

INFORMATION ON GRAPHIC AND INTERACTIVE COMMUNICATIONS STUDY PROGRAMME

Basic information

Name of programme	GRAPHIC AND INTERACTIVE COMMUNICATIONS
Programme features	
Type of study	University study programme
The degree of study	Undergraduate study programme
KLASIUS-SRV	(16204) Academic higher education (first Bologna cycle)
ISCED	(21) Arts
KLASIUS-P	(2130) Audio-visual techniques and (multi)media production (broad programmes)
KLASIUS-P-16	(0211) Audio-visual techniques and media production
Frascati	Engineering and technology (2)
Level SOK	Level SOK 7
Level EOK	Level EOK 6
Level EOVK	First degree undergraduate 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)	3
ECTS points per year	60
Modes of study	Full-time

Basic goals of the programme

The graphic industry is a typical service industry, as it markets services rather than its products. It uses graphic technology to enable the distribution, exchange and storage of information in the form of graphic products. Almost all the activity is directed at a known customer, a publishing house, a company, an organisation or an individual.

The industrial production and organisation characteristics are reflected in the division of labour present in this activity since Gutenberg. Today, there are many publishing, graphic and other companies on the market involved in producing graphic products, either in whole or in part. The division of labour is thus present in print shops and more widely.

The use of computer technology has led to intensive integration with other media, the distribution of the production of graphic products, changes in organisational structures, the need for new skills and significant changes in the existing skills and the emergence of new graphic professions.

The outlook for the graphic arts sector is very mixed. In the past, new media was generally not considered a replacement for old media but rather a complement, filling new niche markets. The same is true of the Internet, which many predict it will take over the role of all existing media and print media. We can expect print media to continue embracing new technologies and successfully exploiting them. These trends are already visible and are confirmed by the growth figures for paper production and the excellent performance of suppliers of graphic arts equipment. The graphic arts industry has reached a period of maturity that guarantees it a growth rate comparable to other “mature” industries over the next few decades. The turning point will be introducing entirely new communication technologies based on, e.g. natural language recognition, artificial intelligence and natural human-machine interactivity.

Another characteristic of the graphic activity is its link to a specific linguistic area since the information conveyed by a graphic product also includes texts in native language. This provides a perspective for the graphic activity within national contexts but simultaneously constitutes a barrier to extending the activity beyond the national, linguistic area.

The main goal of the bachelor’s degree study programme Graphic and Interactive Communications is to qualify experts who will be able to manage the most demanding technological processes in graphic arts and media as well as the field of interactive communications. At the same time, the purpose of the study is also to

offer graduates relevant fundamental natural science knowledge and expertise to continue their education at the second level.

In addition to the knowledge in the field of graphic arts, media and interactive communications, graduates develop scientific approach abilities through selected skills in mathematics, physics and chemistry. The default learning philosophy is such that, in addition to the knowledge acquired, graduates' other competences, skills and abilities are also necessary, emphasising the acquisition of the theoretical foundations of the rapidly evolving technologies in graphic activities and interactive communications. Graduates understand the technological realisation of graphically designed ideas, know how to solve ecological problems in the printing industry, are capable of creating new ideas and develop the abilities of interpersonal communication, negotiation, teamwork, leadership and creative thinking.

Goals and general competences of the programme

- In-depth understanding of theoretical and methodological concepts.
- Ability to transfer and apply theoretical knowledge to practice and problem-solving, in particular by seeking new sources of knowledge and applying scientific methods.
- Ability to experiment and visually communicate different concepts.
- Developed capacity for self-learning in professional field.
- Ability to understand the interrelationship between technology and design.
- Ability to understand visual notation and its technological translation into graphic products.
- Initiative and independence in decision-making and managing the most complex work.
- Social and communication capabilities to lead teamwork even in the case of projects of various sectors.
- Developed professional ethical and environmental responsibility.
- Ability to use modern tools, skills and competences especially in the area of ICT in everyday professional work.

Subject-specific competences

- In-depth knowledge of mathematics, physics and chemistry with a developed capacity for thinking in terms of natural sciences.
- Knowledge and understanding of technological parameters of digital media in visual and interactive applications and services, understanding of visualisation in digital media, the technological basis of the Internet and accompanying information services and of multimedia and interactivity in visual and interactive communications and services.
- Knowledge and understanding of physicochemical basis of conventional and digital printing techniques, measurement of processing variables, guiding, regulation and management of the printing process, advantages and shortcomings of various printing techniques.
- Knowledge of properties of graphic materials, relation between the properties of printed products and the properties of materials used in printing and other materials used in the manufacture of graphic products.
- Understanding and use of the method of critical analysis in the use of typographic design, use of graphic programs for design and composition of a text, ability to generate new ideas (creativity) in the use and setting of typographic elements.
- Knowledge about the connection and interdependence of basic artistic elements and procedures, knowledge of the basics of artistic language, artistic expression techniques and approaches to reading and designing an artistic idea.
- Capacity to use theoretical knowledge and discoveries in solving concrete environmental issues in the graphic industry.
- Developed capacity to functionally use the techniques of mutual communication, negotiation, teamwork, management and creative thinking.

Enrolment conditions

Enrolment in the undergraduate study programme Graphic and Interactive Communications is possible for:

- a) any person who has graduated (general matura) from secondary school;
- b) any person who has passed the vocational matura in any secondary school programme and an

- examination in one of the general matura courses; the chosen course cannot be the course that the candidate already passed at their vocational matura;
- c) any person who has completed any four-year secondary school programme prior to 1 June 1995.

Criteria in the event of enrolment limitation

If the number of candidates applying for the programme exceeds the number of enrolment places, the candidates from items a) and c) shall be selected according to their:

- overall performance at the general matura or final examination (60%);
- overall performance in the 3rd and 4th years of secondary school (40%).

Candidates from item b) will be selected according to their:

- overall performance at their vocational matura (40%);
- overall performance in the 3rd and 4th years of secondary school (40%);
- performance in the chosen general matura course (20%).

Criteria for crediting knowledge and skills obtained before enrolment

The faculty may choose to credit student's knowledge (obtained in the framework of different kinds of education) if it corresponds to the course content of the Graphic and Interactive Communications programme. The Study Committee of the Department of Textiles, Graphic Arts and Design is charged with crediting knowledge and skills obtained before enrolment; it does this on the basis of the student's written application and provided certificates or other documents proving the type of knowledge successfully acquired.

When crediting knowledge obtained before enrolment, the department 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 (the 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.

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 Graphic and Interactive Communications programme, 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 which the applicant would like to have credited. If the department Study Committee finds that the acquired knowledge can be credited, it is granted the same number of ECTS credit points 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.

Requirements for progression through the programme

To enrol in the higher year, a student must complete all practical classes and the following number of ECTS credit points obtained for enrolment in each individual year:

- minimum of 54 ECTS credit points for enrolment in the 2nd year;
- 60 ECTS credit points from the 1st year and minimum of 54 ECTS credit points from the 2nd year for enrolment in the 3rd year.

Exceptionally, the department Study Committee may grant progression to a higher year to a student who has achieved at least 42 ECTS credit points in the previous year if there are justified reasons for exception. Justified reasons are listed in the Statute of the University of Ljubljana.

To re-enrol in the same year of the study (repetition of the same year), students must have:

- minimum of 28 ECTS credit points for the 1st year;
- minimum of 28 ECTS credit points for the 2nd year.

During the course of studies, a student can repeat a year once or change the study programme once for having failed to meet their obligations in the former study programme.

Transfer between programmes

Transfer is possible between two study programmes:

- that upon the completion of studies ensure the acquisition of comparable competences or learning outcomes;
- where, in line with the criteria for recognition of knowledge and skills acquired prior to the enrolment in the university study programme Graphic and Interactive Communications, at least half of the obligations according to the European credit transfer system (ECTS) can be recognised from the first study programme, referring to compulsory courses of the 1st level university study programme Graphic and Interactive Communications.

An individual exam passed in the original study programme is recognised as passed in the 1st level university study programme Graphic and Interactive Communications if the harmonisation of the contents of both courses amounts to at least 75%. The recognised exam is evaluated with credit points in the original study programme; however, not with more credit points as evaluated in the 1st level university study programme Graphic and Interactive Communications.

A candidate can enrol through transfer in the 2nd or 3rd year of the university study programme Graphic and Interactive Communications if:

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

The Study Committee at the Faculty of Natural Sciences and Engineering determines for each candidate to what extent it recognises their already completed study obligations, determines new obligations and which year the candidate can enrol in.

Requirements for completing studies

To complete their studies, students must complete all the requirements for all courses they have enrolled in, and prepare and defend their thesis.

Requirements for completion of individual parts of the programme, if contained in the programme

The study programme does not contain individual parts of the programme.

Professional, scientific or artistic title

- Bachelor of Science

Abbreviation of professional, scientific or artistic title

- B.Sc.

STUDY PROGRAMME CURRICULUM

GRAPHIC AND INTERACTIVE COMMUNICATION

2025/2026

Name of study programme	Graphic and interactive communication
Programme characteristics	
Type	academic
Cycle	bachelor
University of Ljubljana members	Faculty of Natural Sciences and Engineering, Aškerčeva cesta 12, 1000 Ljubljana, Slovenija

Year 1, obvezni

				Contact hours									
	University Course Code	Course title	Lecturers	Lectures	Seminar	Tutorials	Clinical tutorials	Other forms of study	Individual student work	Total hours	ECTS	Semesters	Elective
1.	0642798	Mathematics 1	Janko Bračič	45	0	45	0	0	90	180	6	1st semester	no
2.	0642800	Physics	Borut Paul Kerševan	45	0	45	0	0	90	180	6	1st semester	no
3.	0068727	Chemistry 1	Urška Lavrenčič Štangar	60	0	30	0	0	90	180	6	1st semester	no
4.	0089478	Information technologies	Aleš Hladnik	30	15	30	0	15	90	180	6	1st semester	no
5.	0089482	Printing processes 1	Deja Muck	30	15	30	0	15	90	180	6	1st semester	no
6.	0642799	Mathematics 2	Janko Bračič	45	0	45	0	0	90	180	6	2nd semester	no
7.	0642801	Physics 2	Borut Paul Kerševan	45	0	45	0	0	90	180	6	2nd semester	no
8.	0068728	Chemistry 2	Uroš Grošelj	45	15	30	0	0	90	180	6	2nd semester	no
9.	0089477	Graphic materials	Diana Gregor Svetec, Sabina Bračko	45	15	30	0	0	90	180	6	2nd semester	no
10.	0554327	Graphic prepress	Raša Urbas	30	15	30	0	15	90	180	6	2nd semester	no
Total				420	75	360	0	45	900	1800	60		

Year 2, obvezni

				Contact hours									
	University Course Code	Course title	Lecturers	Lectures	Seminar	Tutorials	Clinical tutorials	Other forms of study	Individual student work	Total hours	ECTS	Semesters	Elective
1.	0089488	Statistics	Stanislav Praček	30	0	30	0	0	60	120	4	1st semester	no
2.	0089491	Typographic design	Klementina Možina	60	0	30	0	0	90	180	6	1st semester	no
3.	0089490	Theory of graphic processes	Maja Klančnik, Sabina Bračko	45	15	30	0	0	90	180	6	1st semester	no
4.	0089487	Interactivity and animation	Helena Gabrijelčič Tomc	30	15	45	0	0	90	180	6	1st semester	no
5.	0089486	Basics of artistic expression	Marica Starešinič	30	30	0	0	0	60	120	4	1st semester	no
6.	0559656	Photography and video	Marica Starešinič	30	0	30	0	0	60	120	4	1st semester	no
7.	0089484	Interactive media 1	Aleš Hladnik	30	15	30	0	15	90	180	6	2nd semester	no
8.	0089485	Colour metrics in graphic arts	Sabina Bračko	30	15	30	0	15	90	180	6	2nd semester	no
9.	0089492	Printing plates	Maja Klančnik	30	15	15	0	0	60	120	4	2nd semester	no
10.	0089489	English for specific purposes	Barbara Luštek Preskar, prof. angl. in nem.	0	60	0	0	0	60	120	4	2nd semester	no
11.	0111830	Optional course 1		30	20	30	10	0	90	180	6	2nd semester	no
12.	0111831	Optional course 2		30	15	15	0	0	60	120	4	2nd semester	no
Total				375	200	285	10	30	900	1800	60		

Year 2, izbirni predmeti letni semester

			Contact hours	
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	University Course Code	Course title	Lecturers	Lectures	Seminar	Tutorials	Clinical tutorials	Other forms of study	Individual student work	Total hours	ECTS	Semesters	Elective
1.	0089458	Printing processes 2	Deja Muck	30	15	30	0	15	90	180	6	2nd semester	yes
2.	0554341	Video	Helena Gabrijelčič Tomc	30	15	30	0	15	90	180	6	2nd semester	yes
3.	0089457	Information design	Primož Fijavž	30	30	30	0	0	90	180	6	2nd semester	yes
4.	0089454	Packaging 1	Diana Gregor Svetec	30	15	15	0	0	60	120	4	2nd semester	yes
5.	0099560	User interface planning	Jože Guna	30	15	15	0	0	60	120	4	2nd semester	yes
6.	0089469	Basics of 3D modelling	Helena Gabrijelčič Tomc	30	15	45	0	0	90	180	6	2nd semester	yes
7.	0642796	Practical training	Habilitiran učitelj	0	0	0	0	0	120	120	4	2nd semester	yes
8.	0644018	Packaging materials and technology	Diana Gregor Svetec	30	15	45	0	0	90	180	6	2nd semester	yes
Total				210	120	210	0	30	690	1260	42		

Year 3, obvezni

				Contact hours									
	University Course Code	Course title	Lecturers	Lectures	Seminar	Tutorials	Clinical tutorials	Other forms of study	Individual student work	Total hours	ECTS	Semesters	Elective
1.	0089497	Typography in various media	Klementina Možina	45	15	30	0	0	90	180	6	1st semester	no
2.	0099372	Interactive systems	Danica Dolničar	30	15	30	0	15	90	180	6	1st semester	no
3.	0089496	Artistic analysis of graphic products	Marica Starešinič	30	15	0	0	15	60	120	4	1st semester	no

4.	0089493	Colour management	Jože Guna, Raša Urbas	30	15	30	0	15	90	180	6	1st semester	no
5.	0559673	Studio photography	Jure Ahtik	15	15	30	0	0	60	120	4	1st semester	no
6.	0089495	Information sources and methodology of thesis work	Danica Dolničar	30	15	15	0	0	60	120	4	1st semester	no
7.	0111832	Optional course 3		35	25	23	0	7	90	180	6	2nd semester	no
8.	0111833	Optional course 4		35	25	23	0	7	90	180	6	2nd semester	no
9.	0111834	Optional course 5		32	15	11	0	2	60	120	4	2nd semester	no
10.	0111835	Optional course 6		32	15	11	0	2	60	120	4	2nd semester	no
11.	0111836	Degree		0	0	0	0	150	150	300	10	2nd semester	no
		Total		314	170	203	0	213	900	1800	60		

