 🛛 laboratory						
2.8. Monitoring student work Class attendance YES A Research YES Oral exam YES Image: State attendance Experimental work YES Report NO Oral exam YES Image: State attendance YES NO Oral exam YES Image: State attendance NO (other) Image: State attendance Image: State attendance NO (other) Image: State attendance Image: State attendance Image: State attendance NO (other) Image: State attendance		🛛 fieldwork	⊠ fieldwork ⊠ work wit			nentor					
2.8. Monitoring student work Class attendance YES Research YES Oral exam YES Experimental work YES Report NO (other) Image: Constraint of the second o					🗌 (other)	-				1	
work attendance Ho Ho <th>2.8. Monitoring student</th> <th>Class</th> <th>YES</th> <th></th> <th>Research</th> <th>YES</th> <th></th> <th>Oral</th> <th>exam</th> <th>YES</th> <th></th>	2.8. Monitoring student	Class	YES		Research	YES		Oral	exam	YES	
Experimental work YES Report NO (other) Image: Constraint of the sector of the	work	attendance			hesearch				(other)		
Essay NO Seminar paper NO (other) Image: seminar paper Preliminary exam NO Practical work NO (other) Image: seminar paper Image: seminar paper NO (other) Image: seminar paper Image: seminar paper Image: seminar paper NO Image: seminar paper Image: seminar paper </th <th></th> <th>Experimental work</th> <th>YES</th> <th></th> <th>Report</th> <th></th> <th>NO</th> <th>(othe</th> <th></th>		Experimental work	YES		Report		NO	(othe			
Preliminary exam NO Practical work NO (other) I Project NO Written exam YES ECTS credits (total) 3 2.9. Assessment methods and criteria Assessment is conducted in accordance with Assessment methods and criteria for the current academic year. Assessment is conducted in accordance with Assessment methods and criteria for the current academic year. 2.10. Student responsibilities Regular attendance at classes and exercises and preparation and submission of exercises within the set deadline. Taking exam. Availability in the library Availability via other media 2.11. Required literature (available in the library and/or via other media) Badun, S.: Tehnološke karakteristike drva I, skripta, Zagreb, 1979, str. 1-50 NO YES, Merlin Badun, S.: Tehnološke karakteristike drva, interna skripta, Zagreb, 2004 NO YES, Merlin 2.12. Optional literature (availability in the Set, Covordin, S.; Sinković, T.: Tehnološke del legno, Volume I, Torino, 1971, str. 1-1086. VES, Merlin 2.12. Optional literature (availability in 68, str. 1-592. I. Giordano, G.: Tecnologia del legno, Volume I, Torino, 1971, str. 1-1086. Skollmann F. R., Cote, W A Jr Principles of Wood. New York, 1991, str. 1-233.		Essay		NO	Seminar paper		NO	(othe			
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Project NO exam YES credits (total) 3 2.9. Assessment methods and criteria Assessment is conducted in accordance with Assessment methods and criteria for the current academic year. Regular attendance at classes and exercises and preparation and submission of exercises within the set deadline. Taking exam. 2.10. Student responsibilities Regular attendance at classes and exercises and preparation and submission of exercises within the set deadline. Taking exam. Availability in the library Availability via other media 2.11. Required literature (available in the library and/or via other media) Badun, S.: Tehnološke karakteristike drva I, skripta, Zagreb, 1979,str.1-50 NO YES, Merlin Badun, S.: Tehnološke karakteristike drva, interna skripta, Zagreb, 2004 I. Giordano, G.: Tecnologia del legno, Volume I, Torino, 1971, str. 1-1086. 2.12. Optional literature I. Giordano, G.: Tecnologia del legno, Volume I, Torino, 1971, str. 1-1086. I. Giordano, G.: Tecnologia del legno, Volume I, Torino, 1971, str. 1-233. 2.12. Optional literature I. Giordano, G.: Tecnologia del legno, Volume I, Torino, 1971, str. 1-233. I. Jasumis, G.; Science and Technology I solid Wood, New York, 1968, str. 1-592.					Written			ECTS			
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		4. Tsoumis. G.:	Science	and Te	chnology of Woo	od. New	York.19	91. str.	1-233.		



