UNIVERSITY OF LJUBLJANA
FACULTY OF NATURAL SCIENCES AND ENGINEERING

DEPARTMENT OF TEXTILES, GRAPHIC ARTS AND DESIGN
Chair of Textile and Clothing Engineering

MASTER'S DEGREE STUDY PROGRAMME

TEXTILE AND CLOTHING PLANNING

ACADEMIC YEAR 2025/26

Basic information

Name of programme	**TEXTILE AND CLOTHING PLANNING**
Programme properties	
Type of study	Master's degree study programme
The degree of study	Postgraduate study programme
Title:	Master of Science (M.Sc.)
KLASIUS-SRV	(17003) Master's education (second Bologna cycle)
ISCED	(54) Manufacturing and processing
KLASIUS-P	(5420) Textiles, clothes, footwear, leather (broad programmes)
KLASIUS-P-16	(0723) Textiles (clothes, footwear and leather)
Frascati	(2) Engineering and technology
Level SOK	Level SOK 8
Level EOK	Level EOK 7
Level EOVK	Second degree postgraduate study programme
Areas/modules/field of study	No subdivision (study programme)
Member of the University of Ljubljana	Faculty of Natural Sciences and Engineering, Aškerčeva cesta 12, 1000 Ljubljana, Slovenia
Duration (years)	2
ECTS points per year	60
Mode of study	Full-time and part-time

Basic goals of the programme

The European and thus also the Slovenian textile and clothing industry is facing significant development challenges at the time of complete liberalisation of trade in textile products. Its future position will depend on the measures that will increase its competitive advantage. It will have to invest more in research and development, encourage innovation and implement an appropriate personnel policy. In the Slovenian textile and clothing industry, the personnel situation is particularly urgent due to the complete collapse of the secondary education in this profession, first in the primary textile industry and now also in the clothing industry.

The analyses conducted in the EU show that the textile industry has a future even in developed economies, of course under certain conditions. This future can only be shaped by abandoning mass-produced products, replacing them with textile and clothing products with high added value, high quality, sophisticated design, creative future products, technical products, medical textiles, smart textiles etc.

The objectives are among others closely related to the relevant knowledge and world-class training of professionals who have the knowledge and skills to design, engineer and manufacture innovative products that meet the demands and needs of the most demanding customers. The ultimate goal of such an orientation is to manufacture products that exceed customer requirements in every respect and predict their future needs and demands.

The basic goal of the postgraduate programme Textile and clothing planning is to expand the knowledge of graduates in the university study programme from the field of textiles and clothing, train students in finding new sources of knowledge through scientific research methods and manage the most complex working systems. The programme is intended to stimulate the development of critical reflection and communication capacity for teamwork management. A programme characteristic is that it aggregates students in project-oriented work and engages them in applied and basic research tasks, preparing them for further education at the third, doctoral level.

In accordance with the principles of the Bologna process, the programme, compared to the previous ones, implies a deviation from the educational philosophy of proper integration of various technologies grounded on selected natural science contents. The default learning philosophy is such that in addition to the acquired knowledge, other student competences are equally important as well, including their skills and dexterity, in this case by promoting a research approach to rapidly developing technologies in the field of primary textile and clothing activities.

General competences (learning outcomes)

- in-depth knowledge gained by the study of theoretical and methodological concepts connected with gaining capacity to seek new sources of knowledge through scientific research methods;
- developed critical reflection;

- ability to experiment and handle various concepts;
- developed capacity for independent learning in the professional and scientific field;
- initiative and independence in decision making and management of the most demanding work;
- ability to communicate with colleagues and experts in related disciplines, which facilitates active cooperation in teamwork and in the area of projects based on linking professional principles from various fields;
- ability to respond quickly to new information and plan a product with new or improved properties;
- developed professional, ethical and environmental responsibility;
- ability to use modern tools, skills and dexterity, primarily in the field of ICT in daily professional and scientific research work.

Subject-specific competences

- in-depth knowledge of mathematics, engineering mechanics, organic and physical chemistry with developed science thinking ability;
- in-depth review of high performance fibres, their structure in different structural levels (nano, microfibrillar, macrofibrillar), morphology and performance; use of high-performance fibres for high-technologies (high-tech) in medicine, pharmacy, biomedicine, biotechnology, optics, electronics, transport technology, IT, nuclear energy; fibres with specially modified properties of standard fibres which allow specific sensual comfort (high-touch) during use;
- understanding of scientific methods, critical analysis and synthesis and their use in solving concrete problems, i.e. analysis, development and production of progressive products with enhanced properties and high added value (yarn, non-woven, woven and knitted textiles); planning, analysis and execution of progressive mechanical textile processes;
- capacity of linking various knowledge from the fields of constructional, mechanical, physical and chemical properties of textiles with finishing processes aimed at the technological design of multi-functional textiles with high added value;
- understanding of the difference between innovation management and management of routine operation;
- in-depth theoretical learning of the integral process of planning textiles with regard to design and functional guidelines;
- in-depth knowledge of the effect of climatic conditions, thermo-physical and sensory human responses in planning clothing for various intended uses;
- knowledge of innovations in modern textiles, especially intelligent textiles and textiles for special comfort based on a multi-functional and interdisciplinary approach;
- knowledge of state-of-the-art and special processes of the physical and chemical modification of fibre-forming polymers.

Enrolment conditions and criteria in case of limited enrolment

Candidates can enrol in the master's degree study programme if they have finished:

a) at least first-level study programme evaluated with minimum 180 ECTS credit points from the professional fields of: textiles, clothes, footwear, leather; fashion design; fashion, interior and industrial design; audio-visual techniques and media production; engineering and engineering trades, or an equivalent study programme completed under current regulations in the Republic of Slovenia or abroad;

b) at least first-level study programme evaluated with minimum 180 ECTS credit points from other professional fields, or an equivalent study programme completed under current regulations in the Republic of Slovenia or abroad if the candidates have completed prior to the enrolment all study obligations from the following fields: Mathematics 1 (6 ECTS credit points), Mathematics 2 (6 ECTS credit points), Physics 1 (6 ECTS credit points), Physics 2 (6 ECTS credit points), Chemistry 1 (6 ECTS credit points), Chemistry 2 (6 ECTS credit points) and Fibre (8 ECTS credit points) as specified in the undergraduate study programme Textile and clothing planning essential for continuing their studies. These obligations are determined by the department Study Committee and comprise from 10 to up to 60 ECTS credit points.

If the number of candidates applying for the programme exceeds the number of enrolment places, candidates referred to in point (a) shall be short-listed on the basis of the number of points obtained in the first-level study programme or in a higher education or university study programme prior to the introduction of the Bologna declaration.

The candidates referred to in point (b) shall be short-listed according to:

- the number of points achieved in the first-level study programme (75% of points), and
- the number of points achieved in performing additional study obligations (25% of points).

Points are calculated by multiplying the average grade of studies or additional study obligations from point (b) rounded to one decimal place by 10 (maximum 100 points).

Criteria for crediting knowledge and skills obtained before enrolment

The Faculty of Natural Sciences an Engineering may choose to credit student's knowledge (obtained in the framework of different kinds of education) if it corresponds to the course contents of the Textile and clothing planning master's degree study programme. The department Study Committee is in charge of recognising knowledge and skills obtained before the enrolment, which is done on the basis of student's written application and provided certificates or other documents proving the type of knowledge successfully acquired.

When recognising knowledge obtained before the enrolment, the Study Committee will take into account the following criteria:

- whether conditions for enrolling into a specific educational course are adequate (required prior education for starting the study programme);
- whether the scope of the completed educational course (number of hours of prior education as compared to the scope of the course in question) adequately compares with the credited requirements;
- whether the areas covered by the prior education programme, which the applicant would like to have credited, adequately compare with the courses dealt with in the faculty study programme.

The acquired knowledge and skills may be credited as a completed study activity if the conditions for taking part in the educational programme were the same as for enrolling into the master's degree study programme Textile and clothing planning, if the prior educational programme encompassed at least 75% of the scope of the course and if at least 75% of its contents cover the same areas as the course the applicant would like to have credited. If the Committee establishes that the acquired knowledge can be credited, the same number of ECTS credit points is granted as awarded for the course in question.

Assessment methods

Assessment methods are in accordance with the Statute of the University of Ljubljana and are specified in the curricula.

Progression through the programme

Conditions for enrolment in the higher year

To enrol in the higher year, student must obtain a minimum of 54 ECTS credit points. The department Study Committee may exceptionally grant enrolment in the higher year to a student who has obtained at least 42 ECTS credit points in the previous year if there are justified reasons. Justified reasons are specified in the Statute of the University of Ljubljana.

Conditions to repeat a year (re-enrol in the same year)

In order to repeat the 1st year, students must have a minimum of 30 ECTS credit points. During the course of studies, a student may repeat a year once or transfer to another study programme once for having failed to meet their obligations in the previous study programme.

Conditions for transfer between study programmes

Transfer is possible between two study programmes:

1. which ensure the acquisition of comparable competences or learning outcomes at the end of the study programme;
2. in which, according to the criteria for recognition of knowledge and skills acquired prior to enrolment in the study programme, at least half of the obligations under the European Credit Transfer and Accumulation System (ECTS) from the first study programme can be recognised, referring to compulsory courses of the second study programme; i.e. master's degree study programme Textile and clothing planning.

An individual examination passed in the first study programme is recognised as passed in the second, master's degree, study programme Textile and clothing planning, if the contents of the two programmes are at least 75% compatible. The examination is recognised with the number of ECTS credit points in the original study programme; however, not with more ECTS credit points than evaluated in the master's degree study programme Textile and clothing planning.
Candidates may enrol in the final year with transfer if:

- they meet the requirements for enrolment in the study programme,
- vacant places are available.

The department Study Committee determines for each candidate the extent to which it recognises previously completed study obligations, determines new obligations and defines the year the candidate can transfer to.

Completion of studies

To complete the studies, students must meet all obligations in all enrolled courses, prepare a master's thesis and defend it.

Title

Master of Science (M.Sc.)

Employment possibilities

With their acquired knowledge, graduates of the master's degree study programme Textile and clothing planning can be employed in the leading positions in textile and clothing industries, consultant companies and agencies, in educational institutions engaged in textile and clothing activities, in trade and government administration.

STUDY PROGRAMME CURRICULUM
TEXTILE AND CLOTHING PLANNING

2025/2026

Name of study programme	**Textile and clothing planning**
Programme characteristics	
Type	master's
Cycle	master
University of Ljubljana members	• Faculty of Natural Sciences and Engineering, Aškerčeva cesta 12, 1000 Ljubljana, Slovenija

Year 1

1st semester

				Contact hours								
	University Course Code	Course title	Lecturers	Lectures	Seminar	Tutorials	Clinical tutorials	Other forms of study	Individual student work	Total hours	ECTS	Elective
1.	0068971	High performance fibres	Tatjana Rijavec	60	15	15	0	0	90	180	6	no
2.	0068969	Advanced mechanical textile technologies	Dunja Šajn Gorjanc, Matejka Bizjak , Živa Zupin	30	30	30	0	0	90	180	6	no
3.	0068970	Advanced finishing processes	Barbara Simončič, Brigita Tomšič, Marija Gorjanc, Mateja Kert, Petra Eva Forte Tavčer	30	30	30	0	0	90	180	6	no
4.	0111958	Basic elective course 1		45	0	45	0	0	90	180	6	yes
5.	0111959	Basic elective course 2		45	15	30	0	0	90	180	6	yes
		Total		210	90	150	0	0	450	900	30	

2nd semester

				Contact hours								
	University Course Code	Course title	Lecturers	Lectures	Seminar	Tutorials	Clinical tutorials	Other forms of study	Individual student work	Total hours	ECTS	Elective

1.	0068968	Mechanical functionalisation of textiles	Dunja Šajn Gorjanc, Matejka Bizjak , Živa Zupin	30	30	30	0	0	90	180	6	no
2.	0068967	Chemical functionalisation of textiles	Barbara Simončič, Brigita Tomšič, Marija Gorjanc, Mateja Kert, Petra Eva Forte Tavčer	30	30	30	0	0	90	180	6	no
3.	0068975	Research seminar	Barbara Luštek Preskar, prof. angl. in nem. , Barbara Simončič	30	60	0	0	0	90	180	6	no
4.	0109006	Composites	Brigita Tomšič, Marija Gorjanc, Matejka Bizjak , Tatjana Rijavec	30	30	30	0	0	90	180	6	no
5.	0068965	Technical textiles	Brigita Tomšič, Dunja Šajn Gorjanc, Matejka Bizjak	30	30	30	0	0	90	180	6	no
		Total		150	180	120	0	0	450	900	30	

Year 1, Temeljni izbirni predmet 1 in 2

1st semester

				Contact hours								
	University Course Code	Course title	Lecturers	Lectures	Seminar	Tutorials	Clinical tutorials	Other forms of study	Individual student work	Total hours	ECTS	Elective
1.	0561971	Mathematics	Janko Bračič	45	0	45	0	0	90	180	6	yes
2.	0561972	Organic chemistry	Janez Cerkovnik	45	15	30	0	0	90	180	6	yes
3.	0068978	Data management	Danica Dolničar	30	15	45	0	0	90	180	6	yes
		Total		120	30	120	0	0	270	540	18	

Year 2

1st semester

				Contact hours								
	University Course Code	Course title	Lecturers	Lectures	Seminar	Tutorials	Clinical tutorials	Other forms of study	Individual student work	Total hours	ECTS	Elective
1.	0068973	Sustainable development of textiles	Petra Eva Forte Tavčer	30	30	0	0	30	90	180	6	no

2.	0068974	Advanced analytical methods	Andrej Demšar	30	30	30	0	0	90	180	6	no
3.	0068966	Functionalisation of ready-made products	Matejka Bizjak , Tatjana Rijavec	30	30	30	0	0	90	180	6	no
4.	0111963	Elective course 1		30	0	30	0	0	60	120	4	yes
5.	0111964	Elective course 2		0	30	30	0	0	60	120	4	yes
6.	0111965	Elective course 3		30	30	0	0	0	60	120	4	yes
		Total		150	150	120	0	30	450	900	30	

2nd semester

				Contact hours								
	University Course Code	Course title	Lecturers	Lectures	Seminar	Tutorials	Clinical tutorials	Other forms of study	Individual student work	Total hours	ECTS	Elective
1.	0068972	Masters thesis						225	225	450	15	no
		Total		0	0	0	0	225	225	450	15	

Year 2, Izbirni predmet 1, 2, 3

1st semester

				Contact hours								
	University Course Code	Course title	Lecturers	Lectures	Seminar	Tutorials	Clinical tutorials	Other forms of study	Individual student work	Total hours	ECTS	Elective
1.	0068958	Quality Engineering	Andrej Demšar	30	30	0	0	0	60	120	4	yes
2.	0109008	Biotechnology for textile processing	Petra Eva Forte Tavčer	30	30	0	0	0	60	120	4	yes
3.	0068962	Digital textile printing	Petra Eva Forte Tavčer	30	0	30	0	0	60	120	4	yes
4.	0642811	Textiles for protection	Barbara Simončič, Brigita Tomšič	0	30	30	0	0	60	120	4	yes
5.	0642812	Eco-finishing	Marija Gorjanc	0	30	30	0	0	60	120	4	yes
6.	0642813	Special woven fabrics	Klara Kostajnšek, Matejka Bizjak	0	30	30	0	0	60	120	4	yes
7.	0642814	Special knitted fabrics and knitwear	Živa Zupin	0	30	30	0	0	60	120	4	yes
8.	0642815	Elective course	Živa Zupin	0	30	30	0	0	60	120	4	yes
9.	0642816	Smart textiles	Tatjana Rijavec	30	0	30	0	0	60	120	4	yes

10.	0642817	Typology of colours	Sabina Bračko	0	30	30	0	0	60	120	4	yes
		Total		120	240	240	0	0	600	1200	40	

ATTACHMENT:
CURRICULUM OF SUBJECTS

BIOTEHNOLOGIJA V TEKSTILSTVU

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Biotehnologija v tekstilstvu
Course title:	Biotechnology for textile processing
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Načrtovanje tekstilij in oblačil, druga stopnja, magistrski (v postopku)	Ni členitve (študijski program)	2. letnik	1. semester	izbirni

Univerzitetna koda predmeta/University course code:	0109008
Koda učne enote na članici/UL Member course code:	11304

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
30	30	0	0	0	60	4

Nosilec predmeta/Lecturer:	Petra Eva Forte Tavčer
Vrsta predmeta/Course type:	Izbirni/Elective
Jeziki/Languages:	Predavanja/Lectures: Angleščina, Slovenščina Vaje/Tutorial: Angleščina, Slovenščina

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	Prerequisites:
Vpis v program.	Enrolment in the program.

Vsebina:	Content (Syllabus outline):
• Klasifikacija encimov. • Encimska aktivnost in stabilnost. • Pridobivanje encimov. • Biotehnološki postopki pri plemenitenju tekstilij. • Uporaba specifičnih encimov za obdelavo različnih substratov. • Encimi v postopkih nege tekstilij. • Encimi pri obdelavi odpadnih vod. • Razgradnja barvil na substratu. • Uporaba encimov pri beljenju. • Biotehnologija pri razvoju novih vlaken. • Biotehnologija za razgradnjo in koristno uporabo odpadkov v tekstilstvu. • Možnosti in učinki genske modifikacije pri pridelavi naravnih vlaken.	• Classification of enzymes. • Enzyme activity and stability. • Production of enzymes. • Biotechnological processes at textile finishing. • Special enzymes for treatment of different textile substrates. • Enzymes in processes of washing of textiles and care. • Enzymes in effluent treatment. • Degradation of dyes on substrates. • Enzymes in bleaching processes. • Biotechnology in development of new fibres. • Biotechnology in degradation and recyclation of waste textile materials. • Possibilities and effects of genetic modification in the production of natural fibers

Temeljna literatura in viri/Readings:

- NIERSTRASZ V.A., CAVACO-PAULO A., Advances in textile biotechnology, The Textile Institute, Woodhead Publishing Ltd., Cambridge, 2010;
- KOKOL V., Biotehnološki postopki v tekstilstvu, Univerza v Mariboru, Maribor, 2010;
- CAVACO-PAILO A. in GÜBITZ G.M., Textile processing with enzymes, The Textile Institute, Woodhead Publishing Ltd., Cambridge, 2003;
- STRAATHOF A.J.J. in ADELCREUTZ P., Applied Biocatalysis, 2nd ed., Harwood Academic Publishers, Amsterdam, 2000;
- KARMAKAR, S. R. Chemical technology in the pretreatment processes of textiles, Amsterdam : Elsevier, 1999;
- M. LEWIN in B. SELLO. Handbook of Fiber Science and Technology : Chemical procesing of fibers and fabrics : Volume 1 and II. Marcel Dekker, New York, 1984;
- R.S. BLACKBURN, Biodegradable and sustainable fibres, (Woodhead publishing in textiles).: Textile Institute; Boca Raton [etc.]: CRC Press; Cambridge: Woodhead Publishing, 2005.

Cilji in kompetence:	**Objectives and competences:**
Študenti spoznajo vrste in namen biotehnoloških postopkov pri proizvodnji in obdelavi tekstilij in drugih vlakenskih substratov. • Poznavanje osnov mikrobne in encimske biotehnologije, s poudarkom na pridobivanju in uporabnosti encimov; • Poznavanje lastnosti in delovanja encimov; Poznavanje aplikacij biotehnoloških postopkov pri plemenitenju tekstilij; • Poznavanje strukturnih in površinskih sprememb tekstilnih substratov po obdelavi z encimi; • Poznavanje ekoloških in ekonomskih prednosti biotehnoloških obdelav pred klasičnimi obdelavami; • Poznavanje delovanja encimov na barvila in tekstilna pomožna sredstva.	Students get insight into the kinds and purposes of biotehnological processes in production and treatment of textiles and other fibrous substrates. • Knowledge of basic microbial and enzyme biotechnology, with the stress on production and applicability of enzymes; • Knowledge of properties and function of enzymes; • Knowledge of application of biotechnological processes in finishing of textiles; • Knowledge of structural and surface modification of textile substrates treated with enzymes; • Knowledge of ecological and economical advantages of biotechnological processes in comparison to conventional processes. • Knowledge of effect of enzymes on dyes and textile auxiliaries.

Predvideni študijski rezultati:	**Intended learning outcomes:**
• Študent pozna pomen biotehnologije v industrijskih procesih. • Pozna specialne biotehnološke obdelave v tekstilstvu. • Pozna prednosti encimskih postopkov pred klasičnimi postopki obdelave. • Pozna postopke pridobivanja encimov in delovanje encimov. • Pozna specifično delovanje encimov na različne tekstilne substrate. • Pozna optimalne pogoje za delovanje encimov in pogoje za ustavitev njihovega delovanja. • Encimske postopke zna smiselno vključiti v procese izdelave končnega izdelka. • Zna spremljati novosti na področju obdelave tekstilij z encimi.	• Student knows the meaning of biotechnology in industrial processes. • Knows special biotechnological treatements of textiles. • Knows the benefits of enzymatic processes in comparison to classical processes. • Knows the production and function of enzymes. • Understands the effect of enzymes on different textile substrates. • Understands optimal conditions of function of enzymes. • Understands how to integrate enzymatic processes into existing treatement. • Can follow the novelties and new investigation in the area.

Metode poučevanja in učenja:	**Learning and teaching methods:**
Predavanja, seminarji, konzultacije, seminarske vaje, laboratorijske vaje.	Lectures, consultations, seminar, individual study, presentation of results, optionaly experimental work.

Načini ocenjevanja:	Delež/Weight	Assessment:
Ustni izpit	50,00 %	Exam
Seminar z zagovorom ali javna predstavitev problema	50,00 %	Presentation of seminar or publication of results

Ocenjevalna lestvica:	Grading system:
5 - 10, pri čemer velja, da je pozitivna ocena od 6 - 10	5 - 10, a student passes the exam if he is graded from 6 to 10

Reference nosilca/Lecturer's references:

1. ŠPIČKA, Nina, FORTE-TAVČER, Petra. Complete enzymatic pre-treatment of cotton fabric with incorporated bleach activator. Textile research journal, ISSN 0040-5175, 2013, vol. 83, no. 6, str. 566-573, ilustr., doi: 10.1177/0040517512458346;
2. FORTE-TAVČER, Petra. Effects of cellulase enzyme treatment on the properties of cotton terry fabrics. Fibres & textiles in Eastern Europe, ISSN 1230-3666, 2013, vol. 21, no. 6 (102), str. 100-105;
3. FORTE-TAVČER, Petra. Low-temperature bleaching of cotton induced by glucose oxidase enzymes and hydrogen peroxide activators. Biocatalysis and biotransformation, ISSN 1024-2422, 2012, vol. 30, no. 1, str. 20-26, doi: 10.3109/10242422.2012.644437. [COBISS.SI-ID 2674288];
4. KOLBL REPINC, Sabina, FORTE-TAVČER, Petra, STRES, Blaž. Potential for valorization of dehydrated paper pulp sludge for biogas production : addition of selected hydrolytic enzymes in semi-continuous anaerobic digestion assays. Energy. 2017, vol. 126, str. 326-334.

DIGITALNI TEKSTILNI TISK

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Digitalni tekstilni tisk
Course title:	Digital textile printing
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Načrtovanje tekstilij in oblačil, druga stopnja, magistrski (v postopku)	Ni členitve (študijski program)	2. letnik	1. semester	izbirni

Univerzitetna koda predmeta/University course code:	0068962
Koda učne enote na članici/UL Member course code:	11273

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
30	0	30	0	0	60	4

Nosilec predmeta/Lecturer:	Petra Eva Forte Tavčer
Vrsta predmeta/Course type:	Izbirni/Elective

Jeziki/Languages:	Predavanja/Lectures:	Angleščina, Slovenščina
	Vaje/Tutorial:	Angleščina, Slovenščina

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	Prerequisites:
Vpis v program.	Enrolment in the program.

Vsebina:	Content (Syllabus outline):
Vsebina predmeta se prilagaja študijskemu načrtu in raziskovalnemu delu magistranda. Poglobljeno se predelajo vsebine izbrane izmed naslednjih poglavij: • Teoretične osnove digitalnega tiska; • Sodobne naprave; • Osnove računalniškega vzorčenja; • Sodobna barvila in pomožna sredstva; • Priprava blaga za digitalni tisk; • Postopki utrjevanja (fiksiranja) barvil na tekstilni substrat; • Analiza tekstilno tehnoloških lastnosti in analiza videza vzorcev; • Osnove barvnega upravljanja na področju digitalnega tiska; • Trajnostni vidik digitalnega tiska.	The content of the course conforms to the syllabus and reserach plan of the master student. The contents chosen among the following topics are intensively studied: • Theoretical basis of digital printing; • Modern machines; • Basics of computer aided design; • Modern dyes and chemicals; • Pretreatment of fabrics; • Curing and fixation of dyes; • Quality analysis, visual analysis; • Color management for digital printing; • Sustainability aspect of digital printing.

Temeljna literatura in viri/Readings:

- UJIIE H., Digital printing of textiles, Woodhead Publishing Ltd., 2006.
- XIN J. H., Total colour management in textiles, Woodhead Publishing Ltd., 2006.
- CIE C., Ink Jet Textile Printing, Woodhead Publishing Ltd., 2015.
- JAVORŠEK, D., KARLOVIĆ, I., MUCK, T. Reproduciranje barv in barvno upravljanje, Ljubljana : Naravoslovnotehniška fakulteta, Oddelek za tekstilstvo, 2013.
- MILES, L.W.C. Textile Printing, SDC, 2004; DAWSON, T.L. and Glover, B. Textile Ink Jet Printing, SDC, Bradford, 2004.

Cilji in kompetence:	**Objectives and competences:**
• Študenti spoznajo teoretične osnove digitalnega tiska, sodobne naprave za tiskanje in se naučijo samostojno delati na digitalnem tiskalniku in uporabljati programsko opremo za upodabljanje (RIP). • Seznanijo se z osnovami barvnega upravljanja in razumejo postopke, ki so potrebni za kolorimetrično natančnost digitalnega odtisa. • Znajo oceniti primernosti posameznih tehnologij glede ne zahtevane lastnosti izdelka in strošek izdelave. • Razumejo povezavo med strukturo tekstilnega substrata, njegovo pripravo, pogoji tiskanja in rezultati dela.	• Students get insight into the theoretical basics of digital printing and modern printers. • They learn how to work on a digital printer and us raster image processor (RIP), create a color profile for a digital printer and evaluate it. • They understand the procedures that are necessary for the colorimetric accuracy of the digital print. • They can evaluate the optimal technology for reaching desirable results regarding properties and cost of production. • They understand connection between chemical structure of textile material, its pretreatment, printing conditions and final results.

Predvideni študijski rezultati:	**Intended learning outcomes:**
• Študent spozna različne sodobne digitalne tiskalnike in razume princip delovanja. • Zna uporabiti določen digitalni tiskalnik. • Seznani se z različnimi programskimi orodji, s katerimi lahko upravlja tiskalnik. • Razume odvisnost doseženih rezultatov od strukture tekstilnega substrata, njegove priprave, izbora barvil in pomožnih kemikalij in pogojev tiskanja. • Zna kvalitativno ovrednotiti potiskane materiale in opisati rezultate	• Knowledge and understanding of different modern digital printers and their functioning. • Practical work on available specific digital printer. • Understanding the dependence of final results on chemical structure of textile material, its pretreatment, selection of dyes and auxiliaries and printing conditions. • Using of standard methods for analysis of printed materials and reporting on results.

Metode poučevanja in učenja:	**Learning and teaching methods:**
Predavanja v predavalnici in/ali prek spleta na daljavo, konzultacije, laboratorijske vaje.	Lectures in a clasroom and/or on-line, consultations, experimental work.

Načini ocenjevanja:	**Delež/Weight**	**Assessment:**
Laboratorijsko delo, poročilo	50,00 %	Laboratory work, report or publication of results
Ustni ali pisni izpit	50,00 %	Oral/written exam

Ocenjevalna lestvica:	**Grading system:**
5 - 10, pri čemer velja, da je pozitivna ocena od 6 - 10	5 - 10, a student passes the exam if he is graded from 6 to 10

Reference nosilca/Lecturer's references:

Petra Forte Tavčer:

1. GOLJA, Barbara, FORTE-TAVČER, Petra. Patterned printing of fragrant microcapsules to cotton fabric. *Coatings*. 26. april 2022, vol. 12, iss. 5, str. 1-12, ilustr. ISSN 2079-6412. https://www.mdpi.com/2079-6412/12/5/593, DOI: 10.3390/coatings12050593. [COBISS.SI-ID 106609667].
2. LAVRIČ, Gregor, KARLOVITS, Igor, MUCK, Deja, FORTE-TAVČER, Petra, KAVČIČ, Urška. Influence of ink curing in UV LED inkjet printing on colour differences, ink bleeding and abrasion resistance of prints on textile = Vpliv sušenja tiskarske barve v UV LED kapljičnem tisku na barvne razlike, razlivanje tiskarske barve in odpornost proti drgnjenju potiskanih tkanin. *Tekstilec : glasilo slovenskih tekstilcev*. [Tiskana izd.]. 2021, vol. 64, [no.] 3, str. 221-229, ilustr. ISSN 0351-3386. https://doi.org/10.14502/Tekstilec2021.64.221-229, DOI: 10.14502/Tekstilec2021.64.221-229. [COBISS.SI-ID 80135683].
3. FORTE-TAVČER, Petra, AHTIK, Jure, GODEC, Mateja. Lastnosti fosforescenčnih pigmentov, tiskanih na tkanino = Characteristics of phosphorescent pigments printed on fabric. *Tekstilec : glasilo slovenskih tekstilcev*. [Tiskana izd.]. 2016, vol. 59, no. 3, str. 226-236, ilustr. ISSN 0351-3386. [COBISS.SI-ID 3294832].
4. PLAJH, Lara, PAVKO-ČUDEN, Alenka, FORTE-TAVČER, Petra, TOMŠIČ, Brigita, KOSTAJNŠEK, Klara, NERAL, Branko, JEVŠNIK, Simona. Digital printing of blue-printed textile exhibits replicas = Imprimares digitalǎ a reproducerilor de exponate textile. Industria textilæa, ISSN 1222-5347, 2015, vol. 66, no. 2, str. 67-73. [COBISS.SI-ID 3120752].

EKO-PLEMENITENJE

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Eko-plemenitenje
Course title:	Eco-finishing
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Načrtovanje tekstilij in oblačil, druga stopnja, magistrski (v postopku)	Ni členitve (študijski program)	2. letnik	1. semester	izbirni

Univerzitetna koda predmeta/University course code: 0642812

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
0	30	30	0	0	60	4

Nosilec predmeta/Lecturer: Marija Gorjanc

Vrsta predmeta/Course type: Izbirni/Elective

Jeziki/Languages:

Predavanja/Lectures:	Angleščina, Slovenščina
Vaje/Tutorial:	Angleščina, Slovenščina

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	Prerequisites:
Predmet nima posebnih pogojev za opravljanje študijskih obveznosti.	The course does not have special prerequisites.