Year 3, izbirni predmeti letni semester

				Contact hours									
	University Course Code	Course title	Lecturers	Lectures	Seminar	Tutorials	Clinical tutorials	Other forms of study	Individual student work	Total hours	ECTS	Semesters	Elective
1.	0089461	Environmental protection in graphic arts	Maja Klančnik	45	15	30	0	0	90	180	6	2nd semester	yes
2.	0089466	Design of sustainable packaging	Diana Gregor Svetec, Klementina Možina	30	0	45	0	15	90	180	6	2nd semester	yes
3.	0099373	Business information applications	Raša Urbas, Urška Stanković Elesini	45	45	0	0	0	90	180	6	2nd semester	yes
4.	0089474	Quality management	Klemen Možina	30	60	0	0	0	90	180	6	2nd semester	yes
5.	0089467	Typeface design	Klementina Možina	30	15	45	0	0	90	180	6	2nd semester	yes

6.	0554341	Video	Helena Gabrijelčič Tomc	30	15	30	0	15	90	180	6	2nd semester	yes
7.	0089458	Printing processes 2	Deja Muck	30	15	30	0	15	90	180	6	2nd semester	yes
8.	0089463	Graphic finishing	Urška Vrabič Brodnjak	30	15	0	0	15	60	120	4	2nd semester	yes
9.	0089462	Packaging 2	Diana Gregor Svetec	30	15	15	0	0	60	120	4	2nd semester	yes
10.	0089468	Packaging design	Urška Vrabič Brodnjak	30	15	15	0	0	60	120	4	2nd semester	yes
11.	0089460	3D technologies	Deja Muck	30	0	30	0	0	60	120	4	2nd semester	yes
12.	0089465	Graphic engineering	Urška Stanković Elesini	45	15	0	0	0	60	120	4	2nd semester	yes
13.	0068758	Entrepreneurship	BLAŽ ZUPAN	30	0	30	0	0	60	120	4	2nd semester	yes
14.	0089456	Media visualisation	Jure Ahtik	15	30	15	0	0	60	120	4	2nd semester	yes
15.	0554373	Basics of 3D animation and simulation	Helena Gabrijelčič Tomc	15	15	30	0	0	60	120	4	2nd semester	yes
16.	0554374	User interface developing	Jože Guna	30	30	0	0	0	60	120	4	2nd semester	yes
17.	0642796	Practical training	Habilitiran učitelj	0	0	0	0	0	120	120	4	2nd semester	yes
18.	0644019	Trends in packaging development	Diana Gregor Svetec	30	15	30	0	15	90	180	6	2nd semester	yes
Total				525	315	345	0	75	1380	2640	88		

3D TEHNOLOGIJE

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	3D tehnologije
Course title:	3D technologies
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Grafične in interaktivne komunikacije, prva stopnja, univerzitetni	Ni členitve (študijski program)	3. letnik	2. semester	izbirni

Univerzitetna koda predmeta/University course code:	0089460
Koda učne enote na članici/UL Member course code:	11298

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:	Deja Muck
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Vrsta predmeta/Course type:	Izbirni/Elective
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Jeziki/Languages:	Predavanja/Lectures:	Angleščina, Slovenščina
	Vaje/Tutorial:	Angleščina, Slovenščina

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

Vpis v program. Pogoj za opravljanje obveznosti je prisotnost na predavanjih, seminarjih in vajah. Zahtevana prisotnost na vajah je 100 %.

Prerequisites:

Enrolment in the programme. Attendance at lectures, seminars and tutorials is a prerequisite for fulfilling obligations. The attendance requirement for tutorials is 100%.

Vsebina:

Predstavitev delokroga 3D-tehnologij.

3D-tehnologije zajema objektov:

- kontaktne (nedestruktivne),
- nekontaktne (reflektivne, presevne)

3D-skeniranje

- zajem specifičnih površinskih značilnosti objektov (topologija, tekstura, barva)
- digitalizacija objektov, kot hitrejša in enostavnejša pot k 3D upodobitvi

Fotogrametrija.

Blender

- seznanitev s programom za 3D-modeliranje

Content (Syllabus outline):

Presentation of 3D-technologies workflow.

3D-technology for objects capturing:

- contact (non-destructive)
- non-contact (reflective, transmissive)

3D-scanning

- capture of specific surface characteristics of objects (topology, texture, color)
- object digitization, as a faster and simpler way for 3D vizualization

Photogrametry.

Blender

- familiarization with the program for 3D-modeling

- grobe osnove 3D-modeliranja - pregled in priprava datotek za 3D-tisk - pregled najpogostejših napak 3D-modelov 3D-tehnologije tiska - pregled razvoja in trendov - poglobljena predstavitev najpomembnejših tehnologij (prednosti, omejitve) - predstavitev materialov, mehanizmov delovanja posameznih procesov Izbira ustrezne tehnologije za doseg želenih končnih lastnosti tiskanega 3D-objekta. 3D tehnologije in različne resničnosti.	- coarse basics of 3D-modeling - review and preparation of models for 3D-printing - overview of the most common defects of 3D-models 3D-printing technologies - review of the development and trends - in-depth presentation of the most important technologies (advantages, disadvantages) - presentation materials, mechanisms of action of individual processes Selection of the appropriate technology to achieve the desired final properties of the 3D-printed object. 3D technologies and various realities.
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Temeljna literatura in viri/Readings:

- Militello G. Laura, Sushereba E. Christen, Ramachandran Sowmya, Handbook of Augmented Reality, Training design principles, Cambridge University Press, 2023.
- Pesce Marc, Augmented Reality, Polity Press, 2021.
- Da Silva Daniel Carneiro, Special Application of Photogrametry, InTech, 2012.
- Muck Deja, Križanovskij Igor: 3D-tisk, Ljubljana, 2015.
- Christopher Barnatt: 3D printing, Second Edition, Amazon, 2014.
- Ian Gibson, David W. Rosen, Brent Stucker: Additive Manufacturing Technologies, Springer, 2010.
- Christopher Barnatt: 3D printing, The next industrial revolution, First edition, Explaining the Future, 2013.
- Paulo Jorge Bartolo; Stereolithography, Materials, Process and Applications, Springer, 2011.

Dodatna literatura in viri/Supplementary literature:

- <http://www.wohlersassociates.com>
- <http://www.3ders.org/applications.html>
- <http://reprap.org>
- www.stratasys.com
- www.3dsystems.com
- <http://www.explainingthefuture.com>
- <http://www.blender.org>

Cilji in kompetence:

Predmet omogoča pridobitev osnovnega znanja s področja 3D-tehnologij, ki so vezana na digitalizacijo, upodobitev, pripravo modela za 3D-tisk in tisk. Predstavlja zelo dobro osnovo ter poveztljivost s predmetom Osnove 3D-modeliranja.

Osnovni cilj predmeta je seznaniti študente z najpomembnejšimi trendi na področju 3D-tehnologij, ter pridobiti kakovostno znanje predvsem o prednostih in omejitvah posameznih 3D-tehnologij tiska. Cilj je, podati znanja, ki jih bodo lahko študentje koristno uporabili v nadaljnjem delu; kot. npr. izbrati ustrezno tehnologijo 3D-zajema in 3D-tiska glede na predhodno določene želene lastnosti končnega 3D-objekta. Eden od pomembnih ciljev je tudi integracija 3D tehnologij z različnimi resničnostmi.

Objectives and competences:

The course enables the acquisition of basic knowledge in the field of 3D-technologies, which are linked to the digitalization, the preparation of the model for 3D-printing and printing. It represents a very good basis and connectivity with the subject The fundamentals of 3D-modeling.

The main goal of the course is to acquaint students with the most important trends in the field of 3D-technologies, and to obtain high levels of knowledge in particular about the advantages and disadvantages of each 3D-printing technologies. The aim is to provide knowledge to students that will be useful in their future work; like. eg. choose the appropriate technology of 3D-capturing and 3D printing according to predetermined desired properties of the finished 3D-object. One of the important objectives is also to integrate 3D technologies with different realities.

Predvideni študijski rezultati:

Študentje bodo osvojili najnovejša znanja s področja vseh najpomembnejših 3D-tehnologij zajema in tiska. Spoznali bodo postopek priprave modelov za 3D-tisk in napake, ki lahko nastanejo ob neustrezni pripravi. Ta znanja bodo študentom omogočala večjo kreativnost, konkurenčnost in možnost samostojnega nadaljnjega dela.

Intended learning outcomes:

Students will gain the latest knowledge from the field of major 3D-technologies for capturing and printing. They will learn the process of preparing models for 3D-printing and the defects that can occur at unsuitable preparation. This knowledge will allow students greater creativity, competitiveness and the possibility for their further independent work.

Metode poučevanja in učenja:

Predavanja, seminarji, laboratorijske vaje in / ali projektno delo potekajo v predavalnici, v laboratoriju in / ali preko spleta s pomočjo ustrezne opreme.

Learning and teaching methods:

Lectures, seminars, laboratory exercises, and/or project work will take place in the lecture hall, in the laboratory, and/or online using appropriate equipment.

Načini ocenjevanja:**Delež/Weight****Assessment:**

Teoretični del, predavanja: pisni in/ali ustni izpit	60,00 %	Theoretical part, lectures: written and/or oral exam
Vaje	40,00 %	Tutorial

Ocenjevalna lestvica:

5 - 10, pri čemer velja, da je pozitivna ocena od 6 - 10

Grading system:

5 - 10, a student passes the exam if he is graded from 6 to 10

Reference nosilca/Lecturer's references:

Univerzitetni, visokošolski ali višješolski učbeniki z recenzijo / Reviewed university, higher education or higher vocational education textbook:
 MUCK, Deja, KRIŽANOVSKI, Igor (avtor, ilustrator). 3D-tisk : [--- tehnologije 3D-tiska, priprava 3D-modelov za tisk, pojmovnik ---]. 1. izd. Ljubljana: Pasadena, 2015. 221 str.

Izvirni znanstveni članki / Original scientific article:
 GREGOR-SVETEC, Diana, LESKOVŠEK, Mirjam, VRABIČ BRODNJAK, Urška, STANKOVIČ ELESINI, Urška, MUCK, Deja, URBAS, Raša. Characteristics of HDPE/cardboard dust 3D printable composite filaments. Journal of materials processing technology. February 2020, vol. 276, 9 str.

Strokovni članek / Professional article:
 ŽIŽEK, Mojca, MUCK, Deja. Reliefna reprodukcija umetniškega dela. Grafičar : revija slovenskih grafičarjev. 2020, [št.] 4, str. 16-19.

MUCK, Deja, ŠTULAR, Meta. Zgodovina, uporaba in opolnomočenje uporabnikov na pragu 4. industrijske revolucije. Pro Bauhaus. poletje 2020, [št.] 2, str. 114-119.

TRČEK PEČAK, Tamara, MADŽARAC, Nada, MUCK, Deja. Med izvirnikom in kopijo : kaj vidimo z očmi, kaj "vidimo" s prsti. Grafičar : revija slovenskih grafičarjev. 2019, [št.] 4, str. 10-14.

PIVAR, Matej, MUCK, Deja. 4D - tisk : 3D - tisk s četrto dimenzijo ... Grafičar : revija slovenskih grafičarjev. 2018, [št.] 6, str. 8-11.

JANČIČ, Valentina, GABRIJELČIČ TOMC, Helena, MUCK, Deja, ČERČE, Luka, KOPAČ, Janez. Optimizacija 3D-modela skenirane človeške glave. Grafičar : revija slovenskih grafičarjev. 2016, [št.] 1, str. 9-11.

Mentorstvo pri diplomskih delih / Supervisor for undergraduate theses:
 BAHUN, Kristjan. 3D tisk pripomočkov za kitaro : diplomsko delo = 3D printed guitar equipment : diploma thesis. Ljubljana: [K. Bahun], 2020. XII, 53 str.

AHČIN, Nuša. Analiza in primerjava 3D zajema s strukturirano svetlobo in fotogrametrijo : diplomsko delo = Analysis and comparison of 3D capturing with structured light and photogrammetry : diploma thesis. Ljubljana: [N. Ahčin], 2020. XI, 40 f.

BRCE, Jon. Izdelava in uporaba 3D tiskane forme za slepi tisk : diplomsko delo = Design and production of travel journal : diploma thesis. Ljubljana: [J. Brce], 2020. XII, 43 f.

ROŠER, Anja. Izdelava pripomočka za prepoznavanje in učenje barv slabovidnih otrok : diplomsko delo = Development of accessory for easier learning and recognition of colours for visually impaired children : diploma thesis. Ljubljana: [A. Rošer], 2020. XI, 31 f.

ŠORLI, Gregor. Modeliranje in 3D tisk sestavljive deske za kajtanje : diplomsko delo = 3D printing and modelling of composable kite board : diploma thesis. Ljubljana: [G. Šorli], 2020. XII, 33 f.

ŽIŽEK, Mojca. Reliefna reprodukcija umetniškega dela : diplomsko delo = Relief reproduction of an artwork : diploma thesis. Ljubljana: [M. Žižek], 2020. XIII, 59 f.

BARVNO UPRAVLJANJE

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Barvno upravljanje
Course title:	Colour management
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Grafične in interaktivne komunikacije, prva stopnja, univerzitetni	Ni členitve (študijski program)	3. letnik	1. semester	obvezni

Univerzitetna koda predmeta/University course code:	0089493
Koda učne enote na članici/UL Member course code:	10003

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	30	0	15	90	6

Nosilec predmeta/Lecturer:	Jože Guna, Raša Urbas
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Vrsta predmeta/Course type:	Obvezni/Compulsory
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Jeziki/Languages:	Predavanja/Lectures: Angleščina, Slovenščina
	Vaje/Tutorial: Angleščina, Slovenščina

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

Pogoj za vključitev v delo je vpis v letnik študija in aktivna udeležba pri vseh učnih enotah predmeta (predavanja, seminar in vaje).
Pozitivno ocenjena seminarska naloga oz. izdelek s predstavitev/zagovorom in pozitivno opravljene vaje (pisno in/ali ustno preverjanje znanja) so pogoj za pristop k pisnemu in/ali ustnemu izpitu teoretičnega dela predmeta.
Pogojena prisotnost pri posameznih učnih enotah:

- predavanja: 70 %,
- seminar: 80 % in
- vaje: 100 %.

Prerequisites:

The prerequisite for participation in the course is enrolment in the study year and active participation in all teaching units of the course (lectures, seminars and exercises).
A completed and positively graded seminar or product with a presentation/defence and positively graded practicum (tutorial) (written and/or oral exam) are a prerequisite for participation in the written and/or oral exam of the theoretical part of the course.
Conditional attendance for individual course units:

- lectures: 70%,
- seminar: 80% and
- practicum (tutorial): 100 %.