UNIVERSITY OF ZAGREB, FACULTY OF FORESTRY AND WOOD TECHNOLOGY

1. GENERAL INFORMATION							
1.1. Course lecturer(s)	Assoc. Prof. Igor Đukić, PhD	1.7. Number of ECTS credits	3				
1.2. Course title	Woodworking machinery II	 1.8. Number of hours in a semester (L+E+F+e-learning) 	30+30+16				
1.3. Course code	236199	1.9. Expected enrolment in the course	20				
1.4. Study programme	University Undergraduate Studies of Wood Technology	1.10. Level of application of e-learning (level 1, 2, 3)	2				
1.5. Course type	Elective	1.11. Language of instruction	Croatian				
1.6. Year of the study	3	1.12. Possibility of instruction in English	NO				
2. COURSE DESCRIPTION							
2.1. Course objectives	Acquiring the knowledge for s wood processing. Acquiring the manufacturers of special equip	selecting, optimal usage and ma e basics knowledge required for oment for wood processing.	aintenance of machinery for assigning project tasks to the				
2.2. Enrolment requirements and/or entry competencies required for the course	-						
2.3. Learning outcomes at the level of the programme to which the course contributes	C1 - Analyse the wood cutting process, select, optimally use and maintain primary process machinery, select machinery working regimes and tools for final wood processing, and recommend project assignments to special equipment manufacturers.						
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	 Suggest optimum tool-tip m for the default workpiece mate Suggest optimum process woodworking processes. Calculate the energy efficient energy consumed in kWh and Comment the results of m woodworking machines with m Measure feed per tooth, feet saw, planer, moulder, drill, and Distinguish the causes of too Analyze the influential facto life under the processing condition 8. Derive the formula for the c roughness in wood cutting Calculate the cutting speed a parameters, and suggest the e Differentiate the evaluation processed on band saws, circut Illustrate and measure basit woodworking machines. 	aterial (high-speed steel, hard al erial and processing parameters. sing parameters (feed speed, hey of a particular processing me unit quantity of the processed me easured and calculated operate eference to the recommended v ed per revolution and cutting speed d report the measurement result of wear and the tool's sharpness rs on tool life according to Taylo itions. alculation of the cutting force, c and tool life for the optimum pro- conomical cutting speed in criteria of wood machinability alar saws, planers, mills, lathes, c is parameters that make up the t	loy, hard metal, or diamond) cutting speed) for basic ethod as the ratio of average naterial. ting regimes for mechanical alues. eed on the band saw, circular is as a report. reduction. ir and suggest increasing tool utting power and theoretical ductivity, analyze influencing for different species of wood Irills. eechnical criteria for selecting				
2.5. Course content (syllabus)	Log frames saw. Carriages and frame output. Circular log saws Band resaws. The band saw our machines. Multi sides planing Tenoning machines. Machines woodworkers and combinati surfaces. Hogs, chippers and	guiding devices. Sawing speeds s. Multiple blade circular saws. Lo tput. Machines for planing and m g and moulding machines. Rou s for boring and mortising. Ma on machines. Sanding machir debarking machines. Woodcut	and feeds. Calculation of log og band mills. Circular resaws. noulding. Planing and jointing rters and carving machines. Inchine for turning. Universal nes. Machines for finishing ting by laser and water jet				



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	machines. Met	machines. Methods of machine failure diagnostics. Preventive machine maintenance.								
2.6 Format of instruction		orinspe			t. nt		270	Common	ter	
	\square rectures	dworke	hone		assignments			Johnnen	13.	
			nops	multimodia and the						
		in a to a								
		irety								
	⊠ partial e-learning									
	A fieldwork			\Box (other)	□ work with mentor □ (other)					
2.8. Monitoring student work	Class attendance	YES		Research		NO	Oral	exam	YES	
	Experimental work		NO	Report	YES		(othe	er)		
	Essay		NO	Seminar paper	YES		(othe	er)		
	Preliminary exam		NO	Practical work		NO	(othe	er)		
	Project		NO	Written		NO	ECTS credi	ECTS credits		
				exam			(tota	l)		
2.9. Assessment methods	Assessment is	conduc	ted in	accordance wit	h Assess	ment n	nethod	s and cr	riteria f	or the
and criteria	current academ	current academic year.								
2.10. Student	Regular attenda	ance an	d active	participation in	lectures	and exe	ercises.	Taking	exam.	
responsibilities								1		
2.11. Required literature					A.	ailabilit				
and/or via other media)		Tit	le		in the library			via other media		
							• •			cura
	Goglia V. (19	94) ST	ROJEVI	I ALATI ZA	YES					
	OBRADU DRVA	4 – I d	io, Šun	narski fakultet						
	Zagreb									
	Zupčević R. (2	1988) N	MAŜINE	ZA OBRADU	YES					
	DRVETA I dio,	TEORIJ	A REZA	NJA, Masinski						
	Ettolt B Gitt		2004)+ 9	Sägon Fräcon	VEC					
	Hobeln Bohrer	е, п (2 1 - Die 9	Snanung	y von Holz und	TES					
	ihre Werkzeuge	e. DRW-	Verlag							
2.12. Optional literature	1. Lisičan J. (19	96) TEO	RIJA A T	ECHNIKA SPRAC	OVANIA	DREVA	, MAT-	CENTRU	M, Zvole	en
	2. Williston E. N	л. (1978	3) SAWS	– design, select	ion, oper	ation, n	nainter	ance, M	iller Fre	eman,
	S.Francisco									
	3. Šavar Š. (199	0) OBR/	ADA ME	TALA ODVAJAN.	JEM ČEST	FICA Sve	zak 1,	Školska l	knjiga Za	agreb
	4. Šavar Š. (199	0) OBRA	ADA ME	TALA ODVAJAN.	JEM ČEST	FICA Sve	zak 2,	Školska l	knjiga Za	agreb

1. GENERAL INFORMATION							
1.1. Course lecturer(s)	Assoc. Prof. Zoran Vlaović, PhD	1.7. Number of ECTS credits	3				
1.2. Course title	Furniture construction	 1.8. Number of hours in a semester (L+E+F+e-learning) 	30+30+16				
1.3. Course code	236200	1.9. Expected enrolment in the course	20				