Vsebina:	Content (Syllabus outline):
Študent pridobi znanje s področja okolju prijaznega in trajnostnega plemenitenja tekstilij, ki zajema barvanje in/ali tiskanja tekstilij. Študent se glede na usmeritev magistrskega dela specializira na področju naravnih in okolju prijaznih sintetičnih barvil ter pigmentov. Na področju naravnih barvil proučuje in se nauči pridobivati barvila ter prilagoditi recepturo barvanja ali tiskanja za doseganje optimalnih rezultatov. Pri izvedbi projektnega dela uporabi že osvojena znanja obveznih predmetov s področja kemijsko plemenitilnih procesov.	The student acquires knowledge in the field of environmentally friendly and sustainable textile finishing, which includes dyeing and / or textile printing. Depending on the direction of the master's thesis, the student specializes in the field of natural and environmentally friendly synthetic dyes and pigments. In the field of natural dyes, he studies and learns how to obtain dyes and adjust the recipe for dyeing or printing to achieve optimal results. In carrying out the project work, he uses the knowledge already acquired in the compulsory subjects in the field of chemical finishing processes.

Temeljna literatura in viri/Readings:

Sustainability in the Textile and Apparel Industries: Production Process Sustainability, Ed. S. S. Muthu, M. A. Gardetti, Springer Nature Switzerland AG 2020
Handbook of natural colorants, Ed. T. Bechtold, R. Mussak, John Wiley & Sons Ltd, 2009

Izbrani strokovni in znanstveni članki iz periodičnih publikacij, ki so na voljo v knjižnici UL NTF OTGO ter v elektronskih revijah. / Selected professional and original scientific articles from periodicals are available in the Library of the UL NTF OTGO, in both paper or electronic version.

Cilji in kompetence:	**Objectives and competences:**
Sposobnost izbire ali izdelave trajnostnega in okolju prijaznega barvila, pigmenta in/ali recepture glede na tekstilni substrat in končno uporabo izdelka. Sposobnost prilagajanja postopka in/ali recepture barvanja ali tiskanja za dosego okolju prijazne tekstilije. Razvoj veščin inženirskega pristopa k reševanju problematike plemenitenja tekstilij. Sposobnost samostojne interpretacije rezultatov.	Ability to select or produce sustainable and environmentally friendly dye, pigment and/or formulation according to the textile substrate and end use of the product. Ability to adapt the process and/or dyeing or printing formulation to produce environmentally friendly textiles. Develop skills to take an engineering approach to solving the textile finishing problem. Ability to interpret results independently.

Predvideni študijski rezultati:	**Intended learning outcomes:**
Študent samostojno izvede postopek barvanja in/ali tiskanja projektiranega tekstilnega izdelka, izvede barvnometrično analizo obarvane in/ali potiskane tekstilije in zahtevanih barvnih obstojnosti v skladu z ISO standardi ter pravilno ovrednoti rezultate.	The student independently carries out the process of dyeing and/or printing a planned textile product, performs the colourimetric analysis of the dyed and/or printed textile and the required colour fastness properties of the dyed textile according to ISO and correctly evaluates the results.

Metode poučevanja in učenja:	**Learning and teaching methods:**
Seminar, konzultacije, eksperimentalne vaje v plemenitilnem laboratoriju.	Seminar work, consultations, laboratory practices in finishing laboratory.

Načini ocenjevanja:	**Delež/Weight**	**Assessment:**
Pisna predstavitev projektnega dela	50,00 %	Written presentation of the project work
Ustna predstavitev projektnega dela	50,00 %	Oral presentation of the project work

Ocenjevalna lestvica:	**Grading system:**

Reference nosilca/Lecturer's references:

Verbič, Anja, Brenčič, Katja, Primc, Gregor, Gorjanc, Marija. Importance of protocol design for suitable green in situ synthesis of ZnO on cotton using aqueous extract of Japanese knotweed leaves as reducing agent. Forests, 2022, 13 (2), 1-10.

Gorjanc, Marija; Gerl, Ana; Kert, Mateja. Screen printing of pH-responsive dye to textile. Polymers, 2022, 14 (3), 1-14.

Gorjanc, Marija; Kert, Mateja; Mujadžić, Amra; Simončič, Barbara; Forte-Tavčer, Petra; Tomšič, Brigita; Kostajnšek, Klara. Cationic pretreatment of cotton and dyeing with Fallopia japonica leaves. Tekstilec, 2019, 62 (3), 181-186.

Gorjanc, Marija; Mozetič, Miran; Vesel, Alenka; Zaplotnik, Rok. Natural dyeing and UV protection of plasma treated cotton. The European physical journal, 2018, 72 (3), 6 str.

Topić, Taja; Gorjanc, Marija; Kert, Mateja. The influence of the treatment process on the dyeability of cotton fabric using goldenrod dye, Tekstilec, 2018, 61 (3), 192-200.

FUNKCIONALIZACIJA KONFEKCIONIRANIH IZDELKOV

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Funkcionalizacija konfekcioniranih izdelkov
Course title:	Functionalisation of ready-made products
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Načrtovanje tekstilij in oblačil, druga stopnja, magistrski (v postopku)	Ni členitve (študijski program)	2. letnik	1. semester	obvezni

Univerzitetna koda predmeta/University course code:	0068966
Koda učne enote na članici/UL Member course code:	11267

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
30	30	30	0	0	90	6

Nosilec predmeta/Lecturer:	Matejka Bizjak , Tatjana Rijavec
Vrsta predmeta/Course type:	Obvezni/Compulsory

Jeziki/Languages:	Predavanja/Lectures:	Angleščina, Slovenščina
	Vaje/Tutorial:	Angleščina, Slovenščina

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	**Prerequisites:**
Vpis v letnik študija. Pogoj za pristop h končnemu izpitu je opravljen seminar.	Enrolment into study year. Before the final exam students must present a seminar.

Vsebina:	**Content (Syllabus outline):**
• Udobnost oblačil in mehanske lastnosti tekstilij povezane z udobjem (togost, površinske in prepustnostne lastnosti); • Prilagajanje oblike oblačil in vpliv oblike kroja ter lastnosti materiala na udobje; • Razvoj specialnih krojev oblačil (konstrukcija / modelacija) za posebne namene (specifični športi, poklici, posebne potrebe in funkcije...) z upoštevanjem specifičnih lastnosti materialov; • Napovedovanje udobnosti oblačil in specialnih funkcijskih lastnosti za posebne namene; • Načrtovanje specialnega oblačila/izdelka: upoštevanje tehnoloških zahtev in zahtev uporabnika;	• Comfort clothing and mechanical properties of textiles related to comfort (stiffness, surface and permeability characteristics); • Adjusting the shape of garments and influence of pattern shape and material properties onto the comfort; • Development of special clothing patterns (construction / modeling) for special purposes (specific sports, professions, specific needs and functions ...) taking into account the specific properties of materials; • Prediction of clothing comforts and special functional properties for specific purposes;

• Funkcionalne zahteve zaščitnih, varovalnih, športnih idr. tekstilj in oblačil; • Sistemska analiza vrednotenja udobnosti oblačil.	• Planning special clothing / product: compliance with technological requirements and the requirements of the user; • Functional requirements of protective, sports and others textiles and clothing; • System analysis evaluation of clothing comfort.

Temeljna literatura in viri/Readings:

- HAKA-Schnittkonstruktionen nach M. Müller & Sohn. München : Rundschau-Verlag Otto G. Königer, 2000.
- ALDRICH, W. Metric Pattern Cutting. Oxford [etc.] : Blackwell Science, 2003.
- ALDRICH, W. Fabrics and pattern cutting. Chichester : John Wiley & Sons, 2013
- RISSANEN, T., McQUILLAN, H. Zero waste fashion design. London ; New York : Fairchild Books, an imprint of Bloomsbury Publishing, 2021.
- Advances in apparel production. Edited by Catherine Fairhurst. Textile Institute ; Boca Raton [etc.] : CRC Press ; Cambridge : Woodhead Publishing, 2008.
- GERŠAK, J. *Mehanske in fizikalne lastnosti tekstilnih materialov*. Maribor: Fakulteta za strojništvo, Oddelek za tekstilstvo, 2006.
- JAKŠIĆ, D. in JAKŠIĆ, N. *Projektiranje in konstrukcija tekstilij in oblačil*. Ljubljana : samozal. D. Jakšić, 2023.
- *Engineering textiles. Integrating the design and manufacture of textile products*. Ur. Y. E. El Mogahzy. Cambridge: Woodhead Publishing, Boca Raton e tal: The Textile Institute, CRC Press. 2009.
- Improving Comfort in Clothing. Uredil Guowen Song. Oxford, Cambridge, Philadelphia, New Delhi : Woodhead Publishing, 2011. ISBN 978-1-84569-539-2 (print), ISBN 978-0-85709-064-5.
- *RADOSTINA, A. Textiles and human thermophysiological comfort in the indoor environment. Boca Raton : CRC Press, 2016.*
- Članki v domačih in tujih strokovnih revijah, dosegljivih v knjižnici Oddelka za tekstilstvo Univerze v Ljubljani.
- Izbrani članki iz domačih in tujih strokovnih revij, dostopnih v knjižnici Oddelka za tekstilstvo, grafiko in oblikovanje NTF, in v elektronskih revijah ter gradivo v spletni učilnici predmeta / Selected articles from national and foreign professional magazines available at the Library of the Department of Textiles, Graphic Arts and Design of NTF, and in electronic journals and web pages.

Cilji in kompetence:	**Objectives and competences:**
Cilj predmeta je pridobitev specialnih znanj, potrebnih za obvladovanje načrtovanja oblačil in drugih konfekcioniranih izdelkov za različne specialne namene in doseganje njihove udobnosti. Pridobi poglobljeno teoretično in praktično znanje s področja razvoja specialnih krojev oblačil, ki bodo zagotavljali funkcijo oblačila, pridobi znanje pravilne izbire materialov za namensko uporabo. **Kompetence**: • Obvladovanje specifičnih zahtev in sposobnost načrtovanja oblačil in konfekcioniranih izdelkov za različne namene; • Sposobnost razvoja specialnih krojev oblačil za specifične oblike (npr. specifični športi, poklici, posebne potrebe...); • Sposobnost prave izbire za optimalne interakcije lastnosti tekstilij in oblike krojev oblačil (vpliv raztegljivosti, elastičnosti tekstilij, idr.); • Poznavanje termofizioloških in čutnih človeških odzivov za načrtovanje oblačil za različne namene; • Poznavanje dejavnikov, ki vplivajo na udobje oblačil, poznavanje objektivnih metod za	**The objective** is to obtain specialized skills required to manage the planning of apparel and other ready-made textile products for a variety of special purposes and to achieve their facilities. Get in-depth theoretical and practical knowledge in the field of development of special clothing patterns that will ensure the function of clothing, acquires knowledge of the correct choice of materials for the designated use. **Competences**: • Management of the specific requirements and the ability to design clothes and ready-made textile products for different purposes; • The ability to develop special garment patterns for specific shapes (e.g. specific sports, professions, special needs ...); • The ability of correct decisions for optimal interaction between properties of textiles and shapes of clothing patterns (impact elasticity, the elasticity of textiles, etc.); • Knowledge of thermo-physiological and sensual human responses to plan clothes for different purposes;

ocenjevanje lastnosti tekstilij in napovedovanje končnih lastnosti izdelka; • Razumevanje kompleksnosti udobja oblačil; • Poznavanje strokovne terminologije.	• Understanding all factors that affect the clothing comfort, knowledge of objective methods for assessing the textile properties and prediction of final product properties; • Understanding the complexity of comfort clothing; • Knowledge of professional terminology.

Predvideni študijski rezultati:	**Intended learning outcomes:**
• Sposobnost razvoja specialnih krojev oblačil in izdelkov za posebne namene in funkcije. • Sposobnost pravilnih odločitev za optimalne interakcije lastnosti tekstilij in izbire oblike krojev. • Poznavanje dejavnikov, ki vplivajo na udobje oblačil. • Uporaba objektivnih metod za oceno tekstilij ter napovedovanje lastnosti oblačil. • Razume kompleksnost udobja. • Pridobljeno znanje mu omogoča planiranje novih izdelkov od izbire surovine do končnega specialnega izdelka za posebno funkcijsko rabo. • Zna ovrednotiti materiale, ki so na tržišču in razumeti konstrukcije novih izdelkov.	• Ability to develop special patterns of clothing and ready-made products for specific purposes and functions. • Ability to correct decision for optimal interaction between textile properties and pattern shapes. • Knowing all factors that affect the comfort of clothes. • Use of objective methods to assess textiles and the forecasting properties of textiles garments. • Understanding the complexity of the comfort. • Acquired knowledge enables him/her to plan new products from raw material to finished product for a specific use. • Knowledge how to evaluate materials available on the market and understand the construction of new products.

Metode poučevanja in učenja:	**Learning and teaching methods:**
Predavanja. **Seminar**: izdelava in zagovor seminarske naloge s področja razvoja funkcionalizacije konfekcioniranega izdelka (specialni kroji, materiali, tehnologije). **Vaje**: razvoj specialnih krojev za namensko rabo z upoštevanjem karakteristik materiala in kakovostnih zahtev materiala in izdelave.	**Lectures**. **Seminar work**: preparation and presentation of the seminar work in the field of development a product with special requirements (special patterns, materials, technologies). **Tutorial**: Developing a special pattern for specific use, taking into account the characteristics of the material and the quality requirements of material and production used.

Načini ocenjevanja:	**Delež/Weight**	**Assessment:**
Predavanja: pisni izpit	30,00 %	Lectures; oral examination
Seminar - pisna in ustna predstavitev	30,00 %	Seminar work - written and oral presentation
Vaje - predstavitev izdelka	40,00 %	Tutorials - presentation of the final product

Ocenjevalna lestvica:	**Grading system:**
5 - 10, pri čemer velja, da je pozitivna ocena od 6 - 10	5 - 10, a student passes the exam if he is graded from 6 to 10

Reference nosilca/Lecturer's references:

Matejka Bizjak:

1. KOSTAJNŠEK, Klara, BIZJAK, Matejka. Estimation of permeability properties of technologically developed jacquard fabrics = Ocena svojstava propustljivosti žakar tkanina dobijenih tehnološkim postupkom. *Hemijska industrija*. 2023, vol. 77, no. 3, str. 191-202. ISSN 2217-7426. https://www.ache-pub.org.rs/index.php/HemInd/article/view/1056, DOI: 10.2298/HEMIND221017008K. [COBISS.SI-ID 147161859]
2. KOSTAJNŠEK, Klara, DIMITROVSKI, Krste, KADOGLU, Hüseyin, ÇELIK, Pinar, BAŞAL BAYRAKTAR, Güldemet, ÜTE, Tuba Bedez, DURAN, Deniz, ERTEKIN, Mustafa, DEMŠAR, Andrej,

BIZJAK, Matejka. Functionalization of woven fabrics with PBT yarns. Polymers. 2021, vol. 13, iss. 2, str. 1-19, ilustr.

3. STANKOVIĆ, Snežana, NOVAKOVIĆ, Milada, POPOVIĆ, Dušan M., POPARIĆ, Goran, BIZJAK, Matejka. Novel engineering approach to optimization of thermal comfort properties of hemp containing textiles. The journal of The Textile Institute. 2019, vol. 110, no. 9, str. 1271-1279.
4. BIZJAK, Matejka. Texprocess 2022 – Več kot napredek = Texprocess 2022 – More than progress. *Tekstilec : glasilo slovenskih tekstilcev*. [Tiskana izd.]. 2023, vol. 66, priloga 1, str. si 22-si 29, ilustr. ISSN 0351-3386. [COBISS.SI-ID 161366787]
5. JEVŠNIK, Simona, KALAOĞLU, Fatma, ERYÜRÜK, Hanife, BIZJAK, Matejka, STJEPANOVIĆ, Zoran. Evaluation of a garment fit model using AHP. Fibres & textiles in Eastern Europe : an international magazine devoted to current problems of the textile industries in Central and Eastern Europe. 2015, vol. 23, iss. 2(110), str. 116-122.

Tatjana Rijavec:

1. CAFUTA, Danijela, ABU-ROUS, Mohammad, JARY, Susanne, SCHEFFELMEIER, Miriam, RIJAVEC, Tatjana. Suitability of lyocell fiber for pillow fillings. *Textile research journal*, 2019, vol. 89(18), 3722-3743, doi: 10.1177/0040517518819844.
2. RIJAVEC, Tatjana, LESKOVŠEK, Mirjam, SUKIČ, Neža, BRZIN, Barbara, PAVKO-ČUDEN, Alenka. Quality of fine yarns from modacrylic/polyacrylate/lyocell blends intended for affordable flame-resistant underwear. *Materials*. 2023, vol. 16, iss. 12, str. 1-23, ilustr. ISSN 1996-1944. https://www.mdpi.com/1996-1944/16/12/4386, DOI: 10.3390/ma16124386.
3. RIJAVEC, Tatjana. Silica aerogel based high thermal insulation materials. V: MAITY, Subhankar (ur.), SINGHA, Kunal (ur.), PANDIT, Pintu (ur.). *Functional and technical textiles*. Cambridge: Woodhead Publishing; [Amsterdam]: Elsevier; [Manchester]: The Textile Institute, 202 Str. 419-452, ilustr. The Textile Institute Book Series. ISBN 978-0-323-91593-9. https://www.sciencedirect.com/science/article/pii/B9780323915939000225, DOI: 10.1016/B978-0-323-91593-9.00022-5.

INŽENIRING KAKOVOSTI

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Inženiring kakovosti
Course title:	Quality Engineering
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Načrtovanje tekstilij in oblačil, druga stopnja, magistrski (v postopku)	Ni členitve (študijski program)	2. letnik	1. semester	izbirni

Univerzitetna koda predmeta/University course code:	0068958
Koda učne enote na članici/UL Member course code:	11271

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
30	30	0	0	0	60	4

Nosilec predmeta/Lecturer:	Andrej Demšar
Vrsta predmeta/Course type:	Izbirni/Elective

Jeziki/Languages:	Predavanja/Lectures:	Angleščina, Slovenščina
	Vaje/Tutorial:	Angleščina, Slovenščina

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	**Prerequisites:**
Vpis študija. Izbira predmeta. Pogoj za opravljanje izpita sta pozitivno opravljeni seminar in predstavitev seminarja.	Enrolment into study and selecting the course. A prerequisite for assessment to the exam are positively evaluated seminar paper and its presentation on a selected topic from the field.

Vsebina:	**Content (Syllabus outline):**
• Študij razvoja sistemov vodenja kakovosti (Kaizen, vitka proizvodnja, šest sigma, 20 ključev, QFD) in trendi razvoja; • Primerjava in analiza sodobnih sistemov vodenja kakovosti; • Kontrola kakovosti, standardi in zagotavljanje kakovosti, celovito vodenje kakovosti, pomen samoocenjevanja, (samo)učeče podjetje; • Kakovost in svetovna konkurenca; • Ekonomski vidiki kakovosti; • Metode stalnih izboljšav in njihova analiza; • Študij primerov dobrih praks na področju kakovosti.	• Study of the development of quality management systems (Kaizen, lean manufacturing, six sigma, 20 keys, QFD) and development trends; • Comparison and analysis of contemporary quality management systems; • Quality control, standards and quality assurance, comprehensive quality management, importance of self-assessment, (self-) learning company; • Quality and global competence; • Economic aspects of quality; • Methods of ongoing quality improvements and their analysis; • Study of the cases of good practices in the area of quality.

Temeljna literatura in viri/Readings:

- EVANS, J. R. Total Quality : Management, Organization, and Strategy. Mason, OH : Thomson/South-Western, 2003;
- MAROLT, J. GOMIŠČEK, B. Management kakovosti. Moderna organizacija, 2005; CONTI, T. Samoocenjevanje družb. Ljubljana : DZS, 1999;
- LOGOTHETIS, N. Managing for Total Quality : from Deming to Taguchi and SPC. New York [etc.] : Prentice Hall, 1992;
- WEALLEANS, D. The Quality Audit for ISO 9001: a Practical Guide. Hampshire : Gower, 2000;
- SLUGA, F. , DEMŠAR, A. Vodenje kakovosti. Ljubljana : NTF, 2015.

Cilji in kompetence:	**Objectives and competences:**
Temeljni izobraževalni **cilj** je razviti sposobnost za kritično vrednotenje sistemov vodenja kakovosti in postopkov za stalne izboljšave kakovosti. **Predmetno specifične kompetence**: • Sposobnost kritične analize sistemov vodenja kakovosti; • Razumevanje sodobnih postopkov vodenja kakovosti na podlagi kritične analize praktičnih primerov, • Razvijanje zavedanja pomena kakovosti za doseganje poslovne odličnosti organizacije; • Spoznavanje in kritično vrednotenje različnih postopkov, ki se uporabljajo.	The main **objective** of the study is to develop the capability of critical evaluation of quality management systems and procedures for constant quality improvement. **Subject-specific competences**: • The capability of critical analysis of quality management systems; • Understanding of contemporary quality management systems on the basis of critical analysis of practical cases; • Developing of the awareness of the importance of the quality for the achieving of business excellence; • Learning and critical evaluation of various applied procedures.

Predvideni študijski rezultati:	**Intended learning outcomes:**
Znanje in razumevanje: • Sodobnega pomena kakovosti in sistemov vodenja kakovosti in njihova kritična analiza; • Orodij, ki se uporabljajo na področju vodenja in v procesu stalnih izboljšav kakovosti; • Standardov za sisteme vodenja kakovosti; • Različnih konceptov vodenja kakovosti; • Statistične analize in orodij za odkrivanje neskladnosti v procesih.	**Knowledge and understanding**: • Modern meaning of quality and quality management systems and their critical evaluation; • Tools which are used in the field of management and in the process of constant quality improvement; • Quality management standardisation; • Different concepts of quality management; • Statistical methods for data analysis and detection of discrepancies in processes.

Metode poučevanja in učenja:	**Learning and teaching methods:**
Predavanja in seminarsko delo.	Lectures and seminar work.

Načini ocenjevanja:	**Delež/Weight**	**Assessment:**
Izpit	50,00 %	Exam
Seminarska naloga	30,00 %	Seminar paper
Predstavitev seminarske naloge	20,00 %	Presentation of seminar paper

Ocenjevalna lestvica:	**Grading system:**

Reference nosilca/Lecturer's references:

1. KAVKLER, Katja, DEMŠAR, Andrej. Application of FTIR and Raman spectroscopy to qualitative analysis of structural changes in cellulosic fibres = Uporaba FTIR in ramanske spektroskopije pri

kvalitativni analizi strukturnih sprememb celuloznih vlaken. Tekstilec, ISSN 0351-3386, 2012, letn. 55, št. 1, str. 19-44, ilustr. [COBISS.SI-ID 2727792];

2. DEMŠAR, Andrej, ŽNIDARČIČ, Dragan, GREGOR-SVETEC, Diana. Impact of UV radiation on the physical properties of polypropylene floating row covers. African journal of biotechnology, ISSN 1684-5315, 2011, vol. 10, no. 41, str. 7998-8006. [COBISS.SI-ID 6760057];
3. KAVKLER, Katja, GUNDE-CIMERMAN, Nina, ZALAR, Polona, DEMŠAR, Andrej. FTIR spectroscopy of biodegraded historical textiles. Polymer degradation and stability, ISSN 0141-3910, 2011, vol. 96, no. 4, str. 574-580, [COBISS.SI-ID 512456491];
4. MOŽINA, Klementina, ČERNIČ, Marjeta, DEMŠAR, Andrej. Non-destructive methods for chemical, optical, colorimetric and typographic characterisation of a reprint. Journal of cultural heritage, ISSN 1296-2074, 2007, [No.] 8, str. 339-349. [COBISS.SI-ID 1974640];
5. DEMŠAR, Andrej, BUKOŠEK, Vili, KLJUN, Alenka. Dynamic mechanical analysis of nylon 66 cord yarns. Fibres & textiles in Eastern Europe, ISSN 1230-3666, 2010, vol. 18, no. 4 (81), str. 29-34, ilustr. [COBISS.SI-ID 2426480].

IZBIRNI PREDMET 1

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Izbirni predmet 1
Course title:	Elective course 1
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Načrtovanje tekstilij in oblačil, druga stopnja, magistrski (v postopku)	Ni členitve (študijski program)	2. letnik	1. semester	izbirni

Univerzitetna koda predmeta/University course code:	0111963
Koda učne enote na članici/UL Member course code:	846

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
30	0	30	0	0	60	4

Nosilec predmeta/Lecturer:

Vrsta predmeta/Course type:

Jeziki/Languages:		
	Predavanja/Lectures:	
	Vaje/Tutorial:	

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	**Prerequisites:**

Vsebina:	**Content (Syllabus outline):**

Temeljna literatura in viri/Readings:

Cilji in kompetence:	**Objectives and competences:**

Predvideni študijski rezultati:	**Intended learning outcomes:**

Metode poučevanja in učenja:	**Learning and teaching methods:**

Načini ocenjevanja:	Delež/Weight	Assessment:

Ocenjevalna lestvica:	Grading system:

Reference nosilca/Lecturer's references:

IZBIRNI PREDMET 2

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Izbirni predmet 2
Course title:	Elective course 2
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Načrtovanje tekstilij in oblačil, druga stopnja, magistrski (v postopku)	Ni členitve (študijski program)	2. letnik	1. semester	izbirni

Univerzitetna koda predmeta/University course code:	0111964
Koda učne enote na članici/UL Member course code:	847

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
0	30	30	0	0	60	4

Nosilec predmeta/Lecturer:

Vrsta predmeta/Course type:

Jeziki/Languages:	Predavanja/Lectures:	
	Vaje/Tutorial:	

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	Prerequisites:

Vsebina:	Content (Syllabus outline):

Temeljna literatura in viri/Readings:

Cilji in kompetence:	Objectives and competences:

Predvideni študijski rezultati:	Intended learning outcomes:

Metode poučevanja in učenja:	Learning and teaching methods:

Načini ocenjevanja:	Delež/Weight	Assessment:

Ocenjevalna lestvica:	Grading system:

Reference nosilca/Lecturer's references:

IZBIRNI PREDMET 3

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Izbirni predmet 3
Course title:	Elective course 3
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Načrtovanje tekstilij in oblačil, druga stopnja, magistrski (v postopku)	Ni členitve (študijski program)	2. letnik	1. semester	izbirni

Univerzitetna koda predmeta/University course code:	0111965
Koda učne enote na članici/UL Member course code:	848

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
30	30	0	0	0	60	4

Nosilec predmeta/Lecturer:

Vrsta predmeta/Course type:

Jeziki/Languages:		
	Predavanja/Lectures:	
	Vaje/Tutorial:	

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	**Prerequisites:**

Vsebina:	**Content (Syllabus outline):**

Temeljna literatura in viri/Readings:

Cilji in kompetence:	**Objectives and competences:**

Predvideni študijski rezultati:	**Intended learning outcomes:**

Metode poučevanja in učenja:	**Learning and teaching methods:**

Načini ocenjevanja:	Delež/Weight	Assessment:

Ocenjevalna lestvica:	Grading system:

Reference nosilca/Lecturer's references:

KEMIJSKA FUNKCIONALIZACIJA TEKSTILIJ

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Kemijska funkcionalizacija tekstilij
Course title:	Chemical functionalisation of textiles
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Načrtovanje tekstilij in oblačil, druga stopnja, magistrski (v postopku)	Ni členitve (študijski program)	1. letnik	2. semester	obvezni

Univerzitetna koda predmeta/University course code:	0068967
Koda učne enote na članici/UL Member course code:	11266

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
30	30	30	0	0	90	6

Nosilec predmeta/Lecturer:	Barbara Simončič, Brigita Tomšič, Marija Gorjanc, Mateja Kert, Petra Eva Forte Tavčer
Vrsta predmeta/Course type:	Obvezni/Compulsory
Jeziki/Languages:	Predavanja/Lectures: Angleščina, Slovenščina Vaje/Tutorial: Angleščina, Slovenščina

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	Prerequisites:
Vpis na program.	Enrolment in the programme.

Vsebina:	Content (Syllabus outline):
• Kemijska funkcionalizacija z barvili in pigmenti: termokromizem, fotokromizem, ionokromizem, elektrokromizem, fosforescenca, učinki specialnih pigmentov; • Kemijska funkcionalizacija z uporabo nanodelcev in nanopremazov: superhidrofobnost, samočistilnost, fotokatalitičnost, zaščita pred UV sevanjem, protimikrobnost, biološka aktivnost, ognjevarnost, povečanje adhezivnosti, anti-adhezivnost; • Kemijska funkcionalizacija s specialnimi polimeri: temperaturna odzivnost, odzivnost na pH, odzivnost na svetlobo, odzivnost na električno in magnetno polje, uravnavanje toplote, menedžment vlage, zadrževanje neprijetnih vonjav, samo-ugasljivost, prevodnost.	• Chemical functionalization with dyes and pigments: thermochromism, photochromism, ionochromism, electrochromism, phosphorescence, the special pigments effects; • Chemical functionalization with nanoparticles and nanocoatings: superhydrophobicity, self-cleaning effect, photocatalytic effect, protection against UV radiation, antimicrobicity, biological activity, flame retardancy, increased adhesiveness, anti-adhesiveness; • Chemical functionalization with special polymers: polymers responsive to temperature, pH, light, electrical and magnetic field, heat control, moisture management, odour retention, self-extinguishing, conductivity.

• Pri vseh kemijskih funkcionalizacijah je poudarek na kemijski strukturi barvil, pigmentov in kemijskih apreturnih sredstev, mehanizmov delovanja in uporabi funkcionalnih tekstilij. **Seminar**: • Vsebinsko je povezan s projektnim delom pri predmetu Napredni plemenitilni postopki. • Obsega pregled literature na področju izbrane kemijske funkcionalizacije. **Vaje**: • V povezavi s projektnim delom pri predmetu Napredni postopki plemenitenja se izvede karakterizacija kemijsko modificiranih tekstilnih substratov, določitev funkcionalnih lastnosti ter njihova pralna obstojnost.	• The chemical functionalizations are emphasised on the chemical structures of dyes, pigments and chemical finishing products, their mechanisms of action, and the use of the functionalized textiles. **Seminar**: • Seminar is associated to the project work of the subject Advanced processes of finishing. • It comprises the literature overview in the field of selected chemical functionalization. **Tutorial**: • The characterization of chemically modified substrates, the determination of functional properties and their wash fastness, which are connected to the project work of the subject Advanced processes of finishing.

Temeljna literatura in viri/Readings:

- Advances in the dyeing and finishing of technical textiles. Edited by M. L. GULRAJANI. Philadelphia : Woodhead Publishing Limited, 2013, 425 str.;
- Functional textiles for improved performance, protection and health. Edited by N. PAN and G. SUN. Oxford ; Philadelphia : Woodhead Publishing Limited, 2011, 528 str.;
- Textiles for protection. Edited by R. A. SCOTT. Cambridge : Woodhead Publishing Limited, 2005, 754 str.;
- Textiles in sport. Edited by R. SHISHOO. Cambridge : Woodhead Publishing Limited, 2005, 364 str.;
- Izbrani članki iz domačih in tujih strokovnih revij, dostopnih v knjižnici Oddelka za tekstilstvo, grafiko in oblikovanje NTF in v CTK ter v revijah, dostopnih v elektronskih medijih/Selected articles from national and international professional journals available at the library of Department of Textiles, Graphic Arts and Design - NTF, at the Central Technological Library, and on-line.