Vsebina:

Razvoj priporočil, specifikacij, evropskih, mednarodnih in nacionalnih standardov, pomen standardizacije grafičnega komunikacijskega procesa, teoretične osnove reprodukcije barv, barvno upravljanje v grafičnem procesu, standardi za

Content (Syllabus outline):

Development of recommendations, specifications, European, international and national standards, the importance of standardization of the graphic communication process, the theoretical basis of colour reproduction, colour management in the

denzitometrične, barvno-metrične in druge meritve v grafičnem procesu, standardi za izmenjavo datotek v grafičnem procesu (PDF-X), standardizirana izdelava tiskovnih form (za ploski – ofsetni tisk), standardi za vodenje procesa barvne reprodukcije v ofsetnem, časopisnem in flekso tisku, standardi za vodenje procesa barvne reprodukcije v digitalnih tehnikah tiska, ostali pomembni standardi v grafičnem procesu.	graphic process, standards for densitometric, colourimetric and other measurements in the graphic process, standards for file exchange in the graphic process (PDF-X), standardized production of printing plates for (flat – offset printing), standards for the management of color reproduction processes in offset, newsprint and flexo printing, standards for the management of color reproduction in digital printing techniques, other relevant standards in the graphic process.
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Temeljna literatura in viri/Readings:

Temeljna literatura

JAVORŠEK, Dejana, KARLOVIĆ, Igor, MUCK, Tadeja. Reproduciranje barv in barvno upravljanje. Ljubljana: Naravoslovnotehniška fakulteta, Oddelek za tekstilstvo, 2013.

Dodatna literatura

KIPPHAN, H. Handbook of Print Media. Berlin [etc.] : Springer, 2001.

HUNT, R. W. G. *The Reproduction of Colour*. John Wiley & Sons, 2004.

YULE, J. A. C. *Principles of Color Reproduction*. Pittsburgh: GATF Press, 2001.

FRASER, B., MURPHY, C., in BUNTING, F. *Real World Color Management: Industrial-Strength Production Techniques*. Berkeley: Peachpit Press, 2005.

Cilji in kompetence:

Poglobljeno spoznavanje teoretičnih osnov procesa barvnega upravljanja, različnih operacijskih sistemov, sistema barvnega upravljanja ICC, poglobljeno spoznavanje delokroga barvnega upravljanja v grafičnih programih, merilnih inštrumentov in različne programske opreme za profiliranje naprav, predstavitev postopkov kalibracije in karakterizacije vhodnih, vhodno/izhodnih in izhodnih naprav, metode za ovrednotenje kakovosti izdelanih profilov, seznanitev z vsemi najpomembnejšimi standardi na področju barvnega upravljanja.

Predmetnospecifične kompetence:

- poznavanje in razumevanje temeljev in razvoja standardizacije grafičnega procesa,
- poznavanje in razumevanje postopkov priprave in sprejemanja priporočil, specifikacij, evropskih, mednarodnih in nacionalnih standardov,
- sposobnost za reševanje konkretnih problemov uvajanja standardov v grafičnem komunikacijskem procesu,
- sposobnost povezovanja znanja z različnih področij in aplikacij na podlagi poznavanja zahtev za standardizacijo grafičnega procesa,
- sposobnost vodenja procesa standardizacije grafičnega komunikacijskega procesa,
- razumevanje in uporaba metod kritične analize in razvoja teorij ter njihova uporaba v reševanju konkretnih delovnih problemov pri standardizaciji grafičnega komunikacijskega procesa,
- sposobnost umeščanja novih informacij in spoznanj na področju standardizacije procesa,

Objectives and competences:

In-depth knowledge of the theoretical basis of the colour management process, various operating systems, the ICC colour management system, in-depth knowledge of the scope of the colour management workflow in graphics programmes, measuring devices and various software for device profiling, presentation of the calibration and characterisation of input, input/output and output devices, methods for evaluating the quality of device profiles created, familiarisation with all important standards in the field of colour management.

Subject-specific competences:

- knowledge and understanding of the principles and development of standardisation of the graphic process,
- knowledge and understanding of the methods of preparation and adoption of recommendations, specifications, European, international and national standards,
- the ability to solve specific problems in the introduction of standards in the graphic communications process,
- the ability to integrate knowledge from different fields and applications based on knowledge of the requirements for standardisation of the graphic process,
- the ability to manage the process of standardisation of the graphic communication process,
- the understanding and application of methods of critical analysis and development of theories and their application in solving specific work problems in the standardisation of the graphic communication process,

- razvoj veščin in spretnosti pri razvoju standardizacije procesa.	– the ability to assimilate new information and knowledge in the field of process standardisation, – development of skills and abilities in the development of process standardisation.
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Predvideni študijski rezultati:

Znanje in razumevanje:
Pozna proces standardizacije grafičnega procesa, pozna standarde za izmenjavo datotek, standarde za izdelavo tiskovnih form, za vodenje procesa barvne reprodukcije v konvencionalnih in digitalnih tehnikah tiska, pozna proces barvnega upravljanja, pozna orodja za uvedbo barvnega upravljanja in metode za analizo barvnih reprodukcij v grafičnem komunikacijskem procesu.

Razume pojme povezane s standardizacijo grafičnega procesa, razume nastanek, uvajanje in spreminjanje standardov, razume teoretične osnove procesa barvne reprodukcije v grafičnem komunikacijskem procesu.

Intended learning outcomes:

Knowledge and understanding of:
Knows the process of standardisation of the graphic process, knows the standards for file exchange, the standards for the production of printing plates, for the management of the process of colour reproduction in conventional and digital printing techniques, knows the process of colour management, knows the tools to implement colour reproductions in the graphic communication process. Understands concepts related to the standardisation of the graphic process, understands the creation, implementation and modification of standards, understands the theoretical basis of the process of colour reproduction in the graphic communication process.

Metode poučevanja in učenja:

Predavanja, vaje in seminar in druge oblike dela na zbranem področju.
Aktivnosti poučevanja in učenja potekajo na fakulteti in/ali prek spleta (online).
Uporaba spletne učilnice in IKT metod poučevanja (multimedijsko gradivo, praktične demonstracije).
Uporaba inovativnih metod poučevanja v smislu obogatitve predavanj z relevantnimi vabljenimi predavanji, povezovanje z industrijo, seminarsko delo na realnih izzivih iz industrije, uporaba sodobnih metod poučevanja s primeri iz prakse.

Learning and teaching methods:

Lectures, practicum and seminars and other forms of work in the collected field.
Teaching and learning activities take place at the faculty and/or online.
Use of the online classroom and ICT teaching methods (multimedia content, practical demonstrations).
Use of innovative teaching methods in terms of enriching lectures with relevant invited lectures, connecting with the industry, seminar work on real challenges from industry, use of modern teaching methods with examples from practice.

Načini ocenjevanja:

Delež/Weight

Assessment:

seminar oz. izdelek	20,00 %	seminar i.e. product
vaje	30,00 %	practicum (tutorials)
izpit teoretičnega znanja	50,00 %	exam of theoretical knowledge
Praktično znanje, osvojeno pri izdelavi seminarske naloge in teoretično znanje pridobljeno na predavanjih in vajah ter iz drugih literaturnih virov se oceni s pomočjo pisnega in/ali ustnega preverjanja, ki se izvede v živo, v predavalnici, ali prek spleta (online) s pomočjo ustreznih programskih rešitev/orodij. Seminarska naloga oz. izdelek je ocenjen na podlagi vsebinske, oblikovne in kontekstualne zasnove ter predstavitve. Skupna ocena seminarske naloge, vaj in teoretičnega znanja predavanj se oceni z negativno oceno 5 ali s pozitivnimi ocenami od 6 do 10. Za pozitivno oceno je treba doseči vsaj 55 % ali več.		The practical knowledge acquired with seminars and the theoretical knowledge from the lectures and practicum (tutorials) and other literature sources is graded by a written and/or oral examination, which is conducted in the classroom or online using suitable software solutions/tools. The seminar, i.e. the product, is graded according to content, design, context quality as well as presentation. The overall grade of the seminar, practicum (tutorials) and the theoretical knowledge of the lectures is graded with a negative grade 5 or with positive grades from 6 to 10. For a positive

		grade, at least 55 % or more must be achieved.
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Ocenjevalna lestvica:

5 - 10, pri čemer velja, da je pozitivna ocena od 6 - 10

Grading system:

5 - 10, a student passes the exam if he is graded from 6 to 10

Reference nosilca/Lecturer's references:

1. MILOŠEVIĆ, Rastko, KAŠIKOVIĆ, Nemanja, CIGULA, Tomislav, STANKOVIĆ ELESINI, Urška, URBAS, Raša. The characterization of microcapsules printed by screen printing and coating technology. *JGED: Journal of Graphic Engineering and Design*. 2017, vol. 8, no. 1, str. 45-56, ilustr. ISSN 2217-379X.
2. STANKOVIĆ ELESINI, Urška, ŠVARC, Jernej, ŠUMIGA, Boštjan, URBAS, Raša. Melamine formaldehyde microcapsules with fragrance core material: preparation, properties, and end use. *Textile research journal*. 2017, vol. 87, no. 20, str. 2435-2448, ilustr. ISSN 0040-5175. DOI: [10.1177/0040517516671126](https://doi.org/10.1177/0040517516671126).
3. URBAS, Raša, STANKOVIĆ ELESINI, Urška. Color differences and perceptive properties of prints made with microcapsules. *JGED: Journal of Graphic Engineering and Design*. Jun 2015, vol. 6, no. 1, str. 15-21, ilustr. ISSN 2217-379X.
4. GUNA, Jože, POLAJNAR HORVAT, Katarina, PODJED, Dan. People-centred development of a smart waste bin. *Sensors*. Feb.-1 2022, iss. 3, 1288, str. 1-14, ilustr. ISSN 1424-8220. <https://www.mdpi.com/1424-8220/22/3/1288>, DOI: [10.3390/s22031288](https://doi.org/10.3390/s22031288).
5. GUNA, Jože, GERŠAK, Gregor, HUMAR, Iztok, SONG, Jeungeun, DRNOVŠEK, Janko, POGACNIK, Matevž. Influence of video content type on users' virtual reality sickness perception and physiological response. *Future generation computer systems*. [Print ed.]. Feb. 2019, vol. 91, str. 263-277, ilustr. ISSN 0167-739X. <https://www.sciencedirect.com/science/article/pii/S0167739X18316546>, DOI: [10.1016/j.future.2018.08.049](https://doi.org/10.1016/j.future.2018.08.049).

DIPLOMA

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Diploma
Course title:	Degree
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Grafične in interaktivne komunikacije, prva stopnja, univerzitetni	Ni členitve (študijski program)	3. letnik	2. semester	obvezni

Univerzitetna koda predmeta/University course code:	0111836
Koda učne enote na članici/UL Member course code:	11106

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
0	0	0	0	150	150	10

Nosilec predmeta/Lecturer:

Vrsta predmeta/Course type:

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

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

Vpis v 3. letnik študija.
Opravljenе vse ostale študijske obveznosti.
Odobrena tema diplomske naloge.

Prerequisites:

Enrolment into the 3rd study year.
Completed all others study prerequisites.
Confirmation of the thesis theme.

Vsebina:

Diplomsko delo je lahko interdisciplinarno naravnano ali ožje specializirano na poljubno področje znotraj strokovnih vsebin s področja, ki ga pokriva prvostopenjski študij Grafične in interaktivne komunikacije. Diplomsko 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.

Diplomsko delo študent izdela pod mentorstvom izbranega učitelja, ga javno predstavi in zagovarja.

Content (Syllabus outline):

Thesis may be interdisciplinary or specialized in any area within the professional course from the area covered by the first-stage studies of Graphic and interactive communications. Thesis includes:

- the purpose of the work, the presentation of the problem or reason for a survey,
- review of literature and knowledge and/or foreign and domestic experiences,
- implicit solution of the problem,
- conclusions and recommendations.

Student completes the diploma thesis under the supervision of a teacher and finishes the study with the public presentation and defend.

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:

CILJI: Študent osvoji delo v praksi. Izdelava diplomskega dela študenta usposobi za reševanje strokovnih ali preprostejših znanstveno-raziskovalnih problemov na področjih, ki jih pokriva prvostopenjski študijski program Grafične in interaktivne komunikacije. KOMPETENCE: Praktično uporabi med študijem pridobljeno znanje.

Objectives and competences:

OBJECTIVES: Student gets familiar with work in practice. Through the work for diploma thesis student gets able to deal with professional or simpler scientific research problems in the areas covered by the first level study program in Graphic and interactive communications. COMPETENCES: Practical application of the knowledge gained during their studies.

Predvideni študijski rezultati:

Študent razume stroko v širšem kontekstu kot interdisciplinarno panogo, dokaže samostojno reševanje konkretnih problemov s povezovanjem temeljnih znanj, ki jih uporabi pri izdelavi diplomskega dela. Pridobi nove informacije, jih kritično analizira in uporabi pri določitvi problemov in njihovem reševanju. Pridobljeno znanje in rešitve konkretnega problema v diplomskem delu je sposoben podati in zagovarjati pred širšim krogom zainteresiranih uporabnikov.

Intended learning outcomes:

The student will understand the profession in a broader context as an interdisciplinary branch. The student demonstrates his/her ability to solve concrete problems by integrating basic skills and uses them to prepare consistent diploma thesis. The student will synthesize and analyze new information and use it to identify and solve problems. The student is able to present and defend acquired knowledge and solutions to a specific problem in the thesis to a wider range of interested users.

Metode poučevanja in učenja:

Praktično delo, branje literature, konzultacije z mentorjem, pisanje naloge.

Learning and teaching methods:

Practical work, literature reading, consultations with advisor, diploma thesis writing.

Načini ocenjevanja:**Delež/Weight****Assessment:**

Ocena pisnega dela diplomskega dela	70,00 %	Assessment of the written thesis
Ocena javne predstavitve in zagovora diplome	30,00 %	Assessment of public presentation and defending of the thesis

Ocenjevalna lestvica:**Grading system:**

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Reference nosilca/Lecturer's references:

Reference nosilcev razvidne iz učnih načrtov pri posameznih predmetih v okviru prvostopenjskega študija Grafične in interaktivne komunikacije. / References of lecturers listed in the curricula of individual courses in the undergraduate program of Graphic and interactive communications.

EKOLOGIJA V GRAFIKI

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Ekologija v grafiki
Course title:	Environmental protection in graphic arts
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Grafične in interaktivne komunikacije, prva stopnja, univerzitetni	Ni členitve (študijski program)	3. letnik	2. semester	izbirni

Univerzitetna koda predmeta/University course code:	0089461
Koda učne enote na članici/UL Member course code:	10947

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:	Maja Klančnik
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Vrsta predmeta/Course type:	Izbirni/Elective
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Jeziki/Languages:	Predavanja/Lectures:	Angleščina, Slovenščina
	Vaje/Tutorial:	Angleščina, Slovenščina

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

Vpis v letnik študija. Pogoji za opravljanje študijskih obveznosti je prisotnost pri predavanjih, seminarju in vajah. Zahtevana prisotnost na vajah je 100 %. Za pristop k izpitu je pogoj opravljen seminar in kolokvij iz laboratorijskih vaj.