1.4. Study programme	University Undergraduate Studies of Wood Technology	1.10. Level of application of e-learning (level 1, 2, 3)	2						
1.5. Course type	Elective	1.11. Language of instruction	Croatian						
1.C. Veen of the study	2	1.12. Possibility of	NO						
1.6. Year of the study	3	instruction in English	NO						
2. COURSE DESCRIPTION									
2.1. Course objectives	Knowledge of constructing, of constructions on the mode of the complete construction s technical documentation appli	constructions and types of fund manufacture. Skills in develops ystem: planning, design, cons ed in the final product production	rniture, the dependence of ment and implementation of truction and production of on.						
2.2. Enrolment requirements and/or entry competencies required for the course	-	-							
2.3. Learning outcomes at the level of the programme to which the course contributes	C4 - Recognise particular type components of wood panels, technical properties of wood wood board factories, select an C5 - Size constructions, define product construction, define systematically, apply CAD syst AutoCAD	-4 - Recognise particular types of veneer and wood panel, analyse the basic structural components of wood panels, explain the interdependency of structural components and echnical properties of wood panels, monitor and control the manufacturing process in wood board factories, select and use wood panels with optimal properties; C5 - Size constructions, define systems of construction compositions as a prerequisite for product construction, define the basic construction documentation and develop it systematically, apply CAD systems in the wood industry and 2D modelling with the help of AutoCAD							
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	 systematically, apply CAD systems in the wood industry and 2D modelling with the help of AutoCAD 1. To identify and describe furniture construction, to classify (kitchen furniture, dining room furniture, office and school etc.) and to identify furniture (whose main features are visual aesthetic and functional elements and inner construction and functional structure) and to use technical terms (rail, panel, hinge etc) 2. To design, draw and describe furniture for storage, dining and work (home, office, school by way of the conceiving stage (analysing tasks and dealing with the issue of constructing) designing (selecting the best variant and making a drawing) and by constructional elaboration to parts and assemblies. 3. To design, draw and describe furniture for sitting and resting in accordance with HRN Eff standards. 4. To draw up the basic construction documentation and approach it systematically to it completion. 5. To design, draw and describe furniture for lying (beds, deck chairs) while considering the user's comfort.) 6. To design, draw and describe furniture for people with special needs in accordance with anthropometric requirements. 7. To design, draw and describe furniture of the exteriors. 8. To use CAD systems for making technical drawings or drawings as data carriers in relation to product shape, construction and quality. 9. To define and sketch paper- and cardboard-made furniture 10. To deal with calculations for the construction of different furniture types (to dimension construction) 11. To manage the equipping of a facility with furniture for storage sitting and hing. 								
2.5. Course content (syllabus)	Introduction to furniture construction (classification, identification, vocabulary). Construction and drawing of the furniture for keeping and supporting the objects (furniture made of massive wood, furniture made of wooded and other materials), work furniture (office, school and home), furniture for serving meals, sitting furniture and furniture with backrest; upholstered sitting furniture, rest furniture (beds and deck chairs), furniture fitted to the people with special needs, furniture of the exteriors, paper- and cardboard-made								
2.6. Format of instruction	\boxtimes lectures	independent	2.7. Comments:						



	□ seminars and workshops			assignments						
	\boxtimes exercises			🛛 🗆 multimedia	and the					
	🗆 online in ent	tirety		internet						
	🛛 partial e-lea	rning		□ laboratory						
	⊠ fieldwork			ork with r	nentor					
		1	1	🗆 (other)					1	
2.8. Monitoring student	Class	YES		Research		NO	Oral	exam	YES	
work	attendance									
	Experimental work		NO	Report	YES		(othe	er)		
	Essay		NO	Seminar paper		NO	(othe	er)		
	Preliminary		NO	Practical		NO	(othe	er)		
	chuin			WORK			ECTS			
	Project		NO	Written	YES		credits		3	
	.,			exam			(tota	I)	_	
2.9. Assessment methods	Assessment is	conduc	ted in	accordance with	n Assess	ment n	hethod	s and cr	iteria f	or the
and criteria	current academ	nic year.								
2.10. Student	Regular attenda	ance an	d active	participation in	lectures	and ex	ercises.	Taking e	exam.	
responsibilities										
2.11. Required literature					•	- 11 - 1- 1114				
(available in the library		Tit	le		AV in t	allabilit ho libro	y Availability			ty odia
and/or via other media)							i y			eula
	Tkalec, S. (198	Tkalec. S. (1985): Konstrukcije namještaja.								
	monografija, Sv	veučilišt	e u Zagi	rebu, Šumarski						
	fakultet, Zagreb	0								
	Tkalec, S., Pre	krat, S.	(2000)	: Konstrukcije	YES					
	proizvoda od	drva	I – O	snove drvnih						
	konstrukcija, sv	eučilišn	i udžbe	nik, Sveučilište						
	U Zagrebu, Surr	arski ta	kultet, A	znanje, zagreb č. Rajković, M	VEC					
	Vlaović 7 Živ	i bac, i iković	v Žun	2° $(2015)^{\circ}$	TL3					
	Kvaliteta i tehr	nički opi	isi proiz	voda od drva,						
	Svezak I. Opr	emanje	zgrada	a za odgoj i						
	obrazovanje, s	veučilišr	ni priru	čnik, Šumarski						
	fakultet Sveud	tilišta ι	u Zagre	ebu, Hrvatska						
	gospodarska ko	omora, Z	Zagreb.							
	Vlaović, Z.	(2009):	Cinite	lji udobnosti	YES					
	noglavlia Sver	usu ičilište	u Zagri	– Ouabrana ehu Šumarski						
	fakultet, Zagreb)	u zugiv	cou, sumarski						
	Grbac, I. (2006): Kreve	t i zdrav	vlje, sveučilišni	YES					
	udžbenik – oda	ibrana p	oglavlja	a, Sveučilište u						
	Zagrebu, Suma	rski faku	ultet, Za	greb						
	Panero, J. i Zel	nik, M.	(1991): history	Antropološke				Web		
	standarde u pr	njer, z	pin IRC	preporuka za Građevinska						
	kniiga". Beogra	d	nju, nu							
	Katalozi svjets	skih pr	oizvođa	iča okova za						
	namještaj	<u> </u>								
2.12. Optional literature	1. Hrvatski zavo	od za no	rme – c	odabrane HRN EN	N					
	2. Nutsch, W.	, 2009.	Holzte	chnik: Gestaltu	ng: Kon	struktio	n: Arb	eitsplan	ung. Le	ektorat
	Wolfgang Nuts	ch. Verla	ag Euro	pa-Lehrmittel.	¥					
	3. Grbac, I. (2	1988): brana -	Istraživa	anje kvalitete le	ezaja i p	oboljša	anje nj	egove k	onstruk	ксіје –
	disertacija, odabrana poglavlja, Sveučilište u Zagrebu, Šumarski fakultet, Zagreb									