Cilji in kompetence:	**Objectives and competences:**
Študenti nadgradijo temeljna znanja na področju kemijske funkcionalizacije tekstilnih substratov s poudarkom na najsodobnejših kemijskih modifikacijah za dosego pametnih in odzivnih tekstilij ter tekstilij s povečano aktivnostjo in zaščitnimi lastnostmi. Študenti pridobijo naslednje **kompetence**: • Poznavanje teoretičnih osnov in mehanizmov delovanja barvil, pigmentov in apreturnih sredstev za dosego specialnih učinkov pri funkcionalizaciji; • Poznavanje zahtevnejših analiz strukturno in površinsko spremenjenih tekstilnih substratov; • Sposobnost povezovanja znanj s področij konstrukcijskih, mehanskih, fizikalnih in kemijskih lastnosti tekstilij s plemenitilnimi postopki, kar je pogoj za kakovostno kemijsko funkcionalizacijo; • Vpogled v interdisciplinarnost področja kemijske funcionalizacije.	The students upgrade their basic knowledge in the field of chemical functionalization of textile substrates with an emphasis on the most advanced chemical modification to achieve smart and responsive textiles, and textiles with increased activity and protective properties. The students gain the **competences** such as: • Knowledge of theoretical fundamentals and mechanisms of action of dyes, pigments and finishes to achieve special functionalization effects; • Knowledge of complex analysis of structurally and surface-modified textile substrates; • The ability to integrate the knowledge from the areas of structural, mechanical, physical and chemical properties with the textile finishing processes, which is a prerequisite for quality chemical functionalization; • The insight into the interdisciplinary field of chemical functionalization.

Predvideni študijski rezultati:	**Intended learning outcomes:**
• Študenti osvojijo teoretično in praktično znanje na področju najsodobnejših načinov kemijske funkcionalizacije tekstilij in ga povežejo z znanji, pridobljenimi na področju naprednih	• The students gain theoretical and practical knowledge in the field of the most advanced methods of chemical functionalization of textiles which can integrate with the knowledge gained in

plemenitilnih in mehanskih tekstilnih postopkov, mehanske funkcionalizacije tekstilij ter funkcionalizacije konfekcioniranih izdelkov. • Dobljeno znanje znajo uporabiti za načrtovanje specialnih kemijskih obdelav tekstilij za doseganje visokokakovostnih tehnoloških tekstilnih izdelkov.	the field of advanced finishing and mechanical textile processes, mechanical functionalization of textiles and functionalization of ready-made products. • The resulting knowledge can be used to design special chemical treatments of textiles in order to achieve high-tech textile products.

Metode poučevanja in učenja:	**Learning and teaching methods:**
Predavanja, seminar, laboratorijske vaje.	Lectures, seminars, laboratory exercises.

Načini ocenjevanja:	**Delež/Weight**	**Assessment:**
Pisni izpit	60,00 %	Written exam
Predstavitev seminarskega dela	40,00 %	Presentation of the seminar work

Ocenjevalna lestvica:	**Grading system:**
5 - 10, pri čemer velja, da je pozitivna ocena od 6 - 10	5 - 10, a student passes the exam if he is graded from 6 to 10

Reference nosilca/Lecturer's references:

Barbara Simončič:

1. GLAŽAR, Dominika, JERMAN, Ivan, TOMŠIČ, Brigita, CHOUHAN, Raghuraj S., SIMONČIČ, Barbara. Emerging and promising multifunctional nanomaterial for textile application based on graphitic carbon nitride heterostructure nanocomposites. *Nanomaterials*, 2023, vol. 13, iss. 3, article 408, str. 1-26. DOI: 10.3390/nano13030408. [COBISS.SI-ID 138579459].
2. RASHID, Mohammad Mamunur, SIMONČIČ, Barbara, TOMŠIČ, Brigita. Recent advances in TiO2-functionalized textile surfaces. *Surfaces and interfaces*. 2021, vol. 22, str. 1-33. https://www.sciencedirect.com/science/article/pii/S2468023020308828. [COBISS.SI-ID 45430275].
3. VASILJEVIĆ, Jelena, JERMAN, Ivan, SIMONČIČ, Barbara. Graphitic carbon nitride as a new sustainable photocatalyst for textile functionalization. *Polymers*. 2021, vol. 13, iss. 15, str. 1-21, https://www.mdpi.com/2073-4360/13/15/2568, https://repozitorij.uni-lj.si/IzpisGradiva.php?id=136095. [COBISS.SI-ID 73349635].
4. VERBIČ, Anja, GORJANC, Marija, SIMONČIČ, Barbara. Zinc oxide for functional textile coatings: recent advances. *Coatings*. 27 August 2019, vol. 9, iss. 9, str. 1-26. DOI: 10.3390/coatings9090550. [COBISS.SI-ID 3631216].

Brigita Tomšič:

1. RASHID, Mohammad Mamunur, TOMŠIČ, Brigita, SIMONČIČ, Barbara, JERMAN, Ivan, ŠTULAR, Danaja, ZORC, Matija. Sustainable and cost-effective functionalization of textile surfaces with Ag-doped TiO2/polysiloxane hybrid nanocomposite for UV protection, antibacterial and self-cleaning properties. *Applied Surface Science,* 2022, vol. 595, str. 1-15.
2. TOMŠIČ, Brigita, MARKOVIĆ, Darka, JANKOVIĆ, Vukašin, SIMONČIČ, Barbara, NIKODINOVIĆ-RUNIĆ, Jasmina, ILIC-TOMIC, Tatjana, RADETIĆ, Maja. Biodegradation of cellulose fibers functionalized with CuO/Cu2O nanoparticles in combination with polycarboxylic acids. *Cellulose*. 2022, vol. 29, iss. 1, str. 287–302.
3. ŠTULAR, Danaja, SAVIO, Elisa, SIMONČIČ, Barbara, ŠOBAK, Matic, JERMAN, Ivan, POLJANŠEK, Ida, FERRI, Ada, TOMŠIČ, Brigita. Multifunctional antibacterial and ultraviolet protective cotton cellulose developed by in situ biosynthesis of silver nanoparticles into a polysiloxane matrix mediated by sumac leaf extract. *Applied Surface Science,* 2021, vol. 563, str. 1-12.
4. ŠTULAR, Danaja, KRUSE, Magnus, ŽUPUNSKI, Vera, KREINEST, Laura, MEDVED, Jože, GRIES, Thomas, BLAESER, Andreas, JERMAN, Ivan, SIMONČIČ, Barbara, TOMŠIČ, Brigita. "Smart" stimuli-responsive polylactic acid-hydrogel fibers produced via electrospinning. *Fibers and polymers*. 2019, vol. 20, no. 9, str. 1857-1868.
5. ŠTULAR, Danaja, TOMŠIČ, Brigita, JERMAN, Ivan, SIMONČIČ, Barbara, MIHELČIČ, Mohor, NOČ, Luka, GERMAN ILIĆ, Ilija. Comparison of responsive behaviour of smart PLA fabrics applied with temperature and pH responsive microgel and nanogel. *Progress in organic coatings,* 2018, 124, str. 213-223.

Marija Gorjanc:

1. VERBIČ, Anja, BRENČIČ, Katja, PRIMC, Gregor, MOZETIČ, Miran, ŠALA, Martin, GORJANC, Marija. Plasma-assisted green synthesis of ZnO directly on polyethylene terephthalate fabric. Fibers and polymers. 2023, vol. 24, no. 1, str. 83-94, ilustr. ISSN 1229-9197. https://link.springer.com/article/10.1007/s12221-023-00059-1, https://repozitorij.uni-lj.si/IzpisGradiva.php?id=148112, DOI: 10.1007/s12221-023-00059-1. [COBISS.SI-ID 141478915]
2. VERBIČ, Anja, BRENČIČ, Katja, PRIMC, Gregor, MOZETIČ, Miran, GORJANC, Marija. Eco-friendly in situ ZnO synthesis on PET fabric using oxygen plasma and plant waste. Coatings. 16. april 2022, vol. 12, iss. 4, str. 1-10, ilustr. ISSN 2079-6412. https://www.mdpi.com/2079-6412/12/4/537, DOI: 10.3390/coatings12040537. [COBISS.SI-ID 105275651]
3. PRAVEEN, K. M., PRIMC, Gregor, SIMONČIČ, Barbara, GORJANC, Marija, VESEL, Alenka, MOZETIČ, Miran, et al. Plasma-assisted fabrication of hydrophobic siloxane based sol–gel-coated coir fibres. Surface innovations. 2022, vol. 10, no. 2, str. 128-139. ISSN 2050-6260. DOI: 10.1680/jsuin.20.00091. [COBISS.SI-ID 128584963]
4. KERT, Mateja, FORTE-TAVČER, Petra, HLADNIK, Aleš, SPASIĆ, Kosta, PUAČ, Nevena, PETROVIĆ, Zoran Lj., GORJANC, Marija. Application of fragrance microcapsules onto cotton fabric after treatment with oxygen and nitrogen plasma. Coatings. 28 September 2021, vol. 11, iss. 10, str. 1-16, ilustr. ISSN 2079-6412. https://www.mdpi.com/2079-6412/11/10/1181, https://repozitorij.uni-lj.si/IzpisGradiva.php?id=136294, DOI: 10.3390/coatings11101181.

Mateja Kert:

1. KERT, Mateja, SKOKO, Jasna. Formation of pH-responsive cotton by the adsorption of methyl orange dye. *Polymers*. 2023, vol. 15, iss. 7, [article no.] 1783, str. 1-15.
2. TOPIĆ, Taja, GORJANC, Marija, KERT, Mateja. The influence of the treatment process on the dyeability of cotton fabric using goldenrod dye = Vpliv postopka obdelave bombažne tkanine na obarvljivost z barvilom zlate rozge. *Tekstilec : glasilo slovenskih tekstilcev*. [Tiskana izd.]. 2018, vol. 61, no. 3, str. 192-200.
3. KERT, Mateja, GORJANC, Marija. The study of colour fastness of commercial microencapsulated photoresponsive dye applied on cotton, cotton/polyester and polyester fabric using a pad-dry-cure process. *Coloration technology : the journal of the Society of Dyers and Colourists*. Dec. 2017, vol. 133, no. 6, str. 491-497.

Petra Eva Forte Tavčer:

1. GOLJA, Barbara, ŠUMIGA, Boštjan, BOH PODGORNIK, Bojana, MEDVED, Jože, PUŠIĆ, Tanja, FORTE-TAVČER, Petra. Application of flame retardant microcapsules to polyester and cotton fabrics. Materiali in tehnologije, 2014, letn. 48, št. 1, str. 105-111;
2. GOLJA, Barbara, ŠUMIGA, Boštjan, FORTE-TAVČER, Petra. Fragrant finishing of cotton with microcapsules: comparison between printing and impregnation. Coloration technology, 2013, vol. 129, no. 5, str. 338-346.

KOMPOZITI

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Kompoziti
Course title:	Composites
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Načrtovanje tekstilij in oblačil, druga stopnja, magistrski (v postopku)	Ni členitve (študijski program)	1. letnik	2. semester	obvezni

Univerzitetna koda predmeta/University course code:	0109006
Koda učne enote na članici/UL Member course code:	11303

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
30	30	30	0	0	90	6

Nosilec predmeta/Lecturer:	Brigita Tomšič, Marija Gorjanc, Matejka Bizjak , Tatjana Rijavec
Vrsta predmeta/Course type:	Obvezni/Compulsory
Jeziki/Languages:	Predavanja/Lectures: Angleščina, Slovenščina Vaje/Tutorial: Angleščina, Slovenščina

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	Prerequisites:
Predmet nima posebnih pogojev za opravljanje študijskih obveznosti.	The course does not have special prerequisites.

Vsebina:	Content (Syllabus outline):
• Biokompoziti (biorazgradljive matrice, biorazgradljivi naravni in sintetični polimeri za ojačitve) • Toplotno izolativni kompoziti iz silicijevega aerogela • Nanokompoziti • Kompoziti za napredne aplikacije • Strukture in fizikalno mehanske zahteve ojačitev • Obdelave za povečanje adhezije v kompozitih • Recikliranje in biorazgradnja kompozitov V sklopu seminarja in vaj se izvede projektno delo, ki zajema pregled sodobne literature, izvedbo poskusa, analizo ter interpretacijo rezultatov.	• Biocomposites (biodegradable matrices, biodegradable natural and synthetic polymers for reinforcements) • Thermally insulating composites of silicon aerogel. • Nanocomposites • Composites for advanced applications • Structures and physico-mechanical requirements for reinforcements • Treatments to increase adhesion in composites • Recycling and biodegradation of composites As part of the seminar and exercises, project work is carried out, which includes a review of contemporary literature, the implementation of an experiment, analysis and interpretation of results.

Temeljna literatura in viri/Readings:

1. *Natural fiber textile composite engineering*. Uredil Magdi El Messiry. Oakville, Waretown : Apple Academic Press. 2017, 360 strani.
2. Gorjanc, M, Mozetič, M. *Modification of fibrous polymers by gaseous plasma : principles, techniques and applications*. Saarbrücken : LAP Lambert Academic Publishing, 2014.
3. *Composite materials engineering. Volume 1- Fundamentals of composite materials*. Uredili Xiao-Su Yi, Shanyi Dum, Litong Zhang. Springer Singapore : Springer Nature Singapore Pte Ltd and Chemical Industry Press, Beijing 2018.
4. *Composite materials engineering. Volume 2- Different types of composite materials*. Uredili Xiao-Su Yi, Shanyi Dum, Litong Zhang. Springer Singapore : Springer Nature Singapore Pte Ltd and Chemical Industry Press, Beijing 2018.
5. Functional and technical textiles. Cambridge : Woodhead Publishing ; [Amsterdam] : Elsevier ; [Manchester] : The Textile Institute, 2023. ISBN –– 978-0-323-91593-9, COBISS.SI-ID – 140634883, Povezava(-e):https://www.sciencedirect.com/book/9780323915939/functional-and-technical-textiles
6. RIJAVEC, Tatjana. Silica aerogel based high thermal insulation materials. V: MAITY, Subhankar (ur.), SINGHA, Kunal (ur.), PANDIT, Pintu (ur.). Functional and technical textiles. Cambridge: Woodhead Publishing; [Amsterdam]: Elsevier; [Manchester]: The Textile Institute, 2023. Str. 419-452, ilustr. The Textile Institute Book Series. ISBN 978-0-323-91593-9. https://doi.org/10.1016/B978-0-323-91593-9.00022-5
7. *Tekstilije v gumenih kompozitih*. 1. izd. V Ljubljani: Naravoslovnotehniška fakulteta, Oddelek za tekstilstvo, 2011.
8. RIJAVEC, Tatjana. *Inženirski kompoziti : predavanje na 4 simpoziju o novostih v tekstilstvu, Sodobni tekstilni materiali, Ljubljana, NTF OTGO, 6. junij 2019*.
9. Izbrani članki iz domačih in tujih strokovnih revij

Dodatna literatura / Additional textbook:

1. *Polymer composites: Volume 3: Biocomposites*. Uredili Sabu Thomas, Kuruvilla Joseph, S. K. Malhotra, Koichi Goda, M. S. Sreekala, Wiley-VCH, 2014.

Cilji in kompetence:	**Objectives and competences:**
Študenti nadgradijo temeljna znanja tekstilnih kompozitov, s poudarkom na sodobnih tehnologijah izdelave kompozitov. Poznajo vpliv materialov, struktur in obdelav za doseganje optimalnih ojačitvenih sposobnosti in dobe trajanja kompozita s čimer znajo načrtovati kompozit glede na končne lastnosti in njegovo namembnost uporabe. Študenti se spoznajo z možnostmi in omejitvami recikliranja in planiranja trajnostnih kompozitov. Spoznajo različne vrste kompozitov in kakovostne zahteve glede na namembnost uporabe. Pridobijo pregled nad tehnologijam izdelave kompozitov in njihovimi kombinacijami v povezavi z želenimi končnimi lastnostmi kompozita.	Students expand their basic knowledge of textile composites, with an emphasis on modern composite manufacturing technologies. They understand the effects of materials, structures, and treatments to achieve optimal composite reinforcement capability and duration, enabling them to design the composite according to the final properties and its intended use. Students will gain insight into the possibilities and limitations of recycling and developing sustainable composite materials. They will learn about the different types of composites and the quality requirements depending on the intended use. Students gain an overview of the manufacturing technology of composites and their combinations in relation to the desired end properties of the composite.

Predvideni študijski rezultati:	**Intended learning outcomes:**
Študenti osvojijo teoretično in praktično znanje izdelave kompozitov in znajo načrtovati kompozit za specifične namene. Študentje pridobijo sposobnost strokovne izbire in uporabe specifičnih analitskih metod za določitev vmesnih in končnih lastnosti kompozita. Znanja pri Kompozitih lahko povezujejo z znanji s področji kemijske in mehanske funkcionalizacije, naprednih plemenitilnih in mehanskih postopkov ter funkcionalizacije konfekcioniranih izdelkov. Študenti pridobijo znanja	Students gain theoretical and practical knowledge in design of composite materials for specific purposes. Students acquire the ability to expertly select and apply specific analytical methods to determine intermediate and final properties of composite materials. Knowledge gain whithin Composites can be combined with knowledge of chemical and mechanical functionalization, advanced finishing and mechanical processes, and functionalization of ready-made products. Students will gain knowledge of

najsodobnejših tehnologij recikliranja kompozitov, s čimer poglobijo ekološko razmišljanje pri načrtovanju trajnostnih kompozitov glede na končne želene lastnosti.	advanced recycling technologies for composites, deepening ecological thinking in the design of sustainable composites according to desired end properties.

Metode poučevanja in učenja:	**Learning and teaching methods:**
Predavanja, diskusija, metode raziskovanja in pisanja	Lectures, discussion, research and writing methods

Načini ocenjevanja:	**Delež/Weight**	**Assessment:**
Izpit	50,00 %	Izpit
Predstavitev rezultatov projektnega dela	50,00 %	Presentation of the project work results

Ocenjevalna lestvica:	**Grading system:**
5 - 10, pri čemer velja, da je pozitivna ocena od 6 - 10	5 - 10, a student passes the exam if he is graded from 6 to 10

Reference nosilca/Lecturer's references:

Tatjana Rijavec

RIJAVEC, Tatjana. Silica aerogel based high thermal insulation materials. V: MAITY, Subhankar (ur.), SINGHA, Kunal (ur.), PANDIT, Pintu (ur.). Functional and technical textiles. Cambridge: Woodhead Publishing; [Amsterdam]: Elsevier; [Manchester]: The Textile Institute, 2023. Str. 419-452, ilustr. The Textile Institute Book Series. ISBN 978-0-323-91593-9. https://doi.org/10.1016/B978-0-323-91593-9.00022-5

RIJAVEC, Tatjana. Inženirski kompoziti = Engineering composites. V: GORJANC, Marija (ur.), SIMONČIČ, Barbara (ur.). *Sodobni tekstilni materiali : zbornik izvlečkov*. 48. simpozij o novostih v tekstilstu, Ljubljana, 6. junij 2019. Ljubljana: Naravoslovnotehniška fakulteta, Oddelek za tekstilstvo, grafiko in oblikovanje, 2019. Str. 15.

BUKOŠEK, Vili, RIJAVEC, Tatjana (avtor, urednik), GREGOR-SVETEC, Diana (avtor, urednik), BIZJAK, Matejka, ČERNE HOČEVAR, Lidija, DIMITROVSKI, Krste, GOLOB, Gorazd. *Tekstilije v gumenih kompozitih*. 1. izd. V Ljubljani: Naravoslovnotehniška fakulteta, Oddelek za tekstilstvo, 2011. 144 str.

Marija Gorjanc

GORJANC, Marija. Plasma treatment of high-performance fibrous materials. V: THOMAS, Sabu (ur.), MOZETIČ, Miran (ur.), CVELBAR, Uroš (ur.). *Non-thermal plasma technology for polymeric materials : applications in composites nanostructured materials, and biomedical fields*. Amsterdam: Elsevier, cop. 2019. Str. 341-366;

OGRIZEK, Linda, LAMOVŠEK, Janja, ČUŠ, Franc, LESKOVŠEK, Mirjam, GORJANC, Marija. Properties of bacterial cellulose produced using white and red grape bagasse as a nutrient source. *Processes*. 2021, vol. 9, iss. 7, str. 1-15.

DEEPA, B., ABRAHAM, E., CORDEIRO, Nereida, FARIA, Marisa, PRIMC, Gregor, POTTA THARA, Yasir Beeran, LESKOVŠEK, Mirjam, GORJANC, Marija, MOZETIČ, Miran, THOMAS, Sabu, POTHAN, L. A. Nanofibrils vs nanocrystals bio-nanocomposites based on sodium alginate matrix : an improved-performance study. *Heliyon*. 2020, vol. 6, iss. 2, str. e03266-1-e03266-9.

Matejka Bizjak

ČUK, Marjeta, BIZJAK, Matejka, KOČEVAR, Tanja Nuša. Influence of simple and double-weave structures on the adhesive properties of 3D printed fabrics. *Polymers*. 2022, vol. 14, iss. 4, str. 1-18, ilustr. ISSN 2073-4360. https://www.mdpi.com/2073-4360/14/4/755.

BOSCAROL, Anastasia Taja, HEUFFEL BERGINC, Ingrid, BIZJAK, Matejka, ZEVNIK, Luka. Tekstilije letijo v nebo = Textiles fly into the sky. V: SIMONČIČ, Barbara (ur.), TOMŠIČ, Brigita (ur.). *Napredne tekstilije za družbo in gospodarstvo : zbornik izvlečkov*. 45. simpozij o novostih v tekstilstvu, Ljubljana, 3. junij 2014. Ljubljana: Naravoslovnotehniška fakulteta, Oddelek za tekstilstvo, 2014. Str. 12. ISBN 978-961-6900-06-5.

BIZJAK, Matejka. Beton ojačan tekstilom = Textile reinforced concrete = Testilverstärkter Beton. *Tekstil : časopis za tekstilnu tehnologiju i konfekciju*. [Print ed.]. 2002, vol. 51, no. 1, str. 22-30, ilustr. ISSN 0492-5882.

Brigita Tomšič

RASHID, Mohammad Mamunur, TOMŠIČ, Brigita, SIMONČIČ, Barbara, JERMAN, Ivan, ŠTULAR, Danaja, ZORC, Matija. Sustainable and cost-effective functionalization of textile surfaces with Ag-doped TiO2/polysiloxane hybrid nanocomposite for UV protection, antibacterial and self-cleaning properties. *Applied Surface Science*, 2022, vol. 595, str. 1-15

RASHID, Mohammad Mamunur, TOMŠIČ, Brigita, SIMONČIČ, Barbara, JERMAN, Ivan, ŠTULAR, Danaja, ZORC, Matija, ČELAN KOROŠIN, Nataša. In situ tailoring of Ag-doped-TiO2/TPMP/cotton nanocomposite with UV-protective, self-sterilizing and flame-retardant performance for advanced technical textiles. *Polymer degradation and stability*, 2023, vol. 216, [article no.] 110504, str. 1-11, ilustr.
TOMŠIČ, Brigita, MARKOVIĆ, Darka, JANKOVIĆ, Vukašin, SIMONČIČ, Barbara, NIKODINOVIĆ-RUNIĆ, Jasmina, ILIC-TOMIC, Tatjana, RADETIĆ, Maja. Biodegradation of cellulose fibers functionalized with CuO/Cu2O nanoparticles in combination with polycarboxylic acids. *Cellulose,* 2021. DOI: 10.1007/s10570-021-04296-6.

MAGISTRSKO DELO

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Magistrsko delo
Course title:	Masters thesis
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Načrtovanje tekstilij in oblačil, druga stopnja, magistrski (v postopku)	Ni členitve (študijski program)	2. letnik	2. semester	obvezni

Univerzitetna koda predmeta/University course code:	0068972
Koda učne enote na članici/UL Member course code:	10497

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
				225	225	15

Nosilec predmeta/Lecturer:	
Vrsta predmeta/Course type:	Obvezni/Compulsory

Jeziki/Languages:	Predavanja/Lectures:	Angleščina, Slovenščina
	Vaje/Tutorial:	

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	**Prerequisites:**
Vpis v 2. letnik študija. Opravljene vse ostale študijske obveznosti. Odobrena tema magistrske naloge.	Enrollment in the 2nd year of study. Completion of all other degree requirements. Confirmation of thesis topic.

Vsebina:	**Content (Syllabus outline):**
Magistrsko delo je lahko interdisciplinarno naravnano ali ožje specializirano na poljubno področje znotraj strokovnih vsebin s področja, ki ga pokriva prvostopenjski študij Načrtovanje tekstilij in oblačil. Magistrsko delo vsebuje: • namen dela, predstavitev problema oz. razlog za raziskavo, • pregled znanj iz literature oz. tuje in domače izkušnje, • nakazane rešitve problema, • sklepi in priporočila. Magistrsko delo študent izdela pod mentorstvom izbranega učitelja, ga javno predstavi in zagovarja.	The Master thesis may be interdisciplinary or specialized in any area within the subject study from the area of the first degree in Textile and Clothing Planning. The Master thesis includes: • the purpose of the thesis, the statement of the problem or reason for an investigation, • the review of literature and knowledge and/or foreign and domestic experience, • the implicit solution of the problem, • conclusions and recommendations. Student completes the thesis under the supervision of a teacher and ends the study with the public presentation and defend it.

Temeljna literatura in viri/Readings:

Izbrana literatura glede na nalogo, ki jo opravlja. / Selected readings, depending on the thesis he/she is working on.

Cilji in kompetence:	**Objectives and competences:**
Cilji: Študent je sposoben reševati konkretne probleme s tekstilnega in oblačilnega področja. V času priprave magistrskega dela po možnosti sodeluje v tekočih projektih, ki po vsebini sovpadajo s konceptom teme magistrskega dela. Dopolnjuje in poglablja temeljna znanja, ter razvija sposobnosti za reševanje problemov s tekstilnega in oblačilnega področja. **Kompetence**: Predstavi in reši določen problem s področja tekstilij in oblačil s praktično uporabo znanja pridobljenega med študijem. Sposoben je uporabljati in povezovati temeljna in aplikativna tekstilna in oblačilna znanja.	**Objectives**: The student is able to solve specific problems in the field of textiles and clothing. During the preparation of the Master's thesis, the student is involved in current projects that are close to the topic of his/her thesis. The student completes and deepens the basic knowledge and develops the ability to solve the problems in the textile and clothing field. **Competencies**: The student presents and solves a specific problem in the textile and clothing field with practical application of knowledge acquired in the course. The student is able to use and integrate basic and applied textile and clothing knowledge.

Predvideni študijski rezultati:	**Intended learning outcomes:**
Študent razume stroko v širšem kontekstu kot interdisciplinarno panogo, dokaže samostojno reševanje konkretnih problemov s povezovanjem temeljnih in aplikativnih znanj, ki jih uporabi pri izdelavi magistrskega dela. Pridobi nove informacije, jih kritično analizira in uporabi pri določitvi problemov in njihovem reševanju. Pridobljeno znanje in rešitve konkretnega problema v magistrskem delu je sposoben podati in zagovarjati pred širšim krogom zainteresiranih uporabnikov.	The student understands the profession in a broader context as an interdisciplinary industry. The student demonstrates his/her ability to solve specific problems by integrating basic and applied skills and use them to produce a consistent master's thesis. The student synthesizes and analyzes new information and uses it to identify and solve problems. The student is able to present and defend the acquired knowledge and solutions to a specific problem in the master's thesis to a wider audience of interested users.

Metode poučevanja in učenja:	**Learning and teaching methods:**
Praktično delo, študij literature, konzultacije z mentorjem, pisanje magistrskega dela.	Practical work, study of literature, consultations with supervisor, writing of masters thesis.

Načini ocenjevanja:	**Delež/Weight**	**Assessment:**
Ocena pisnega in praktičnega dela magistrskega dela	70,00 %	Assessment of the written and practical part of the master's thesis
Ocena javne predstavitve	20,00 %	Assessment of public presentation
Ocena zagovora	10,00 %	Defending of the thesis

Ocenjevalna lestvica:	**Grading system:**
5 - 10, pri čemer velja, da je pozitivna ocena od 6 - 10	5 - 10, a student passes the exam if he is graded from 6 to 10

Reference nosilca/Lecturer's references:

Reference nosilcev razvidne iz učnih načrtov pri posameznih predmetih v okviru drugostopenjskega študija Načrtovanje tekstilij in oblačil. / References of lecturers listed in the curricula of each course in the Textile and Clothing Planning program

MATEMATIKA

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Matematika
Course title:	Mathematics
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Grafične in interaktivne komunikacije, druga stopnja, magistrski	Ni členitve (študijski program)	1. letnik	1. semester	izbirni
Načrtovanje tekstilij in oblačil, druga stopnja, magistrski (v postopku)	Ni členitve (študijski program)	1. letnik	1. semester	izbirni

Univerzitetna koda predmeta/University course code:	0561971
Koda učne enote na članici/UL Member course code:	10515

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
45	0	45	0	0	90	6

Nosilec predmeta/Lecturer:	Janko Bračič
Vrsta predmeta/Course type:	Izbirni / Elective

Jeziki/Languages:	Predavanja/Lectures:	Slovenščina
	Vaje/Tutorial:	Slovenščina

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	Prerequisites:
Vpis v prvi letnik.	Entering first year class.

Vsebina:	Content (Syllabus outline):
Uvod in ponovitev osnov funkcij ene spremenljivke (odvod; nedoločeni in določeni integral). Navadne diferencialne enačbe (linearne diferencialne enačbe 1. in 2. reda; uporaba). Osnove funkcij dveh spremenljivk (graf; parcialni odvodi; tangentna ravnina; gradient; stacionarne točke in njihova klasi8fikacija). Dvojni integral (dvakratni integral; menjava vrstnega reda integriranja; uvedba novih spremenljivk in Jacobijeva determinanta; polarne koordinate).	Repetition of the theory of functions with one variable (derivative; indefinite and definite integral). Ordinary differential equations (linear differential equations of order 1 and 2; applications). Basics of functions with two variables (graph; partial derivatives; tangent plane; gradient; stationary points and their classification). Double integral (iterated integrals; changing order of integration; change of variables and Jacobian determinant; polar coordinates).

Temeljna literatura in viri/Readings:

Bračič, Janko; *Matematika 1-2: števila, funkcije, linearna algebra*, NTF UL, 2021.
Bračič Janko, *Priprave na izpit iz matematike,* NTF UL, 2022.

Cilji in kompetence:	**Objectives and competences:**
Predmet obravnava osnove funkcij ene in dveh realnih spremenljivk. Slušatelj se seznani z ustrezno teorijo in njeno uporabo. Večina izrekov je podanih brez dokazov. Poudarek je na učenju standardnih metod za reševanje problemov. Namen vaj je utrditev predavane snovi in pridobitev računske prakse, predmet pa je kot temeljni podlaga tako za strokovne kakor za druge osnovne predmete.	Basic theory of function of one and two real variables is presented. A student becomes familiar with some notions from the theory and get skilled in its use. The emphasis is on standard methods for solving problems in calculus. The aim of tutorial is in practising. The subject is a basis for many other subjects.

Predvideni študijski rezultati:	**Intended learning outcomes:**
Znanje in razumevanje: Razvijanje sposobnosti učenja osnovnih predmetov in prilagajanje ter uporaba znanja na svojem strokovnem področju.	Knowledge and understanding: Developing the ability of understanding of all basic subjects and adapting and using the knowledge in the own professional area.