Prerequisites:

Enrolment into the study year. Prerequisite to complete study obligations is participation at lectures, seminar and tutorials. Requested presence at tutorials is 100 %. Student can attend the exam after passing the tutorials and the seminar.

Vsebina:

Osnovne definicije pojmov: ekologija, onesnaževanje, obremenjevanje okolja, trajnostni razvoj, varstvo okolja.
Okoljska zakonodaja in ukrepi EU za zmanjševanje onesnaževanja okolja.
Okolju prijaznejši produkti in ekološko označevanje.
Okolju prijazna embalaža. Sistemi okoljevarstvenega vodenja.
Onesnaževanje zraka in tehnike čiščenja prašnih delcev in škodljivih plinov iz zraka.
Onesnaževanje vod in tehnike čiščenja odpadnih vod s poudarkom na čiščenju vod papirne in grafične industrije. Okoljska analitika vod: splošni, anorganski, organski in ekotoksikološki parametri ocenjevanja

Content (Syllabus outline):

Basic definitions of notions: ecology, pollution, environmental burden, sustainable development, environmental protection.
Environmental legislation and actions of EU for reducing of environmental pollution.
Environmentally friendly products and eco-labelling.
Environmentally friendly packing. Environmental management systems.
Air pollution and purification techniques for elimination of dust particles and harmful gases from air.
Water pollution and treatments of wastewater, with emphasis on water treatments of the paper and the graphic industry. Environmental water analysis:

onesnaženosti vod. Kemikalije: nevarne kemikalije in označevanje. Varstvo pri delu. Sistem vodenje poklicnega zdravja in varstva pri delu. Tiskarske barve: ekološko nezaželeno in okolju prijaznejše. Ekološka problematika in okoljevarstvene rešitve v pripravi in v posameznih tehnikah tiska: ofsetni, flekso, knjigo, globoki, tampo, sito in digitalni tisk ter v dodelavi. Ustrezno ravnanje z odpadnimi snovmi.	general, inorganic, organic and eco-toxic parameters for assessment of water pollution. Chemicals: dangerous and labelling. Safety at work. Occupational health and safety management system. Printing inks: ecological unfavourable and eco-friendly. Environmental problems and environmental protective solutions in the prepress and in the printing processes: offset, flexo, letterpress, gravure, tampo, screen and digital printing and in the finishing. Appropriate waste management.
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Temeljna literatura in viri/Readings:

- KLANČNIK, Maja. Ekologija in okoljevarstvo : študijsko gradivo. Ljubljana: Naravoslovnotehniška fakulteta, Oddelek za tekstilstvo, grafiko in oblikovanje, 2021. 1 zv. (loč. pag.), ilustr. [COBISS.SI-ID [75498755](#)].
- Kipphan, H. Handbook of Print Media, Technologies and Production Methods. Verlag; Berlin; Heidelberg; New York : Springer, 2001.
- Eldred, N. R. Chemistry for the Graphic Arts. 3rd edition. Pittsburg : GaltPress, 2001.
- Leach, R. H., in Pierce, R. J. The Printing Ink Manual. 5th edition. Dordrecht; Boston; London : Kluwer Academic Publishers, 1993.
- Roš, M. Biološko čiščenje odpadne vode. Ljubljana : GV Založba, 2001.
- Vuk, D. Uvod v ekološki management. Ljubljana : Založba moderna organizacija, 2000.
- Kurnik Donlagić, J. Tehnološke vode in odplake. Maribor : Univerza v Mariboru, Fakulteta za strojništvo, 2001.
- Klančnik, M. Ekologija v grafiki : vaje. Ljubljana: Naravoslovnotehniška fakulteta, Oddelek za tekstilstvo, grafiko in oblikovanje, 2016.

Cilji in kompetence:

Študent se pri predmetu seznani z negativnim vplivom procesov in materialov grafične industrije na okolje. Spozna okoljevarstvene rešitve, okolju prijaznejše grafične materiale in postopke kot tudi ustrezno ravnanje z odpadnimi snovmi. Seznani se z osnovami okoljske analitike in tehnologije čiščenja tehnoloških odpadnih vod in zraka. Spozna okoljsko zakonodajo in ekološke standarde.

Kompetence:

- ekološko osveščeno ravnanje na delovnem mestu,
- sposobnost uporabe teoretičnega znanja pri ocenitvi in reševanju konkretnih ekoloških problemov v grafični industriji,
- sposobnost načrtovanja in uvajanja sodobnih, okoljsko čistejših tehnologij v podjetjih,
- sposobnost povezovanja okoljevarstvene zakonodaje z različnimi področji grafične stroke,
- sposobnost razvijanja ekoloških proizvodov,
- sposobnost pridobivanja okoljskih priznanj in dovoljenj,
- sposobnost raziskovalnega dela in predstavljanja rezultatov,
- sposobnost umeščanja novih znanj in podatkov o grafičnih materialih, tehnikah tiska in dodelave v kontekst grafične stroke in okoljevarstva.

Objectives and competences:

The students are introduced to the negative influences of processes and materials of graphic technology on the environment. They get knowledge about environmental protective solutions, environmentally friendly materials and procedures, as well as about appropriate waste management. They are introduced with basics of environmental analysis and technologies of wastewater treatment and air purification as well as with environmental legislation and standards.

Competences:

- environmental consciousness management at work,
- ability to use the theoretical knowledge at evaluation and solving the ecological problems in the graphic industry,
- ability to plan and introduce the modern and more environmentally friendly technologies in companies,
- ability to connect the environmental legislation with different areas of graphic professions,
- ability to develop the eco-products,
- ability to gain environmental recognitions and permissions,
- ability of research work and presentation of results,
- ability to apply newly gained knowledge and information of graphic materials, techniques of

	printing and finishing into the graphic professional field and the environmental protection.
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Predvideni študijski rezultati:	Intended learning outcomes:
Poznavanje in razumevanje vpliva grafične industrije (priprave za tisk, tiskanja in dodelave) na okolje. Poznavanje okolju prijaznejših grafičnih materialov, tehnoloških postopkov in grafičnih izdelkov. Poznavanje kriterijev za pridobitev ekološke oznake tiskanih papirnih proizvodov. Poznavanje in razumevanje ekoloških problemov odlaganja grafičnih odpadkov in izdelkov. Poznavanje in razumevanje pravilnikov (zakonodaje) in standardov s področja varovanja okolja. Poznavanje in razumevanje spremljanja parametrov onesnaževanja. Poznavanje in razumevanje osnov tehnologije čiščenja odpadnih tehnoloških vod in zraka.	Knowing and understanding the impact of graphic industry (prepress, printing and finishing) on the environment. Knowing environmentally friendly graphic materials, technologies and graphic products. Knowing the criteria for acquisition of ecolabel for printing paper products. Knowing and understanding the environmental problems of disposal of graphic wastes and products. Knowing and understanding the environmental regulations (legislation) and standards. Knowing and understanding the monitoring of pollution parameters. Knowing and understanding the basics of technologies of wastewater treatment and air purification.

Metode poučevanja in učenja:	Learning and teaching methods:
Predavanja, seminar, laboratorijske vaje, ki potekajo v predavalnici oziroma v laboratoriju in/ali preko spleta s pomočjo ustrezne računalniške opreme.	Lectures, seminar, tutorials, that take place in a classroom or in a laboratory and/or online using appropriate computer equipment.

Načini ocenjevanja:	Delež/Weight	Assessment:
Laboratorijske vaje	20,00 %	Tutorial
Seminarska naloga	10,00 %	Seminar
Pisni/Ustni izpit Ocena: pozitivno: 6–10, negativno: 5.	70,00 %	Written/Oral exam Positive: 6–10; Negative: 5.

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. KLANČNIK, Maja. Printing with natural dye extracted from <i>Impatiens glandulifera</i> Royle. <i>Coatings</i>. 13 April 2021, vol. 11, iss. 4, str. 1-12, ilustr. ISSN 2079-6412. 2. KLANČNIK, Maja. Screen printing with natural dye extract from Japanese knotweed rhizome. <i>Fibers and polymers</i>. 19 May 2021, vol. , no. , 9 str. ISSN 1229-9197. 3. KLANČNIK, Maja, BATISTA, Meta. Čiščenje odpadne vode, onesnažene s sitotiskarsko barvo = Treatment of wastewater contaminated with screen printing ink. <i>Tekstilec</i>, ISSN 0351-3386, 2015, vol. 58, no. 3, str. 209–220. 4. KLANČNIK, Maja. Coagulation and adsorption treatment of printing ink wastewater. <i>Acta graphica</i>, ISSN 0353-4707. [Print ed.], 2014, vol. 25, no. 3/4, str. 73–82. 5. KLANČNIK, Maja, KOTNIK, Kaja. Biološko razgradljivi adsorbenti pri čiščenju obarvane odpadne vode = Biologically degradable adsorbents in treatment of coloured wastewater. <i>Tekstilec</i>, ISSN 0351-3386/2018, 2016, vol. 61, no. 1, str. 54–64.

EMBALAŽNI MATERIALI IN TEHNOLOGIJA

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Embalažni materiali in tehnologija
Course title:	Packaging materials and technology
Članica nosilka/UL	UL NTF
Member:	

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Grafična in medijska tehnika, prva stopnja, visokošolski strokovni	Ni členitve (študijski program)	2. letnik	2. semester	izbirni
Grafične in interaktivne komunikacije, prva stopnja, univerzitetni	Ni členitve (študijski program)	2. letnik	2. semester	izbirni

Univerzitetna koda predmeta/University course code: 0644018

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: Diana Gregor Svetec

Vrsta predmeta/Course type: Izbirni/Elective

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

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

Vpis v letnik študija.
Pogoj za opravljanje študijskih obveznosti je prisotnost pri predavanjih, seminarju in vajah. Zahtevana prisotnost na vajah je 100 %, pri seminarjih 80 % in predavanjih 50 %.

Prerequisites:

Enrolment into the study year.
Prerequisites for performing study obligations is presence at lectures, seminar and tutorials. Requested presence at tutorials is 100 %, at seminar 80 % and lectures 50 %.

Vsebina:

Predavanja: Pregled postopkov, embalažnih materialov in tehnologij, ki se uporabljajo za izdelavo embalažnih rešitev za različne izdelke. Pregled zahtev živilske, kozmetične, farmacevtske in drugih industrij glede embalaže.
• predstavitev funkcij embalaže; • trajnost in okoljska funkcija embalaže; • embalažni materiali; lastnosti, prednosti in pomanjkljivosti posameznih embalažnih materialov in vrst embalaže; • trajnostni embalažni materiali; • postopki izdelave posameznih vrst embalaže; • vpeljava krožnega gospodarjenja v procese izdelave embalaže in prehod v ogljično nevtralno družbo.

Content (Syllabus outline):

Lectures: An overview of the processes, packaging materials and technologies used to create packaging solutions for various products. An overview of regulations for packaging of food, beauty and personal care, pharmaceutical and in other sectors.
• introduction of packaging and its functions; • sustainability and environmental function of packaging; • packaging materials; characteristics, advantages and disadvantages of various types of packaging materials and packaging; • sustainable packaging materials; • manufacturing processes of certain types of packaging; • introduction of circular

Seminar: izdelava in predstavitev seminarske naloge. V seminarske naloge so vključene zelene in trajnostne vsebine. Vaje: načrtovanje embalaže in izdelava kartonske embalaže z računalniškim programom za načrtovanje embalaže.	economy into manufacturing processes and transition to carbon neutral society. Seminar: preparation and presentation of seminar work. Green and sustainable topics are included in the seminar assignments. Tutorial: design and production of cardboard packaging with a computer program for the design of packaging.
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Temeljna literatura in viri/Readings:

• Vrabčič Brodnjak, U. Načrtovanje in oblikovanje embalaže, Ljubljana, UL NTF, 2022 • Auras, R.A., Selke, S.E.M. Life cycle of sustainable packaging: From design to end-of-life. Wiley, 2023 • Bastioli, C. Handbook of biodegradable polymers. Boston, De Gruyter, 2020 • Kwan, C., Ho, E. Packaging materials. Honkong, SendPoint Publishing, 2014 • Hanlon, J.F., Kelsey, R.J., Forcinio, H.E. Handbook of package engineering. London, CRC Press, 1998 • Brody, A.L. Encyclopedia of packaging technology. New York, J Wiley & Sons, 2009 Literatura je dostopna v knjižnici NTF-Oddelka za tekstilstvo, grafiko in oblikovanje. Literature is available in the library NTF-Department of Textiles, Graphic Arts and Design. DODATNA LITERATURA E-revije in e-knjige iz podatkovnih zbirk univerze / e-journals and e-books from university databases	
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Cilji in kompetence:

Študenti spoznajo različne vrste embalaže, njihove funkcije, vključno z okoljsko funkcijo. Seznanijo se z različnimi embalažnimi materiali, z njihovimi lastnostmi, prednostmi in pomanjkljivostmi. Seznanijo se s trajnostnimi embalažnimi materiali. Spoznajo procese pri načrtovanju embalaže in postopke izdelave različnih vrst embalaže ter tehnologije, ki so del krožnega gospodarstva in manj ogljično intenzivne. Seznanijo se s posebnimi zahtevami za določeno vrsto embalaže, kot je embalaža za pakiranje živil, zdravil, kozmetike, elektronike itd. Naučijo se uporabljati računalniški program, ki omogoča načrtovanje kartonske embalaže. Predmetnospecifične kompetence: • poznavanje pomena lastnosti embalažnih materialov za izdelavo različnih vrst embalaže, • obvladovanje postopka načrtovanja in izdelave embalaže, • razvoj spretnosti pri uporabi ustreznih računalniških programov, • uporaba informacijsko-komunikacijske tehnologije pri načrtovanju embalaže, posredovanju in obdelavi podatkov ter zasledovanju novosti, • sposobnost umeščanja novih informacij in spoznanj v kontekstu razvoja novih izdelkov.	
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Objectives and competences:

Students get know various types of packaging and the functions of packaging, including environmental function. They learn about different packaging materials and their characteristics, advantages and disadvantages. They get to know sustainable packaging materials. They learn about the processes in the design and manufacturing of various types of packaging, technologies which are part of circular economy and less carbon intensive. They become familiar with the specific requirements for a particular type of packaging, such as packaging for food, drugs, cosmetics, electronics, etc. They learn how to use a computer program for design of packaging. Competences: • knowledge of the importance of packaging materials characteristics for the manufacturing of various types of packaging, • managing of planning process and design of packaging, • develop skills in using appropriate computer programs, • use of information-communication technology at packaging development, data evaluation and following innovations, • ability to include new information and knowledge in the context of the development of new product.	
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Predvideni študijski rezultati:

Znanje in razumevanje: študent pozna različne vrste embalažnih materialov in iz njih izdelano embalažo, njihove lastnosti, postopke izdelave in dodelave. Razume postopek načrtovanja in oblikovanja embalažnih enot in zna uporabiti računalniške programe za načrtovanje embalaže.	
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Intended learning outcomes:

Knowledge and understanding: student knows various types of packaging materials and packaging made from them, their properties, manufacturing processes and finishing. Understand the design process of packaging units and is able to use computer programmes for packaging design.	
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Razume pomembnost embalažnih materialov in posameznih faz pri postopkih izdelave v relaciji z lastnostmi embalaže in optimiranjem le-te. Razume pomen vpeljave krožnega gospodarjenja v procese izdelave embalaže in trajnostni razvoj na področju embalaže. Teoretična podlaga mu pomaga prenesti znanje v delovni proces.	Understands the importance of packaging materials and the various stages in manufacturing processes in relation to the properties of packaging in order to optimize it. Understands the importance of introducing circular economy into packaging production processes and sustainable development in the field of packaging. Theoretical basis helps to implement the knowledge into the working process.
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Metode poučevanja in učenja:

- klasična in interaktivna predavanja, poučevanje z uporabo IKT tehnologije
- projektno delo, diskusije, interpretacije, skupinsko delo,
- samostojno analitično pisno delo s predstavitvijo in individualno delo pri vajah.
Vse oblike (predavanja/seminar/vaje) se lahko izvajajo v živo v učilnicah ali preko spleta (online) v spletnih učilnicah, z uporabo specifičnih orodij ter ustrezne programske opreme.