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4. The Taunton Press (2000): Practical Design Solutions and Strategies, Key advise for sound construction from Fine Woodworking, The Taunton Press Inc. Newtown, USA

1. GENERAL INFORMATIO	N						
1.1. Course lecturer(s)	Assoc. Prof. Zoran Vlaović, PhD Assoc. Prof. Danijela Domljan, PhD	1.7. Number of ECTS credits	3				
1.2. Course title	Upholstered furniture	 1.8. Number of hours in a semester (L+E+F+e-learning) 	30+30+16				
1.3. Course code	236201	1.9. Expected enrolment in the course	20				
1.4. Study programme	University Undergraduate Studies of Wood Technology	1.10. Level of application of e-learning (level 1, 2, 3)	2				
1.5. Course type	Elective	1.11. Language of instruction	Croatian				
1.6. Year of the study	3	1.12. Possibility of instruction in English	NO				
2. COURSE DESCRIPTION							
2.1. Course objectives	Knowledge of construction, ty of construction upon production	pes and functions, requirements on technology of upholstered fur	in use, and the dependence rniture.				
2.2. Enrolment requirements and/or entry competencies required for the course	-						
2.3. Learning outcomes at the level of the programme to which the course contributes	A1 - Apply a physical approach of experimental observation and mathematical modelling, solve mathematically various research and practical problems, statistically process, present and analyse data, and reach conclusions based on analysed data; B3 - Apply knowledge about the mechanical properties of wood, mechanical properties arrangement within individual trees and groups of trees, tree flaws and the influence of flaws on the mechanical properties of wood; C5 - Size constructions, define systems of construction compositions as a prerequisite for product construction, define the basic construction documentation and develop it systematically, apply CAD systems in the wood industry and 2D modelling with the help of AutoCAD; D1 - Plan and organise the time study, work rationalisation, and perform quality control in technological processes and on finished products, maintain supply, stock and logistic support optimization, plan and calculate the production, calculate basic business KPIs, write						
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	 To identify historical periods To design and construct typ multiple purposes (resting and To distinguish and recomm frame construction, the elastic To choose materials for the lying; for the elastic layer, i.e. layer: To explain the specificity of decorative fabric with a patter To design furniture and plan (hand), machine-made, construct 	s, styles and development of uph es of upholstered furniture inter l relaxation) end materials for making uphols : layer, and the decorative-cover e frame construction; for the bas . the core; for surface softness material utilisation for upholster n) hits manufacture depending on a uction technology of bed-mattre tion of upholstered furniture for	nolstered furniture nded for sitting, lying and for stered furniture (such as the ing layer) se of furniture for sitting and and the decorative covering ered furniture (e.g. leather or available technology (classical ess) sitting and lying				



	 8. To define and apply functional requirements for upholstered furniture 9. To plan. recommend and assess upholstered furniture quality 10. to distinguish and compare the resistance to the flammability of upholstered furniture 11. To recognise and apply ecological production of upholstered furniture 12. To differ stages of the technological process of upholstered furniture manufacturing (e.g. when producing mattresses, to recognise the process of making the mattress core, making outer layers etc.) 13. To recognise the type (quality) of sponge materials (eg. the difference between viscoelastic foam and latex, differences in density (hardness) 										
2.5. Course content (syllabus)	Introduction to classification o sitting; constru types of multip upholstered fur rest (bed bases surfaces – cove specificities of the production furniture for (anthropometry upholstered requirements). ecological aspe	classification of upholstered furniture (construction types of upholstered furniture for sitting; construction types of upholstered furniture for rest – bed systems; construction types of multipurpose upholstered furniture – sitting, relaxation and laying). Materials for upholstered furniture (materials for frame construction, bases for sitting furniture (seat) and rest (bed bases), materials for elastic layer, i.e. seat cores and mattresses, materials for soft surfaces – covering materials, materials for decorative-covering layer, auxiliary materials, specificities of material utilization in upholstered furniture). Relevance of construction for the production technology of upholstered furniture, classical construction of upholstered furniture for sitting and rest. Functional requirements upon upholstered furniture (anthropometry, health aspects of upholstered furniture, functional dimensions of upholstered furniture, comfort, physiological-hygienic requirements, aesthetic requirements). Quality of upholstered furniture. Flammability of upholstered furniture and ecological aspect of the production of upholstered furniture.									
2.6. Format of instruction	Iectures	ما ي م ي ا		independer	nt 2.7. Comments:				its:		
	 Seminars and workshops exercises online in entirety partial e-learning 			□ multimedia internet □ laboratory	□ multimedia and the internet ☑ laboratory						
	⊠ fieldwork			\Box work with i	nentor						
2.8. Monitoring student work	Class attendance	YES		Research		NO	Oral	exam	YES		
	work		NO	Report	YES		(othe	r)			
	Essay		NO	Seminar paper		NO	(othe	r)			
	Preliminary exam		NO	Practical work		NO	(othe	r)			
	Project		NO	Written exam		NO	ECTS credit (total	ts I)	3		
2.9. Assessment methods	Assessment is	conduc	ted in	accordance wit	n Assess	ment n	nethods	s and c	riteria f	or the	
and criteria	current academ	nic year	d active	narticination in	lectures	and ev	ercises	Taking	exam		
responsibilities			u active		icetures		creises.	Taking	cxum.		
2.11. Required literature (available in the library and/or via other media)		Tit	le		Av in t	ailabilit he libra	y ry	Availability via other media			
	Grbac, I. (20 sveučilišni udžl Šumarski fakult	05): C benik, S et, Zagi)jastuče Sveučiliš reb	ni namještaj, šte u Zagrebu,	YES						
	Vlaović, Z. (uredskih stolic poglavlja, Sveu fakultet, Zagret	(2009): ca, dis ıčilište o	Ćinite ertacija u Zagr	Iji udobnosti – odabrana ebu, Šumarski	YES						