Metode poučevanja in učenja:	**Learning and teaching methods:**
Predavanja in vaje s praktičnimi računskimi primeri.	Lectures and tutorials with concrete numerical examples.

Načini ocenjevanja:	**Delež/Weight**	**Assessment:**
Način (pisni izpit, ustno izpraševanje, naloge, projekt) Pisni izpit: opravljena kolokvija sta enakovredna pisnemu izpitu.	70,00 %	Type (examination, oral, coursework, project) Writing exam: two partial exams are equivalent to the writing exam.
Teoretični izpit je test, na katerem se preveri poznavanje in razumevanje teorije.	30,00 %	Theoretical test. The aim of the theoretical test is to check the understanding of the theory.

Ocenjevalna lestvica:	**Grading system:**
5 - 10, pri čemer velja, da je pozitivna ocena od 6 - 10	5 - 10, a student passes the exam if he is graded from 6 to 10

Reference nosilca/Lecturer's references:

1. Janko Bračič, *Operators with a nontrivial closed invariant affine subspace*, Aequationes mathematicae, 98(5) (2024), 1305-1315.
2. Janko Bračič, *Reflexivity of finite-dimensional sets of operators,* Banach J. Math. Anal. (2023) 17:72.
3. Janko Bračič, Marko Kandić, *Hyperinvariant subspaces for sets of polynomially compact operators,* Annals of Functional Analysis 13, Article number: 71 (2022).
4. Janko Bračič, Marko Kandić, *On the normalizer of the reflexive cover of a unital algebra of linear transformations,* Linear Algebra and its Applications 653 (2022), 207-230.
5. Janko Bračič, *Local commutants and ultrainvariant subspaces*, Journal of Mathematical Analysis and Applications 506 (2022), Issue 2.

MEHANSKA FUNKCIONALIZACIJA TEKSTILIJ

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Mehanska funkcionalizacija tekstilij
Course title:	Mechanical functionalisation of textiles
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Načrtovanje tekstilij in oblačil, druga stopnja, magistrski (v postopku)	Ni členitve (študijski program)	1. letnik	2. semester	obvezni

Univerzitetna koda predmeta/University course code:	0068968
Koda učne enote na članici/UL Member course code:	11265

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
30	30	30	0	0	90	6

Nosilec predmeta/Lecturer:	Dunja Šajn Gorjanc, Matejka Bizjak , Živa Zupin
Vrsta predmeta/Course type:	Obvezni/ Compulsory

Jeziki/Languages:	Predavanja/Lectures:	Angleščina, Slovenščina
	Vaje/Tutorial:	Angleščina, Slovenščina

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	**Prerequisites:**
Vpis na program.	Enrolment in the programme.

Vsebina:	**Content (Syllabus outline):**
Predavanja: • Funkcionalizacija z izbiro surovin in predilskega postopka: zahtevnejši parametri prej ter njihov vpliv na lastnosti 2D in 3D tekstilij; • Funkcionalizacija z izbiro surovin in netkanega postopka: zahtevnejši parametri netkanih tekstilij ter njihov vpliv na lastnosti netkanih ploskih in prostorskih tekstilij; • Funkcionalizacija s projektiranjem geometrijskih parametrov tkanin in pletiv; vpliv geometrijskih parametrov tkanin in pletiv na mehanske in kemijske lastnosti tkanin in pletiv; • Funkcionalizacija s projektiranjem strukture tkanin in pletiv; vpliv tkalskih in pletilskih vezav na mehanske in kemijske lastnosti tkanin in pletiv;	**Lectures**: • Functionalization with the selection of raw materials and spinning process: advanced yarn parameters and their influence on the properties of 2D and 3D textiles; • Functionalization with the selection of raw materials and nonwoven process: advanced parameters of nonwovens and their influence on the properties of non-woven 2D and 3D textiles; • Functionalization with the design of geometrical parameters of woven and knitted fabrics; the influence of geometrical parameters of woven and knitted fabric on the mechanical and chemical properties of woven and knitted fabrics; • Functionalization of the design of the structure of woven and knitted fabrics; the impact of weaving and knitting structures on the

• Funkcionalizacija z interakcijo surovine, geometrijskih in strukturnih parametrov ploskih tekstilij: projektiranje mehanskih, prepustnostnih in udobnostnih lastnosti tekstilij. **Seminar**: • Študij literature in projektiranje tekstilije z izbranimi funkcionalnimi lastnostmi. **Vaje:** • Računalniško podprta simulacija videza tekstilij z načrtovanimi geometrijskimi in strukturnimi parametri; • Praktična izdelava in optimiranje tekstilije s projektiranimi funkcionalnimi lastnostmi.	mechanical and chemical properties of woven and knitted fabrics; • Functionalization by the interaction of materials, geometry and structural parameters of textiles: design of mechanical, permeability and comfort features of textiles. **Seminar**: • Literature study and design of textiles with selected functional properties. **Exercises/Laboratory practice:** • Computerized simulation of the appearance of textiles with planned geometrical and structural parameters; • Manufacture and optimization of textiles with planned functional properties.

Temeljna literatura in viri/Readings:

- JAKŠIĆ, D. Projektiranje in konstrukcija tekstilij. Ljubljana : FNT, VTOZD Tekstilna tehnologija, 1988;
- Woven Textiles - Principles, Technologies and Application, Edited by GANDHI, K., Woodhead Publishing, 2020.
- HU, J. Structure and mechanics of woven fabrics. Boca Raton [etc.] : CRC Press ; Cambridge : Woodhead Pub., 2004.
- QUINN, B. Textile futures. Oxford : Berg, 2010;
- Textiles for advanced applications [Elektronski vir], Rijeka : InTech, 2017
- Interior textiles : design and developments. Boca Raton [etc.] : CRC Press ; Cambridge : Woodhead Publishing ; [Manchester] : Textile Institute, 2009.
- Advances in knitting technology. (editor AU, K.F.), Woodhead Publishing, Cambridge, 2012;
- Tekoče periodične publikacije s področja predilstva, netkanih tekstilij, tkalstva, pletilstva dostopno v knjižnici NTF-OTGO / Current periodical publications in the field of spinning, non-woven textiles, weaving, knitting;
- Gradivo v spletni učilnici predmeta.

Cilji in kompetence:	**Objectives and competences:**
• Poznavanje uporabnih in estetskih lastnosti linijskih in ploskovnih tekstilij ter njihovih prednosti in pomanjkljivosti v odvisnosti od geometrijskih in strukturnih parametrov; • Poglobljeno teoretično spoznavanje integralnega postopka načrtovanja in mehanske funkcionalizacije tekstilij ob upoštevanju oblikovalskih, trajnostnih in varnostnih izhodišč; • Sposobnost načrtovanja optimalne funkcionalne tekstilije za znanega uporabnika.	• Knowing functional and aesthetic properties of linear and flat textiles and their advantages and disadvantages depending on the geometrical and structural parameters; • In-depth theoretical understanding of integrated planning process and mechanical functionalization of textiles in regard to design, sustainability and security; • The ability to design an optimize functional fabrics for the known user.

Predvideni študijski rezultati:	**Intended learning outcomes:**
• Študenti osvojijo teoretično in praktično znanje na področju konvencionalnih in najsodobnejših načinov mehanske funkcionalizacije tekstilij in ga povežejo z znanji, pridobljenimi na področju visokozmogljivih vlaken in naprednih mehanskih tekstilnih postopkov. • Dobljeno znanje znajo uporabiti za načrtovanje specialnih ploskih tekstilij: končnih izdelkov ali substratov za nadaljnjo kemijsko funkcionalizacijo.	• Students acquire theoretical and practical knowledge in the field of conventional and new methods of mechanical functionalization of textiles and they link it with the knowledge gained in the field of high-performance fibers and advanced mechanical textile processes. • They know how to use the resulting knowledge for the planning of special textiles: finished products or substrates for further chemical functionalization.

Metode poučevanja in učenja:	Learning and teaching methods:
Predavanja, seminar, vodeni individualni študij, projektno delo, panelna razprava, vaje.	Lectures, seminars, guided individual study, panel discussion, laboratory exercises.

Načini ocenjevanja:	Delež/Weight	Assessment:
Pisni izpit	50,00 %	Written exam
Predstavitev seminarskega dela	25,00 %	Presentation of the seminar work
Predstavitev izdelka	25,00 %	Presentation of the product

Ocenjevalna lestvica:	Grading system:
5 - 10, pri čemer velja, da je pozitivna ocena od 6 - 10	5 - 10, a student passes the exam if he is graded from 6 to 10

Reference nosilca/Lecturer's references:

Matejka Bizjak:

1. KOSTAJNŠEK, Klara, BIZJAK, Matejka. Estimation of permeability properties of technologically developed jacquard fabrics = Ocena svojstava propustljivosti žakar tkanina dobijenih tehnološkim postupkom. *Hemijska industrija*. 2023, vol. 77, no. 3, str. 191-202. ISSN 2217-7426. https://www.ache-pub.org.rs/index.php/HemInd/article/view/1056, DOI: 10.2298/HEMIND221017008K.
2. KOSTAJNŠEK, Klara, DIMITROVSKI, Krste, KADOGLU, Hüseyin, ÇELIK, Pinar, BAŞAL BAYRAKTAR, Güldemet, ÜTE, Tuba Bedez, DURAN, Deniz, ERTEKIN, Mustafa, DEMŠAR, Andrej, BIZJAK, Matejka. Functionalization of woven fabrics with PBT yarns. *Polymers*. 2021, vol. 13, iss. 2, str. 1-19, ilustr. ISSN 2073-4360
3. KOCIĆ, Ana, BIZJAK, Matejka, POPOVIĆ, Dušan, POPARIĆ, Goran, STANKOVIĆ, Snežana. UV protection afforded by textile fabrics made of natural and regenerated cellulose fibres. *Journal of cleaner production*. [Print ed.]. 10. Aug. 2019, vol. 228, str. 1229-1237. ISSN 0959-6526.
4. STANKOVIĆ, Snežana, NOVAKOVIĆ, Milada, POPOVIĆ, Dušan M., POPARIĆ, Goran, BIZJAK, Matejka. Novel engineering approach to optimization of thermal comfort properties of hemp containing textiles. *The journal of The Textile Institute*. 2019, vol. 110, no. 9, str. 1271-1279, ilustr. ISSN 0040-5000.
5. ČUK, Marjeta, BIZJAK, Matejka, MUCK, Deja, KOČEVAR, Tanja Nuša. 3D printing and functionalization of textiles. V: DEDIJER, Sandra (ur.). *Proceedings*. 10th International Symposium on Graphic Engineering and Design GRID 2020, Novi Sad, November 12-14th, 2020. Novi Sad: Faculty of Technical Sciences, Department of Graphic Engineering and Design, 2020. Str. 499-506, ilustr. International Symposium on Graphic Engineering and Design GRID. ISBN 978-86-6022-303-8. ISSN 2620-1437.

Živa Zupin

1. ZUPIN, Živa, KNIFIC, Karmen, PAVKO-ČUDEN, Alenka. Comfort properties of functional double bed knitted fabric for firefighters underwear. Tekstil ve konfeksiyon dergisi : journal of textile and apparel. 2023, vol. 33, no. 3, str. 249-26 ISSN 1300-3356. https://dergipark.org.tr/en/download/article-file/2224036.
2. ZUPIN, Živa, KOVAČIČ, Sara. Performance properties of double bed jacquard knitted fabrics for upholstery. V: KARDAŞLAR, Ahmet (ur.), MİKE, Faruk (ur.). Full text book : II. International Korkut Ata Scientific Researches Conference : October 7-8, 2023, Ankara, Turkey. II. International Korkut Ata Scientific Researches Conference, October 7-8, 2023, Ankara, Turkey. Ankara: IKSAD Publishing House, 2023. Str. 555-562, ilustr. ISBN 978-625-367-347-5. https://www.korkutataconference.org/_files/ugd/614b1f_16c34c13a6234f2782cbdff104c7aa9a.pdf.
3. ZUPIN, Živa, KNIFIC, Karmen, PAVKO-ČUDEN, Alenka. Comfort properties of functional double bed knitted fabric for firefighters underwear. V: PERRIN AKÇAKOCA KUMBASAR, Emriye (ur.). Book of proceedings. 15th International İzmir Textile & Apparel Symposium, IITAS 2021, October 26 - 27, 2021, İzmir-Turkey. Izmir: Ege University, Faculty of Engineering, Department of Textile Engineering, 2021. Str. 429-435, ilustr. ISBN 978-605-338-329-1. http://www.iitas2021.com/en/. [COBISS.SI-ID 85826307]
4. ZUPIN, Živa, MOTNIKAR, Ana, ZOREC, Petja, GAJŠEK, Gašper, HRASTAR, Zala, MAVRIĆ, Zala, MIKLAVČIČ, Anita, PETROVČIČ, Elizabeta, REŠETIČ, Klara, SCHWARZBARTEL, Petra, TURK, Maruša, VIDMAR, Lara, VRHOVSKI, Iris. Exploring the history of hosiery and design of modern socks-socks. V: PERRIN AKÇAKOCA KUMBASAR, Emriye (ur.). Book of proceedings. 15th International

İzmir Textile & Apparel Symposium, IITAS 2021, October 26 -27, 2021, İzmir-Turkey. Izmir: Ege University, Faculty of Engineering, Department of Textile Engineering, 2021. Str. 549-553, ilustr. ISBN 978-605-338-329-1. http://www.iitas2021.com/en/.

5. ZUPIN, Živa. Novosti na področju računalniškega oblikovanja tkanin, pletiv in pletenin na sejmih ITMA in Techtextil 2019 = Novelties in computer-aided design of woven and knitted fabrics and knittwear at Techtextil and ITMA 2019. Tekstilec : glasilo slovenskih tekstilcev. [Tiskana izd.]. 2019, vol. 62, priloga 2, str. si 123-sl 133, ilustr. ISSN 0351-3386.

Dunja Šajn Gorjanc:

1. ŠAJN GORJANC, Dunja. Functional properties of nonwovens as an insulating layer for protective gloves. *Polymers*. 2023, vol. 15, iss. 3, str. 1-15.
2. BATIČ, Eva, ŠAJN GORJANC, Dunja. Characteristics of laminates for car seats. *AUTEX research journal*, ISSN 1470-9589. [Print ed.], 29 Sep 2020, vol. , no. , 14 str. https://content.sciendo.com/view/journals/aut/ahead-of-print/article-10.2478-aut-2020-0032/article-10.2478-aut-2020-003xml,
3. BEZGOVŠEK, Špela, ŠAJN GORJANC, Dunja, PULKO, Boštjan, LENART, Stanislav. Influence of structural parameters of nonwoven geotextiles on separation and filtration in road construction. *AUTEX research journal*, ISSN 1470-9589. [Print ed.], Dec. 2020, vol. 20, no. 4, str. 449 - 460. https://www.degruyter.com/view/j/aut.ahead-of-print/aut-2019-0038/aut-2019-0038.xml?format=INT, doi: 10.2478/aut-2019-0038.
4. ŠAJN GORJANC, Dunja, SUKIČ, Neža. Determination of optimum twist equation for the long Staple combed cotton ring-spun yarn. *Fibers*, ISSN 2079-6439, 21 Sep. 2020, vol. 8, iss. 9, article 59, str. 1-18, ilustr. https://www.mdpi.com/2079-6439/8/9/59.
5. ŠAJN GORJANC, Dunja, BRAS, Ana, NOVAK, Boštjan. Influence of technology process on responsiveness of footwear nonwovens. *AUTEX research journal*, ISSN 1470-9589. [Print ed.], 19. Sep. 2019, vol. , no. , 13 str. https://content.sciendo.com/view/journals/aut/ahead-of-print/article-10.2478-aut-2019-0053.xml.

NAPREDNE ANALITSKE METODE

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Napredne analitske metode
Course title:	Advanced analytical methods
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Načrtovanje tekstilij in oblačil, druga stopnja, magistrski (v postopku)	Ni členitve (študijski program)	2. letnik	1. semester	obvezni

Univerzitetna koda predmeta/University course code:	0068974
Koda učne enote na članici/UL Member course code:	11302

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
30	30	30	0	0	90	6

Nosilec predmeta/Lecturer:	Andrej Demšar
Vrsta predmeta/Course type:	Obvezni/Compulsory

Jeziki/Languages:	Predavanja/Lectures:	Angleščina, Slovenščina
	Vaje/Tutorial:	Angleščina, Slovenščina

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	**Prerequisites:**
Vpis študija. Pogoj za opravljanje izpita so pozitivno opravljeni seminar, predstavitev seminarja in eksperimentalne vaje.	Enrolment into study. A prerequisite for assessment to the exam are positively evaluated seminar paper, its presentation and experimental work.

Vsebina:	**Content (Syllabus outline):**
Predmet obsega klasične in najsodobnejše preiskovalne metode za določanje strukture in lastnosti polimernih materialov. Nekatere lastnosti in analitske metode, ki jih študent spozna v sklopu predmeta: • Molekulska masa (analiza končnih skupin, viskozimetrija); • Porazdelitev molekulskih mas (frakcioniranje - sedimentacija, difuzija) in kromatografija; • Morfologija (mikroskopske metode: OM, TEM, SEM); • Anizotropija (WAXS, razširjanje zvoka (akustika), dvolomnost, dihroizem v UV in IR spektru);	The scope of the subject are classical and modern analytical methods for the analysis of structure and properties of polymeric materials. Some structural properties and methods which student will study in the frame of the subject: • Molecular mass (end groups analysis, viscometry); • Distribution of molecular masses (fractioning - sedimentation, diffusion) and chromatography; • Morphology (microscopy OM, SEM, TEM); • Anisotrophy (WAXS, sound propagation, birefrigence, dichroism in UV and IR range); • Thermal properties (TG, DTA, DSC, thermal conductivity, DMA);

• Toplotne lastnosti (TG, DTA, DSC, toplotna prevodnost, DMA); • Difuzijski pojavi (sorpcija, difuzijski koeficient, prepustnost plinov); • Viskoelastičnost (DMA, dielektrična spektroskopija, natezne lastnosti); • Mehanske lastnosti (natezne, upogibne, tlačne itd. lastnosti).	• Diffusion phenomena (sorption, diffusion coefficient, gas permeability); • Viscoelasticity (dynamic mechanical spectroscopy, dielectric spectroscopy, tensile properties); • Mechanical properties (tensile, bending, compression etc.).

Temeljna literatura in viri/Readings:

- ROEGES, N.P.G. Guide to the complete interpretation of infrared spectra of organic structures. John Weily & Sons, Chichester, 1994;
- RACHEEL, M.Modern Textile Characterization Methods, Marcel Dekker Inc., 1995;
- Handbook of textile fibre structure: Volume 1: Fundamentals and manufactured polymer fibres, Ed. S.J. Eichhorn et al. Woodhead Publishing ltd., 2009.

Cilji in kompetence:	**Objectives and competences:**
Temeljni izobraževalni **cilj predmeta** je, da študent pridobi znanje o analitskih metodah potrebnih za analizo lastnosti in strukture polimernih materialov. **Predmetno specifične kompetence**: • Poznavanje in razumevanje klasičnih in najsodobnejših analitskih in preiskovalnih metod za določanje lastnosti in strukture polimernih materialov; • Zna izbrati pravo metodo za analizo določene(ih) lastnosti; • Zna interpretirati rezultate; • Zna, iz rezultatov analize, sklepati na druge lastnosti materialov; • Zna, na podlagi pridobljenih rezultatov analize, sklepati na uporabnost materialov.	The main **objective of the study** is to develop the knowledge of analytical methods which are needed to analyse structure and properties of polymeric materials. **Subject-specific competence**s: • Knowledge and understanding of classical and modern analytical methods fort the analysis of structure and properties of polymeric materials; • Knowledge to choose proper analytical method for the analysis of the certain propertie(s); • Knowledge of interpretation of the results; • Knowledge to deduce on the properties from the results of the analysis; • Knowledge to evaluate applicability of the materials on the basis of the results of the analysis.

Predvideni študijski rezultati:	**Intended learning outcomes:**
Znanje in razumevanje: • Študent se nauči izbirati in uporabljati ustrezne preiskovalne metode za analizo željenih lastnosti polimernih materialov. • Pozna principe izbranih analitskih metod in delovanja aparatov. • Zna interpretirati rezultate analize in jih uporabiti za razlago lastnosti in uporabnosti materialov.	**Knowledge and understanding**: • To choose and use adequate testing and analytical methods for the analysis of structure and properties of polymeric materials. • Student has knowledge of the principles of analytical methods and of the functioning of the apparatus. • Has knowledge to interpret the results of the analysis and to use them to explain the properties and applicability of materials.

Metode poučevanja in učenja:	**Learning and teaching methods:**
Predavanja, vaje in seminarsko delo.	Lectures, exercises and seminar work.

Načini ocenjevanja:	**Delež/Weight**	**Assessment:**
Izpit	50,00 %	Exam
Seminarska naloga	20,00 %	Seminar paper
Predstavitev seminarske naloge	10,00 %	Presentation of seminar paper
Vaje	20,00 %	Excercises

Ocenjevalna lestvica:	Grading system:
5 - 10, pri čemer velja, da je pozitivna ocena od 6 - 10	5 - 10, a student passes the exam if he is graded from 6 to 10

Reference nosilca/Lecturer's references:

Andrej Demšar:

1. BRODA, Jan, SLUSARCZYK, Czeslaw, FABIA, Janusz, DEMŠAR Andrej. Formation and properties of polypropylene/stearic acid composite fibers. Textile Research Journal, ISSN 0040-5175, 2015, DOI: 10.1177/0040517514566104;
2. KAVKLER, Katja, DEMŠAR, Andrej. Application of FTIR and Raman spectroscopy to qualitative analysis of structural changes in cellulosic fibres, Tekstilec, ISSN 0351-3386, 2012, letn. 55, št. 1, str. 19-44, ilustr. [COBISS.SI-ID 2727792];
3. DEMŠAR, Andrej, ŽNIDARČIČ, Dragan, GREGOR-SVETEC, Diana. Impact of UV radiation on the physical properties of polypropylene floating row covers. African journal of biotechnology, ISSN 1684-5315, 2011, vol. 10, no. 41, str. 7998-8006. [COBISS.SI-ID 6760057];
4. DEMŠAR, Andrej, BUKOŠEK, Vili, KLJUN, Alenka. Dynamic mechanical analysis of nylon 66 cord yarns. Fibres & textiles in Eastern Europe, ISSN 1230-3666, 2010, vol. 18, no. 4 (81), str. 29-34, ilustr. [COBISS.SI-ID 2426480];
5. MOŽINA, Klementina, ČERNIČ, Marjeta, DEMŠAR, Andrej. Non-destructive methods for chemical, optical, colorimetric and typographic characterisation of a reprint. Journal of cultural heritage, ISSN 1296-2074, 2007, [No.] 8, str. 339-349. [COBISS.SI-ID 1974640].

NAPREDNE MEHANSKE TEKSTILNE TEHNOLOGIJE

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Napredne mehanske tekstilne tehnologije
Course title:	Advanced mechanical textile technologies
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Načrtovanje tekstilij in oblačil, druga stopnja, magistrski (v postopku)	Ni členitve (študijski program)	1. letnik	1. semester	obvezni

Univerzitetna koda predmeta/University course code:	0068969
Koda učne enote na članici/UL Member course code:	10499

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
30	30	30	0	0	90	6

Nosilec predmeta/Lecturer:	Dunja Šajn Gorjanc, Matejka Bizjak , Živa Zupin
Vrsta predmeta/Course type:	Obvezni/Compulsory

Jeziki/Languages:	Predavanja/Lectures:	Angleščina, Slovenščina
	Vaje/Tutorial:	Angleščina, Slovenščina

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	**Prerequisites:**
Vpis v letnik študija. Pogoj za pristop h končnemu izpitu: opravljen seminar, opravljene vaje.	Enrollment in the study year. The condition for the final exam: completed seminar and tutorial/laboratory practice.

Vsebina:	**Content (Syllabus outline):**
Predavanja: • Pomen in uporaba naprednih mehanskih tekstilnih tehnologij v tekstilstvu in na ostalih področjih uporabe; • Napredne predilske, netkane, tkalske, pletilske in konfekcijske tehnologije; posebnosti strojne opreme; vpliv tehnologije na uporabne lastnosti izdelkov; • Posebnosti, organizacija in upravljanje napredne predilske, netkane, tkalske, pletilske in konfekcijske proizvodnje; • Ekonomika izdelkov z izboljšanimi lastnostmi, izdelanih po naprednih mehanskih tekstilnih tehnologijah. **Seminar**:	**Lectures**: • The importance and use of advanced mechanical textile technologies in textile and other fields of application; • Advanced spinning, non-woven, weaving, knitting and clothing technology; specialities of machine equipment; the impact of technology on the performance properties of the products; • Characteristics, organization and management of advanced spinning, non-woven, weaving, knitting and sewing production; • The economics of products with enhanced properties produced by advanced mechanical textile technologies. **Seminar**:

• Predstavitev analize/projektiranja izdelka z izboljšanimi lastnostmi, izdelanega po izbrani napredni mehanski tekstilni tehnologiji. **Vaje**: • Načrtovanje in izvedba izdelka s posebnimi lastnostmi z izbrano mehansko tekstilno tehnologijo.	• Presentation of the analysis/design of a product with enhanced properties produced by the selected advanced mechanical textile technology. **Tutorial/Laboratory Practice**: • Design and manufacture of a product with specific features by the selected mechanical textile technology.

Temeljna literatura in viri/Readings:

- SEYMOURE, S. Fashionable technology : the intersection of design, fashion, science, and technology, Wien ; New York : Springer, cop. 2009;
- GANDHI, K.: Woven Textiles - Principles, Technologies and Application, Elsevier Science & Technology : Woodhead Publishing Ltd, Cambridge, United Kingdom, 2019
- HU, J. Structure and mechanics of woven fabrics. Boca Raton [etc.] : CRC Press ; Cambridge : Woodhead Pub., 2004.
- Advances in apparel production / edited by FAIRHURST, C., Textile Institute ; Boca Raton [etc.] : CRC Press ; Cambridge : Woodhead Publishing, 2008;
- Advances in knitting technology. (editor AU, K.F.), Woodhead Pubublishing ; [Manchester] : The Textile Institute, 2012
- Maity, Subhankar, Singha, Kunal, Pandit, Pintu (ed). Functional and technical textiles, Cambridge : Woodhead Publishing,, 2023, ISBN - 978-0-323-91593-9
- Tekoče periodične publikacije s področja predilstva, netkanih tekstilij, tkalstva, pletilstva, konfekcije dostopne v knjižnici NTF OTGO / Current periodical publications in the field of spinning, non-woven textiles, weaving, knitting, clothing;
- Gradivo s sejmov sodobne tekstilne opreme / Materials from fairs of modern textile equipment;
- Promocijsko gradivo proizvajalcev tekstilne strojne opreme / Promotional materials of textile equipment manufacturers.
- Dodatno gradivo dostopno v spletni učilnici predmeta.

Cilji in kompetence:	**Objectives and competences:**
Študenti spoznajo napredne mehanske tekstilne tehnologije. **Kompetence**: • Poznavanje in razumevanje razvoja naprednih tehnologij v odvisnosti od splošnega razvoja tekstilstva, sodobne tehnike, informatike in industrije; • Poznavanje in razumevanje naprednih tehnologij v slovenskem, evropskem in svetovnem prostoru; • Sposobnost načrtovanja, analiziranja, razvoja in izdelave naprednih izdelkov z izboljšanimi lastnostmi in z visoko dodano vrednostjo; • Sposobnost načrtovanja, analiziranja in organiziranja naprednih mehanskih tekstilnih procesov; • Obvladovanje ekonomične porabe materiala, časa in energije pri naprednih mehanskih tekstilnih postopkih; • Obvladovanje predvidevanja možnih problemov na področju naprednih mehanskih tekstilnih tehnologij; • Poznavanje strokovne terminologije s področja naprednih mehanskih tehnologij v slovenskem in tujih jezikih; • Uporaba informacijsko-komunikacijskih sistemov in opreme pri projektiranju, optimiranju in	Students learn advanced mechanical textile technologies. **Competencies**: • Knowledge and understanding of the development of advanced technologies in relation to the overall development of textiles, contemporary art, IT and industry; • Knowledge and understanding of advanced technologies in the Slovenian, European and global environment; • The ability to design, analyze, develop and manufacture advanced products with improved characteristics and high added value; • The ability to plan, analyze and organize the advanced mechanical textile processes; • Management of economical use of materials, time and energy in advanced mechanical textile processes; • Anticipation of possible problems in the field of advanced mechanical textile technologies; • Knowledge of technical terminology in the field of advanced mechanical technologies in Slovenian and foreign languages; • The use of information and communication systems and equipment for the design,

kontroli naprednih mehanskih procesov in izdelkov.	optimization and control of advanced mechanical processes and products.

Predvideni študijski rezultati:	**Intended learning outcomes:**
Študent zna izbrati optimalno napredno izdelavno tehnologijo za načrtovani izdelek, zna predvideti uporabne lastnosti tekstilnega izdelka, proizvedenega z napredno mehansko tekstilno tehnologijo, je sposoben predvideti bodoče potrebe po izdelkih z izboljšanimi lastnostmi, izdelanih po naprednih mehanskih tekstilnih postopkih, je sposoben neodvisne analize naprednih mehanskih tekstilnih tehnologij.	The student is able to select the optimal advanced manufacturing technology for the planned product and is able to anticipate the performance properties of the textile product, produced with an advanced mechanical textile technology. He is is able to anticipate the future demand for products with improved properties produced by advanced mechanical textile processes, he is capable of independent analysis of advanced mechanical textile technologies.

Metode poučevanja in učenja:	**Learning and teaching methods:**
Predavanja, seminarsko in projektno delo, individualno delo, praktično delo v laboratoriju.	Lectures, seminar and project work, individual study and practical work in the laboratory.

Načini ocenjevanja:	**Delež/Weight**	**Assessment:**
Pisni izpit	50,00 %	Written exam
Seminar	25,00 %	Seminar
Vaje	25,00 %	Tutorial/laboratory practice

Ocenjevalna lestvica:	**Grading system:**
5 - 10, pri čemer velja, da je pozitivna ocena od 6 - 10	5 - 10, a student passes the exam if he is graded from 6 to 10

Reference nosilca/Lecturer's references:

Matejka Bizjak:

1. KOSTAJNŠEK, Klara, BIZJAK, Matejka. Estimation of permeability properties of technologically developed jacquard fabrics = Ocena svojstava propustljivosti žakar tkanina dobijenih tehnološkim postupkom. *Hemijska industrija*. 2023, vol. 77, no. 3, str. 191-202. ISSN 2217-7426. https://www.ache-pub.org.rs/index.php/HemInd/article/view/1056, DOI: 10.2298/HEMIND221017008K. [COBISS.SI-ID 147161859]
2. KOSTAJNŠEK, Klara, DIMITROVSKI, Krste, KADOGLU, Hüseyin, ÇELIK, Pinar, BAŞAL BAYRAKTAR, Güldemet, ÜTE, Tuba Bedez, DURAN, Deniz, ERTEKIN, Mustafa, DEMŠAR, Andrej, BIZJAK, Matejka. Functionalization of woven fabrics with PBT yarns. *Polymers*. 2021, vol. 13, iss. 2, str. 1-19, ilustr. ISSN 2073-4360
3. KOCIĆ, Ana, BIZJAK, Matejka, POPOVIĆ, Dušan, POPARIĆ, Goran, STANKOVIĆ, Snežana. UV protection afforded by textile fabrics made of natural and regenerated cellulose fibres. *Journal of cleaner production*. [Print ed.]. 10. Aug. 2019, vol. 228, str. 1229-1237. ISSN 0959-6526.
4. STANKOVIĆ, Snežana, NOVAKOVIĆ, Milada, POPOVIĆ, Dušan M., POPARIĆ, Goran, BIZJAK, Matejka. Novel engineering approach to optimization of thermal comfort properties of hemp containing textiles. *The journal of The Textile Institute*. 2019, vol. 110, no. 9, str. 1271-1279, ilustr. ISSN 0040-5000.
5. BIZJAK, Matejka. ITMA 2019 - Tkanje = ITMA 2019 - Weaving. *Tekstilec : glasilo slovenskih tekstilcev*. [Tiskana izd.]. 2020, vol. 63, priloga 1, str. si100-sl111, ilustr. ISSN 0351-3386.