Learning and teaching methods:

- classic and interactive lectures, teaching using IKT technology
- project work in groups, discussions, interpretation, group work,
- independent analytical written work with presentation and individual work at tutorials.
All forms (lectures/seminar/tutorials) can be conducted live in classrooms or online in online classrooms, using specific tools and suitable software.

Načini ocenjevanja:

Delež/Weight

Assessment:

Ustni ali pisni izpit ali izpitna naloga. Poteka lahko v predavalnici ali na daljavo.	40,00 %	Oral or written exam or exam assignment. Performed in classroom or on-line.
Seminarska naloga	20,00 %	Seminar work
Vaje	40,00 %	Tutorial

Ocenjevalna lestvica:

5 - 10, pri čemer velja, da je pozitivna ocena od 6 - 10

Grading system:

5 - 10, a student passes the exam if he is graded from 6 to 10

Reference nosilca/Lecturer's references:

- DERMOL, Špela, BORIN, Bojan, GREGOR-SVETEC, Diana, SLEMENIK PERŠE, Lidija, LAVRIČ, Gregor. The development of a bacterial nanocellulose/cationic starch hydrogel for the production of sustainable 3D-printed packaging foils. *Polymers*. 2024, vol. 16, iss. 11, [article no.] 1527, str. 1-23
- GREGOR-SVETEC, Diana, VODNIK, Žan, GALE, Tea, KAVČIČ, Urška. Tomato plant residues, a sustainable fiber source for cardboard packaging. *Sustainability*. 2024, vol. 16, iss. 17, str. 1-21
- ŠARČEVIČ, Iva, GREGOR-SVETEC, Diana, BANIČ, Dubravko. Influence of perforations on the reduction of the compressive strength of corrugated cardboard. *Journal of physics. Conference series*. [Online ed.]. 2022, vol. 2321, 6 str.
- PÁL, Magdolna, DEDIJER, Sandra, KOLTAI, László, GREGOR-SVETEC, Diana, CIGULA, Tomislav, PAVLOVIĆ, Živko, MILIĆ-KERESTEŠ, Neda. Fold cracking of coated papers: investigation on automated computer-aided visual assessment method. *Nordic pulp & paper research journal*. [Print ed.]. 28. sep. 2021, vol. , no. , str. 1-17.
- TIŠLER KORLIJAN, Barbara, GREGOR-SVETEC, Diana. Properties and printability of compression moulded recycled polyethylene. *Materials & design*, ISSN 0264-1275. [Print ed.], Mar. 2014, vol. 55, str. 583-590.
- JOHANSSON, Caisa, BRAS, Julien, MONDRAGON, Inaki, NECHITA, Petronela, PLACKETT, David, ŠIMON, Peter, GREGOR-SVETEC, Diana, VIRTANEN, Sanna, GIACINTI BASCHETTI, Marco, BREEN, Chris, CLEGG, Francis, AUCEJO, Susana. Renewable fibers and bio-based materials for packaging applications - a review of recent developments. *Bioresources*, 2012, vol. 7, no. 2, str. 2506-2552.

FIZIKA 1

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Fizika 1
Course title:	Physics
Članica nosilka/UL	UL NTF
Member:	

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Grafične in interaktivne komunikacije, prva stopnja, univerzitetni	Ni členitve (študijski program)	1. letnik	1. semester	obvezni
Načrtovanje tekstilij in oblačil, prva stopnja, univerzitetni	Ni členitve (študijski program)	1. letnik	1. semester	obvezni

Univerzitetna koda predmeta/University course code:	0642800
Koda učne enote na članici/UL Member course code:	11319

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:	Borut Paul Kerševan
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Vrsta predmeta/Course type:	Obvezni/Compulsory
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Jeziki/Languages:	Predavanja/Lectures:	Slovenščina
	Vaje/Tutorial:	Slovenščina

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	Prerequisites:
Vpis v 1. letnik.	Enetrng the 1st year of program.

Vsebina:	Content (Syllabus outline):
Uvod: Skalarne, vektorske količine, enote, meritve, merske napake. Kinematika.	Introduction: Scalar and vector variables, units, measurements, measurement uncertainties; Kinematics.
Mehanika: Sile in Newtonovi zakoni (vklj.: sila lepenja in trenja, gravitacija nad in pod površjem, med telesi), navor sil, primeri iz dinamike; Statika; Gibalna količina (vklj.: težišče, sila curka, reaktivni pogon); Vrtilna količina (vklj.: vztrajnostni moment, zobniški prenos); Delo, energija, moč (vklj.: prožnostna energija, rotacijska kinetična energija);	Mechanics: Forces, Newton's laws (incl.: friction, gravitation above and below the Earth's surface), torque, examples from dynamics; Static equilibrium; Momentum (incl.: center of mass, jet force, reaction force); Angular momentum (incl.: moment of inertia, gears and transmission); Work, energy, power (incl.: elastic energy, rotational kinetic energy);

Nihanje (vklj.: dušeno, vsiljeno nihanje, resonanca); Valovanje (vklj.: hitrost in energija valovanja, zvok, Dopplerjev pojav, stoječe valovanje); Mehanika kontinuov: Elastomehanika (vklj.: nateg, stisljivost, elastični modul, natezna trdnost, torzija, strig, zveze med snovnimi elastičnimi konst.); Hidrostatika (vklj.: hidrost. tlak, hidr. naprave, vzgon, površinska napetost) Hidrodinamika (vklj.: Bernoullijeva en., pretok, viskoznost, upor v tekočini, dinamični vzgon).	Oscillations (incl.: damped and forced oscillations, resonance); Waves (incl.: wave speed and energy, sound, Doppler effect, standing waves); Continuum mechanics: Elasticity (incl.: stress and strain, elastic moduli, torsion, shear, relations among material constants); Hydrostatics (incl.: hydrostatic pressure, buoyancy, hydraulics, surface tension), hydrodynamics (incl.: Bernoulli equation, flux conservation, viscosity, drag and lift).
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Temeljna literatura in viri/Readings:

D. Halliday, R. Resnick and J. Walker, Fundamentals of Physics (Wiley, 2003)
I. DREVENŠEK OLENIK, B. GOLOB, I. SERŠA: Naloge iz fizike za študente tehniških fakultet (DMFA, 2003);
R. Kladnik, Visokošolska fizika (DZS, 1991): 1. del (Mehanski in toplotni pojavi), 2. del (Elektrika in atomika), 3. del (Valovni pojavi)

Cilji in kompetence:

Cilji:
Kratka ponovitev, nadgradnja srednješolske fizike;
Seznanitev študentov s temeljnimi poglavji fizike;
Poudarek na temah, za katere se pričakuje, da jih bodo študenti srečevali pri kasnejšem študiju in delu (opis vsebine v oklepajih);
Podajanje analitičnega reševanja zadanih problemov in upravičene poenostavitve le-teh.

Kompetence:

Razumevanje fizikalnih zakonitosti, na katerih temeljijo naravni pojavi in merske metode;
Sposobnost matematične formulacije problemov;
Obvladovanje fizikalnih osnov metod in tehnik, s katerimi se bodo študenti srečevali;
Formulacija problemov z izbiro potrebnih podatkov, metodo in interpretacijo meritev, ter upoštevanjem poenostavitev.

Objectives and competences:

Objectives:
Short repetition and sophistication of high school physics;
Acquainting with the basic laws of physics;
Emphasize on the subjects which are expected to be encountered by students during the later studies and work;
Analytic problem solving and justified simplification of problems.

Competences:

Understanding of laws of physics on which natural phenomena and measurement methods are based upon;
Ability of mathematical formulation of problems;
Mastering basic physics methods to be used by the students at later studies and work;
Formulation of problems by selection of necessary data, method and simplifications, measurements interpretation.

Predvideni študijski rezultati:

Znanje in razumevanje:
Osnovne fizikalne zakonitosti, opisno ter v matematični formulaciji; medsebojno povezovanje le-teh.
Analitičen pristop k zadanim problemom, dedukcija na osnovne fizikalne zakonitosti, na katerih posamezni pojavi in merske metode temeljijo; nekateri primeri aplikacij na področju, s katerim se bodo študenti srečevali.
Razumevanje pojavov v naravi na podlagi preprostejših abstraktnih zakonitosti; utemeljevanje uporabljenih poenostavitev in približkov.
Modeliranje problemov z uporabo poenostavitev

Intended learning outcomes:

Knowledge and understanding:
Basic laws of physics, descriptive and in mathematical formulation; interconnection among laws of physics. Analytic approach to problems and their deduction to basic physics mechanisms; examples of applications in the area of the program.
Understanding of natural phenomena on the basis of simple (abstract) laws;
justification of simplifications and approximations.
Modelling of problems using simplifications; choice of necessary data and interpretation of measurements.

(zanemaritve nebitvenih lastnosti); izbira potrebnih podatkov; interpretacija meritev.	
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Metode poučevanja in učenja:	Learning and teaching methods:
Predavanja z demonstracijskimi poskusi, vodeno in samostojno reševanje računskih vaj in problemov.	Lectures with demonstrations, assisted and individual problem solving

Načini ocenjevanja:	Delež/Weight	Assessment:
Pisna ocena • 2 kolokvija ali • Pisni izpit	50,00 %	Written exam • 2 partial written exams or • Written exam
Teoretični izpit	50,00 %	Theory part

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:

AAD, G., CINDRO, Vladimir, DELIYERGIYEV, Maksym, DOLENC, Irena, FILIPČIČ, Andrej, FRATINA, Saša, GORIŠEK, Andrej, KERŠEVAN, Borut Paul, KRAMBERGER, Gregor, MAČEK, Boštjan, MANDIĆ, Igor, MIJOVIĆ, Liza, MIKUŽ, Marko, TYKHONOV, Andrii, et al, ATLAS Collaboration. Observation of a new particle in the search for the Standard Model Higgs boson with the ATLAS detector at the LHC. Physics letters. Section B, ISSN 0370-2693. [Print ed.], 2012, vol. 716, no. 1, str. 1-29, doi: 10.1016/j.physletb.2012.08.020. [COBISS.SI-ID 26060071], [JCR, SNIP, WoS do 22. 1. 2017: št. citatov (TC): 3792, čistih citatov (CI): 3684, Scopus do 13. 1. 2017: št. citatov (TC): 3217, čistih citatov (CI): 3162];

AAD, G., CINDRO, Vladimir, FILIPČIČ, Andrej, GORIŠEK, Andrej, KERŠEVAN, Borut Paul, KRAMBERGER, Gregor, MANDIĆ, Igor, MIJOVIĆ, Liza, MIKUŽ, Marko, ŠFILIGOJ, Tina, VALENČIČ, Nika, et al, ATLAS Collaboration. Measurement of spin correlation in top-antitop quark events and search for top squark pair production in pp collisions at $\sqrt{s} = 8$ TeV using the ATLAS detector. Physical review letters, ISSN 0031-9007. [Print ed.], 2015, vol. 114, no. 14, str. 142001-1-142001-19, doi: 10.1103/PhysRevLett.114.142001. [COBISS.SI-ID 28810791], [JCR, SNIP, WoS do 22. 1. 2017: št. citatov (TC): 9, čistih citatov (CI): 9, Scopus do 28. 1. 2017: št. citatov (TC): 19, čistih citatov (CI): 18];

AAD, G., CINDRO, Vladimir, FILIPČIČ, Andrej, GORIŠEK, Andrej, KERŠEVAN, Borut Paul, KRAMBERGER, Gregor, MANDIĆ, Igor, MIJOVIĆ, Liza, MIKUŽ, Marko, ŠFILIGOJ, Tina, VALENČIČ, Nika, et al, ATLAS Collaboration. Combined measurement of the Higgs boson mass in pp collisions at $\sqrt{s} = 7$ and 8 TeV with the ATLAS and CMS experiment. Physical review letters, ISSN 0031-9007. [Print ed.], 2015, vol. 114, no. 19, str. 191803-1-191803-33, doi: 10.1103/PhysRevLett.114.191803. [COBISS.SI-ID 28811815], [JCR, SNIP, WoS do 22. 1. 2017: št. citatov (TC): 149, čistih citatov (CI): 149, Scopus do 31. 1. 2017: št. citatov (TC): 149, čistih citatov (CI): 148];

4. AAD, G., CINDRO, Vladimir, DELIYERGIYEV, Maksym, FILIPČIČ, Andrej, FRATINA, Saša, GORIŠEK, Andrej, KERŠEVAN, Borut Paul, KRAMBERGER, Gregor, MAČEK, Boštjan, MANDIĆ, Igor, MIJOVIĆ, Liza, MIKUŽ, Marko, et al, ATLAS Collaboration. Search for invisible decays of a Higgs boson produced in association with a Z boson in ATLAS. Physical review letters, ISSN 0031-9007. [Print ed.], 2014, vol. 112, no. 20, str. 201802-1-201802-19, doi: 10.1103/PhysRevLett.112.201802. [COBISS.SI-ID 27885607], [JCR, SNIP, WoS do 22. 1. 2017: št. citatov (TC): 100, čistih citatov (CI): 92, Scopus do 27. 1. 2017: št. citatov (TC): 70, čistih citatov (CI): 66];

AAD, G., CINDRO, Vladimir, DOLENC, Irena, FILIPČIČ, Andrej, FRATINA, Saša, GORIŠEK, Andrej, KERŠEVAN, Borut Paul, KRAMBERGER, Gregor, MAČEK, Boštjan, MANDIĆ, Igor (pisar), MIJOVIĆ, Liza, MIKUŽ, Marko, TYKHONOV, Andrii, et al, ATLAS Collaboration. Search for dark matter candidates and large extra dimensions in events with a photon and missing transverse momentum in pp collision data at $\sqrt{s} = 7$ TeV with the ATLAS detector. Physical review letters, ISSN 0031-9007. [Print ed.], 2013, vol. 110, no. 1, str. 011802-1-011802-18, doi: 10.1103/PhysRevLett.110.011802. [COBISS.SI-ID 26480167],

[JCR, SNIP, WoS do 22. 1. 2017: št. citatov (TC): 85, čistih citatov (CI): 78, Scopus do 26. 1. 2017: št. citatov (TC): 83, čistih citatov (CI): 78].