	Domljan, D., Grbac, I., Jirouš Rajković, V., Vlaović, Z., Živković, V., Župčić, I. (2015): Kvaliteta i tehnički opisi proizvoda od drva, Svezak I. Opremanje zgrada za odgoj i obrazovanje, sveučilišni priručnik, Šumarski fakultet Sveučilišta u Zagrebu, Hrvatska	YES	
	gospodarska komora, Zagreb. Grbac, I. (2006): Krevet i zdravlje, sveučilišni udžbenik, Sveučilište u Zagrebu, Šumarski fakultet, Zagreb	YES	
	Panero, J. i Zelnik, M. (1991): Antropološke mjere i interijer, Zbirka preporuka za standarde u projektiranju, IRO "Građevinska knjiga", Beograd	NO	Web
	Katalozi svjetskih proizvođača okova za namještaj	NO	Web
2.12. Optional literature	 Hrvatski zavod za norme – odabrane HRN El Tkalec, S. (1985): Konstrukcije namještaja, fakultet, Zagreb Grbac, I. (1988): Istraživanje kvalitete li disertacija, odabrana poglavlja, Sveučilište u Zi 4. Krasny, J., Parker, W. and Babrauskas, V., 20 mattresses. William Andrew de Witte, H.L., 2017. Impression tests uph Institute For Safety., Arnhem Morley, J. (1999): Furniture: The western Hudson Ltd., London 	N monografija, Sveučilišto ežaja i poboljšanje nj agrebu, Šumarski fakult 00. Fire behavior of uph nolstered furniture and tradition, History, sty	e u Zagrebu, Šumarski egove konstrukcije – et, Zagreb iolstered furniture and mattresses. Arnhem: le, design, Thames &

1. GENERAL INFORMATIO	N							
1.1. Course lecturer(s)	Assoc. Prof. Danijela Domljan, PhD Assoc. Prof. Zoran Vlaović, PhD	1.7. Number of ECTS credits	3					
1.2. Course title	Furniture design 1.8. Number of hours in a semester 3 (L+E+F+e-learning) 3		30+30+16					
1.3. Course code	236202	1.9. Expected enrolment in the course	20					
1.4. Study programme	University Undergraduate Studies of Wood Technology	1.10. Level of application of e-learning (level 1, 2, 3)	1					
1.5. Course type	Elective	1.11. Language of instruction	Croatian					
1.6. Year of the study	3	1.12. Possibility of instruction in English	YES					
2. COURSE DESCRIPTION								
2.1. Course objectives	Mastering and understanding of theoretical, practical and methodological principles of furniture design as a complex interdisciplinary process aimed at developing skills for independent analytical and creative design and action.							
2.2. Enrolment requirements and/or entry competencies required for the course	Knowledge and skills acquired graphics and Wooden construct - knowledge and application of techniques of design drawing - application of ACAD or simila	Independent analytical and creative design and action. Knowledge and skills acquired in the subjects Basics of design drawing, Applied technical graphics and Wooden constructions: - knowledge and application of artistic expression, principles of aesthetics and types and techniques of design drawing application of ACAD ac similar computer programs for 2D and 2D drawing						

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	understanding and exclusion of 2D plane, with several regionitions and regressions
	- understanding and application of 3D plane, orthogonal projections and perspectives
	- knowledge of the basics of the construction of wood products
	- knowledge of at least one foreign language (preferably English)
	- equipped workshop/practicum DTO with a lathe, laser cutter and other basic machines for
	wood and wood panels and mouldings.
	A1 - Apply a physical approach of experimental observation and mathematical modelling,
	solve mathematically various research and practical problems, statistically process, present
	and analyse data, and reach conclusions based on analysed data;
	A4 - Apply skills in solving practical issues in the business, either by control measurements,
	calculations or testing verificationsB3 - Apply knowledge about the mechanical properties of
	wood, mechanical properties arrangement within individual trees and groups of trees, tree
	flaws and the influence of flaws on the mechanical properties of wood;
	B3 - Apply knowledge about the mechanical properties of wood, mechanical properties
	arrangement within individual trees and groups of trees, tree flaws and the influence of
	flaws on the mechanical properties of wood;
	B4 - Apply technical knowledge for the purpose of mastering wood industry procedures and
	processes, means of work and material handling methods;
2.3. Learning outcomes at	C4 - Recognise particular types of veneer and wood panel, analyse the basic structural
the level of the	components of wood panels, explain the interdependency of structural components and
programme	technical properties of wood panels, monitor and control the manufacturing process in
to which the course	wood board factories, select and use wood panels with optimal properties;
contributes	C5 - Size constructions, define systems of construction compositions as a prerequisite for
	product construction, define the basic construction documentation and develop it
	systematically, apply CAD systems in the wood industry and 2D modelling with the help of
	AutoCAD;
	C8 - Recommend materials and procedures that are applied in the wood finishing process in
	the interior and the exterior, operate the wood finishing process starting from base
	preparation to the hardening of the material;
	D2 - Perform wood industry-specific calculations, define and analyse expenses, organise and
	conduct distribution, promotion and market research, plan products and product
	programmes, form product cost and selling prices, organise and conduct sales of wood and
	wooden products;
	E1 - Continue specialization in university graduate studies at the Wood Technology
	Department of the Faculty of Forestry and Wood Technology
	1. Recognize and apply the characteristics of historical styles and heritage in furniture design
	2. Compare and monitor contemporary trends and innovations in furniture design (internet,
	magazines, books) in the context of economic development, culture, heritage and social,
	developmental and historical factors of each nation and apply them in designing new
	furniture design solutions.
	3. Explain the importance of an interdisciplinary approach and the inclusion of knowledge of
	other professions in furniture design
	4. Recognize and explain the term good design using the parameters of good design
2.4. Expected learning	5. Design and shape furniture and other wooden products using design elements (means of
outcomes at the level of	expression) and the principles of modern design (functional, aesthetic, technical-
the course (3 to 10	technological, human, economic, environmental principles, etc.) or according to given
learning	characteristics (input data)
outcomes)	6. Use innovations and new materials and technologies in designing conceptual furniture
·	solutions on a given topic
	7. Apply knowledge of aestnetics, ergonomics, anthropometry, ecology, standards, new
	materials, and technologies, marketing and visual identity in the design of furniture and
	other wood products
	8. Define design-functional, construction-technological and other characteristics of the
	executive design of furniture
	9. Apply knowledge of design drawing (spatial and / or, computer) and workshop work
	(protessional practice) in the development of conceptual and implementation solutions for
	aesignea turniture.