Živa Zupin

1. ZUPIN, Živa, KNIFIC, Karmen, PAVKO-ČUDEN, Alenka. Comfort properties of functional double bed knitted fabric for firefighters underwear. Tekstil ve konfeksiyon dergisi : journal of textile and apparel. 2023, vol. 33, no. 3, str. 249-26 ISSN 1300-3356. https://dergipark.org.tr/en/download/article-file/2224036.
2. ZUPIN, Živa, KOVAČIČ, Sara. Performance properties of double bed jacquard knitted fabrics for upholstery. V: KARDAŞLAR, Ahmet (ur.), MİKE, Faruk (ur.). Full text book : II. International Korkut Ata Scientific Researches Conference : October 7-8, 2023, Ankara, Turkey. II. International Korkut Ata

Scientific Researches Conference, October 7-8, 2023, Ankara, Turkey. Ankara: IKSAD Publishing House, 2023. Str. 555-562, ilustr. ISBN 978-625-367-347-5. https://www.korkutataconference.org/_files/ugd/614b1f_16c34c13a6234f2782cbdff104c7aa9a.pdf.

3. ZUPIN, Živa, KNIFIC, Karmen, PAVKO-ČUDEN, Alenka. Comfort properties of functional double bed knitted fabric for firefighters underwear. V: PERRIN AKÇAKOCA KUMBASAR, Emriye (ur.). Book of proceedings. 15th International İzmir Textile & Apparel Symposium, IITAS 2021, October 26 - 27, 2021, İzmir-Turkey. Izmir: Ege University, Faculty of Engineering, Department of Textile Engineering, 2021. Str. 429-435, ilustr. ISBN 978-605-338-329-1. http://www.iitas2021.com/en/. [COBISS.SI-ID 85826307]
4. ZUPIN, Živa, MOTNIKAR, Ana, ZOREC, Petja, GAJŠEK, Gašper, HRASTAR, Zala, MAVRIĆ, Zala, MIKLAVČIČ, Anita, PETROVČIČ, Elizabeta, REŠETIČ, Klara, SCHWARZBARTEL, Petra, TURK, Maruša, VIDMAR, Lara, VRHOVSKI, Iris. Exploring the history of hosiery and design of modern socks-socks. V: PERRIN AKÇAKOCA KUMBASAR, Emriye (ur.). Book of proceedings. 15th International İzmir Textile & Apparel Symposium, IITAS 2021, October 26 -27, 2021, İzmir-Turkey. Izmir: Ege University, Faculty of Engineering, Department of Textile Engineering, 2021. Str. 549-553, ilustr. ISBN 978-605-338-329-1. http://www.iitas2021.com/en/.
5. ZUPIN, Živa. Novosti na področju računalniškega oblikovanja tkanin, pletiv in pletenin na sejmih ITMA in Techtextil 2019 = Novelties in computer-aided design of woven and knitted fabrics and knittwear at Techtextil and ITMA 2019. Tekstilec : glasilo slovenskih tekstilcev. [Tiskana izd.]. 2019, vol. 62, priloga 2, str. si 123-sl 133, ilustr. ISSN 0351-3386.

Dunja Šajn-Gorjanc:

1. ČEPIČ, Gracija, ŠAJN GORJANC, Dunja. Influence of the web formation of a basic layer of medical textiles on their functionality. *Polymers*. 2022, vol. 14, iss. 11, str. 1-23.
2. BATIČ, Eva, ŠAJN GORJANC, Dunja. Characteristics of laminates for car seats. *AUTEX research journal*, ISSN 1470-9589. [Print ed.], 29 Sep 2020, vol. , no. , 14 str. https://content.sciendo.com/view/journals/aut/ahead-of-print/article-10.2478-aut-2020-0032/article-10.2478-aut-2020-003xml,
3. BEZGOVŠEK, Špela, ŠAJN GORJANC, Dunja, PULKO, Boštjan, LENART, Stanislav. Influence of structural parameters of nonwoven geotextiles on separation and filtration in road construction. *AUTEX research journal*, ISSN 1470-9589. [Print ed.], Dec. 2020, vol. 20, no. 4, str. 449 - 460. https://www.degruyter.com/view/j/aut.ahead-of-print/aut-2019-0038/aut-2019-0038.xml?format=INT, doi: 10.2478/aut-2019-0038.
4. ŠAJN GORJANC, Dunja, SUKIČ, Neža. Determination of optimum twist equation for the long Staple combed cotton ring-spun yarn. *Fibers*, ISSN 2079-6439, 21 Sep. 2020, vol. 8, iss. 9, article 59, str. 1-18, ilustr. https://www.mdpi.com/2079-6439/8/9/59.
5. ŠAJN GORJANC, Dunja. The functionality of woven fabric from air-jet yarn from the mixture of CO/PA and CO/PES fibres in the weft direction. *The journal of The Textile Institute*, ISSN 0040-5000, 2019, vol. 110, no. 5, str. 680-689, ilustr.

NAPREDNI POSTOPKI PLEMENITENJA

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Napredni postopki plemenitenja
Course title:	Advanced finishing processes
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Načrtovanje tekstilij in oblačil, druga stopnja, magistrski (v postopku)	Ni členitve (študijski program)	1. letnik	1. semester	obvezni

Univerzitetna koda predmeta/University course code:	0068970
Koda učne enote na članici/UL Member course code:	10500

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
30	30	30	0	0	90	6

Nosilec predmeta/Lecturer:	Barbara Simončič, Brigita Tomšič, Marija Gorjanc, Mateja Kert, Petra Eva Forte Tavčer
Vrsta predmeta/Course type:	Obvezni /Compulsory
Jeziki/Languages:	Predavanja/Lectures: Angleščina, Slovenščina Vaje/Tutorial: Angleščina, Slovenščina

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	Prerequisites:
Vpis v 1. letnik študijskega programa.	Enrolment into 1st year of the study programme.

Vsebina:	Content (Syllabus outline):
• Specialni napredni postopki priprave tekstilnih substratov na plemenitenje, priprava biomaterialov in tekstilij iz specialnih vlaken: obdelava z encimi, plazemska obdelava, mokri kemijski postopki kationizacije in anionizacije površin vlaken; • Tehnološke novosti v procesih barvanja in tiskanja z vidika izdelave izdelkov z višjo dodano vrednostjo: vpeljava sodobnih ekološko sprejemljivejših barvil in barvil ter pigmentov s posebnimi učinki, posebnosti pri njihovem nanosu; • Napredni postopki funkcionalizacije tekstilnih substratov z vidika doseganja zaščitnih lastnosti: fizikalno in kemijsko naparjevanje tankih filmov,	• Special advanced processes of preparation of textile substrates on finishing, preparation of biomaterials and textiles made of special fibres: enzyme treatment, plasma treatment, wet chemical processes of cationization and anionization of fibres surface; • Technological novelties in processes of dyeing and printing from the view of production of products with high added value: introduction of contemporary ecologically acceptable dyes and dyes and pigments with special effects, specifics of their application; • Advanced processes of functionalization of textile substrates from the view of achieving protective properties: nanotechnology, in situ

nanotehnologija, in situ sinteza nanodelcev, sol-gel, elektro-predenje, mikrokapsuliranje; • Predstavitev namena in učinkov nekaterih obdelav, kemikalij in sredstev za predobdelavo, barvil, pigmentov in apreturnih sredstev, njihov vpliv na okolje in preverjanje drugih možnih negativnih posledic takih obdelav. **Seminar**: • V sklopu projektnega dela celovita obdelava določenega problema, ki obsega pregled raziskav, načrtovanje plemenitilnega postopka za doseganje lastnosti posebnega namena in vrednotenje kakovosti oplemenitene tekstilije. **Vaje**: • V povezavi s projektnim delom izvedba določenih specialnih postopkov predobdelav, barvanja, tiska in apreture na različnih materialih ter analiza njihovih učinkov.	synthesis of nanoparticles, sol-gel, electrospinning, microencapsulation; • Presentation of the purpose and effects of some treatments, chemicals and agents for pre-treatment, dyes, pigments and finishing agents, their environmental impact and verification of other possible negative consequences of such treatments. **Seminar work**: • As part of the project work complete processing a particular problem which comprises an overview of the research, planning of finishing process to achieve properties of specific purpose and evaluation of the quality of finished textile. **Tutorial**: • Within the project work the implementation of specific procedures of special pre-treatment, dyeing, printing and finishing on different materials and the analysis of their effects.

Temeljna literatura in viri/Readings:

- Advances in the dyeing and finishing of technical textiles. Edited by M. L. GULRAJANI. Philadelphia : Woodhead Publishing, 2013, 425 str.;
- GORJANC, M., MOZETIČ, M. Modification of fibrous polymers by gaseous plasma : principles, techniques and applications. Saarbrücken : LAP Lambert Academic Publishing, 2014, 152 str.;
- Textile processing with enzymes. Edited by A. CAVACO-PAULO and G. M. GÜBITZ. Cambridge : Woodhead, 2003, 228 str.;
- Textile finishing. Edited by D. HEYWOOD. Bradford : SDC, 2003, 528 str.;
- SCHINDLER, W. D., HAUSER, P. J. Chemical finishing of textiles . Cambridge England, The Textile Institute, Woodhead Publ. Lim., 2004;
- Functional textiles for improved performance, protection and health. Edited by N. PAN and G. SUN. Oxford ; Philadelphia : Woodhead Publishing, 2011, 528 str.;
- Water Recycling in Textile Wet processing. Edited by K. SKELLY. SDC, 2003;
- Izbrani članki iz domačih in tujih strokovnih revij, dostopnih v knjižnici Oddelka za tekstilstvo NTF in v CTK ter v revijah, dostopnih v elektronskih medijih / Selected articles from national and foreign professional journals available in the Library of the NTF Textile Department and in the CTK and in journals accessible in electronic media.

Cilji in kompetence:	**Objectives and competences:**
• Študenti spoznajo vrste in namen naprednih in specialnih postopkov plemenitenja tekstilij. • Spoznajo specialne tehnološke postopke pripravljalnih, barvalnih, tiskarskih in apreturnih del. • Spoznajo vpliv posameznih obdelav na strukturne in površinske spremembe tekstilnih substratov ter uporabo zahtevnejših metod za analizo le-teh. • Imajo sposobnost povezovanja znanj s področij konstrukcijskih, mehanskih, fizikalnih in kemijskih lastnosti tekstilij s plemenitilnimi postopki, kar je pogoj za kakovostno izvedbo modifikacije površin vlaken. • Imajo sposobnost kritične presoje vpeljave novosti v posamezne tehnološke faze.	• Students learn about the nature and purpose of the advanced and special processes of textile finishing. • They learn about special technological procedures for preparation, dyeing, printing and finishing. • They get to know about the impact of various treatments on the structural and surface changes of textile substrates and the use of advanced methods for their analysis. • They have the ability of knowledge integration from the areas of structural, mechanical, physical and chemical properties with the textile finishing processes, which is a prerequisite for quality surface modification of fibres. • They have the ability to critically evaluate the implementation of technological innovations in the individual technological phases.

Predvideni študijski rezultati:	Intended learning outcomes:
• Študent pozna specialne postopke plemenitenja, jih zna načrtovati ter smiselno vključiti v procese izdelave končnega izdelka. • Ima sposobnost presoje možnosti njihovega združevanja z namenom tehnološkega oblikovanja več-funkcionalne tekstilije z visoko dodano vrednostjo. • Seznani se z interdisciplinarnostjo pri izdelavi večnamenskih tekstilij. • Zna predvidevati o vplivih uporabljenih postopkov in sredstev na okolje. • Zna uporabiti različne zahtevne tekstilne preiskave in razložiti ter predstaviti rezultate. • Razvije raziskovalni pristop ob opredelitvi in pri reševanju tehnoloških problemov.	• The student is familiar with special finishing processes, is able to plan them and meaningfully include them in the process of manufacturing of the final product. • He has the capacity of the assessment of the possibilities for their combining, with the aim to technological design multi-functional textiles with high added value. • He gets acquainted with interdisciplinary in the manufacture of multi-purpose textiles. He can anticipate the impact of the used processes and agents on the environment. • He knows how to use a variety of demanding textile analysis and to explain and present the results. • He develops a research approach when defining and solving technological problems.

Metode poučevanja in učenja:	Learning and teaching methods:
Predavanja, seminarji, individualne naloge, laboratorijske vaje, projektno delo, ekskurzije.	Lectures, seminar, individual assignments, laboratory work, project work, excursions.

Načini ocenjevanja:	Delež/Weight	Assessment:
Pisni izpit	50,00 %	Written exam
Laboratorijske vaje	20,00 %	Laboratory work
Seminarsko in projektno delo	30,00 %	Seminar and project work

Ocenjevalna lestvica:	Grading system:
5 - 10, pri čemer velja, da je pozitivna ocena od 6 - 10	5 - 10, a student passes the exam if he is graded from 6 to 10

Reference nosilca/Lecturer's references:

Barbara Simončič:

1. ŠTULAR, Danaja, VAN DE VELDE, Nigel Willy, DRINČIĆ, Ana, KOGOVŠEK, Polona, FILIPIĆ, Arijana, FRIC, Katja, SIMONČIČ, Barbara, TOMŠIČ, Brigita, CHOUHAN, Raghuraj S., BOHM, Sivasambu, VERMA, Suresh Kr., PANDA, P.K., JERMAN, Ivan. Boosting copper biocidal activity by silver decoration and few-layer graphene in coatings on textile fibers. *Global challenges*. 2023, vol. 7, iss. 10, 2300113, str. 1-13. DOI: 10.1002/gch2.202300113. [COBISS.SI-ID 164656899].
2. TOMŠIČ, Brigita, BAJRIČ, Špela, CERGONJA, Kaja, ČEPIČ, Gracija, GERL, Ana, LADISLAV VARGA, Egshig, PANOSKA, Marina, PEULIĆ, Svjetlana, SKOKO, Jasna, GORJANC, Marija, SIMONČIČ, Barbara. Tailoring of multifunctional cotton fabric by embedding a TiO2+ZnO composite into a chitosan matrix. *Tekstilec*, 2023, vol. 66, [no.] 2, str. 134-147. DOI: 10.14502/tekstilec.66.2023049. [COBISS.SI-ID 160303619].
3. TOMŠIČ, Brigita, SAVNIK, Nika, SHAPKOVA, Elena, CIMPERMAN, Laura, ŠOBA, Lara, GORJANC, Marija, SIMONČIČ, Barbara. Green in-situ synthesis of TiO2 in combination with Curcuma longa for the tailoring of multifunctional cotton fabric. *Tekstilec*, 2023, vol. 66, [no.] 4, str. 321-338. DOI: 10.14502/tekstilec.66.2023075. [COBISS.SI-ID 177712899].
4. IVANUŠA, Monika, KUMER, Blažka, PETROVČIČ, Elizabeta, ŠTULAR, Danaja, ZORC, Matija, JERMAN, Ivan, GORJANC, Marija, TOMŠIČ, Brigita, SIMONČIČ, Barbara. Eco-friendly approach to produce durable multifunctional cotton fibres using TiO2, ZnO and Ag NPs. *Nanomaterials*. 2022, vol. 12, iss. 18, str. 1-21. DOI: 10.3390/nano12183140. [COBISS.SI-ID 121039363].

Brigita Tomšič:

1. RASHID, Mohammad Mamunur, TOMŠIČ, Brigita, SIMONČIČ, Barbara, JERMAN, Ivan, ŠTULAR, Danaja, ZORC, Matija. Sustainable and cost-effective functionalization of textile surfaces with Ag-doped

TiO2/polysiloxane hybrid nanocomposite for UV protection, antibacterial and self-cleaning properties. *Applied Surface Science*, 2022, vol. 595, str. 1-15.
2. ŠTULAR, Danaja, SAVIO, Elisa, SIMONČIČ, Barbara, ŠOBAK, Matic, JERMAN, Ivan, POLJANŠEK, Ida, FERRI, Ada, TOMŠIČ, Brigita. Multifunctional antibacterial and ultraviolet protective cotton cellulose developed by in situ biosynthesis of silver nanoparticles into a polysiloxane matrix mediated by sumac leaf extract. *Applied Surface Science*, 2021, vol. 563, str. 1-12.
3. ŠTULAR, D., KRUSE, M., ŽUPUNSKI, V., KREINEST, L., MEDVED, J., GRIES, T., BLAESER, A., JERMAN, I., SIMONČIČ, B., TOMŠIČ, B.. "Smart" stimuli-responsive polylactic acid-hydrogel fibers produced via electrospinning. *Fibers and polymers,* 2019, vol. 20, no. 9, str. 1857-1868.
4. ŠTULAR, D., TOMŠIČ, B., JERMAN, I., SIMONČIČ, B., MIHELČIČ, M., NOČ, L., GERMAN ILIĆ, I.. Comparison of responsive behaviour of smart PLA fabrics applied with temperature and pH responsive microgel and nanogel. *Progress in organic coatings*, 2018, vol. 124, str. 213-223.
5. TOMŠIČ, B., VASILJEVIĆ, J., SIMONČIČ, B., RADOIČIĆ, M., RADETIĆ, M.. The influence of corona treatment and impregnation with colloidal TiO2 nanoparticles on biodegradability of cotton fabric. *Cellulose*, 2017, vol. 24, no. 10, 4533-4545 str.,

Marija Gorjanc:
1. GORJANC, M., JAZBEC, K., ŠALA, M., ZAPLOTNIK, R., VESEL, A., MOZETIČ, M. Creating cellulose fibres with excellent UV protective properties using moist CF4 plasma and ZnO nanoparticles. Cellulose, 2014, 21 (4), str. 3007-3021;
2. GORJANC, Marija, KOVAČ, Franci, GORENŠEK, Marija. The influence of vat dyeing on the adsorption of synthesized colloidal silver onto cotton fabrics. Textile research journal, 2012, 82 (1), str. 62-69;
3. KERT, M., JAZBEC, K., ČERNE, L., JERMAN, I., GORJANC, M. The influence of nano-ZnO application methods on UV protective properties of cotton. Acta chimica slovenica, 2014, 61 (3), str. 587-594;
4. GORJANC, M., JAZBEC, K., MOZETIČ, M., KERT, M. UV protective properties of cotton fabric treated with plasma, UV absorber and reactive dye. Fibers and polymers, ISSN 1229-9197, 2014, 15 (10), str. 2095-210

Mateja Kert:
1. GORJANC, Marija, GERL, Ana, KERT, Mateja. Screen printing of pH-responsive dye to textile. *Polymers*. 2022, vol. 14, iss. 3, str. 1-14, ilustr. ISSN 2073-4360.
2. BOH PODGORNIK, Bojana, ŠANDRIĆ, Stipana, KERT, Mateja. Microencapsulation for functional textile coatings with emphasis on biodegradability : a systematic review. *Coatings*. 2021, vol. 11, iss. 11, str. 1-31
3. STOJKOSKI, Viktor, KERT, Mateja. Design of pH responsive textile as a sensor material for acid rain. *Polymers*. 2020, vol. 12, iss. 10, 15 str.

Petra Eva Forte Tavčer:
1. ŠPIČKA, N., FORTE-TAVČER, P. Low-temperature bleaching of knit fabric from regenerated bamboo fibers with different peracetic acid bleaching processes. Textile research journal, 2015, 85 (14), 1497-1505,
2. ŠPIČKA, N., FORTE-TAVČER, P. Complete enzymatic pre-treatment of cotton fabric with incorporated bleach activator. Textile research journal, 2013, 83 (6), 566-573
3. FORTE-TAVČER, Petra. Impregnation and exhaustion bleaching of cotton with peracetic acid. Textile research journal, ISSN 0040-5175, 2010, 80 (1), 3-11.

ORGANSKA KEMIJA

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Organska kemija
Course title:	Organic chemistry
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Grafične in interaktivne komunikacije, druga stopnja, magistrski	Ni členitve (študijski program)	1. letnik	1. semester	izbirni
Načrtovanje tekstilij in oblačil, druga stopnja, magistrski (v postopku)	Ni členitve (študijski program)	1. letnik	1. semester	izbirni

Univerzitetna koda predmeta/University course code:	0561972
Koda učne enote na članici/UL Member course code:	10517

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
45	15	30	0	0	90	6

Nosilec predmeta/Lecturer:	Janez Cerkovnik
Vrsta predmeta/Course type:	Izbirni / Elective

Jeziki/Languages:	Predavanja/Lectures:	Angleščina, Slovenščina
	Vaje/Tutorial:	Angleščina, Slovenščina

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	Prerequisites:
Vpis v program.	Enrolment in the programme.

Vsebina:	Content (Syllabus outline):
1. Struktura, vezi in reaktivnost v organski kemiji - Kemijske vezi v organskih spojinah - Elektroni v molekulah in tvorba vezi - Hibridne orbitale in vezi v molekulah - Zapisi formul organskih molekul - Strukturne značilnosti, osnovni tipi organskih spojin in poimenovanje - Fizikalne lastnosti ogljikovodikov - Molekule z dvojnimi vezmi - Aromatski ogljikovodiki - Funkcionalne skupine v organskih molekulah 2. Izomerija organskih spojin 3. Reaktivnost organskih spojin - Zapis kemijske reakcije v organski kemiji - Reakcijski mehanizem	1. Structure, chemical bonds and reactivity in organic chemistry - Chemical bonds in organic compounds - The electrons in the molecules and bond formation - Hybrid orbitals and bonds in molecules - How to draw the organic molecule - Structural characteristics, basic types and naming of organic compounds - Physical properties of hydrocarbons - Molecules with double bonds - Aromatic hydrocarbons - Functional groups in organic molecules 2. Isomerism of organic compounds 3. Reactivity of organic compounds - Record of chemical reaction

- Reakcijski intermediati - Organske kisline in baze; vpliv substituentov - Tavtomerija, izotopni efekt, vpliv topila 4. Pretvorbe organskih spojin: reakcije v organski kemiji - Razvrstitev organskih reakcij; nukelofili in elektrofili - Reakcije alkanov - Reakcije alkenov - Reakcije karbonilnih spojin - Reakcije aromatskih spojin - Polimerizacije 5. Kemija naravnih organskih makromolekul in polimerov - Ogljikovi hidrati, aminokisline in peptidi, lipidi, nukleinske kisline 6. Organska barvila	- Reaction mechanisms - Reaction intermediates - Organic acids and bases; the influence of substituents - Tautomery, isotope effect, solvent effect 4. The conversion of organic compounds: reactions in organic chemistry - Classification of organic reactions; nucleophils and electrophiles - Reactions of alkanes - Reactions of alkenes - Reactions of carbonyl compounds - Reactions of aromatic compounds - Polymerization 5. Chemistry of natural organic macromolecules and polymers Carbohydrates, amino acids and peptides, lipids, nucleic acid 6. Organic dyes

Temeljna literatura in viri/Readings:

Š. Tršek, J. Cerkovnik, Verige in obroči – Učbenik za gimnazije, Modrijan, Ljubljana, 2011.
D. Doelnc, Organska kemija, Založba UL FKKT, Ljubljana, 2019.

Dodatna literatura:

K. P. C. Vollhardt, N. E. Schore, Organic Chemistry, 6th ed., Freeman, New York, 2009.

Cilji in kompetence:	**Objectives and competences:**
Doseganje osnovnega znanja iz organske kemije in obvladovanje praktičnih laboratorijskih tehnik, ki se uporabljajo pri sintezi, izolaciji in čiščenju organskih spojin. Spoznajo in razumejo kemijo naravnih in umetnih makromolekul in polimerov ter barvil. Predmet študentom daje osnovna znanja, potrebna za študij grafike, barvil in barvanja ter sorodnih predmetov.	Achieving basic knowledge of organic chemistry and managing practical laboratory techniques used in the synthesis, isolation and purification of organic compounds. They understand the chemistry of natural and synthetic macromolecules, polymers and colorants. The course provides the basic knowledge needed to study graphics, dyes and painting, and related courses.

Predvideni študijski rezultati:	**Intended learning outcomes:**
Znanje in razumevanje: Študent prepozna in zna imenovati organske spojine, razume vpliv strukture na fizikalno-kemijske lastnosti in reaktivnost izbranih organskih molekul, zna opisati in razložiti osnovne stereokemijske pojme, zna predvideti in interpretirati mehanizme substitucijskih, adicijskih in eliminacijskih reakcij, zna klasificirati makromolekule (ogljikove hidrate, nukleinske kiseline, peptide in lipide), polimere (po različnih tipih) in barvila ter opisati njihove kemijske lastnosti. Z uporabo običajnih laboratorijskih tehnik je sposoben samostojno izvesti enostavne postopke sinteze, izolacije in čiščenja organskih spojin.	Knowledge and understanding: The student recognizes and is able to designate organic compounds, understands the impact of the structure on the physico-chemical properties and rectivity of selected organic molecules, can describe and explain the basic stereochemical concepts, is able to anticipate and interpret the mechanisms of substitution, addition and elimination reactions, knows how to classify macromolecules (carbohydrates, nucleic acids, peptides and lipids), polymers (different types) and dyes, and described their chemical properties. The student is able to independently perform a simple method of synthesis, isolation and purification of organic compounds by using conventional laboratory techniques.

Metode poučevanja in učenja:	**Learning and teaching methods:**
Predavanja, seminarske vaje, laboratorijsko delo.	Lectures, seminars, laboratory work

Načini ocenjevanja:	Delež/Weight	Assessment:
Laboratorijsko delo (30 %)	30,00 %	Laboratory work (30%)
Pisni izpit (70 %)	70,00 %	Examination (70%)

Ocenjevalna lestvica:	Grading system:
5 - 10, pri čemer velja, da je pozitivna ocena od 6 - 10	5 - 10, a student passes the exam if he is graded from 6 to 10

Reference nosilca/Lecturer's references:

1) CERKOVNIK, Janez, PLESNIČAR, Božo. Recent advances in the chemistry of hydrogen trioxide (HOOOH). Chemical Reviews, 2013, vol. 113, no. 10, 7930−7951, doi: 10.1021/cr300512s. [COBISS.SI-ID 1615407]
2) STRLE, Gregor, CERKOVNIK, Janez. A simple and efficient preparation of high-purity hydrogen trioxide (HOOOH). Angewandte Chemie, 2015, vol. 54, no. 34, str. 9917−9920, doi: 10.1002/anie.201504084. [COBISS.SI-ID 1536385475]
3) STAMENKOVIĆ, Nikola, POKLAR ULRIH, Nataša, CERKOVNIK, Janez. An analysis of electrophilic aromatic substitution: a "complex approach". PCCP: Physical chemistry chemical physics. 2021, vol. 23, no. 9, str. 5051−5068, doi: 10.1039/d0cp05245k. [COBISS.SI-ID 49484035]
4) JANSEN-VAN VUUREN, Ross D., LIU, Susana, MIAH, M. A. Jalil, CERKOVNIK, Janez, KOŠMRLJ, Janez, SNIECKUS, Victor. The versatile and strategic O-carbamate directed metalation group in the synthesis of aromatic molecules: an update. Chemical Reviews, 2024, vol. 124, iss. 12, str. 7731−7828, ilustr. doi: 10.1021/acs.chemrev.3c00923. [COBISS.SI-ID 198743811]
5) SILJANOVSKA, Ana, VIRANT, Miha, LOZINŠEK, Matic, CERKOVNIK, Janez. Ph3AsO as a strong hydrogen-bond acceptor in cocrystals with hydrogen peroxide and *gem*-dihydroperoxides. Inorganic chemistry, 2025, vol. 64, iss. 5, str. 2329–2335, doi: 10.1021/acs.inorgchem.4c04535. [COBISS.SI-ID 224558083]

PAMETNE TEKSTILIJE

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Pametne tekstilije
Course title:	Smart textiles
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Načrtovanje tekstilij in oblačil, druga stopnja, magistrski (v postopku)	Ni členitve (študijski program)	2. letnik	1. semester	izbirni

Univerzitetna koda predmeta/University course code: 0642816

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
30	0	30	0	0	60	4

Nosilec predmeta/Lecturer: Tatjana Rijavec

Vrsta predmeta/Course type: Izbirni/Elective

Jeziki/Languages:

Predavanja/Lectures:	Angleščina, Slovenščina
Vaje/Tutorial:	Angleščina, Slovenščina

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	Prerequisites:
Predmet nima posebnih pogojev za opravljanje študijskih obveznosti.	The course does not have special prerequisites.

Vsebina:	Content (Syllabus outline):
Elektroprevodni, toplotno emisivni, optično prevodni tekstilni materiali, luminiscentni tekstilni materiali. Kozmetične tekstilije. Pametni tekstilni materiali s pametnimi barvili, materiali z oblikovnim spominom, elektroluminiscentnimi, fotovoltaičnimi, fazno spremenljivimi, oksetičnimi, termoelektričnimi, piezoelektričnimi dilatacijskimi, elektrolitskimi in kapacitivnimi materili. Nosljiva elektronika. Pametna oblačila. Integriranje elektronskih naprav v preje in ploskovne tekstilije. Recikliranje pametnih oblačil.	Electrically conductive, heat emitting, optically conductive, luminescent textile materials. Cosmetic textiles. Smart textile materials with smart dyes, shape memory materials, electroluminescent, photovoltaic, phase-changing, auxetic, thermoelectric, piezoelectric, dilatation, electrolytic and capacitive materials. Wearable electronics. Smart clothes. Integrating of electronic devices into yarns and fabrics. Smart textiles and clothing recycling.

Temeljna literatura in viri/Readings:

1. SAJOVIC, Irena, KERT, Mateja, BOH PODGORNIK, Bojana. Smart textiles : a review and bibliometric mapping. Applied sciences. 2023, vol. 13, iss. 18, str. 1-38. ISSN 2076-3417. DOI: 10.3390/app131810489.
2. Mattila, Heikki R. Intelligent textiles and clothing. Boca Raton [etc.] : CRC Press ; Cambridge : Woodhead Publishing, 2006.

3. RIDGWELL, J. *Smart fabrics : Sample collection*. London : Ridgwell, 2004.
4. *Smart textiles for medicine and healthcare : materials, systems and applications*. Uredila L. van LANGENHOVE. Boca Raton [etc.]: CRC Press; Cambridge: Woodhead Publishing; [Manchester]: The Textile Institute, 2007. [ch. 7], str. 123-149. Woodhead publishing in textiles.
5. Članki v domačih in tujih strokovnih revijah, dosegljivi v knjižnici UL NTF OTGO.