FIZIKA 2

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Fizika 2
Course title:	Physics 2
Članica nosilka/UL	UL NTF
Member:	

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Grafične in interaktivne komunikacije, prva stopnja, univerzitetni	Ni členitve (študijski program)	1. letnik	2. semester	obvezni
Načrtovanje tekstilij in oblačil, prva stopnja, univerzitetni	Ni členitve (študijski program)	1. letnik	2. semester	obvezni

Univerzitetna koda predmeta/University course code:	0642801
Koda učne enote na članici/UL Member course code:	11319

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:	Borut Paul Kerševan
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Vrsta predmeta/Course type:	Obvezni/Compulsory
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Jeziki/Languages:	Predavanja/Lectures:	Slovenščina
	Vaje/Tutorial:	Slovenščina

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	Prerequisites:
Vpis v 1. letnik.	Enetrng the 1st year of program.

Vsebina:	Content (Syllabus outline):
Elektromagnetizem: Električni naboj, električno polje (vklj.: osnovni naboj, Coulombov zakon); Električna napetost (vklj.: kondenzator, polje v snovi, potencial, energija naboja v el. polju); Električni tok, Ohmov zakon in Kirchoffova izreka (vklj.: upornost snovi, prevajanje v kovinah, preprosti tokokrogi, el. moč); Magnetno polje (vklj.: Lorentzova sila, Amperov zakon) Indukcija in njena uporaba (vklj.: tuljava, generator, transformator, zaznavanje mag. polja); Elektromagnetno valovanje (vklj.: EM valovanje v snovi). Optika:	Electromagnetism: Electric charge, electric field (incl.: elementary charge, Coulomb law); Voltage (incl.: capacitor, field in matter, potential, energy of a charge); Current, Ohm's law, Kirchoff's laws (incl.: resistivity, simple circuits, el. power); Magnetic field (incl.: Lorentz force, Ampere's law) Induction (incl.: coil, transformer, generator, measuring magnetic field); Electromagnetic waves (incl: EM field in matter). Optics: Wave optics (incl.: interference, X-ray diffraction); Ray optics (incl.: reflection, refraction, total reflection, microscope, telescope).

Valovna optika (vklj.: interferenca, uklon rentgenskih žarkov); Geometrijska optika (vklj.: odboj, lom, popolni idboj, optične naprave - mikroskop, teleskop). Termodinamika: Temperatura (vklj.: merjenje temp., temp. raztezanje, bimetal); Energija, delo, toplota (1. zakon termodinamike); Enačbe stanj (vklj.: plinska enačba, fazni diagrami); Termodin. spremembe na plinu (vklj.: delo pri raztezanju, zveza med specifičnima toplotama); Entropija (2. zakon termodinamike) Fazne spremembe (vklj.: latentna toplota); Toplotni stroji (vklj.: izkoristki toplotnih strojev); Razširjanje toplote (vklj.: toplotno prevajanje, izolacija, Stefanov zakon). Atmosferska fizika (vklj.: modeli atmosfere, barometrična enačba, vlažnost). Izbrane teme iz moderne fizike (vklj.: fotoefekt, model atoma, radioaktivnost).	Thermodynamics: Temperature (incl.: measurements of T, expansion, bimetal); Energy, work, heat(1st law of thermodynamics); Equation of state (incl.: ideal gas law, phase diagram); Thermodynamic changes in gas (incl.: expansion work, specific heat relation); Entropy (2nd law of thermodynamics); Phase changes (incl.: latent heat); Heat engines (incl.: efficiencies); Heat dissipation (incl.: heat conduction, insulation, Stefan's law). Atmospheric physics (incl.: atmospheric models, barometric equation, humidity). Selected topics in Modern Physics: (incl. photoeffect, model of an atom, radioactivity).
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Temeljna literatura in viri/Readings:

D. Halliday, R. Resnick and J. Walker, Fundamentals of Physics (Wiley, 2003)
I. DREVENŠEK OLENIK, B. GOLOB, I. SERŠA: Naloge iz fizike za študente tehniških fakultet (DMFA, 2003);
R. Kladnik, Visokošolska fizika (DZS, 1991): 1. del (Mehanski in toplotni pojavi), 2. del (Elektrika in atomika), 3. del (Valovni pojavi)

Cilji in kompetence:

Cilji:
Kratka ponovitev, nadgradnja srednješolske fizike;
Seznanitev študentov s temeljnimi poglavji fizike;
Poudarek na temah, za katere se pričakuje, da jih bodo študenti srečevali pri kasnejšem študiju in delu (opis vsebine v oklepajih);
Podajanje analitičnega reševanja zadanih problemov in upravičene poenostavitve le-teh.

Kompetence:
Razumevanje fizikalnih zakonitosti, na katerih temeljijo naravni pojavi in merske metode;
Sposobnost matematične formulacije problemov;
Obvladovanje fizikalnih osnov metod in tehnik, s katerimi se bodo študenti srečevali;
Formulacija problemov z izbiro potrebnih podatkov, metodo in interpretacijo meritev, ter upoštevanjem poenostavitev.

Objectives and competences:

Objectives:
Short repetition and sophistication of high school physics;
Acquainting with the basic laws of physics;
Emphasize on the subjects which are expected to be encountered by students during the later studies and work;
Analytic problem solving and justified simplification of problems.

Competences:
Understanding of laws of physics on which natural phenomena and measurement methods are based upon;
Ability of mathematical formulation of problems;
Mastering basic physics methods to be used by the students at later studies and work;
Formulation of problems by selection of necessary data, method and simplifications, measurements interpretation.

Predvideni študijski rezultati:

Znanje in razumevanje:
Osnovne fizikalne zakonitosti, opisno ter v matematični formulaciji; medsebojno povezovanje le-

Intended learning outcomes:

Knowledge and understanding:
Basic laws of physics, descriptive and in mathematical formulation; interconnection among laws of physics.

teh. Analitičen pristop k zadanim problemom, dedukcija na osnovne fizikalne zakonitosti, na katerih posamezni pojavi in merske metode temeljijo; nekateri primeri aplikacij na področju, s katerim se bodo študenti srečali. Razumevanje pojavov v naravi na podlagi preprostejših abstraktnih zakonitosti; utemeljevanje uporabljenih poenostavitev in približkov. Modeliranje problemov z uporabo poenostavitev (zanemaritve ne bistvenih lastnosti); izbira potrebnih podatkov; interpretacija meritev.	Analytic approach to problems and their deduction to basic physics mechanisms; examples of applications in the area of the program. Understanding of natural phenomena on the basis of simple (abstract) laws; justification of simplifications and approximations. Modelling of problems using simplifications; choice of necessary data and interpretation of measurements.
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Metode poučevanja in učenja:	Learning and teaching methods:
Predavanja z demonstracijskimi poskusi, vodeno in samostojno reševanje računskih vaj in problemov.	Lectures with demonstrations, assisted and individual problem solving

Načini ocenjevanja:	Delež/Weight	Assessment:
Pisna ocena • 2 kolokvija ali • Pisni izpit	50,00 %	Written exam • 2 partial written exams or • Written exam
Teoretični izpit	50,00 %	Theory part

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:

AAD, G., CINDRO, Vladimir, DELIYERGIYEV, Maksym, DOLENC, Irena, FILIPČIČ, Andrej, FRATINA, Saša, GORIŠEK, Andrej, KERŠEVAN, Borut Paul, KRAMBERGER, Gregor, MAČEK, Boštjan, MANDIČ, Igor, MIJOVIČ, Liza, MIKUŽ, Marko, TYKHONOV, Andrii, et al, ATLAS Collaboration. Observation of a new particle in the search for the Standard Model Higgs boson with the ATLAS detector at the LHC. Physics letters. Section B, ISSN 0370-2693. [Print ed.], 2012, vol. 716, no. 1, str. 1-29, doi: 10.1016/j.physletb.2012.08.020. [COBISS.SI-ID 26060071], [JCR, SNIP, WoS do 22. 1. 2017: št. citatov (TC): 3792, čistih citatov (CI): 3684, Scopus do 13. 1. 2017: št. citatov (TC): 3217, čistih citatov (CI): 3162];

AAD, G., CINDRO, Vladimir, FILIPČIČ, Andrej, GORIŠEK, Andrej, KERŠEVAN, Borut Paul, KRAMBERGER, Gregor, MANDIČ, Igor, MIJOVIČ, Liza, MIKUŽ, Marko, ŠFILIGOJ, Tina, VALENČIČ, Nika, et al, ATLAS Collaboration. Measurement of spin correlation in top-antitop quark events and search for top squark pair production in pp collisions at $\sqrt{s}$ 8 TeV using the ATLAS detector. Physical review letters, ISSN 0031-9007. [Print ed.], 2015, vol. 114, no. 14, str. 142001-1-142001-19, doi: 10.1103/PhysRevLett.114.142001. [COBISS.SI-ID 28810791], [JCR, SNIP, WoS do 22. 1. 2017: št. citatov (TC): 9, čistih citatov (CI): 9, Scopus do 28. 1. 2017: št. citatov (TC): 19, čistih citatov (CI): 18];

AAD, G., CINDRO, Vladimir, FILIPČIČ, Andrej, GORIŠEK, Andrej, KERŠEVAN, Borut Paul, KRAMBERGER, Gregor, MANDIČ, Igor, MIJOVIČ, Liza, MIKUŽ, Marko, ŠFILIGOJ, Tina, VALENČIČ, Nika, et al, ATLAS Collaboration. Combined measurement of the Higgs boson mass in pp collisions at $\sqrt{s}$ = 7 and 8 TeV with the ATLAS and CMS experiment. Physical review letters, ISSN 0031-9007. [Print ed.], 2015, vol. 114, no. 19, str. 191803-1-191803-33, doi: 10.1103/PhysRevLett.114.191803. [COBISS.SI-ID 28811815], [JCR, SNIP, WoS do 22. 1. 2017: št. citatov (TC): 149, čistih citatov (CI): 149, Scopus do 31. 1. 2017: št. citatov (TC): 149, čistih citatov (CI): 148]

4. AAD, G., CINDRO, Vladimir, DELIYERGIYEV, Maksym, FILIPČIČ, Andrej, FRATINA, Saša, GORIŠEK, Andrej, KERŠEVAN, Borut Paul, KRAMBERGER, Gregor, MAČEK, Boštjan, MANDIČ, Igor, MIJOVIČ, Liza, MIKUŽ, Marko, et al, ATLAS Collaboration. Search for invisible decays of a Higgs boson produced in association with a Z boson in ATLAS. Physical review letters, ISSN 0031-9007. [Print ed.], 2014,

vol. 112, no. 20, str. 201802-1-201802-19, doi: 10.1103/PhysRevLett.112.201802. [COBISS.SI-ID 27885607], JCR, SNIP, WoS do 22. 1. 2017: št. citatov (TC): 100, čistih citatov (CI): 92, Scopus do 27. 1. 2017: št. citatov (TC): 70, čistih citatov (CI): 66];

AAD, G., CINDRO, Vladimir, DOLENC, Irena, FILIPČIČ, Andrej, FRATINA, Saša, GORIŠEK, Andrej, KERŠEVAN, Borut Paul, KRAMBERGER, Gregor, MAČEK, Boštjan, MANDIĆ, Igor (pisar), MIJOVIĆ, Liza, MIKUŽ, Marko, TYKHONOV, Andrii, et al, ATLAS Collaboration. Search for dark matter candidates and large extra dimensions in events with a photon and missing transverse momentum in pp collision data at $\sqrt{s} = 7$ TeV with the ATLAS detector. Physical review letters, ISSN 0031-9007. [Print ed.], 2013, vol. 110, no. 1, str. 011802-1-011802-18, doi: 10.1103/PhysRevLett.110.011802. [COBISS.SI-ID 26480167], JCR, SNIP, WoS do 22. 1. 2017: št. citatov (TC): 85, čistih citatov (CI): 78, Scopus do 26. 1. 2017: št. citatov (TC): 83, čistih citatov (CI): 78].

FOTOGRAFIJA IN VIDEO

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Fotografija in video
Course title:	Photography and video
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Grafične in interaktivne komunikacije, prva stopnja, univerzitetni	Ni členitve (študijski program)	2. letnik	1. semester	obvezni

Univerzitetna koda predmeta/University course code:	0559656
Koda učne enote na članici/UL Member course code:	10968

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:	Marica Starešinič
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Vrsta predmeta/Course type:	Obvezni /Compulsory
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Jeziki/Languages:	Predavanja/Lectures:	Slovenščina
	Vaje/Tutorial:	Slovenščina

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

Pogoj za vključitev v delo je vpis v letnik študija. Pogoj za pristop h končnemu izpitu so opravljene vaje.

Prerequisites:

Enrolment in the study year. For the final exam, tutorial has to be completed successfully.