	10. Present the solution of designed furniture in all stages of product development with the final model/prototype in the design of furniture and other wood products									
2.5. Course content (syllabus)	What is design. Historical overview of furniture design development. Characteristics of world and European styles in furniture manufacturing. The use and meaning of shapes, materials and constructions in certain historical styles. Contemporary trends in furniture design. Development of contemporary design. Basics of product design. Theory of form. Elements and principles of form. Aesthetic components of the product. Product perception. Expressive means of industrial design. Design elements of industrial design: Design principles. Functional principles. Aesthetic principles. Technical and technological principles. Human principles. Economic principles. Ecological principles. Product development. Which is a good design. The role and importance of good product design. The relationship between the designer and the company. Methods in the design process. Design and interdisciplinarity. Product quality. Design and standardization. Design and ergonomics. Anthropometry and ergonomics. Ergonomic methods. Design and marketing. Marketing information and market and user research. Design and visual communications. The importance of visual culture in communication with the product. Environmental design. Ecology and furniture design. Bionics. Biophilia. The role of information technology in product development. The relationship between furniture and dedicated space. The impact of sustainable development in product and space design.									
2.6. Format of instruction	 ☑ lectures ☑ seminars an ☑ exercises □ online in ent ☑ partial e-lea ☑ fieldwork 	d works <i>irety</i> rning	hops	 ☑ independent assignments □ multimedia and the internet □ laboratory □ work with mentor ☑ some of the tasks are performed in a DTO practicum (workshop 			2.7. Comments: The student's practical work implies the creation of a model/prototype of a product solution designed within the main task in the exercises.			
2.8. Monitoring student work	Class attendance	YES		Research	YES		Oral	exam	YES	
	Experimental work	YES		Report	YES		(othe	er)		
	Essay		NO	Seminar paper	YES		(othe	(other)		
	Preliminary exam		NO	Practical work	YES		(othe	er)		
	Project	YES		Written exam		NO	ECTS credi (tota	ts I)	3	
2.9. Assessment methods	Assessment is	conduc	ted in	accordance wit	h Assess	ment m	ethod	s and cr	riteria f	or the
2.10. Student	Regular attenda	ance an	d active	participation in	lectures.	exercise	es and	fieldwor	k. prepa	aration
responsibilities	and submission	of exer	rcises, p	apers and semir	nars with	in the sp	pecified	d time. T	aking e	xam.
2.11. Required literature (available in the library and/or via other media)	Title in t						y Availability ry via other media			ty edia
	Domljan, D. (2 namještaja, (fakultet. Zagrel	015): E interna o	kologija skript	a i ergonomija ta), Šumarski	NO			YES, M	lerlin	
	takultet. ZagrebDomljan, D; Grbac, I; Jirouš Rajković, V; YESVlaović, Z; Živković, V; Župčić, I. (2015):Kvaliteta i tehnički opisi proizvoda od drva.Svezak I. Opremanje zgrada za odgoj iobrazovanje, sveučilišni priručnik, Šumarskifakultet Sveučilišta u Zagrebu, Hrvatskagospodarska komora. Zagreb									