Cilji in kompetence:	**Objectives and competences:**
Razvoj analitičnega, abstraktnega in konceptualnega pristopa pri uporabi pametnih materialov za izdelavo tekstilij in oblačil v funkciji senzorjev, aktuatorjev in dinamičnih odzivov. Spodbujanje k refleksiji aktualnega razvoja pametnih tekstilij in oblačil.	Development of an analytical, abstract and conceptual approach in the use of smart materials for the production of textiles and clothing in the function of sensors, actuators and dynamic responses. Encouraging reflection on the current development of smart textiles and clothing.

Predvideni študijski rezultati:	**Intended learning outcomes:**
Poznavanje in razumevanje delovanja pametnih materialov in možnosti integriranja v tekstilije ter omejitve pri negi tekstilij in oblačil. Izdelava pametne tekstilije z uporabo funkcionalnega oziroma pametnega materiala. Analiza in ocena pametnega oblačila, prepoznavanje napak, izboljšanje delovanja.	Knowledge and understanding of fthe unction of smart materials and the possibilities of integration into textiles and limitations in the care of textiles and clothing. Production of smart textiles using functional or smart material. Analysis and evaluation of smart clothing, error detection, performance improvement.

Metode poučevanja in učenja:	**Learning and teaching methods:**
Predavanja, individualne in skupinske laboratorijske vaje. Študij literature v knjižnici, uporaba svetovnega spleta.	Lectures, individual and team tutorials. Study of literature using library, use of the World Wide Web.

Načini ocenjevanja:	**Delež/Weight**	**Assessment:**
Pisni izpit	60,00 %	Written exam
Vaje	40,00 %	Tutorial

Ocenjevalna lestvica:	**Grading system:**
5 - 10, pri čemer velja, da je pozitivna ocena od 6 - 10	5 - 10, a student passes the exam if he is graded from 6 to 10

Reference nosilca/Lecturer's references:

1. ŠALEJ LAH, Alenka, FAJFAR, Peter, KUGLER, Goran, RIJAVEC, Tatjana. A NiTi alloy weft knitted fabric for smart firefighting clothing. *Smart materials and structures*. [Print ed.]. 2019, vol. 28, no. 6, str. 1-10. ISSN 0964-1726. DOI: 10.1088/1361-665X/ab18b9. [COBISS.SI-ID 1805151]
2. RANT, Darja, RIJAVEC, Tatjana, PAVKO-ČUDEN, Alenka. Auxetic textiles. *Acta chimica slovenica*. [Tiskana izd.]. 2013, vol. 60, no. 4, str. 715-723, ilustr. ISSN 1318-0207. [COBISS.SI-ID 2952560]
3. KLANČNIK, Maja, GABRIJELČIČ TOMC, Helena, GREGOR-SVETEC, Diana, STAREŠINIČ, Marica, RIJAVEC, Tatjana. Electrically conductive textile materials and printing inks for wearable technology. V: YVON, Kylian (ur.), FABRICE, Nathan (ur.). *Printed electronics : technologies, applications and challenges*. New York: Nova Science Publishers, 2017. Str. [81]-126
4. RIJAVEC, Tatjana, BRAČKO, Sabina. Smart dyes for medical and other textiles. V: LANGENHOVE, Lieva van (ur.). *Smart textiles for medicine and healthcare : materials, systems and applications*. Boca Raton [etc.]: CRC Press; Cambridge: Woodhead Publishing; [Manchester]: The Textile Institute, 2007. [ch. 7], str. 123-149. Woodhead publishing in textiles.

PODATKOVNO UPRAVLJANJE

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Podatkovno upravljanje
Course title:	Data management
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Načrtovanje tekstilij in oblačil, druga stopnja, magistrski (v postopku)	Ni členitve (študijski program)	1. letnik	1. semester	izbirni

Univerzitetna koda predmeta/University course code:	0068978
Koda učne enote na članici/UL Member course code:	11268

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
30	15	45	0	0	90	6

Nosilec predmeta/Lecturer:	Danica Dolničar
Vrsta predmeta/Course type:	Temeljni izbirni/Basic elective

Jeziki/Languages:	Predavanja/Lectures:	Angleščina, Slovenščina
	Vaje/Tutorial:	Angleščina, Slovenščina

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	**Prerequisites:**
Vpis v program.	Enrolment in the programme.

Vsebina:	**Content (Syllabus outline):**
• Podatki, informacije in znanje: tipi, definicije, klasifikacije; • Pridobivanje, zajem in vrednotenje podatkov: iz lastnega eksperimentalnega dela, iz podatkovnih zbirk; • Urejanje podatkov: datoteke, podatkovne zbirke, informacijski sistemi; orodja, formati; • Obdelave podatkov: kategorizacija, analiza, sinteza, pretvorbe; • Predstavitve podatkov: strukturiranje, vizualizacija, orodja in tehnike; • Shranjevanje podatkov: dokumentiranje, metapodatki, arhiviranje, zaščita, dostop, pravice, licence; • Metodološki pristopi v podatkovnem upravljanju: izbrane hevristične in matematično-statistične metode;	• Data, information and knowledge: types, definitions, classifications; • Acquisition, collection and evaluation of data: from the experimental work, from databases; • Managing data: files, databases, information systems; tools, formats; • Data Processing: categorization, analysis, synthesis, transformation; • Presentation of data: structuring, visualizations, tools and techniques; • Data storage: documentation, metadata, archiving, security, access, rights, licenses; • Methodological approaches to data management: selected heuristic and mathematical-statistical methods; • Selected software tools and systems for data management.

• Izbrana programska orodja in sistemi za upravljanje s podatki.	

Temeljna literatura in viri/Readings:

- WATSON Richard : Data management : databases and organizations, 6th edition, 2016
- BOH PODGORNIK Bojana: študijska gradiva za študente v spletni učilnici.

Cilji in kompetence:	**Objectives and competences:**
Cilj: • Študent se usposobi za upravljanje s podatki iz podatkovnih zbirk in iz lastnega raziskovalnega dela. **Predmetno specifične kompetence**: • Razumevanje razlik med podatki, informacijami in znanjem; poznavanje tipov in formatov podatkov; • Obvladovanje pridobivanja in vrednotenja podatkov lastnega raziskovalnega dela; obvladovanje naprednih tehnik iskanja v mednarodnih podatkovnih zbirkah. • Obvladovanje urejanja podatkov v datoteke, podatkovne zbirke in enostavnejše informacijske sisteme. • Poznavanje izbranih metod in orodij za analize, pretvorbe in druge obdelave podatkov. • Sposobnost uporabe hevrističnih in matematično statističnih metod za sintezo podatkov v znanje. • Sposobnost učinkovite predstavitve podatkov z metodami in orodji za strukturiranje in vizualizacijo, • Razumevanje pomena sistematičnega dokumentiranja, opremljanja z metapodatki, arhiviranja, možnosti zaščite, selektivnega dostopa, licenc in pravic intelektualne lastnine. • Obvladovanje izbranih programskih orodij in sistemov za upravljanje s podatki.	**Objective**: • The student will be trained to manage data obtained from the databases, and from their own research. **Subject-specific competencies**: • Understanding of the differences between data, information and knowledge; knowing types and data formats. • Ability to acquire and evaluate data from own research work; mastering of advanced search techniques in the international databases. • Ability to organise data into files, databases and simple information systems. • Knowledge of selected methods and tools for data analysis, conversion and data processing. • Ability to use heuristic and mathematical-statistical methods for the synthesis of information into knowledge. • Ability to efficiently present the data by using methods and tools for structuring and visualization. • Understanding the importance of systematic documentation, metadata, archiving, security, selective access, licensing and intellectual property rights. • Ability to apply selected software tools and systems for data management.

Predvideni študijski rezultati:	**Intended learning outcomes:**
Znanje in razumevanje: • Definicije, klasifikacije, tipi, formati podatkov. • Napredno iskanje in sortiranje podatkov v podatkovnih zbirkah. • Načrtovanje in gradnja podatkovnih zbirk in informacijskih sistemov. • Izbrane statistične metode za analizo podatkov. • Hevristične metode strukturiranja podatkov v sisteme. • Metode in tehnike za vizualizacijo podatkov. • Shranjevanje in dostop do podatkov. **Uporaba**: • Orodja za statistično analizo podatkov; • Orodja za gradnjo podatkovnih zbirk; • Orodja za vizualizacijo podatkov.	**Knowledge and understanding**: • Definitions, classifications, types, formats of data. • Advanced data searching and sorting in the databases. • Design and construction of databases and information systems. • Selected statistical methods for data analysis. • Heuristic methods for structuring of data into systems. • Methods and techniques for visualisation of data. • Data storing and accessing. **Application**: • Tools for statistical analysis of data; • Tools for building databases; • Tools for data visualization.

Metode poučevanja in učenja: **Learning and teaching methods:**

Predavanja, vodeno seminarsko delo s predstavitvami, vaje v računalniški učilnici.	Lectures, guided seminar work with presentations, practical exercises in a computer laboratory.

Načini ocenjevanja:	**Delež/Weight**	**Assessment:**
Vse delne ocene morajo biti pozitivne. Pisni izpit	50,00 %	All partial grades must be positive. Written exam
Vaje v računalniški učilnici	40,00 %	Computer lab practice
Ocena seminarja	10,00 %	Assesment of a seminar

Ocenjevalna lestvica:	**Grading system:**
5 - 10, pri čemer velja, da je pozitivna ocena od 6 - 10	5 - 10, a student passes the exam if he is graded from 6 to 10

Reference nosilca/Lecturer's references:

1. DOLNIČAR, Danica, BOH PODGORNIK, Bojana. 3DChemMol : web-based molecular modeling interface supporting technology-based learning. V: GÓMEZ-CHOVA, Luis (ur.). *EDULEARN23 Proceedings : 15th International Conference on Education and New Learning Technologies : Palma, Spain, 3-5 July, 2023*. [Valencia]: IATED Academy, cop. 2023. Str. 1426-1435. EDULEARN proceedings. ISBN 978-84-09-52151-7. ISSN 2340-1117. DOI: 10.21125/edulearn.2023.0449. [COBISS.SI-ID 160167939]
2. DOLNIČAR, Danica, BOH PODGORNIK, Bojana. Factors influencing information literacy of university students. V: WALLER, Lee (ur.). *Higher Education - Reflections From the Field [Working Title] : [Vol. 2]*. 1st ed. London: IntechOpen, cop. 2023. Str. 1-16, ilustr. DOI: 10.5772/intechopen.109436. [COBISS.SI-ID 156185859]
3. DOLNIČAR, Danica, BOH PODGORNIK, Bojana, BARTOL, Tomaž, ŠORGO, Andrej. Added value of secondary school education toward development of information literacy of adolescents. Library & Information Science Research : an international journal. [Print ed.]. 2020, vol. 42, no. 2, str. 1-18. ISSN 0740-8188. DOI: 10.1016/j.lisr.2020.101016. [COBISS.SI-ID 16455171]
4. DOLNIČAR, Danica, BOH PODGORNIK, Bojana. Undergraduate students' information literacy : challenges and opportunities. V: NATA, Roberta V. (ur.). Progress in education. New York: Nova Science Publishers, 2020. Str. 153-185. Progress in education, 63. ISBN 978-1-53617-845-6. ISSN 1535-4806. [COBISS.SI-ID 17201667]
5. DOLNIČAR, Danica, BOH PODGORNIK, Bojana, BARTOL, Tomaž. A comparative study of three teaching methods on student information literacy in stand-alone credit-bearing university courses. Journal of information science. [Online ed.]. 2017, vol. 43, iss. 5, str. 601-614. ISSN 1741-6485. DOI: 10.1177/0165551516655084. [COBISS.SI-ID 127062]

PROJEKTIRANJE OBLAČIL

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Projektiranje oblačil
Course title:	Elective course
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Načrtovanje tekstilij in oblačil, druga stopnja, magistrski (v postopku)	Ni členitve (študijski program)	2. letnik	1. semester	izbirni

Univerzitetna koda predmeta/University course code: 0642815

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
0	30	30	0	0	60	4

Nosilec predmeta/Lecturer: Živa Zupin

Vrsta predmeta/Course type: Izbirni/Elective

Jeziki/Languages:

Predavanja/Lectures:	Angleščina, Slovenščina
Vaje/Tutorial:	Angleščina, Slovenščina

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	Prerequisites:
Predmet nima posebnih pogojev za opravljanje študijskih obveznosti.	The course does not have special prerequisites.

Vsebina:	Content (Syllabus outline):
• Poglobljena znanja s področja razvoja specialnih krojev oblačil in oblačilne tehnologije s poudarkom na trajnosti - glede na temo magistrskega dela ali vsebin. • Poznavanje sodobnih 2D/3D tehnologij na področju CAD sistemov v procesu razvoja novih produktov z visoko dodano vrednostjo v oblačilni industriji.	• In-depth knowledge in the field of developing special garment pattern cuts and garment technology with a focus on sustainability - depending on the topic of the master's thesis. • Knowledge about modern 2D/3D technologies in the field of CAD systems to develop new products with high added value for the apparel industry.

Temeljna literatura in viri/Readings:

Tyler DJ, Carr H, Latham B. Carr and Latham's technology of clothing manufacture. 3rd ed. Oxford: Blackwell Science; 2000. 281 str.
COOKLIN, G. Introduction to clothing manufacture, Blackwell Publishing, UK, 2002
BRACKENB,URY, T. Knitted Clothing Technology, Blackwell Publishing, UK, 1992
PARISH, P. Pattern cutting : the architecture of fashion, London : AVA Publishing, 2013
ALDRICH, W. Fabrics and pattern cutting / 3rd ed., updated and simplified, Chichester : John Wiley & Sons, 2013

RISSANEN, T., McQUILLAN, H. Zero waste fashion design, London ; New York : Fairchild Books, an imprint of Bloomsbury Publishing, Plc, [2016]
STIEGLER, M. and KROLOPP, L. *Schnittkonstruktionen für Rocke und Hosen.* 23. Aufl. Munich: Rundschau-Verlag Otto G. Königer, 1996.
STIEGLER, M. *Schnittkonstruktionen für Kleider und Blusen.* 22. Aufl. Munich: Rundschau-Verlag Otto G. Königer, 1997.
STIEGLER, M. and KROLOPP, L. *Schnittkonstruktionen für Jacken und Mantel.* 24. Aufl. Munich: Rundschau-Verlag Otto G. Königer, 1994.
SATO, H. Drape Drape. London: Laurence King Publishing, 2012.
SATO, H. Drape Drape 2. London: Laurence King Publishing, 2012.
SATO, H. Drape Drape 3. London: Laurence King Publishing, 2013.
NAKAMICHI, T. Pattern Magic. London: Laurence King Publishing, 2005.
NAKAMICHI, T. Pattern Magic volume 2. London: Laurence King Publishing, 2007.
NAKAMICHI, T. Pattern Magic: Stretch Fabrics. London: Laurence King Publishing, 2010.
HIRAIWA, N. Shape Shape 2. United States: Interweave Press, 2013.
Liechty EG, Rasband JA, Pottberg DN. Fitting & pattern alteration: a multi-method approach to the art of style selection, fitting, and alteration. 2nd ed. New York: Fairchild Books; 2010. IX, 470

Cilji in kompetence:	**Objectives and competences:**
• Študent pridobi sposobnost interdisciplinarnega razmišljanja in povezovanja različnih področij celostnega razvoja novih sodobnih oblačilnih izdelkov s poudarkom na trajnostnih načelih delovanja tekstilne in oblačilne industrije. • Študent razširi znanja s področja razvoja specialnih krojev oblačil in oblačilne tehnologije, ki jih zna praktično uporabiti. • Študent spozna vlogo sodobnih 2D/3D tehnologij v procesu razvoja novih oblačilnih izdelkov. • Študent pozna tehnično pripravo oblačil in pripravo proizvodnje, specifičnost posameznih tehnoloških procesov, lastnosti osnovnih in pomožnih tekstilnih materialov, ki jih zna pravilno izbrati glede izbire načina razvoja kroja in namena uporabe. • Študent nadgradi strokovno terminologijo s področja razvoja krojev oblačil in oblačilne tehnologije.	• The student acquires the ability to think in an interdisciplinary manner and connect different areas of integrated development of new modern apparel products, with emphasis on sustainable principles of the textile and apparel industry. • The student expands his/her knowledge in the field of development of special clothing pattern cuts and clothing technology, which he/she practically applies. • The student learns about the role of modern 2D/3D technologies in the process of developing new apparel products • The student understands the technical preparation of garments and preparation for production, the specifics of each technological process, the properties of basic and auxiliary textile materials, which are properly selected depending on the garment patteren development process its intended use. • The student expands the technical terminology in the field of pattern development and clothing technology.

Predvideni študijski rezultati:	**Intended learning outcomes:**
Samostojno delo študenta na področju razvoja izbranih specialnih krojev oblačil in sodobnih oblačilnih tehnologij izdelave s poudarkom na trajnosti.	Independent student work in the field of developing selected special clothing pattern cuts and modern clothing manufacturing technologies with a focus on sustainability.

Metode poučevanja in učenja:	**Learning and teaching methods:**
Seminar, projektno delo, konzultacije, eksperimentalne vaje.	Seminar, project work, consultations, experimental work.

Načini ocenjevanja:	**Delež/Weight**	**Assessment:**
Pisna predstavitev seminarske naloge	70,00 %	Written presentation of the seminar work
Ustna predstavitev seminarske naloge	30,00 %	Oral presentation of the seminar work

Ocenjevalna lestvica:	Grading system:
5 - 10, pri čemer velja, da je pozitivna ocena od 6 - 10	5 - 10, a student passes the exam if he is graded from 6 to 10

Reference nosilca/Lecturer's references:

ZUPIN, Živa, KNIFIC, Karmen, PAVKO-ČUDEN, Alenka. Comfort properties of functional double bed knitted fabric for firefighters underwear. Tekstil ve konfeksiyon dergisi : journal of textile and apparel. 2023, vol. 33, no. 3, str. 249-261. ISSN 1300-3356. https://dergipark.org.tr/en/download/article-file/2224036, DOI: 10.32710/tekstilvekonfeksiyon.1065942.

ZUPIN, Živa, DIMITROVSKI, Krste, HLADNIK, Aleš, KOSTAJNŠEK, Klara. Elongation properties of woven fabrics with incorporated PBT yarns. The journal of The Textile Institute. 2022, vol. 113, no. 5, str. 846-856, ilustr. ISSN 0040-5000. https://www.tandfonline.com/doi/full/10.1080/00405000.2021.1907971, https://repozitorij.uni-lj.si/IzpisGradiva.php?id=141246, DOI: 10.1080/00405000.2021.1907971.

ZUPIN, Živa, CERAR, Urša, PODBEVŠEK, Tanja. Garment design according to zero waste design principle. V: ÜN, Çağrı (ur.), KIDIRYUZ, Merve (ur.). Full texts book : Cukurova 9th International Scientific Researches Conference : October 9-11, 2022, Adana, Turkey. Cukurova 9th International Scientific Researches Conference, October 9-11, 2022, Adana, Turkey. Ankara: IKSAD Publishing House, 2022. Str. 1721-1729. ISBN 978-625-8246-28-5.
https://en.iksadkongre.net/_files/ugd/262ebf_712087d19a0843b786e9a55dd73c035e.pdf.

ZUPIN, Živa. Novosti na področju računalniškega oblikovanja tkanin, pletiv in pletenin na sejmih ITMA in Techtextil 2019 = Novelties in computer-aided design of woven and knitted fabrics and knittwear at Techtextil and ITMA 2019. Tekstilec : glasilo slovenskih tekstilcev. [Tiskana izd.]. 2019, vol. 62, priloga 2, str. si 123-sl 133, ISSN 0351-3386. [COBISS.SI-ID 3694448]

ZUPIN, Živa, MOTNIKAR, Ana, ZOREC, Petja, GAJŠEK, Gašper, HRASTAR, Zala, MAVRIĆ, Zala, MIKLAVČIČ, Anita, PETROVČIČ, Elizabeta, REŠETIČ, Klara, SCHWARZBARTEL, Petra, TURK, Maruša, VIDMAR, Lara, VRHOVSKI, Iris. Exploring the history of hosiery and design of modern socks-socks. V: PERRIN AKÇAKOCA KUMBASAR, Emriye (ur.). Book of proceedings. 15th International İzmir Textile & Apparel Symposium, IITAS 2021, October 26 -27, 2021, İzmir-Turkey. Izmir: Ege University, Faculty of Engineering, Department of Textile Engineering, 2021. Str. 549-553, ISBN 978-605-338-329-1. http://www.iitas2021.com/en/. [COBISS.SI-ID 85731587]

ZUPIN, Živa. Computer aided fabrics patterning . V: CVIKL, Nives (ur.), HREN BRVAR, Maja (ur.). Tekstil, oblačilna kultura in moda = Textile, the culture of clothing and fashion : Museoeurope : the collected volume of the symposium 18.-19. 10. 2019. Maribor: Pokrajinski muzej: = Regional Museum, 2019. Str. 23-33, Zbirka Museoeurope, 6. ISBN 978-961-94532-3-0. [COBISS.SI-ID 3677296]

RAZISKOVALNI SEMINAR

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Raziskovalni seminar
Course title:	Research seminar
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Načrtovanje tekstilij in oblačil, druga stopnja, magistrski (v postopku)	Ni členitve (študijski program)	1. letnik	2. semester	obvezni

Univerzitetna koda predmeta/University course code:	0068975
Koda učne enote na članici/UL Member course code:	10508

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
30	60	0	0	0	90	6

Nosilec predmeta/Lecturer:	Barbara Luštek Preskar, prof. angl. in nem. , Barbara Simončič
Vrsta predmeta/Course type:	Obvezni/Compulsory
Jeziki/Languages:	Predavanja/Lectures: Angleščina, Slovenščina
	Vaje/Tutorial: Angleščina, Slovenščina

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	Prerequisites:
Vpis na program.	Enrolment in the programme.

Vsebina:	Content (Syllabus outline):
• Priprava na raziskovanje: izbor in določitev okvira in obsega teme, izbor in predstavitev raziskovalnega problema, priprava pregleda raziskav, oblikovanje raziskovalne hipoteze in raziskovalnih vprašanj, namen in cilji raziskave, načrtovanje raziskovanja (vsebinsko in časovno), definiranje materialov in postopkov dela, analitske metode, prestavitev rezultatov in priprava zaključkov. • Soodvisnost elementov raziskave: namen – cilji – hipoteze – materiali in metode. • Pisanje raziskovalnega teksta: osnovna pravila priprave raziskovalnega besedila, struktura in zgradba izvirnega in preglednega raziskovalnega članka, pravila za vsebinsko pripravo posameznih poglavij, razlikovanje tehnik pisanja raziskovalnega teksta.	• Research preparation: selection and setting the topic framework and scope, literature review, creation of the research hypothesis and research questions, aim and objectives of the research, planning the research (content and timing), definition of the materials and processes, analytical methods, results presentation, drawing the conclusions. • Interdependence of the research elements: aim – objectives – hypothesis – materials and methods. • Writing a research text: basic rules of preparation of the research text, structure of the article, rules for the preparation of the contents of individual chapters, differentiation of the techniques for writing original and review research text, rules for the preparation of the contents of individual

• Koraki pri oblikovanju besedila: pisanje osnutka, popravljanje besedila, priprava slikovnega gradiva, zbiranje literature, ustvarjanje bibliografske baze, citiranje literaturnih del, oblikovna priprava končne verzije. • Priprava slikovnega gradiva (tabelarična in grafična), sestavni deli preglednic in slik, smiselnost uporabe posameznega prikaza. • Ustna predstavitev raziskovalnega načrta: zasnova in priprava javne predstavitve ob upoštevanju smernic za uspešen nastop, t. i. predstavitveni trikotnik (vsebina, oblika, nastop). • Etika v raziskovanju	chapters, differentiation of techniques for writing a research text. • Steps for the text creation: writing the draft, correcting the text, preparing the figures, collecting the literature, creating the bibliographic databases, citing the literature, preparing the final version. • Preparation of the images (tables and figures), contents of tables and figures, advisability of the use of the particular mode. • Oral presentation of research plan: preparation of public presentation, taking into account the guidelines for a successful presentation, based on presentation triangle (contents, design, delivery). • Ethics in research work

Temeljna literatura in viri/Readings:

- Hofmann, A.H. Scientific Writting and Comunication. Oxford : Oxford University Press, 2010. 682 str.
- Roš, M. Pišem! : Priročnik za pisanje strokovnih in znanstvenih del. Ljubljana : GV Založba, 2005, 116 str.
- Carnegie, D. Kako se naučiš javno nastopati in govoriti. Ljubljana : Mladinska knjiga, 2004, 206 str.
- Duarte, N. Slide:ology : the art and science of creating great presentations. Sebastopol : O'Reilly Media, 2008, 274 str.
- Reynholds, G. Presentation zen : simple ideas on presentation design and delivery. Berkeley : New Riders, 2008, 229 str.
- Reynolds, G. Presentation zen design : simple design principles and techniques to enhance your presentations. Berkeley : New Riders, 2010, 252 str.
- Lindsay, D. Scientific writting = thinking in words. Collingwood : CSIRO Publishing, 2011, 122 str.
- Gibaldi, J. M.L.A. Handbook for Writers of Research Papers. 5th edition. New York : The Modern Language Association of America, 1999, 332 str.
- Alley, M. The crafts of scientific writting. New York : Springer, 1996, 282 str.
- Alley, M. The crafts of scientific presentations. New York : Springer, 2003, 241 str.
- Izbrani raziskovalni članki iz periodičnih publikacij, dostopnih na svetovnem spletu.

Cilji in kompetence:	**Objectives and competences:**
Študent se podrobno seznani s pravili pisanja in načini priprave raziskovalnega besedila, njegovo vsebinsko razdelitvijo, pripravo slikovnega gradiva, zbiranjem literaturnih virov ter načini predstavitve dela. Predmetno specifične kompetence: • sposobnost samostojne izbire raziskovalne teme, določitve njenega okvira in obsega, • sposobnost oblikovanja raziskovalne hipoteze in raziskovalnega načrta, • sposobnost samostojnega ustvarjalnega raziskovalnega dela ter razmišljanja, • poznavanje razlik med slogi pisanja znanstvenega, strokovnega in umetniškega besedila, • poznavanje specifičnosti visokošolskih besedil, kot so diplomsko, magistrsko in doktorsko delo, • poznavanje korakov nastajanja raziskovalnega dela, • poznavanje načinov zbiranja literature, ustvarjanja bibliografske baze in citiranja literaturnih del, • sposobnost priprave ustne predstavitev raziskovalnega dela z uporabo ustrezne predstavitvene tehnike,	Students acquire the rules of the writing of the research text, distribution of the content, preparation of images, the collection of literature, as well as presentation of work. Subject-specific competencies: • The ability of independent selection of the research topic, the determination of its scope and extent, • The ability to formulate hypothesis and research plan, • The ability of independent creative research and thinking, • An understanding of the differences between styles of writing scientific, technical and artistic texts, • Knowledge about the specificities of the higher education texts, such as bachelor, master and doctoral work, • Knowledge of the steps of the research work formation, • Understanding of the methods of collecting literature, the creation of bibliographic and citation of the literature,

• sposobnost javnega nastopanja ob upoštevanju smernic za govorne nastope, • poznavanje pravice za zaščito intelektualne lastnine.	• Ability to prepare an oral presentation of research work using an appropriate presentation technique, • Ability to perform in public, paying attention to guidelines for a successful presentation, • Knowledge of the rights of the intellectual property protection.

Predvideni študijski rezultati:	**Intended learning outcomes:**
Študenti razumejo namen in smisel raziskovalnega dela. Rezultate raziskovalnega dela znajo urediti, vrednotiti in jih na ustrezen način predstaviti. Pozna zakonitosti pisanja strokovnih in znanstvenih člankov, pozna njihovo strukturo. Ima ustrezno znanje za različne načine iskanja in zbiranja literaturnih virov ter njihovega urejanja. Pridobi spretnosti javnega nastopa.	Students understand the purpose and meaning of the research work. They are able to process the data and interpret and present the results of the research in an appropriate way. They have detailed knowledge of the structure of the professional and scientific papers. They acquire skills in a variety of ways to search and collection of literature sources and their regulation. They acquire skills to deliver a successful presentation.

Metode poučevanja in učenja:	**Learning and teaching methods:**
Predavanja, seminar.	Lectures and seminars.

Načini ocenjevanja:	**Delež/Weight**	**Assessment:**
Pisni izpit	50,00 %	Written exam
Predstavitev seminarskega dela	50,00 %	Presentation of the seminar work

Ocenjevalna lestvica:	**Grading system:**
5 - 10, pri čemer velja, da je pozitivna ocena od 6 - 10	5 - 10, a student passes the exam if he is graded from 6 to 10

Reference nosilca/Lecturer's references:

TOMŠIČ, Brigita, MARKOVIĆ, Darka, JANKOVIĆ, Vukašin, SIMONČIČ, Barbara, NIKODINOVIĆ-RUNIĆ, Jasmina, ILIC-TOMIC, Tatjana, RADETIĆ, Maja. Biodegradation of cellulose fibers functionalized with CuO/Cu2O nanoparticles in combination with polycarboxylic acids. Cellulose, 2022, **29**, 287–302.
ČOLOVIĆ, Marija, VASILJEVIĆ, Jelena, ŠTIRN, Žiga, ČELAN KOROŠIN, Nataša, ŠOBAK, Matic, SIMONČIČ, Barbara, DEMŠAR, Andrej, MALUCELLI, Giulio, JERMAN, Ivan. New sustainable flame retardant DOPO-NH-functionalized polyamide 6 and filament yarn. Chemical Engineering Journal, **426**, 15. December 2021, 130760.
ŠTULAR, Danaja, SAVIO, Elisa, SIMONČIČ, Barbara, ŠOBAK, Matic, JERMAN, Ivan, POLJANŠEK, Ida, FERRI, Ada, TOMŠIČ, Brigita. Multifunctional antibacterial and ultraviolet protective cotton cellulose developed by in situ biosynthesis of silver nanoparticles into a polysiloxane matrix mediated by sumac leaf extract. Applied Surface Science, 2021, **563**, 150361.
SIMONČIČ, Barbara. Od mlade raziskovalke do mentorice. V: GYÖRKÖS, József (ur.), GLAVIČ NOVAK, Tina (ur.). > 30 : več kot 30 let programa Mladi raziskovalci. Ljubljana: Javna agencija za raziskovalno dejavnost Republike Slovenije, 2016, str. 37-40.
LUŠTEK PRESKAR, Barbara. English for specific purposes. [Graphic arts]. Ljubljana: Naravoslovnotehniška fakulteta, Oddelek za tekstilstvo, grafiko in oblikovanje, 2020. 160 str.
LUŠTEK PRESKAR, Barbara. English for specific purposes. Textile engineering. Ljubljana: Naravoslovnotehniška fakulteta, Oddelek za tekstilstvo, 2011. 128 str.
LUŠTEK PRESKAR, Barbara, VRBINC, Marjeta. Patient information leaflet as genre in English and Slovenian : contrastive analysis. V: CIGAN, Vesna (ur.), KRAKIĆ, Ana-Marija (ur.), OMRČEN, Darija (ur.). Od teorije do prakse u jeziku struke : zbornik radova = From theory to practice in language for specific purposes : conference proceedings = Von der Theorie zur Praxis in der Fachsprache : Sammelband. Zagreb: Udruga nastavnika jezika na visokošolskim ustanovama: = Association of LSP Teachers at Higher Education Institutions. 2019, str. 144-157, ilustr. Od teorije do prakse u jeziku struke (Zbornik radova).