Vsebina:

Zgodovina fotografije s poudarkom na starih fotografskih tehnikah, fotografski opremi, postopkih izdelave klasičnih črno-belih fotografij. Analogni fotoaparati, objektiv, optični zakoni, osvetlitvene naprave, leče, napake leč, ČB in barvni materiali, urejanje in arhiviranje posnetega materiala, snemalne tehnike, razvijalni postopki za klasično ČB fotografijo, reproduksijska fotografija, digitalna fotografija, digitalni fotoaparati, formati zapisa, korekcija fotografij. Osnovne razlike med digitalno in klasično fotografijo, HDR fotografija, različne teme v fotografiji: portret, panorama, kolaži, abstraktna fotografija. Likovna analiza fotografij, odnos med fotografijo in tipografijo. Vzorci v naravi in na fotografiji, osnovni likovni parametri ter likovno -

Content (Syllabus outline):

The history of photography, classical analogue photographic techniques, equipment, and manufacturing processes of classical black-and-white photos. Cameras, lenses, optical laws, and lighting systems, lens defects, black-and-white and colour materials, editing and archiving of photography, procedures for the classic black & white photo reproduction photography, digital photography, digital cameras, image formats, correction of photos. Basic differences between digital and conventional photography, HDR photography, a variety of topics in photography: portrait, panorama, collages, abstract photo. Art analysis of the photos, the relationship between photography and typography, patterns in nature and photography. Basic parameters and Fine

estetska načela v fotografiji, združena z likovno analizo fotografije. Osnove videa, pomembni parametri, spoznavanje z opremo, snemanjem v studiu ter na terenu, spoznavanje z programsko opremo za montažo in korekcije videov. Vaje: fotografija, izvedba vaj na različnih lokacijah, računalniške korekcije fotografij, (spoznavanje tehničnih parametrov, estetskih in izraznih rešitev). Video, snemanje, montaža ter uporaba v medijskih tehnologijah.	Arts - aesthetic principles of photography, combined with the visual analysis of the photographs. Basics of video production, key parameters, learning about equipment, video filming in the studio and in the field, learning about editing software and video correction. Tutorial: photography on locations and computer postproduction of photos (to determine technical parameters of photography, aesthetic and expressive requirements and solutions). Video production, postproduction and use in media technologies.
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Temeljna literatura in viri/Readings:

1. PAPOTNIK, A. Fotografija : zbrano gradivo o fotografiji. Radovljica : Didakta, 1994
2. INTIHAR, M., E-fotografija (prenovljena in razširjena izdaja), Ljubljana: Samozaložba, 2003.
3. ANG, T., Digitalna fotografija, Ljubljana: Tehniška založba, 2000.
4. SLAVEC, D., Fotografija, Ljubljana: Much, 2000.
5. LONG, B., Complete Digital Photography, Massachusetts, 2001.
6. HIRSCH, Robert. Seizing the light. A history of photography, 2008.
7. Članki v revijalnem tisku o fotografiji.
8. Elektronske publikacije digitalnih knjižnic na svetovnem spletu.
9. Tiskane publikacije ter strokovna poročila.
10. Robert B. Musburger: Single-camera video production • Owens, J., Millerson, G. Video production Handbook
11. Hughes, M. Digital Filmmaking for Beginners A Practical Guide to Video Production
12. Stoller, B. M. Filmmaking For Dummies [Paperback]
13. Martin, S., Grosenick, U. Video art

Literatura je dosegljiva v knjižnici Oddelka za tekstilstvo , ter on-line preko programa Moodle.

Dodatna literatura:

1. PARR, Martin; BADGER, Gerry. The photobook: a history. Phaidon Press, 2006
2. Carroll, M. Naked Filmmaking: How To Make A Feature-Length Film - Without A Crew
3. Sikov, E. Film Studies: An Introduction (Film and Culture Series) • Weise, M., Weynand, D. How video works

Cilji in kompetence:

Spoznavanje fotografije kot enega najpomembnejših vizualno komunikacijskih medijev, in videa, ki fotografijo nadgrajuje, katera skupaj s tipografijo omogočata oblikovanje grafičnih izdelkov in multimedijskih predstavitev.

Predmetno specifične kompetence:

- Sposobnost vpogleda v celotno vlogo fotografije kot enega najpomembnejših vizualnih komunikacijskih medijev.
- Sposobnost za uporabo in poznavanje tehnoloških, postopkov za izdelavo reprodukcij za vse vrste tiska in računalniško oblikovanje slike z različno programsko opremo.
- Poznavanje zgodovine fotografije in videa.
- Poznavanje vseh specifičnih značilnosti in področij uporabe fotografije in videa skozi zgodovino in danes.
- Sposobnost izvedbe in predstavitev samostojne kolekcije ČB in barvnih fotografij v kombinaciji s tipografijo.

Objectives and competences:

Learning about photography as one of the most important visual communication media, and video that upgrades photography, that together with typography allows the creation of graphic products and multimedia presentations.

Subject-specific competencies:

- A complex knowledge of photography as one of the most important visual communication media.
- The use of knowledge and technology for making reproductions for all types of printing and computer images using different software.
- Knowledge of the history of photography and video.
- Knowledge of the specific characteristics and application areas of photography and video through history and today.
- Ability to present separate collection of black & white and colour photographs, combined with typography.

• Znanje s področja zaznave prostora s pomočjo zakona o perspektivi in perspektivi v fotografiji kot prostorski, estetski in izpovedni parameter. • Znanje s področja likovne analize fotografij in videa. • Poznavanje osnov video produkcije, opreme ter osnov snemanja. • Sposobnost montaže in osnovnih korekcij v video produkciji. • Sposobnost tehnične priprave (izvoza) videa za različne medije.	• Knowledge of the perception of space by means of the Law on the perspective and the perspective of the photo as a spatial , aesthetic and narrative parameter. • Art analysis of the photos and video. • Knowledge of the basics of video production, equipment and the basics of recording video. • Ability to edit and make basic corrections in video production. • Ability to technically export video for different media formats.
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Predvideni študijski rezultati:

Znanje s področja analogne in digitalne fotografije, poznavanje nekaterih najpomembnejših svetovnih in slovenskih fotografov in njihovih del.
Uporaba znanja s področja digitalne fotografije v grafični proizvodnji, oglaševanju ter samostojno delovanje na področju fotografije ter osnove priprave fotografskih razstav ter razstav grafičnih izdelkov.
Poznavanje osnov video produkcije ter izdelava avtorskega videa.

Intended learning outcomes:

The knowledge of analogue and digital photography, and some of the most important photographers and their works.

The use of knowledge from the field of digital photography in graphic production, advertising, graphic products and to set their photography exhibitions.
Knowing the basics of video production and making of original video.

Metode poučevanja in učenja:

Predavanja, vodene individualne naloge.
Predavanja v predavalnici ali on-line preko programa Moodle, ter vodene individualne naloge.

Learning and teaching methods:

Lectures and guided tutorials.
Lectures and guided individual work in lecture room or on-line using Moodle.

Načini ocenjevanja:

Delež/Weight

Assessment:

Izpit teoretskih znanj	50,00 %	Exam of theoretical knowledge and
Ocena iz vaj	20,00 %	Completed tutorials
Ocena seminarja	30,00 %	Completed seminar project

Ocenjevalna lestvica:

5 - 10, pri čemer velja, da je pozitivna ocena od 6 - 10

Grading system:

5 - 10, a student passes the exam if he is graded from 6 to 10

Reference nosilca/Lecturer's references:

1. STAREŠINIČ, Marica, SIMONČIČ, Barbara, BRAČKO, Sabina. Using a digital camera to identify colors in urban environments. *Journal of imaging science and technology*, ISSN 1062-3701, 2011, vol. 55, no. 6, str. 060201/1-060201/4, ilustr., doi: [10.2352/J.ImagingSci.Technol.2011.55.6.060201](https://doi.org/10.2352/J.ImagingSci.Technol.2011.55.6.060201). [COBISS.SI-ID [2684272](#)]
2. AHTIK, Jure, MUCK, Deja, STAREŠINIČ, Marica. Detail diversity analysis of novel visual database for digital image evaluation. *Acta polytechnica Hungarica*, ISSN 1785-8860, 2017, vol. 14, no. 6, str. 115-132. <http://www.uni-obuda.hu/journal/Issue77.htm>. [COBISS.SI-ID [3458416](#)]
3. AHTIK, Jure, STAREŠINIČ, Marica. Eye movement analysis of image quality parameters compared to subjective image quality assessment = Analiza pokreta očiju u određivanju parametara kvalitete slike u usporedbi sa subjektivnom procenom kvalitete slike. *Tehnički vjesnik : znanstveno-stručni časopis tehničkih fakulteta Sveučilišta u Osijeku*, ISSN 1330-3651, 2017, vol. 24, no. 6, str. 1833-1839. http://hrcak.srce.hr/index.php?show=clanak&id_clanak_jezik=280290. [COBISS.SI-ID [3452784](#)]
4. JAVORŠEK, Dejana, MOČNIK, Janja, STAREŠINIČ, Marica. Analyses of colour appearances on different display devices = Analiza interpretacije barv na različnih prikazovalnih napravah. *Tekstilec : glasilo slovenskih tekstilcev*, ISSN 0351-3386. [Tiskana izd.], 2015, letn. 58, št. 2, str. 100-107, ilustr. [COBISS.SI-ID [3139440](#)]

5. OPAKA, Uroš, JAVORŠEK, Andrej, STAREŠINIČ, Marica, JAVORŠEK, Dejana. Analiza kakovosti barvnega profila za digitalno kamero Nikon D50 = Analysis of colour profile quality for digital camera Nikon D50. *Tekstilci : glasilo slovenskih tekstilcev*, ISSN 0351-3386. [Tiskana izd.], 2013, letn. 56, št. 2, str. 123-128, ilustr. [COBISS.SI-ID [2905712](#)]

Razstave

6. GODLER, Marjeta, STAREŠINIČ, Marica. *Space illusions dance : [razstava] : Galéria Umelka, Slovak Union of Visual Arts, 5th - 24th August, 2014, Bratislava, Slovakia*. 2014. [COBISS.SI-ID [3049072](#)]

7. GODLER, Marjeta, STAREŠINIČ, Marica. *Vesolje - veselje v nas : [samostojna razstava] : 33. festival idrijske čipke, 20. - 22. junij 2014, Idrija = "Space - the joy in us" exhibition : 33. idrija lace festival, 20. - 22. June 2014*. 2014. [COBISS.SI-ID [3023728](#)]

8. AHTIK, Jure (avtor razstave, mentor), KOČEVAR, Tanja Nuša (avtor razstave, mentor), STAREŠINIČ, Marica (avtor razstave, mentor). *Muvit/6x60 in NTF : razstava študentov 2. letnika, Naravoslovnotehniške fakultete, Univerze v Ljubljani : Maraton filmskega ustvarjanja Muvit/6x60, Celje, 16. - 19. avgust 2017*. 2017. [COBISS.SI-ID [3396976](#)]

GRAFIČNA DODELAVA

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Grafična dodelava
Course title:	Graphic finishing
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Grafične in interaktivne komunikacije, prva stopnja, univerzitetni	Ni členitve (študijski program)	3. letnik	2. semester	izbirni

Univerzitetna koda predmeta/University course code:	0089463
Koda učne enote na članici/UL Member course code:	10905

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	0	0	15	60	4

Nosilec predmeta/Lecturer:	Urška Vrabič Brodnjak
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Vrsta predmeta/Course type:	Izbirni/Elective
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Jeziki/Languages:	Predavanja/Lectures:	Slovenščina
	Vaje/Tutorial:	Slovenščina

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

Vpis v 3. letnik študija.
Za pristop h končnemu izpitu je pogoj opravljen seminar, opravljena predstavitev projektnega dela in izdelek ročne vezave (z oceno 6 ali več).

Prerequisites:

Enrollment in the 3rd year of studies.
For the approach to the final exam is a prerequisite completed seminar, conducted project presentation and handmade booklet (with grade 6 or more).

Vsebina:

Spoznavanje značilnosti in podrobnih tehnik knjigoveške, kartonažerske in ostale dodelave in temeljne skupine tehnoloških operacij. Tehnologija knjigoveške dodelave s tehnološkimi operacijami: rezanje, zgibanje, znašanje, rezkanje, lepljenje (vezava rezkano-lepljeno, kaširanje, plastificiranje), šivanje (žica, nit, taljiva nit), tehnološke linije za spiralno vezavo, vezavo z žičnim glavnikom, mehko vezavo, trdo vezavo knjig. Tehnologija dodelave časopisa na rotaciji. Tehnologija kartonažerske dodelave z izdelavo orodja in protiorodja za izsekovanje in žlebljenje, izsekovanje, zgibanje in lepljenje zložen, tehnologija izdelave transportnih škatel iz valovitega kartona, tehnologija izdelave papirnih in samolepilnih etiket, tehnologija izdelave neskončnih računalniških

Content (Syllabus outline):

Getting to know the detailed characteristics of bookbinding, packaging and other finishing and basic groups of technological operations. Technology bookbinding finishing with technological operations: cutting, folding, assembling, milling, bonding (binding, cutting, gluing, coating, laminating), sewing (wire, thread, fusible thread), technological lines for spiral binding, binding with wire comb, soft binding, hard bookbinding. Technology completion newspaper in rotation. Cardboard and packaging technology completion of the manufacture of tools and dieboards for cutting and creasing, cutting, folding and gluing leaflets, manufacturing technology transport boxes made of corrugated cardboard, paper manufacturing technology and self-adhesive labels,

obrazcev in obrazcev z integriranimi elementi. Seznantitev s trajnostnimi pristopi in uporabo zelenih tehnologij, v procesih grafične dodelave. Projektno delo: predstavitev tehnologije dodelave določenega grafičnega izdelka od surovin, izdelave, lastnosti in uporabe. Seminar: poglobljena predstavitev dela snovi in izdelava grafičnega izdelka, v povezavi s trenutno temo, ki jo določi nosilec seminarja. Druge oblike študija: spoznavanje temeljnih tehnoloških operacij v knjigoveški in kartonažerski dodelavi, določanje jakosti lepljene vezave (dinamometer Instron), ročna izvedba trde in mehke vezave (knjige in brošure), analiza lastnosti kartonažerskega izdelka.	manufacturing technology of continuous computer forms and forms with integrated elements. Getting to know the sustainable approaches and the use of green technologies, in the processes of graphic finishing. Project work: technology demonstration completion of a specific graphic product from raw materials, processing, properties and use. Seminar: an in-depth presentation of substance and making a graphic product, in conjunction with the current theme set by the lecturer of the seminar. Other forms of study: comprehension of basic technological operations in binding and printing finishing, determine the strength of glued binding (dynamometer Instron), handmade bookbinding and binding of brochures, analysis features of printing finishing product.
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Temeljna literatura in viri/Readings:

- KIPPHAN, H. Handbook of Print Media. Berlin [etc.] : Springer, 2001. – NOVAK, G. Grafični materiali. Ljubljana : Naravoslovnotehniška fakulteta, Oddelek za tekstilstvo, 2004.
 - LIEBAU, D., in HEINZE, I. Industrielle Buchbinderei. Itzehoe : Verlag Beruf+Schule, 1997.
 - POTISK, V. Grafička dorada. Zagreb : Školska knjiga, 1997.
 - GREENFIELD, J. ABC of Bookbinding. New Castle : Oak Knoll Press; New York : The Lyons Press, 1998.
 - WIESER, F. Der Bucheinband. Hannover : Schlütersche Verlaganstalt und Druckerei, 1983.
 - SCHEICHER, L. Tehnologija knjigoveške dodelave. Ljubljana : Tehniška založba Slovenije, 1997. – REP, J. Krajšnica o knjigoveštvu. Ljubljana : TLP, 1997.
 - Standardi ISO, sprejeti na TC 130, TC 42 in SIST-ISO, sprejeti na odboru USM/GRT. – Internet, strani ISO, Fogra, Ugra, GATF, SWOP, ...
- Literatura je dosegljiva v knjižnici Oddelka za tekstilstvo, grafiko in oblikovanje, NTF.