UNIVERSITY OF ZAGREB, FACULTY OF FORESTRY AND WOOD TECHNOLOGY

	Lapaine, B. (1994): Dizajn, Sveučilište u YES								
	Zagrebu Šumarski fakultet, Zagreb								
	Noblet de, J. (1999): Dizajn, pokret i šestar,	YES							
	Golden marketing, Zagreb								
	Panero, J. i Zelnik, M. (1987): Antropološke	YES							
	mere i interijer, Zbirka preporuka za								
	standarde u projektiranju, IRO "Građevinska								
	knjiga'', Beograd								
	Baxter, M. (2000): Product Design, CRC Press,	NO	Web						
	London, Boca Raton, NY, Washington								
	IDSA (2001): Design secrets – products. 50	NO	Web						
	Real-Life Product Design Projects, Rockport,								
	Luchs M.G. Swan S.; Griffin, A (2015): Design	NO	Web						
	Ininking: New Product Development								
	Essentials from the PDIVIA. Willey, New								
	Jersey	NO	Mah						
	Bridger, R.S. (2018): Introduction to Human		devv						
	Proce Taylor & Francis Group USA								
	Lidwell W Holden K Butler I (2006) :	VES							
	Univerzalna načela dizajna Mate Zagreb								
2 12 Optional literature	1 Berman, D.B. (2009): Do Good Design, New	Riders & AIGA Design P	ress USA						
	2. Beazley, M. (2003): The Elements of Design.	Octopus Publishing Gro	pup Itd. UK						
	3.Fuad-Luke, A. (2007): The Eco-design Handb	book. Thames & Hudso	n. London. UK						
	4.Dul, J.; Weerdmeester, B. (2008): Ergonomic	s for Beginners. A Quicl	k Reference Guide. 3rd						
	Edition. CRC Press. Taylor & Francis Group. FL. USA								
	5.Grbac, I. (2003): Zdrav život – zdravo stanovanje, Prvi priručnik iz područja namieštaja u								
	funkciji zdravlja, Spektar media, Zagreb								
	6.IDSA (2001): Design secrets – products. 50 Real-Life Product Design Projects, Rockport,								
	USA								
	7.Lapaine, B (1998): Stolica kao problem rješenja sjedenja,								
	8.Luchs M.G. Swan S.; Griffin, A (2015): D	esign Thinking: New	Product Development						
	Essentials from the PDMA. Willey, New Jersey								
	9.Konz, S.; Johnson, S. (2016): Work design	- Occupational Ergonoi	mics. 7th edition. CRC						
	Press, Taylor & Francis Group, FL, USA.	later de tien te France							
	10.Kroemer, K.H.E. (2017): Fitting the Human.	Introduction to Ergond	omics / Human Factors						
	11 Močtrović M (1080): Toorija dizajna i prok	rancis Group, USA	Nanriiod Zagrah						
	12 Pheasant S (2003): Rodyspace Anthronom	etry Ergonomics and the	a Naprijeu, Zagreb						
	edition CBC Press Taylor & Francis Group Lik		ie Design of Work. Zha						
	13. Papanek, V. (1973): Dizain za stvarni svijet.	M. Marulić, Split							
	14.Pevsner. N. (1936. i dalie): Pioneers of Moo	dern Design, Penguin, L	ondon						
	15.Sparke, P. (1986): Design in context, Quatro	o Publishing, London							
	16.Quarante, D. (1991): Osnove industrijskog	g dizajna, Sveučilište u	Zagrebu Arhitektonski						
	fakultet - Interfakultetski studij dizajna, Zagrel	b							
	17.Urlich, K.T.; Eppinger, S.D. (2012): Product	t Design and Developm	ent, 5th ed. McGraw-						
	Hill, NY								
	18. Vukić, F. (1996): Stoljeće hrvatskog dizajna	, Meandar, Zagreb							
	19.*** (1999): Living spaces, Ecological Build	ing and Design, Öko te	st, Könemann, English						
	Edition, (Edit.: Schmitz-Gunther T.), Mladinska	ı knjiga tiskarna d.d., Lju	ubljana						



1.1. Course lecturer(s)	-	1.7. Number of ECTS credits	8
		1.8. Number of hours in a	
1.2. Course title	Bachelor thesis	semester	-
		(L+E+F+e-learning)	
1.2 Course code	226052	1.9. Expected enrolment in	20
1.5. Course code	228032	the course	20
1.4. Study programma	University Undergraduate	1.10. Level of application of	2
1.4. Study programme	Studies of Wood Technology	e-learning (level 1, 2, 3)	2
1.5. Course type	Compulsory	1.11. Language of instruction	Croatian
1.6. Year of the study	2	1.12. Possibility of	NO
1.0. Teal of the study		instruction in English	NO
2. COURSE DESCRIPTION			
2.1. Course objectives	The Bachelor thesis is an inde professional work in which the deals with the chosen topic. T knowledge if it corresponds to thesis of an experimental nat scale research or part of it that and presents the results him results. The final review thesis problem/topic based on publi of relevant literature.	ependent professional work of e student, under the guidance ar he topic of the final thesis may b o the title and objectives of the ure means the student's independ the student conducts independ self. The final thesis should no has cognitive value because it gis shed papers and studies and real	an experimental nature or a nd with the help of a mentor, be related to interdisciplinary thesis. The preparation of a endent work based on small- ently and analyzes, describes t contain original views and ves a complete overview of a quires the study and analysis
2.2. Enrolment			
requirements and/or			
entry competencies	-		
required for the course			
2.3. Learning outcomes at the level of the programme to which the course contributes	solve mathematically various r and analyse data, and reach co A2 - Apply basic laws of phys Newton's axioms and apply th field of electrical engineering, A3 - Competently maintain, components; A4 - Apply skills in solving prace calculations or testing verificat wood, mechanical properties a flaws and the influence of flaw B1 - Identify parts and shapes of identify and explain the anatool like species based on differe practical knowledge of comments fungi and marine borers, and of the basic principles of wood pr of wood, and apply basic proce B3 - Apply knowledge about arrangement within individua flaws on the mechanical proper B4 - Apply technical knowledge processes, means of work and B5 - Organise transport of woo of means of transport with consumption, and recomment transport projects:	research and practical problems, ponclusions based on analysed data sics that present the basis of we nem to solve technical problem and make accurate and optimal work with and use the pos- ctical issues in the business, eith ionsB3 - Apply knowledge about arrangement within individual tr vs on the mechanical properties of trees, macroscopic, physical ar mic structure of the xylem of wo nt morphological characteristics ercially important indigenous and the mest important types of x determine flaws on wood incurre otection based on physical, cherr edures and methods for wood pi the mechanical properties of w I trees and groups of trees, tree erties of wood; e for the purpose of mastering we material handling methods; od and wooden materials, calcul technological procedures, can d solutions for less complex of the	statistically process, present ta; ood technology, understand s, explain phenomena in the use of electric energy ssibilities of basic technical er by control measurements, the mechanical properties of ees and groups of trees, tree of wood; nd chemical wood properties, od-like plants, identify wood- s, and apply theoretical and d foreign species of wood and ylophagous bacteria, insects, ed due to their activity; learn nical and structural properties rotection; wood, mechanical properties e flaws and the influence of rood industry procedures and late and adjust the capacities lculate and analyse energy wood and wooden material