STANKOVIĆ ELESINI, Urška, QUALIZZA, Nataša Pavla, HRKAČ, Tanja, ABSEC, Andreja, LUŠTEK PRESKAR, Barbara, JEDRINOVIĆ, Sanja, URBAS, Raša. Analiza uporabnosti in namembnosti večpredmetnega zvezka pri pouku v prvem razredu osnovne šole. Sodobna pedagogika. okt. 2021, letn. 72(138), št. 3, str. 46-64.

STANKOVIĆ ELESINI, Urška, LUŠTEK PRESKAR, Barbara. Posodobitev visokošolskega predmeta Inovacijski management = Higher education course Innovation management update. V: LIPOVEC, Alenka (ur.). Vloga predmetnih didaktik za kompetence prihodnosti : zbornik povzetkov. 1. izd. Maribor: Univerzitetna založba Univerze, 2019. Str. 283-284.

SPECIALNA PLETIVA IN PLETENINE

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Specialna pletiva in pletenine
Course title:	Special knitted fabrics and knitwear
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Načrtovanje tekstilij in oblačil, druga stopnja, magistrski (v postopku)	Ni členitve (študijski program)	2. letnik	1. semester	izbirni

Univerzitetna koda predmeta/University course code: 0642814

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
0	30	30	0	0	60	4

Nosilec predmeta/Lecturer: Živa Zupin

Vrsta predmeta/Course type: Izbirni/Elective

Jeziki/Languages:

Predavanja/Lectures:	Angleščina, Slovenščina
Vaje/Tutorial:	Angleščina, Slovenščina

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	Prerequisites:
Pogoj za pristop h končnemu izpitu: pozitivno ocenjena predstavitev in zagovor seminarskega dela.	Requirement to enter the final exam: positively evaluated presentation and defense of the seminar paper.

Vsebina:	Content (Syllabus outline):
Seminar: • Razvoj in novosti na področju specialnih pletiv in pletenin ter pletilnikov za njihovo izdelavo; • Materiali za izdelavo specialnih pletiv in pletenin; • Ozka pletiva, kvačkana pletiva, brezšivna pletiva in pletenine z izboljšanimi lastnostmi, pletiva in pletenine iz nekonvencionalnih materialov; • Lastnosti in preskušanje specialnih pletiv; • Pomen in uporaba specialnih pletiv in pletenin v tekstilstvu in na ostalih področjih uporabe; • Vizija razvoja specialnih pletiv in pletenin. • Študij primerov specialnih pletiv in opreme za njihovo izdelavo. **Vaje:** • Vključitev študentov v raziskovalno delo na področju razvoja specialnih pletiv in pletenin.	**Seminar**: • Development and innovations in the field of special knitted fabrics and knitwear and knitting machines for their production; • Materials for special knitted fabrics and knitwear production; • Narrow knitted fabrics, crocheted fabrics, seamless knitted products with improved properties, knitted fabrics and knitwear from unconventional materials; • Properties and testing of special knitted fabrics and knitwear; • Importance and use of special knitted fabrics and knitwear in textiles and other areas of application; • Vision for the future development of special knitted fabrics and knitwear;

	• Study of examples of special knitted fabrics and knotwear and equipment for their production. **Laboratory practice:** • Involvement of students in research work in the field of development of special knitted fabrics and knitwear.

Temeljna literatura in viri/Readings:

- PAVKO-ČUDEN, Alenka. Recent developments in knitting technology. V: MAITY, Subhankar (ur.), et al. Advanced knitting technology. [Cambridge]: Woodhead publishing, 2021. Str. [13]-66;
- PAVKO-ČUDEN, A., RANT, D. Multifunctional foldable knitted structures : fundamentals, advances and applications. V: KUMAR, Bipin (ur.), THAKUR, Suman (ur.). Textiles for advanced applications, (Physical Sciences, Engineering and Technology, Technology). Rijeka: InTech. 2017, str. [55]-84;
- Advances in knitting technology (editor AU, K.F.), Woodhead Publishing, Cambridge, 2011;
- Maity, Subhankar, Singha, Kunal, Pandit, Pintu (ed). Functional and technical textiles, Cambridge : Woodhead Publishing,, 2023, ISBN - 978-0-323-91593-9

Cilji in kompetence:	**Objectives and competences:**
Cilji: Študenti spoznajo vrste, lastnosti in uporabo specialnih pletiv in pletenin, proizvedenih po različnih pletilskih postopkih in tehnikah. **Predmetno-specifične kompetence:** • Poznavanje surovin, postopkov in opreme za izdelavo specialnih pletiv in pletenin; • Poznavanje vrst, uporabe in posebnosti specialnih pletiv in pletenin; • Sposobnost načrtovanja razvoja, izdelave, uporabe, preskušanja in zagotavljanja kakovosti specialnih pletiv in pletenin.	**Objectives:** Students learn about the types, properties, and uses of special knitted fabrics and knitwear produced by various knitting processes and techniques. **Subject-specific competences**: • Knowledge of raw materials, processes, and equipment used in the manufacture of special knitted fabrics and knitwear; • Knowledge of the types, uses, and characteristics of special knitted fabrics and knitwear; • Ability to plan the development, production, use, testing, and quality assurance of special knitted fabrics and knitwear.

Predvideni študijski rezultati:	**Intended learning outcomes:**
• Poznavanje vrst, postopkov izdelave in namenov uporabe specialnih pletiv in pletenin; • Poznavanje konstrukcijskih, fizikalnih in uporabnih lastnosti specialnih pletiv/pletenin; • Kritična ocena prednosti, pomanjkljivosti in posebnosti posameznih vrst specialnih pletiv/pletenin; • Poznavanje strokovne terminologije s področja specialnih pletiv in pletenin v slovenskem in najmanj enem svetovnem tujem jeziku.	• Knowledge of the types, manufacturing processes, and uses of special knitted fabrics and knitwear; • Knowledge of constructional, physical, and performance properties of special knitted fabrics and knitwear; • Critical assessment of the advantages, disadvantages, and special features of individual types of special knitted fabrics and knitwear; • Knowledge of technical terminology in the field of special knitted fabrics and knitwear in Slovenian and at least one world foreign language;

Metode poučevanja in učenja:	**Learning and teaching methods:**
Seminar, projektno delo, panelna razprava, eksperimentalne vaje.	Seminar, project work, panel discussion, experimental work.

Načini ocenjevanja:	**Delež/Weight**	**Assessment:**
pisni/ustni izpit	70,00 %	written/oral exam
seminarsko delo	30,00 %	seminar work

Ocenjevalna lestvica:	Grading system:
5 - 10, pri čemer velja, da je pozitivna ocena od 6 - 10	5 - 10, a student passes the exam if he is graded from 6 to 10

Reference nosilca/Lecturer's references:

1. ZUPIN, Živa, KNIFIC, Karmen, PAVKO-ČUDEN, Alenka. Comfort properties of functional double bed knitted fabric for firefighters underwear. Tekstil ve konfeksiyon dergisi : journal of textile and apparel. 2023, vol. 33, no. 3, str. 249-261. ISSN 1300-3356. https://dergipark.org.tr/en/download/article-file/2224036.
2. ZUPIN, Živa, KOVAČIČ, Sara. Performance properties of double bed jacquard knitted fabrics for upholstery. V: KARDAŞLAR, Ahmet (ur.), MİKE, Faruk (ur.). Full text book : II. International Korkut Ata Scientific Researches Conference : October 7-8, 2023, Ankara, Turkey. II. International Korkut Ata Scientific Researches Conference, October 7-8, 2023, Ankara, Turkey. Ankara: IKSAD Publishing House, 2023. Str. 555-562, ilustr. ISBN 978-625-367-347-5. https://www.korkutataconference.org/_files/ugd/614b1f_16c34c13a6234f2782cbdff104c7aa9a.pdf.
3. ZUPIN, Živa, KNIFIC, Karmen, PAVKO-ČUDEN, Alenka. Comfort properties of functional double bed knitted fabric for firefighters underwear. V: PERRIN AKÇAKOCA KUMBASAR, Emriye (ur.). Book of proceedings. 15th International İzmir Textile & Apparel Symposium, IITAS 2021, October 26 - 27, 2021, İzmir-Turkey. Izmir: Ege University, Faculty of Engineering, Department of Textile Engineering, 2021. Str. 429-435, ilustr. ISBN 978-605-338-329-1. http://www.iitas2021.com/en/. [COBISS.SI-ID 85826307]
4. ZUPIN, Živa, MOTNIKAR, Ana, ZOREC, Petja, GAJŠEK, Gašper, HRASTAR, Zala, MAVRIĆ, Zala, MIKLAVČIČ, Anita, PETROVČIČ, Elizabeta, REŠETIČ, Klara, SCHWARZBARTEL, Petra, TURK, Maruša, VIDMAR, Lara, VRHOVSKI, Iris. Exploring the history of hosiery and design of modern socks-socks. V: PERRIN AKÇAKOCA KUMBASAR, Emriye (ur.). Book of proceedings. 15th International İzmir Textile & Apparel Symposium, IITAS 2021, October 26 -27, 2021, İzmir-Turkey. Izmir: Ege University, Faculty of Engineering, Department of Textile Engineering, 2021. Str. 549-553, ilustr. ISBN 978-605-338-329-1. http://www.iitas2021.com/en/.
5. ZUPIN, Živa. Novosti na področju računalniškega oblikovanja tkanin, pletiv in pletenin na sejmih ITMA in Techtextil 2019 = Novelties in computer-aided design of woven and knitted fabrics and knittwear at Techtextil and ITMA 2019. Tekstilec : glasilo slovenskih tekstilcev. [Tiskana izd.]. 2019, vol. 62, priloga 2, str. si 123-sl 133, ilustr. ISSN 0351-3386.

SPECIALNE TKANINE

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Specialne tkanine
Course title:	Special woven fabrics
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Načrtovanje tekstilij in oblačil, druga stopnja, magistrski (v postopku)	Ni členitve (študijski program)	2. letnik	1. semester	izbirni

Univerzitetna koda predmeta/University course code: 0642813

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
0	30	30	0	0	60	4

Nosilec predmeta/Lecturer: Klara Kostajnšek, Matejka Bizjak

Vrsta predmeta/Course type: Izbirni/Elective

Jeziki/Languages:

Predavanja/Lectures:	Angleščina, Slovenščina
Vaje/Tutorial:	Angleščina, Slovenščina

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	Prerequisites:
Predmet nima posebnih pogojev za opravljanje študijskih obveznosti.	The course does not have special prerequisites.

Vsebina:	Content (Syllabus outline):
Projektiranje struktur tkanin za specialne aplikacije, kot so 3D, votle in večplastne strukture in vpliv strukture na fizikalno mehanske lastnosti pri specialnih aplikacijah. Tkalske tehnologije za izdelavo specialnih tkanin, prednosti in pomanjkljivosti. **Seminar**: Študij literature z ožjega področja specialnih tkanin in njihove izdelave, spoznavanje načrtovanja tkanine za izbrano specialno aplikacijo. **Vaje:** Načrtovanje strukture, geometrije in ustreznih lastnosti tkanih struktur za specialne aplikacije.	Design of fabric structures for special applications such as 3D, hollow and multilayer structures and the influence of structure on physical and mechanical properties in special applications. Weaving technologies for the production of special fabrics, advantages and disadvantages. **Seminar:** Study of literature in the field of specialty fabrics and their fabrication, learning about fabric design for selected specialty applications. **Exercises/laboratory practice:** Design of structure, geometry and corresponding properties of woven structures for special applications.

Temeljna literatura in viri/Readings:

Woven fabrics. Rijeka : InTech, 2012. Povezava(-e): http://www.intechopen.com/books/woven-fabrics

GANDHI, Kim (ed.). *Woven textiles: Principles, technologies and applications*. Woodhead Publishing, 2019.
BILISIK, K., KARADUMAN, N. S. , & BILISIK, N. E.. 3D Fabrics for Technical Textile Applications. In: Jeon, H. , editor. Non-woven Fabrics [Internet]. London: IntechOpen; 2016 [cited 2022 Mar 08]. Available from: https://www.intechopen.com/chapters/48971 doi: 10.5772/61224
HU, J. Structure and mechanics of woven fabrics. Boca Raton [etc.] : CRC Press ; Cambridge : Woodhead Pub., 2004
Tekoče periodične publikacije s področja tkanja in tkanih struktur, dostopno v knjižnici NTF OTGO / Current periodical publications in the field of weaving and woven structures;
Gradivo s sejmov sodobne tekstilne opreme / Materials from fairs of modern textile equipment;
Dodatno gradivo v spletni učilnici predmeta

Cilji in kompetence:	**Objectives and competences:**
Študenti spoznajo specialne tkanine in njihove aplikacije. **Kompetence**: • Poznavanje in razumevanje razvoja specialnih tkanih struktur v odvisnosti od splošnega razvoja sodobnih tehnik tkanja, IT rešitev na tem področju in smernic razvoja mehanske tekstilne tehnologije v slovenskem prostoru in globalno; • Sposobnost načrtovanja, analiziranja, razvoja in izdelave tkanih struktur za specialne tkanine z izboljšanimi lastnostmi; • Sposobnost načrtovanja, analiziranja in organiziranja tkalskega procesa z upoštevanjem sodobnih smernic krožnega gospodarstva in sposobnost predvidevanja morebitnih problemov pri proizvodnji ali končni aplikaciji; • Poznavanje strokovne terminologije s področja specialnih tkanin	Students learn about special woven fabrics and their applications. **Competencies:** • Knowledge and understanding of the development of woven structures in relation to the overall development of advanced weaving techniques, IT solutions and guidelines of advanced mechanical textile technologies in the Slovenian and global environment; • The ability to design, analyze, develop and manufacture advanced woven structures for specific applications with improved properties; • The ability to plan, analyze and organize the weaving process according to the guidelines of modern circular economy and to foresee possible problems in production or application; • Knowledge of technical terminology in the field of special woven fabrics

Predvideni študijski rezultati:	**Intended learning outcomes:**
Študenti osvojijo teoretično in praktično znanje na področju specialnih tkanin in najsodobnejših tkalskih tehnologij in ga povežejo z znanji, pridobljenimi na področju visokozmogljivih vlaken, naprednimi mehanskih tekstilnih postopki in mehansko funkcionalizacijo tekstilij. Dobljeno znanje znajo uporabiti za načrtovanje specialnih ploskih, 3D, votlih in plastenih tkanin v obliki končnih izdelkov ali ojačitvenih komponent za specialne aplikacije.	Students acquire theoretical and practical knowledge in the field of special woven fabrics and the new methods of weaving technologies and combine them with the knowledge in the field of high performance fibers, advanced mechanical textile processes and mechanical functionalization of textiles. Know how to use the resulting knowledge to design special 2D, 3D, holllow or multilayer woven fabrics, such as finished products or reinforcement components for special applications.

Metode poučevanja in učenja:	**Learning and teaching methods:**
Seminar, vodeni individualni študij, projektno delo, razprave, vaje.	Seminars, guided individual study, discussion, laboratory exercises.

Načini ocenjevanja:	**Delež/Weight**	**Assessment:**
Ocena strokovnega in kreativnega dela seminarja	50,00 %	Evaluation of the professional and creative work of the seminar
Predstavitve seminarske naloge	50,00 %	Presentation of the seminar work

Ocenjevalna lestvica: **Grading system:**

5 - 10, pri čemer velja, da je pozitivna ocena od 6 - 10	5 - 10, a student passes the exam if he is graded from 6 to 10

Reference nosilca/Lecturer's references:

Matejka Bizjak

KOSTAJNŠEK, Klara, BIZJAK, Matejka. Estimation of permeability properties of technologically developed jacquard fabrics = Ocena svojstava propustljivosti žakar tkanina dobijenih tehnološkim postupkom. *Hemijska industrija*. 2023, vol. 77, no. 3, str. 191-202. ISSN 2217-7426. https://www.ache-pub.org.rs/index.php/HemInd/article/view/1056, DOI: 10.2298/HEMIND221017008K. [COBISS.SI-ID 147161859]

ČUK, Marjeta, BIZJAK, Matejka, KOČEVAR, Tanja Nuša. Influence of simple and double-weave structures on the adhesive properties of 3D printed fabrics. *Polymers*. 2022, vol. 14, iss. 4, str. 1-18, ilustr. ISSN 2073-4360. https://www.mdpi.com/2073-4360/14/4/755.

KOSTAJNŠEK, Klara, DIMITROVSKI, Krste, KADOGLU, Hüseyin, ÇELIK, Pinar, BAŞAL BAYRAKTAR, Güldemet, ÜTE, Tuba Bedez, DURAN, Deniz, ERTEKIN, Mustafa, DEMŠAR, Andrej, BIZJAK, Matejka. Functionalization of woven fabrics with PBT yarns. *Polymers*. 2021, vol. 13, iss. 2, str. 1-19, ilustr. ISSN 2073-4360. https://www.mdpi.com/2073-4360/13/2/260.

STANKOVIĆ, Snežana, NOVAKOVIĆ, Milada, POPOVIĆ, Dušan M., POPARIĆ, Goran, BIZJAK, Matejka. Novel engineering approach to optimization of thermal comfort properties of hemp containing textiles. *The journal of The Textile Institute*. 2019, vol. 110, no. 9, str. 1271-1279, ilustr. ISSN 0040-5000. https://www.tandfonline.com/doi/full/10.1080/00405000.2018.1557367, DOI: 10.1080/00405000.2018.1557367.

BIZJAK, Matejka. ITMA 2019 - Tkanje = ITMA 2019 - Weaving. *Tekstilec : glasilo slovenskih tekstilcev*. [Tiskana izd.]. 2020, vol. 63, priloga 1, str. si100-sl111, ilustr. ISSN 0351-3386. [COBISS.SI-ID 21052931]

Klara Kostajnšek

KOSTAJNŠEK, Klara, BIZJAK, Matejka, ERTEKIN, Gözde, ERTEKIN, Mustafa. Evaluation of the UV protection properties of para-aramid woven fabrics with various specialty core yarns. *Polymers*. 2024, vol. 16, iss. 21, [article no.] 3090, str. 1-17

KOSTAJNŠEK, Klara, ZUPIN, Živa, HLADNIK, Aleš, DIMITROVSKI, Krste. Optical assessment of porosity parameters in transparent woven fabrics. *Polymers*. 2021, vol. 13, iss. 3, str. 1-16

KOSTAJNŠEK, Klara, DIMITROVSKI, Krste. Use of extended cover factor theory in UV protection of woven fabric. *Polymers*. 2021, vol. 13, iss. 8, str. 1-13.

KOSTAJNŠEK, Klara, PEULIĆ, Svjetlana, BIZJAK, Matejka. Design and development of a jacquard fabric for zero- waste garments. V: PERRIN AKÇAKOCA KUMBASAR, Emriye (ur.). *Book of proceedings*. 16th International İzmir Textile & Apparel Symposium, IITAS 2023, October 25 - 27, 2023, İzmĭr-Türkĭye. Izmir: Ege University, Faculty of Engineering, Department of Textile Engineering, 2023. Str. 440-443.

BIZJAK, Matejka, KOSTAJNŠEK, Klara. ITMA 2023 - Tkanje = ITMA 2023 – Weaving. *Tekstilec : glasilo slovenskih tekstilcev*. [Tiskana izd.]. 2023, vol. 66, priloga 2, str. si 106-si 117.

TEHNIČNE TEKSTILIJE

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Tehnične tekstilije
Course title:	Technical textiles
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Načrtovanje tekstilij in oblačil, druga stopnja, magistrski (v postopku)	Ni členitve (študijski program)	1. letnik	2. semester	obvezni

Univerzitetna koda predmeta/University course code:	0068965
Koda učne enote na članici/UL Member course code:	11269

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
30	30	30	0	0	90	6

Nosilec predmeta/Lecturer:	Brigita Tomšič, Dunja Šajn Gorjanc, Matejka Bizjak
Vrsta predmeta/Course type:	Obvezni/Compulsory

Jeziki/Languages:	Predavanja/Lectures:	Angleščina, Slovenščina
	Vaje/Tutorial:	Angleščina, Slovenščina

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	Prerequisites:
Predmet nima posebnih pogojev za opravljanje študijskih obveznosti.	The course does not have special prerequisites.

Vsebina:	Content (Syllabus outline):
• Tehnične tekstilije: aktualne razmere na trgu; • Večplastne medicinske in higienske tekstilije (kombinacije spunbonding in meltblowing temeljnih postopkov) • Zračno položene higienske tekstilije (Air-laid) • Medicinske tekstilije (biomateriali, nadzor infekcije, pametni materiali za hitro celjenje rane in sproščanje zdravilnih učinkovin) • Tekstilije v transportu (3D struto tekstilije, tkane in pletene strukture v avtomobilih in drugih transportnih sredstvih) • Tekstilije za zaščito okolja (filtracija) • Plastene tekstilije; • Premazane tekstilije • Tehnologija konfekcioniranja/spajanja tehničnih tekstilij	• Technical textiles: current market conditions; • Multilayer medical and hygienic textiles (combinations of spunbonding and meltblowing basic procedures) • Air-laid hygienic textiles • Medical textiles (biomaterials, infection control, smart woundcare materials and drug release systems) • Textiles in transport (3D struto textiles, woven and knitted structures in automotive interior and transportation) • Textiles for environmental protection (filtration) • Multilayer textiles; • Coated textiles • Assembly technology of technical textiles

• Trajnostni vidiki na področju tehničnih tekstilij; • Novosti na področju tehničnih tekstilij	• Sustainability aspects in the field of technical textiles; • Novelties in the field of technical textiles

Temeljna literatura in viri/Readings:

- HARROCKS, A., R. ; ANAND, S., C. Handbook of technical textiles. Cambridge: Woodhead Publishing, Boca Raton: The Textile Institute, CRC Press. 2000;
- HORROCKS, A.,R., ANAND, S., C. Handbook of Technical Textiles: Technical Textile Applications. Bolton: Elsevier Science, 2016;
- Functional and technical textiles. Cambridge : Woodhead Publishing ; [Amsterdam] : Elsevier ; [Manchester] : The Textile Institute, 2023
- ŠAJN GORJANC, Dunja. *Tehnične tekstilije : študijsko gradivo*. Ljubljana: Naravoslovnotehniška fakulteta, Oddelek za tekstilstvo, grafiko in oblikovanje, Katedra za tekstilno in oblačilno inženirstvo, [2021]. https://www.ntf.uni-lj.si/toi/employee/dunja-sajn/tehnicne_tekstilije/.
- ŠAJN GORJANC, D. Procesne linije za izdelavo koprenskih tekstilij : študijsko gradivo. Ljubljana : Naravoslovnotehniška fakulteta, Oddelek za tekstilstvo, 2014.

Cilji in kompetence:	**Objectives and competences:**
Cilji: • Študent se osredotoči na aktualnejša poglavja s področja tehničnih tekstilij, utrdi znanje s področja plastenih in premazanih tekstilij ter recikliranja tehničnih tekstilij. • Študent se seznani z novostmi in prihodnjimi izzivi na področju tehničnih tekstilij. **Kompetence**: • Pozna prednosti in omejitve uporabe tekstilij na tehničnih področjih; • Pozna aktualna poglavja na področju tehničnih tekstilij, trende in nove izzive na tem področju; • Zna definirati tehnološke in strukturne parametre pri izdelavi tehničnih tekstilij in jih uporabiti samostojno ali v kompozitu.	**Objectives**: • The student focuses on more current chapters in the field of technical textiles, consolidates knowledge in the field of layered and coated textiles and recycling of technical textiles. • The student gets acquainted with innovations and future challenges in the field of technical textiles. **Competences**: • Knows the advantages and limitations of the use of textiles in technical fields; • Knows current chapters in the field of technical textiles, trends and future challenges in this field; • Can define technological and structural parameters in the production of technical textiles and use them independently or in composite.

Predvideni študijski rezultati:	**Intended learning outcomes:**
Znanje in razumevanje: • Pozna strukturne in kakovostne parametre najaktualnejših tehničnih tekstilij; • Poglobi znanje s področja inženirskega načrtovanja in izbiro optimalnega tehnološkega procesa za izdelavo različnih struktur tehničnih tekstilij; • Zna strokovno in argumentirano izbrati plastene in premazane tekstilije. • Pozna tehnološke postopke konfekcioniranja tehničnih tekstilij • Pozna novosti in izzive na področju tehničnih tekstilij in recikliranja le teh.	**Knowledge and understanding**: • Students knows the structural and quality parameters of the latest technical textiles; • Students deepen knowledge in the field of engineering design and selection of the optimal technology process for the production of various structures of technical textiles; • Students can professionally and argumentatively choose multilayered and coated textiles. • Students know assembly technology of technical textiles • Students know innovations and challenges in the field of technical textiles and their recycling.

Metode poučevanja in učenja:	**Learning and teaching methods:**
Predavanja, seminar in vaje.	Lectures, seminar work and laboratory work.

Načini ocenjevanja:	**Delež/Weight**	**Assessment:**
Pisni ali ustni izpit	50,00 %	Written or oral exam
Seminar	30,00 %	Seminar

Izpit iz vaj	20,00 %	Preparation and written exam from laboratory work

Ocenjevalna lestvica:	**Grading system:**
5 - 10, pri čemer velja, da je pozitivna ocena od 6 - 10	5 - 10, a student passes the exam if he is graded from 6 to 10

Reference nosilca/Lecturer's references:

Dunja Šajn Gorjanc

1. ŠAJN GORJANC, Dunja. Functional properties of nonwovens as an insulating layer for protective gloves. *Polymers*. 2023, vol. 15, iss. 3, str. 1-15.
2. BATIČ, Eva, ŠAJN GORJANC, Dunja. Characteristics of laminates for car seats. *AUTEX research journal*, ISSN 1470-9589. [Print ed.], 29 Sep 2020, vol. , no. , 14 str. https://content.sciendo.com/view/journals/aut/ahead-of-print/article-10.2478-aut-2020-0032/article-10.2478-aut-2020-003xml.
3. BEZGOVŠEK, Špela, ŠAJN GORJANC, Dunja, PULKO, Boštjan, LENART, Stanislav. Influence of structural parameters of nonwoven geotextiles on separation and filtration in road construction. *AUTEX research journal*, ISSN 1470-9589. [Print ed.], Dec. 2020, vol. 20, no. 4, str. 449 - 460. https://www.degruyter.com/view/j/aut.ahead-of-print/aut-2019-0038/aut-2019-0038.xml?format=INT.

Matejka Bizjak

1. ČUK, Marjeta, BIZJAK, Matejka, KOČEVAR, Tanja Nuša. Influence of simple and double-weave structures on the adhesive properties of 3D printed fabrics. *Polymers*. 2022, vol. 14, iss. 4, str. 1-18, ilustr. ISSN 2073-4360. https://www.mdpi.com/2073-4360/14/4/755.
2. KOSTAJNŠEK, Klara, DIMITROVSKI, Krste, KADOGLU, Hüseyin, ÇELIK, Pinar, BAŞAL BAYRAKTAR, Güldemet, ÜTE, Tuba Bedez, DURAN, Deniz, ERTEKIN, Mustafa, DEMŠAR, Andrej, BIZJAK, Matejka. Functionalization of woven fabrics with PBT yarns. *Polymers*. 2021, vol. 13, iss. 2, str. 1-19, ilustr. ISSN 2073-4360. https://www.mdpi.com/2073-4360/13/2/260.
3. BIZJAK, Matejka. ITMA 2019 - Tkanje = ITMA 2019 - Weaving. *Tekstilec : glasilo slovenskih tekstilcev*. [Tiskana izd.]. 2020, vol. 63, priloga 1, str. si100-sl111, ilustr. ISSN 0351-3386. [COBISS.SI-ID 21052931]

Brigita Tomšič

1. ŠTULAR, Danaja, SAVIO, Elisa, SIMONČIČ, Barbara, ŠOBAK, Matic, JERMAN, Ivan, POLJANŠEK, Ida, FERRI, Ada, TOMŠIČ, Brigita. Multifunctional antibacterial and ultraviolet protective cotton cellulose developed by in situ biosynthesis of silver nanoparticles into a polysiloxane matrix mediated by sumac leaf extract. Applied Surface Science, 2021, 563, 15036
2. ŠTULAR, Danaja, JERMAN, Ivan, SIMONČIČ, Barbara, GRGIĆ, Katia, TOMŠIČ, Brigita. Influence of the structure of a bio-barrier forming agent on the stimuli-response and antimicrobial activity of a "smart" non-cytotoxic cotton fabric. Cellulose, ISSN 0969-0239, Oct. 2018, vol. 25, no. 10, str.
3. ŠTULAR, Danaja, KRUSE, Magnus, ŽUPUNSKI, Vera, KREINEST, Laura, MEDVED, Jože, GRIES, Thomas, BLAESER, Andreas, JERMAN, Ivan, SIMONČIČ, Barbara, TOMŠIČ, Brigita. "Smart" stimuli-responsive polylactic acid-hydrogel fibers produced via electrospinning. Fibers and polymers. ISSN 1229-9197, 2019, vol. 20, no. 9, str. 1857-1868.

TEKSTILIJE ZA ZAŠČITO

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Tekstilije za zaščito
Course title:	Textiles for protection
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Načrtovanje tekstilij in oblačil, druga stopnja, magistrski (v postopku)	Ni členitve (študijski program)	2. letnik	1. semester	izbirni

Univerzitetna koda predmeta/University course code: 0642811

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
0	30	30	0	0	60	4

Nosilec predmeta/Lecturer: Barbara Simončič, Brigita Tomšič

Vrsta predmeta/Course type: Izbirni/Elective

Jeziki/Languages:

Predavanja/Lectures:	Angleščina, Slovenščina
Vaje/Tutorial:	Angleščina, Slovenščina

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	Prerequisites:
Predmet nima posebnih pogojev za opravljanje študijskih obveznosti.	The course does not have special prerequisites.

Vsebina:	Content (Syllabus outline):
• Klasifikacija zaščitnih tekstilij, zahteve in standardi za zaščitne tekstilije, dejavniki, ki vplivajo na izbor tekstilnih materialov in postopkov plemenitenja za dosego zaščitnih lastnosti. • Pregled raziskav na specifičnem področju zaščitnih tekstilij v povezavi s tematiko magistrskega dela, kot na primer tekstilije za zaščito pred mikroorganizmi, insekti, ultravijoličnim sevanjem, toploto in ognjem, dežjem, mrazom ter balistično, elektrostatično, kemično in biološko zaščito. • Načrtovanje postopka izdelave zaščitne tekstilije z uporabo ustreznih apreturnih postopkov ter izbor najustreznejših analitskih metod za vrednotenje lastnosti zaščitnih tekstilij.	• Classification of protective textiles, requirements and standards for protective textiles, factors affecting the selection of textile materials and finishing processes to achieve protective properties. • State of the art of certain protective textiles related to the master thesis topic, such as textiles for protection against microorganisms, insects, ultraviolet radiation, heat and fire, rain, cold and ballistic, electrostatic, chemical and biological protection. • Planning the manufacturing process of protective textiles using appropriate finishing processes and selecting the most appropriate analytical methods for evaluating the properties of protective textiles.

Temeljna literatura in viri/Readings:

- Textiles for protection. 1st Edition. R.A. Scott (Ed.). Woodhead Publishing Limited: Cambridge, 2005, 754 str. Functional textiles for improved performance, protection and health. N. Pan and G. Sun (Eds.). Woodhead Publishing Limited: Cambridge, 2011, 528 str.
- Antimicrobial textiles. G. Sun (Ed.). Elsevier: Cambridge, 2016, 351 str.
- Smart textiles for medicine and healthcare. Materials, systems and applications. L. Van Langenhove (Ed.). Woodhead Publishing Limited: Cambridge, 2007, 312 str.
- Medical textiles and biomaterials for healthcare. S.C. Anand, J.F. Kennedy, M. Miraftab and S. Rajendran (Eds.). Woodhead Publishing Limited: Cambridge, 2006, 508 str.
- Superhydrophobic surfaces. A. Carré and K.L. Mittal (Eds.). Koninklijke Brill NV: Leiden, 2009, 495 str.
- Fire retardant materials. A.R. Horrocks and D. Price (Eds.). Woodhead Publishing Limited: Cambridge, 2000, 429 str.

Cilji in kompetence:	**Objectives and competences:**
Cilj predmeta je osvojiti temeljna in tehnološka znanja za načrtovanje in izpeljavo postopkov izdelave zaščitnih tekstilij. Magistrand nadgradi znanja s področja apretiranja tekstilij, ki jih je pridobil na dodiplomskem študiju. S tem pridobi pregled nad postopki za izdelavo zaščitnih tekstilij ter njihovimi funkcionalnimi lastnostmi.	The aim of the course is to gain basic and technological knowledge for the design and implementation of the manufacturing processes of protective textiles. The student expands the knowledge in the field of textile processing acquired in the undergraduate studies. Student gains an overview of the processes for manufacturing protective textiles and their functional properties.

Predvideni študijski rezultati:	**Intended learning outcomes:**
Znanje in razumevanje: • poznavanje različnih zaščitnih lastnosti tekstilij ter postopkov njihove izdelave, • poznavanje mehanizmov delovanja različnih zaščitnih sredstev na površini tekstilnih vlaken, • sposobnost strokovne izbire postopka in kemijskih apreturnih sredstev za izdelavo določene zaščitne funkcionalne lastnosti tekstilije, • sposobnost povezovanja teoretičnih in aplikativnih znanj s področij strukturnih, konstrukcijskih, mehanskih, fizikalnih in kemijskih lastnosti tekstilij ter apreturnih postopkov za dosego zahtevanih zaščitnih lastnosti, • sposobnost uporabe najsodobnejših analitskih metod za določitev kakovosti zaščite, • sposobnost ekološkega razmišljanja pri uporabi najsodobnejših načinov kemijske modifikacije tekstilnih vlaken pri izdelavi zaščitnih tekstilij.	Knowledge and understanding: • knowledge of the various protective properties of textiles and their manufacturing processes, • knowledge of the mechanisms of action of the various protective agents on the surface of textile fibres, • the ability to make a professional choice of process and chemical finishes to achieve a specific protective functional property of textiles, • the ability to integrate theoretical and applied knowledge in the field of structural, constructional, mechanical, physical and chemical properties of textiles and finishing processes to achieve the desired protective properties, • the ability to apply state-of-the-art analytical methods to determine the quality of protection, • the ability to think ecologically when applying modern methods of chemical modification of textile fibres in the production of protective textiles.

Metode poučevanja in učenja:	**Learning and teaching methods:**
Seminar, laboratorijske vaje	Seminar, laboratory exercises

Načini ocenjevanja:	**Delež/Weight**	**Assessment:**
Seminarsko delo	50,00 %	Seminar work
Poročilo eksperimentalnega dela	50,00 %	Report of experimental work

Ocenjevalna lestvica:	**Grading system:**
5 - 10, pri čemer velja, da je pozitivna ocena od 6 - 10	5 - 10, a student passes the exam if he is graded from 6 to 10

Reference nosilca/Lecturer's references:

1. TOMŠIČ, Brigita, MARKOVIĆ, Darka, JANKOVIĆ, Vukašin, SIMONČIČ, Barbara, NIKODINOVIĆ-RUNIĆ, Jasmina, ILIC-TOMIC, Tatjana, RADETIĆ, Maja. Biodegradation of cellulose fibers functionalized with CuO/Cu2O nanoparticles in combination with polycarboxylic acids. Cellulose, 2022, **29**, 287–302.
2. ČOLOVIĆ, Marija, VASILJEVIĆ, Jelena, ŠTIRN, Žiga, ČELAN KOROŠIN, Nataša, ŠOBAK, Matic, SIMONČIČ, Barbara, DEMŠAR, Andrej, MALUCELLI, Giulio, JERMAN, Ivan. New sustainable flame retardant DOPO-NH-functionalized polyamide 6 and filament yarn. Chemical Engineering Journal, **426**, 15. December 2021, 130760.
3. ŠTULAR, Danaja, SAVIO, Elisa, SIMONČIČ, Barbara, ŠOBAK, Matic, JERMAN, Ivan, POLJANŠEK, Ida, FERRI, Ada, TOMŠIČ, Brigita. Multifunctional antibacterial and ultraviolet protective cotton cellulose developed by in situ biosynthesis of silver nanoparticles into a polysiloxane matrix mediated by sumac leaf extract. Applied Surface Science, 2021, **563**, 150361.
4. ŠTULAR, Danaja, JERMAN, Ivan, SIMONČIČ, Barbara, GRGIĆ, Katia, TOMŠIČ, Brigita. Influence of the structure of a bio-barrier forming agent on the stimuli-response and antimicrobial activity of a "smart" non-cytotoxic cotton fabric. Cellulose, ISSN 0969-0239, Oct. 2018, vol. 25, no. 10, str.
5. VASILJEVIĆ, Jelena, ZORKO, Milena, ŠTULAR, Danaja, TOMŠIČ, Brigita, JERMAN, Ivan, OREL, Boris, MEDVED, Jože, KOVAČ, Janez, SIMONČIČ, Barbara. Structural optimisation of a multifunctional water- and oil-repellent, antibacterial, and flame-retardant sol-gel coating on cellulose fibres. Cellulose, ISSN 0969-0239, Mar. 2017, vol. 24, no. 3, str. 1511-1528.

TEMELJNI IZBIRNI PREDMET 1

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Temeljni izbirni predmet 1
Course title:	Basic elective course 1
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Načrtovanje tekstilij in oblačil, druga stopnja, magistrski (v postopku)	Ni členitve (študijski program)	1. letnik	1. semester	izbirni

Univerzitetna koda predmeta/University course code:	0111958
Koda učne enote na članici/UL Member course code:	845

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
45	0	45	0	0	90	6

Nosilec predmeta/Lecturer:	
Vrsta predmeta/Course type:	
Jeziki/Languages:	Predavanja/Lectures:
	Vaje/Tutorial:

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	**Prerequisites:**

Vsebina:	**Content (Syllabus outline):**

Temeljna literatura in viri/Readings:

Cilji in kompetence:	**Objectives and competences:**

Predvideni študijski rezultati:	**Intended learning outcomes:**

Metode poučevanja in učenja:	**Learning and teaching methods:**

Načini ocenjevanja:	Delež/Weight	Assessment:

Ocenjevalna lestvica:	Grading system:

Reference nosilca/Lecturer's references:

TEMELJNI IZBIRNI PREDMET 2

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Temeljni izbirni predmet 2
Course title:	Basic elective course 2
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Načrtovanje tekstilij in oblačil, druga stopnja, magistrski (v postopku)	Ni členitve (študijski program)	1. letnik	1. semester	izbirni

Univerzitetna koda predmeta/University course code:	0111959
Koda učne enote na članici/UL Member course code:	841

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
45	15	30	0	0	90	6

Nosilec predmeta/Lecturer:	
Vrsta predmeta/Course type:	
Jeziki/Languages:	Predavanja/Lectures:
	Vaje/Tutorial:

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	**Prerequisites:**

Vsebina:	**Content (Syllabus outline):**

Temeljna literatura in viri/Readings:

Cilji in kompetence:	**Objectives and competences:**

Predvideni študijski rezultati:	**Intended learning outcomes:**

Metode poučevanja in učenja:	**Learning and teaching methods:**

Načini ocenjevanja:	Delež/Weight	Assessment:

Ocenjevalna lestvica:	Grading system:

Reference nosilca/Lecturer's references:

TIPOLOGIJA BARV

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Tipologija barv
Course title:	Typology of colours
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Načrtovanje tekstilij in oblačil, druga stopnja, magistrski (v postopku)	Ni členitve (študijski program)	2. letnik	1. semester	izbirni

Univerzitetna koda predmeta/University course code: 0642817

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
0	30	30	0	0	60	4

Nosilec predmeta/Lecturer: Sabina Bračko

Vrsta predmeta/Course type: Izbirni/Elective

Jeziki/Languages:

Predavanja/Lectures:	Angleščina, Slovenščina
Vaje/Tutorial:	Angleščina, Slovenščina

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	Prerequisites:
Predmet nima posebnih pogojev za opravljanje študijskih obveznosti.	The course does not have special prerequisites.

Vsebina:	Content (Syllabus outline):
Študent se seznani s pojmom barve in z barvo kot sredstvom komunikacije glede na ožje strokovno področje. Na podlagi projektnega dela spozna prednosti in možnosti uporabe različnih postopkov numeričnega vrednotenja barve, seznani se z uporabo CIE kolorimetrije, barvnih sistemov, prostorov in zbirk. Seznani se s prednostmi in omejitvami naravnih in umetnih svetlobnih virov pri zaznavanju in vrednotenju barve. V okviru projektnega dela se nauči uporabljati naprave in standarde za merjenje barve in barvnih razlik. Na podlagi rezultatov se seznani z vlogo opazovalca in barvnega spomina pri vrednotenju barve.	Student is instructed with colour phenomenon and colour as a communication medium within selected professional area. Based on the project work, he learns about possibilities and advantages of numerical definition of colour, he is instructed with application of the CIE colorimetry, colour spaces and colour systems. He obtains experience in evaluating the advantages and limitations of natural and artificial light sources. Within the project work, he is instructed to use devices and standards for measuring colour and colour differences. He learns about the role of observer and his colour memory in the process of colour evaluation.

Temeljna literatura in viri/Readings:

R.W. G. Hunt, M. R. Pointer: Measuring Colour. 4th Edition. Chichester : J. Wiley & Sons, 2011.

N. Ohta, A. R Robertson: Colorimetry – Fundamentals and Applications. Chichester : J. Wiley & Sons, 2005. G. Wyszecki, W. S. Stiles: Color Science – Concepts and methods, Quantitative Data and Formulae. 2nd Edition. New York, Chichester, Weinheim, Brisbane, Toronto : J. Wiley & Sons, 2000. R. W. G. Hunt: The Reproduction of Colour. 6th Edition. Chichester : J. Wiley & Sons, 2004. Izbrani znanstveni in strokovni članki, dostopni v knjižnici NTF OTGO in na spletu./Selected scientific and professional papers, available in the NTF OTGO library and on the web.

Cilji in kompetence:	**Objectives and competences:**
Študent poglobi in nadgradi znanje o nastanku, zaznavanju in opisovanju barve na osnovi primerov v praksi. Razume notranje in zunanje dejavnike, ki vplivajo na videz barve in na lastnosti obarvanih izdelkov. Sposoben je definirati in uporabiti ustrezne metode, naprave in standarde za objektivno vrednotenje barve različnih materialov ter kritično ovrednotiti rezultate.	Student upgrades and consolidates the knowledge about formation, perception and description of colour, with focus on selected cases in praxis. Understands internal and external factors influencing the appearance of colour and coloured object. Capable to define and use appropriate methods, devices and standards to assure exact description of colour according to the material and the surroundings and to critically evaluate the results.

Predvideni študijski rezultati:	**Intended learning outcomes:**
Študent pozna in razume strukturne dejavnike, ki vplivajo na nastanek barve. Razume objektivne in subjektivne dejavnike, ki vplivajo na proces zaznavanja barve pri človeku. Zna uporabiti ustrezne barvne sisteme, barvne prostore in naprave za merjenje barve. Zna analizirati in predvideti vpliv različnih dejavnikov na videz barve.	Student understands structural factors influencing the formation of colour. Understands objective and subjective factors affecting the human colour vision. Capable to use appropriate colour systems, colour spaces and devices for colour measurement. Capable to analyse and predict the influence of different factors on colour appearance.

Metode poučevanja in učenja:	**Learning and teaching methods:**
Projektno delo, eksperimentalno laboratorijsko delo, vodeno učenje/konzultacije	Project work, experimental laboratory work , consultancy

Načini ocenjevanja:	**Delež/Weight**	**Assessment:**
Pisna in ustna predstavitev projektnega dela	50,00 %	Written and oral presentation of project work
Pisni/ustni izpit	50,00 %	Written/oral exam

Ocenjevalna lestvica:	**Grading system:**

Reference nosilca/Lecturer's references:

STJEPIĆ, Marta, BRAČKO, Sabina. Colour memory analysis for selected associative colours = Analiza barvnega spomina za izbrane asociativne barve. *Tekstilec : glasilo slovenskih tekstilcev*, ISSN 0351-3386. [Tiskana izd.], 2021, vol. 64, [no.] 3, str. 260-271, ilustr. http://www.tekstilec.si/wp-content/uploads/2021/11/10.14502Tekstilec2021.64.260-271.pdf. [COBISS.SI-ID 82511107]

MOŽINA, Klementina, BRAČKO, Sabina, KOVAČEVIĆ, Dorotea, BLAZNIK, Barbara, MOŽINA, Klemen. Legibility of prints on paper made from Japanese knotweed. *Bioresources*, ISSN 1930-2126, 2020, vol. 15, no. 2, str. 3999-4015. https://bioresources.cnr.ncsu.edu/resources/legibility-of-prints-on-paper-made-from-japanese-knotweed/. [COBISS.SI-ID 16364291]

KAVČIČ, Urška, MRAOVIĆ, Matija, BRAČKO, Sabina, MUCK, Deja. Printed thermochromic displays. *Coloration technology : the journal of the Society of Dyers and Colourists*, ISSN 1472-3581, Feb. 2019, vol. 135, no. 1, str. 60-66. https://onlinelibrary.wiley.com/doi/10.1111/cote.12372, doi: 10.1111/cote.12372. [COBISS.SI-ID 3516272]

BLAZNIK, Barbara, GREGOR-SVETEC, Diana, BRAČKO, Sabina. Influence of light and temperature on optical properties of papers. *Cellulose chemistry and technology*, ISSN 0576-9787, 2017, vol. 51, no. 7/8, str. 755-764, ilustr. http://www.cellulosechemtechnol.ro/onlinearticles.php. [COBISS.SI-ID 3449200]
JAVORŠEK, Dejana, JEVNIKAR, Elizabeta, BRAČKO, Sabina. Determination of human skin color - possibilities and limitations. V: BERHARDT, Leon V. (ur.). *Advances in medicine and biology. Vol. 111*, (Advances in medicine and biology, ISSN 2157-5398). New York: NOVA Science. 2017, str. 109-128. [COBISS.SI-ID 3365744]

TRAJNOSTNI RAZVOJ TEKSTILSTVA

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Trajnostni razvoj tekstilstva
Course title:	Sustainable development of textiles
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Načrtovanje tekstilij in oblačil, druga stopnja, magistrski (v postopku)	Ni členitve (študijski program)	2. letnik	1. semester	obvezni

Univerzitetna koda predmeta/University course code:	0068973
Koda učne enote na članici/UL Member course code:	11301

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
30	30	0	0	30	90	6

Nosilec predmeta/Lecturer:	Petra Eva Forte Tavčer
Vrsta predmeta/Course type:	Obvezni/Compulsory
Jeziki/Languages:	Predavanja/Lectures: Angleščina, Slovenščina Vaje/Tutorial: Angleščina, Slovenščina

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	Prerequisites:
Vpis v letnik študija.	Enrolment into study year.

Vsebina:	Content (Syllabus outline):
Vsebine naštetih poglavij se predelajo s poudarkom na problematiki tekstilne proizvodnje in uporabe tekstilij: • temelji ekologije in varstva okolja • mednarodni cilji in zaveze za varstvo okolja • okoljevarstvena zakonodaja • institucije varstva okolja • sistemi in orodja za prehod v trajnostno gospodarstvo • trajnostno upravljanje podjetij (EMAS) • standardi na področju varstva okolja • ekološki produkt in okoljske oznake • okoljski vpliv dobavne verige tekstilj in oblačil • analiza okoljskega življenjskega cikla (LCA) • krožna ekonomija v tekstilstvu in oblačilstvu • socialni vidik globalne proizvodnje tekstila	The contents chosen among the following topics are studied with the emphasis on textile production and use: • foundations of ecology and environmental protection • international goals and commitments for environmental protection • environmental legislation • environmental protection institutions • systems and tools for the transition to a sustainable economy • Sustainable Business Management (EMAS) • standardization and environmental management systems • the environmental impact of the textile and clothing supply chain • Life Cycle Analysis (LCA)

• problematika »hitre mode« in nakupne navade potrošnikov • trajnostno ravnanje potrošnikov s tekstilom	• sustainable product and ecology labels • circular economy in textiles and clothing • the social aspect of global textile production • the issue of "fast fashion" and consumer shopping habits • sustainable consumer behavior

Temeljna literatura in viri/Readings:

- Jani Zore, Gospodarjenje z odpadki, Zelena Slovenija, 2015
- Jana Sterže, Varstvo okolja, Zelena Slovenija, 2013
- Vanesa Čanji, Prehod v zeleno gospodarstvo, Zelena Slovenija, 2018
- Adrijana Viler Kovačič, Okoljevarstvena zakonodaja, Zelena Slovenija, 2010
- Milenko Roš, Sodobni postopki čiščenja odpadnih vod, Zelena Slovenija, 2015.
- WANG Y. Recycling in Textiles, Woodhead Publishing, Cambridge, 2006.
- MIRAFAB M., HORROCKS A.R. Ecotextiles, Woodhead Publishing, Cambridge, 2007.
- Znanstveni članki/scientific papers
- Internetni viri/internet sources
- Spletne strani ARSO in EU komisije.

Cilji in kompetence:	**Objectives and competences:**
• Poznavanje osnov okoljske zakonodaje in ekoloških standardov. • Razumevanje vplivov procesov tekstilne industrije in tekstilij na okolje, • Razumevanje pojma trajnostno delovanje v družbi, gospodarstvu in kot posameznik. • Razumevanje predpisanih in prostovoljnih pristopov k trajnostnemu gospodarstvu • Razumevanje globalne povezanosti mode, proizvodnje tekstila in socialne problematike • Sposobnost organizirati proizvodnjo in poslovanje po principih trajnostnega razvoja.	• Knowledge of the basics of environmental legislation and ecological standards. • Understanding the impact of textile and textile processes on the environment, • Understanding the concept of sustainable functioning in society, the economy and as an individual. • Understanding prescribed and voluntary approaches to a sustainable economy • Understanding the global connection between fashion, textile production and social issues • Ability to organize production and management according to the principles of sustainable development.

Predvideni študijski rezultati:	**Intended learning outcomes:**
Znanje in razumevanje: • vplivov tekstilne industrije na okolje. • okolju prijaznejših tekstilnih materialov, postopkov in izdelkov. • pomena ekoloških oznak. • zakonodaje in standardov s področja varovanja okolja. • sistemov in orodij za prehod v trajnostno gospodarstvo	**Knowledge and understanding of:** • influence of textile industry on the environment, • environment-friendlier textile materials, process and products, • eco-labelling and acquisition criteria, • legislation and standardisation on environmental protection, • systems and tools for the transition to a sustainable economy

Metode poučevanja in učenja:	**Learning and teaching methods:**
Predavanja, seminarji/projektno delo.	Lectures, seminars/project work.

Načini ocenjevanja:	**Delež/Weight**	**Assessment:**
Ustni/pisni izpit	50,00 %	Oral/written exam
Seminarska naloga/projektno delo	50,00 %	Seminar/project

Ocenjevalna lestvica: **Grading system:**

5 - 10, pri čemer velja, da je pozitivna ocena od 6 - 10	5 - 10, a student passes the exam if he is graded from 6 to 10

Reference nosilca/Lecturer's references:

PRELOG, Karla, FORTE-TAVČER, Petra. Čiščenje odpadne vode v barvarni tekstilnega materiala s flokulacijo in ponovna uporaba očiščene vode = Wastewater treatment in dyehouse using flocculation method and water re-use. Tekstilec : glasilo slovenskih tekstilcev. [Tiskana izd.]. 2017, vol. 60, no. 2, str. 137-151, ilustr. ISSN 0351-3386.

KOLBL REPINC, Sabina, FORTE-TAVČER, Petra, STRES, Blaž. Potential for valorization of dehydrated paper pulp sludge for biogas production : addition of selected hydrolytic enzymes in semi-continuous anaerobic digestion assays. Energy. 2017, vol. 126, str. 326-334, ilustr. ISSN 0360-5442.

ŽURGA, Zala, HLADNIK, Aleš, FORTE-TAVČER, Petra. Environmentally sustainable apparel acquisition and disposal behaviours among Slovenian consumers. AUTEX research journal. [Print ed.]. 2015, vol. 15, no. 4, str. 243-259, ilustr. ISSN 1470-9589.

ŽURGA, Zala, FORTE-TAVČER, Petra. Apparel purchasing with consideration of eco-labels among Slovenian consumers. Fibres & textiles in Eastern Europe, ISSN 1230-3666, 2014, vol. 22, no. 5 (107), str. 20-27, ilustr. http://www.fibtex.lodz.pl/article1334.html. [COBISS.SI-ID 3050096]

VISOKO ZMOGLJIVA VLAKNA

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Visoko zmogljiva vlakna
Course title:	High performance fibres
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Načrtovanje tekstilij in oblačil, druga stopnja, magistrski (v postopku)	Ni členitve (študijski program)	1. letnik	1. semester	obvezni

Univerzitetna koda predmeta/University course code:	0068971
Koda učne enote na članici/UL Member course code:	10512

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
60	15	15	0	0	90	6

Nosilec predmeta/Lecturer:	Tatjana Rijavec

Vrsta predmeta/Course type:	Obvezni/Compulsory

Jeziki/Languages:	Predavanja/Lectures:	Angleščina, Slovenščina
	Vaje/Tutorial:	Angleščina, Slovenščina

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	**Prerequisites:**
Vpis v letnik študija.	Enrolment into study year.

Vsebina:	**Content (Syllabus outline):**
Predavanja: • Opredelitev, razvoj, razvrstitev in poimenovanje visokozmogljivih vlaken (VZV); • Natezne, tlačne, toplotne, kemične lastnosti VZV; • Tehnološki postopki izdelave VZV; • Molekulska zgradba VZV; • Nadmolekulska struktura VZV; • Tekoče-kristalni polimeri; • Predstavitev tržno najpomembnejših VZV: aramidi,vlakna iz polietilena ultravisoke molekulske mase,ogljikova in steklena vlakna. **Seminarsko delo**: • Obravnava aktualnih problemov, npr. recikliranje, barvanje, razvoj izdelka ipd.	**Lectures**: • Definition, development, classification and description of high performance fibres (HPF); • Tensile, compression, thermal, chemical properties of HPF; • Technological processes of manufacture of HPF; • Molecular structure of HPF; • Supramolecular structure of HPF; • Liquid-crystal polymers; • Presentation of commercially the most important HPF: aramid, fibres from ultra-high molecular weight polyethylene, carbon and glass fibres. **Seminar work**: • Addressing current issues, e.g. recycling, painting, product development, etc.

Laboratorijske vaje:	**Laboratory exercises**:
• Razpoznavanje in študij lastnosti VZV.	• Identification and studies of the properties of HPF.

Temeljna literatura in viri/Readings:

Knjige/Books:

- High performance fibres. Uredil J. W. S. HEARLE. Cambridge: Woodhead Publishing, 2001;
- PREVORŠEK, D.C.: Visokozmogljiva vlakna iz gibkih polimerov: teorija in tehnologija. Uredila T. RIJAVEC in F. SLUGA. Ljubljana: Univerza v Ljubljani, Naravoslovnotehniška fakulteta, 1998;
- BUKOŠEK, V., RIJAVEC, T. Morfologija i struktura vlakana - vlakna visokih svojstava = Fibre morphology and structure - high performance fibres. Tekstil, ISSN 0492-5882. [Print ed.], 2006, vol. 55, no. 3, str. 135-146;
- HONGU, T., PHILIPS, G. O., TAKIGAMI, M. New millenium fibers. Boca Raton, Boston,New York, WashingTextile Institute, CRC press in Woodhead Publishing, 2005;
- RIJAVEC, T. Visokozmogljiva vlakna na trgu. V: BUKOŠEK, V. et al. Tekstilije v gumenih kompozitih. 1. izd. V Ljubljani: Naravoslovnotehniška fakulteta, Oddelek za tekstilstvo, 2011, str. 31-64, ilustr.

Članki in zapiski/Articles and notes:

- Strokovni in znanstveni članki s področja strukture, lastnosti in uporabe visokozmogljivih vlaken / Professional and scientific articles in the field of structure, properties and application of high-performance fibers.

Zapiski predavanj / Lecture notes:

Cilji in kompetence:	**Objectives and competences:**
Cilji predmeta so nuditi podiplomskim študentom sodoben pregled visokozmogljivih vlaken (VZV), razumevanje njihove strukture in morfologije v povezavi z lastnostmi VZV ter predstaviti bodoči razvoj VZV za tehnološko visoko zahtevne tehnične izdelke. Kandidati se neposredno pri predavanjih ali osebnih razgovorih in posvetovanjih seznanijo z načini oblikovanja VZV, njihovo strukturo nanometrski, mikrofibrilnIi in makrofibrilni ravni, lastnostmi in uporabo tržno pomembnih VZV. Predmet nudi razširjeno znanje o aromatskih poliamidih (aramidih), visokozmogljivih PE vlaknih, o drugih visokomodulnih vlaknih, termotropih aromatskih poliestrih, ogljikovih, steklenih, keramičnih vlaknih ter o kemično in toplotno obstojnih vlaknih.	**The aims of the course** is to provide graduate students an overview of modern high-performance fibres (HPF), understanding of their structure and morphology in conjunction with properties of HPF, and future development for technologically demanding technical textiles. Applicants directly at lectures or personal interviews and consultations learn methods for establishing high performance fibres, their structure at nanoscale, microfibrile and macrofibrile structural levels, properties and application of HPF. The course offers extensive knowledge of aromatic polyamide (aramid), high performance PE fibres and other commercially important fibres, thermotropic aromatic polyester, carbon, glass, ceramic fibres and the chemical and heat-resistant fibres.
Kompetence: • Sposobnost ocene in presoje dejavnikov, ki pogojujejo določene lastnosti vlaken; • Teoretično in informativno znanje omogočata sposobnost presoje in povezave lastnosti vlaken z njihovo morfološko strukturo, oziroma njeno spremembo v času tehnološke predelave in uporabe vlaken; • Sposobnost razpoznavanja različnih vrst VZV; • Sposobnost reševanja praktičnih problemov, povezanih s tehnologijo proizvodnje raznih tehničnih izdelkov.	**Competencies**: • The ability of assessment of factors that determine certain properties of the high performance fibres; • The theoretical and informative knowledge allow good judgment and link properties of the HPF to their morphological structure, its amendment during the technological processing and use of the fibre capacity to recognition of various types of HPF; • Ability recognition of various types of HPF; • Ability to solve practical problems associated with the manufacturing technology for various technical products.

Predvideni študijski rezultati:	Intended learning outcomes:
Sistematično pregledno znanje visokozmogljivih vlaken. Študent pridobi poglobljeno znanje o oblikovanju, molekulski, nadmolekulski strukturi in morfologiji VZV v povezavi z njihovimi lastnostmi. Ima znanje o spremembah lastnosti in obnašanju vlaken v različnih okoliških pogojih, kakor tudi znanje o uporabi VZV v sodobnih najzahtevnejših tehnologijah. Pridobljeno znanje o VZV omogoča razumevanje odvisnosti struktura – lastnosti. Razumevanje in poznavanje nastanka in strukture VZV ustvarja možnost razumevanja obnašanja vlaken in izdelkov iz njih v specifično zahtevnih ali ekstremnih pogojih njihove uporabe, kakor tudi na osnovi tega znanja njihovo ustrezno pravilno izbiro za končni izdelek.	Systematic overview knowledge of high-performance fibers. The student will acquire in-depth knowledge of design, molecular, supramolecular structure and morphology of HPF in relation to their properties. It has knowledge about changes in the properties and behavior of fibres in different ambient conditions, as well as knowledge on the use of HPF in the most demanding modern technologies. Acquired knowledge of HPF enable understanding of the relationship structure - properties. Understanding and knowledge of the origin and structure of HPF creates the possibility of understanding the behavior of the fibres and products derived therefrom in specific challenging or extreme conditions of their use, as well as on the basis of this knowledge their proper right choice for the final product.

Metode poučevanja in učenja:	Learning and teaching methods:
Metode poučevanja: predavanja, demonstracije, praktično delo. Metode učenja: individualno in skupinsko.	Teaching methods: lectures, demonstrations, practical work. Learning methods: individual and in groups.

Načini ocenjevanja:	Delež/Weight	Assessment:
Pisni in ustni izpit	50,00 %	Written and oral exam
Izdelava in predstavitev seminarja	30,00 %	Preparation and presentation of the seminar work
Opravljene vaje in poročila	20,00 %	Completed laboratory work and reports

Ocenjevalna lestvica:	Grading system:

Reference nosilca/Lecturer's references:

1. RIJAVEC, Tatjana. Visokozmogljiva vlakna na trgu. V: BUKOŠEK, Vili, et al. Tekstilije v gumenih kompozitih. 1. izd. V Ljubljani: Naravoslovnotehniška fakulteta, Oddelek za tekstilstvo, 2011, str. 31-64, ilustr. [COBISS.SI-ID 2540656]
2. RIJAVEC, T. Novosti i perspektive konvencionalnih vlakana i visokoučinkovitih (HPF) vlakana za tehničke namjene. Tekstil, 2004, 53(12), 630–641;
3. BUKOŠEK, Vili, RIJAVEC, Tatjana, GREGOR-SVETEC, Diana, BIZJAK, Matejka, DIMITROVSKI, Krste, ČERNE, Lidija, GOLOB, Gorazd. Tehnične tekstilije v gumarski industriji : Strokovno izobraževanje v Savatech, d.o.o., 19. januar 2011 - 9. februar 2011. Ljubljana: Naravoslovnotehniška fakulteta, Oddelek za tekstilstvo, 2011. 1 zv. (loč. pag.), ilustr. [COBISS.SI-ID 2542448];
4. RIJAVEC, Tatjana. Novosti na področju visokozmogljivih vlaken. V: Šola IRSPIN 2014, Hotel Slovenija, Litija, 8. 5. 2014-9. 5. 2014. Litija: Industrijski razvojni center slovenske predilne industrije: = IRSPIN, 2014, [16] str., ilustr. [COBISS.SI-ID 3006832]