	C1. Analyse the wood cutting process, select, entimally use and maintain primary process								rocoss	
	machinery sel	e woou ert mar	hinerv	working regimes	and to	nols for	final wood pr	nnary p	g and	
	recommend project assignments to special equipment manufacturers:									
	C2 - Recognise and assess sawmilling raw material and products, conduct the categorisation									
	and measurements of sawmilling raw material and products, apply basic skills of wood									
	sawmilling tech	wmilling technology and techniques of log and board sawing, and identify factors of								
	successful sawr	nilling v	vood pr	ocesses:			0,	•		
	C3 - Monitor an	d contro	ol proce	sses of massive w	vood, ve	neer an	d wood particle	e drying,	, other	
	special drying p	rocesse	es, and v	vood steaming;			·	,,		
	C4 - Recognise	particu	ular typ	es of veneer and	d wood	panel,	analyse the ba	asic stru	uctural	
	components of	wood	panels,	explain the inter	depend	lency of	, f structural cor	nponen	ts and	
	technical prope	erties o	f wood	panels, monitor	and co	ntrol th	ne manufacturi	ng proc	cess in	
	wood board fac	ctories,	select a	nd use wood pan	els with	optima	l properties;			
	C5 - Size constructions, define systems of construction compositions as a prerequ									
	product const	ruction,	define	the basic con	structio	n docu	imentation an	d deve	lop it	
	systematically,	apply C	AD syst	ems in the wood	industr	y and 2	D modelling wi	th the h	nelp of	
	AutoCAD;									
	C6 - Use wood	glueing	techno	logy, select mate	erials w	ith optii	mal properties	importa	ant for	
	final processing	, apply	simpler	technological me	ethods i	n final v	vood processing	g;		
	C7 - Define the	specific	s of woo	od used in constru	uction, r	ecomm	end adequate a	pplicati	ions of	
	a particular typ	e of wo	od for l	ouilding purposes	s, recon	imend t	he basic shape:	, physic	al and	
	construction so	lutions,	explain	and ensure func	tional r	equirem	ients, types and	d constr	uction	
	solutions for m	ain proc	duct gro	ups;						
	C8 - Recommer	nd mate	rials and	d procedures that	t are ap	olied in	the wood finish	ing pro	cess in	
	the interior ar	ia the	exterior	, operate the v		nisning	process startin	ng from	i base	
	preparation to	the hard	the time	of the material;	tionalic	tion a	ad parform au		trol in	
	technological	rocoss	as and	on finished pro	ducts	naintai	nu periorini qua	anty con		
	support optimi	vation r	lan and	I calculate the pro	nduction		ate hasic husin	ess KPls	write	
	basic financial r	enorts	recogni	se types of exper	ises.	i, cuicui			, write	
	D2 - Perform wood industry-specific calculations, define and analyse expenses, organise and									
	conduct distribution, promotion and market research. plan products and product									
	programmes, form product cost and selling prices, organise and conduct sales of wood and									
	wooden products;									
	E1 - Continue	specia	lization	in university gr	aduate	studies	s at the Woo	d Techr	nology	
	Department of	the Fac	ulty of F	orestry and Woo	d Techr	nology.				
2.4 Exported loorning	1. be able to apply existing knowledge to solve professional problems for the selected topic								d topic	
2.4. Expected learning	2. create a terr	n work	plan fol	lowing the set de	eadlines	for the	preparation of	f the ba	chelor	
the course (3 to 10	thesis by comp	onents								
learning	3. devise a met	hodolog	gy for w	riting a professio	nal or re	eview pa	aper			
outcomes)	4. apply the me	thodolo	ogy of w	riting a professio	nal or r	eview p	aper			
	5. present bach	elor the	esis in w	ritten and oral fo	orm					
	The bachelor th	iesis is a	n indivi	dual written work	based	on prote	essional researc	h. It is w	vritten	
2.5. Course content	in a profession	al form	n and ir	nplies the time	load of	studer	its with resear	ch wor	k. The	
(syllabus)	bachelor thesis	is usua	ally prep	bared during the	tinal se	mester	of undergradu	ate stuc	ay and	
2.6 Format of instruction		arexaii	1.	⊠ indonondon	+		27 Common	+c.		
2.6. Format of instruction		مسمعاده	hone		ι		2.7. Commen	ts.		
	\square seminars and \square eversions	u works	nops		and the					
	\square exercises	irot			anu trie					
		nety								
	partial e-lea	rning			ontor					
	I TIEldwork			\square (other)	ientor					
2.8. Monitoring student	Class		NO	Deee-web	VEC		Oral	VEC		
work	attendance		NU	Kesearch	TES		Oral exam	TES		
	Experimental	VES		Report		NO	Thesis	VES		
	work	113		Nepoli		NU	1110313	113		



	Essay		NO	Seminar paper		NO	(othe	r)		
	Preliminary exam		NO	Practical work	YES		(othe	other)		
	Project	YES		Written exam		NO	ECTS credit (total	cs)	8	
2.9. Assessment methods and criteria	Assessment is current academ	conduc nic year.	ted in a	accordance with	Assess	ment m	methods and criteria for the			
2.10. Student	Choose the the	me and	mentor	of the thesis, pr	epare th	e thesis	and su	bmit it t	o the m	entor.
responsibilities	Report the thes	sis and p	orepare	for the oral exa	ım.					
2.11. Required literature (available in the library and/or via other media)		Title Availability in the library				y ry	Availability via other media			
	Ordinance on tl bachelor thesis				websit Faculty and W Techno	e of the of Fore ood ology	estry			
	Form ZR-1 Req				websit	e of the				
	and mentor of				Faculty and W Techno	v of Fore ood ology	estry			
	Instructions on diploma thesis				websit Faculty and W Techno	e of the of Fore ood ology	estry			
2.12. Optional literature	-									