Cilji in kompetence:

Študenti spoznajo podrobne tehnološke operacije za ločevanje, preoblikovanje in združevanje materialov v knjigoveški, kartonažerski in ostali dodelavi. Seznanijo se s tehnološkimi procesi za dodelavo različnih grafičnih izdelkov (mehko in trdo vezana knjiga, brošura, časopis, kartonske škatle oz. zloženke, transportne škatle, etikete, neskončni računalniški obrazci), seznanijo se s tehnološkimi linijami v dodelavi in z dodelavnimi tehnološkimi operacijami na tiskarskih in drugih strojih in napravah.

Predmetno specifične kompetence: – poznavanje in razumevanje temeljev in razvoja grafične dodelave ter zelenih, trajnostnih pristopov, – poznavanje in razumevanje razvoja tehnoloških operacij v knjigoveški, kartonažerski in ostali dodelavi, – sposobnost za reševanje konkretnih problemov na podlagi poznavanja tehnoloških operacij za ločevanje, preoblikovanje in združevanje materialov v dodelavi, – sposobnost povezovanja znanja z različnih področij in aplikacij na podlagi poznavanja grafičnih

Objectives and competences:

Students learn the detailed technological operations for the separation, transformation and aggregation of materials in book binding, print finishing and other finishing. Get acquainted with the technological processes for processing a variety of graphic products (soft and hardcover books, brochures, newspaper, cardboard boxes or. leaflets, transport boxes, labels, continuous computer forms) to get acquainted with technological lines in the finishing and finishing technology operations at printing and other industrial machinery.

Subject-specific competencies: - knowledge and understanding of the foundations and the development of graphic finishing and green processes, - knowledge and understanding of the development of technological operations in bookbinding, printing finishing and other processing, - the ability to solve practical problems based on the knowledge of technological operations for the separation, transformation and combine materials in the finishing, - the ability to integrate knowledge from

izdelkov, materialov in dodelavnih tehnoloških operacij, – sposobnost umeščanja novih informacij in interpretacij v kontekst temeljne grafične stroke z obvladovanjem novih grafičnih izdelkov v procesu dodelave, – razumevanje in uporaba metod kritične analize in razvoja teorij ter njihova uporaba v reševanju konkretnih delovnih problemov v grafični dodelavi pri posodabljanju obstoječih in nastanku novih grafičnih izdelkov, – razvoj veščin in spretnosti pri razvoju kakovostnih grafičnih izdelkov.	different fields and applications based on knowledge of graphic products, materials and finishing technology operations, - the ability to place new information and interpretation in the context of the basic graphic profession by mastering new graphic products in the process of completion, - understanding and use of critical analysis and development theories and their application in solving specific working problems in the graphic finishing the modernization of existing and creation of new graphic products, - the development of skills and expertise in the development of high-quality graphic products.
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Predvideni študijski rezultati:	Intended learning outcomes:
Znanje in razumevanje: Pozna natančno tehnologijo oz. tehnološke operacije za ločevanje, preoblikovanje in združevanje materialov v knjigoveški, kartonažerski in ostali dodelavi, pozna načrtovanje knjigoveških in kartonažerskih grafičnih izdelkov, postopke za določanje njihove ustreznosti oz. funkcionalnosti, zna voditi proces grafične dodelave. Razume pojme povezane s knjigoveškimi, kartonažerskimi in ostalimi grafičnimi izdelki, pomen njihovih lastnosti pri načrtovanju in v procesu grafične dodelave, razume delovanje strojev in naprav v knjigoveški, kartonažerski in ostali dodelavi ter delovanje tehnoloških linij v dodelavi glede kakovosti izvedbe dodelave, optimizacije procesov, trajnostnih rešitev in pravilnosti zaporedja izvedbe operacij.	Knowledge and understanding: Student's knowledge: detailed technological operations for the separation, transformation and aggregation of materials in book binding, graphic finishing and other processing, familiar with the design bookbinding and graphic products, procedures for determining their suitability or. Functionality, guiding the process of graphic finishing. Understands and knows the concepts related to bookbinding, packaging and other graphic products, the importance of their properties in the planning and in the process of graphic finishing, understands the operation of machines and devices in bookbinding, packaging and other finishing and operation of technological lines in the process of completion in terms of quality of performance completion, process optimization, sustainability and regularity the sequence of the execution.

Metode poučevanja in učenja:	Learning and teaching methods:
Predavanja, seminar, projektno delo in druge oblike študija. Predavanja se izvajajo v živo v predavalnici in/ali prek spleta (online) s pomočjo specifičnih orodij. Seminarska dela se izvajajo individualno in/ali v skupini (3–4 študenti). Tematika seminarских nalog oz. izdelka se vedno nanaša na vsebine in področja grafične dodelave. Vaje se izvajajo v laboratorijih in/ali prek spleta (online) s pomočjo primerne in ustrezne programske opreme, ki omogoča ustrezno podajanje snovi in izvedbe.	Lectures, seminars, project work and other forms of study. Lectures are performed live in the classroom and/or online with the help of specific tools. Seminar assignments are performed individually and/or in a group (3–4 students). Topics of seminar assignments or the product always refers to the contents that cover of the graphic finishing. Tutorials are performed in a laboratory and/or online with the help of appropriate and suitable software that enables suitable preparation and performance of the practicum.

Načini ocenjevanja:	Delež/Weight	Assessment:
Ustni/pisni izpit, seminarska naloga, poročilo o projektnem delu	50,00 %	Oral/written exam, (practicum), essay, report on project work
Druge oblike študija: ročno izdelana vezava izbranega izdelka.	50,00 %	Other forms of study: handmade binding of selected product.

Ocenjevalna lestvica:	Grading system:

Reference nosilca/Lecturer's references:

VRABIČ BRODNJAK, Urška. Bio based paper coatings containing protein, polysaccharide and essential oil. V: RESTREPO BAENA, Oscar Jaime (ur.). Current Perspectives on Chemical Sciences. Vol. 8. [S. l.]: Book Publisher International, 2021. Str. 88-102.

LAVRIČ, Gregor, ZAMLJEN, Aleksandra, JUHANT GRKMAN, Janja, JASIUKAITYTE, Edita, GRILC, Miha, LIKOZAR, Blaž, GREGOR-SVETEC, Diana, VRABIČ BRODNJAK, Urška. Organosolv lignin barrier paper coatings from waste biomass resources. Polymers. 2021, vol. 13, iss. 24, str. 1-13.

VRABIČ BRODNJAK, Urška, TIHOLE, Katarina. Chitosan solution containing zein and essential oil as bio based coating on packaging paper. Coatings. 22 May 2020, vol. 10, iss. 5, str. 1-13

VRABIČ BRODNJAK, Urška, TODOROVA, Dimitrina, LESKOVŠEK, Mirjam. Viscoelastic and physical properties of paper from softwood and hardwood pulp with addition of chitosan and rice starch. Journal of science & technology for forest products and processes. 2020, vol. 7, no. 6, str. 48-60.

STANKOVIĆ ELESINI, Urška, VRABIČ BRODNJAK, Urška, PUŠNIK, Nace, TOROŠ, Ivan. Board games development: challenge for graphic arts students. V: Gamestorming for innovative teaching. [S. l.]: GameIT Project, 2020.

VRABIČ BRODNJAK, Urška. Znanostjo iz bioloških adhezivov do sintetičnih veziv. Embalaža, okolje, logistika, ISSN 1855-4849, dec. 2016, 114/115, str. 14.

VRABIČ BRODNJAK, Urška. UV-drogen van biobased coatings : oppervlakteafwerking voor papier en karton. V: Papier-gerelateerd onderzoek in Nederland en daarbuiten, (Innovatieboekjes, 7). Arnhem: Kenniscentrum Papier & Karton (KCPK), Aug. 2016, str. 15, ilustr.

VRABIČ BRODNJAK, Urška. Effect of UV-treatment on properties of coated paper with biopolymers : [invited lecture on the European Paper Week 2015, 17th - 19th November 2015, Brussels, Belgium]. 2015: Confederation of European Paper Industries; Brussels.

VRABIČ BRODNJAK, Urška. UV drying for bio-based coatings : [invited lecture on "Industry meets science" / "science meets industry", International paper and board value chain innovation event 2 february 2016, Arnhem, Netherlands]. 2016: KCPK - Kenniscentrum Papier en Karton; Arnhem.

GRAFIČNA PRIPRAVA

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Grafična priprava
Course title:	Graphic prepress
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Grafične in interaktivne komunikacije, prva stopnja, univerzitetni	Ni členitve (študijski program)	1. letnik	2. semester	obvezni

Univerzitetna koda predmeta/University course code:	0554327
Koda učne enote na članici/UL Member course code:	10012

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	30	0	15	90	6

Nosilec predmeta/Lecturer:	Raša Urbas
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Vrsta predmeta/Course type:	Obvezni/Compulsory
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Jeziki/Languages:	Predavanja/Lectures:	Angleščina, Slovenščina
	Vaje/Tutorial:	Angleščina, Slovenščina

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

Pogoj za opravljanje študijskih obveznosti je vpis v 1. letnik GIK študija ter aktivna udeležba pri vseh segmentih predmeta (predavanja, seminar, vaje in druge oblike študija).
Izdelana in pozitivno ocenjena seminarska naloga oz. izdelek s predstavitev/zagovorom ter pozitivno opravljene in ocenjene vaje so pogoj za pristop h končnemu pisnemu in/ali ustnemu izpitu teorije predmeta.
Pogojena prisotnost pri posameznih učnih enotah:

- predavanja: 70 %
- vaje 100 % in
- seminar: 80 %.

Prerequisites:

The prerequisite for fulfilling the study obligation is enrolment in the 1st year of GIK study and active participation in all segments of the subject (lectures, seminar, tutorial and other forms of study).
A completed and positively graded seminar assignment i.e. product with presentation/defense, as well as positively completed and graded tutorials are prerequisites for taking the final written and/or oral theoretical examination.
Conditional attendance for individual course units:

- lectures: 70%,
- practicum (tutorials) 100 % and
- seminar: 80%.

Vsebina:

Pri predmetu bodo študentje seznanjeni s sledečimi vsebinami:

- način priprave elementov slikovnih in tekstovnih predlog za zapis tiskovin in digitalnih grafičnih vsebin;

Content (Syllabus outline):

Lectures will enable students to become acquainted with the following content:

- methods of preparing image and text elements for printed and digital graphic contents;
- types and forms of communication procedures and methods;

• vrste in oblike komunikacijskih načinov in metod; • analogno-digitalna pretvorba grafičnih predlog; • značilnosti kompresijskih in interpolacijskih mehanizmov; • tehnične značilnosti vhodnih in izhodnih naprav v digitalni grafični pripravi; • lastnosti zapisov datotečnih formatov v odvisnosti od načina upodobitve • osnove barvnega upravljanja; • vrste in načini rastriranja ter uporaba programskega orodja RIP za izdelavo rastriranih predlog; • impozicija; • izdelava in pregled kontrolnih odtisov v digitalni pripravi za tisk; • tehnološke značilnosti delokrogov digitalne priprave za tisk in splet; • značilnosti in pomembnost pravilne uporabe različnih vrst .pdf dokumentov v grafični pripravi.	• analogue-digital conversion of graphic designs; • properties of compression and interpolation techniques; • technical properties of input and output devices in graphic digital prepress; • properties of file formats depending on the rendering mode; • basics of color management; • types and methods of rasterization and the use of RIP software for the production of raster designs; • imposition; • production and overview of control prints in digital prepress; • technical properties of graphic print and web workflows; • properties and the importance of correct use of different types of .pdf files in graphic prepress.
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Temeljna literatura in viri/Readings:

Kipphan H. Handbook of Print Media. Berlin, Springer, 2001.

Novak G. A. Grafični materiali, 2004

Kumar M. Tehnologija Grafičnih procesov. Srednja medijska in grafična šola, 2009

Možina K. Tipografska kunšt. Ljubljana: Naravoslovnotehniška fakulteta, 2023

Cilji in kompetence:

Študentje se seznani z osnovnimi znanji s področja digitalne in grafične priprave za tiskane in spletne medije ter druge oblike zapisa digitalnih datotek. Seznanijo se s pripadajočimi osnovnimi tehnološkimi procesi, orodji in elementi delokroga za izdelavo tiskovin in spletnih objav ter drugih digitalnih datotek.

Predmetno specifični cilji in kompetence so naslednje:

- pregled osnovnih značilnosti komuniciranja;
- obvladovanje analogno-digitalne pretvorbe različnih grafičnih predlog (besedila in slik);
- pregled osnovnih tehnoloških značilnosti procesov izdelave različnih vrst tiskovin;
- pregled namena in uporabe najpomembnejših formatov zapisa datotek grafičnih predlog;
- obvladovanje sestave in tehnoloških parametrov delokroga digitalne priprave tiskovin;
- nameni in cilji uporabe barvnega upravljanja pri pripravi grafičnih predlog;
- uporaba rastriranja in pripadajočih tehnoloških procesov;
- priprava rastriranih predlog na RIPu in izdelava posameznih separacij;
- spoznavanje pomembnosti in namembnosti različnih oblik pdf zapisa.

Cilj rabe IKT opreme in sodobnega pristopa poučevanja je doseganje boljšega razumevanja in

Objectives and competences:

Students are acquainted with the basic knowledge from the field of digital and graphic prepress for printed and web media, as well as other types of digital files. They are acquainted with associated basic technology processes, tools and elements of workflow for the production of printed and web material as well as other types of digital files. Subject-specific objectives and competencies are as follows:

- review of the basic communication characteristics;
- controlling of analogue-digital conversion of different graphic designs (text and images);
- review of basic technology characteristics in the production process of different printing material;
- review of the aim and the use of most important file formats of graphic designs;
- managing of composition and technological parameters of digital prepress workflow of printing material;
- aims and objectives of the use of color management in graphic designs;
- use of raster and related technological processes;
- preparation of raster designs on RIP and production of individual separations;
- understanding the importance and the purpose of different .pdf file formats.

znanja vsebine teoretičnega in praktičnega dela predmeta ter hkrati zagotavljanje trajnostnega znanja rabe in pomena IKT tehnologij v učnem procesu in praktični rabi v postopkih grafične priprave. Študent bo s pridobljenim znanjem znal interdisciplinarno povezovati osvojene vsebine z drugimi predmeti.	The aim of the use of ICT devices and a modern teaching approach is to achieve a better understanding and knowledge of the contents of the theoretical and practical part of the studies, while ensuring sustainable knowledge of the use and importance of ICT technologies in the learning process and practical use in graphic prepress. With the knowledge acquired, the student will be able to combine the acquired content with other subjects in an interdisciplinary manner.
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Predvideni študijski rezultati:

Študent razume in zna pravilno uporabljati: - osnovna orodja, ki predstavljajo industrijski standard v grafični pripravi za tisk in splet; - osnove tehnoloških procesov grafičnega delokroga v digitalni pripravi za tisk in splet; - izbrati in urediti ustrezne podatke in informacije, ki so osnova v digitalni grafični pripravi; - povezave med posameznimi procesi pretvorbe grafičnih predlog v digitalni pripravi za tisk; - načine dela in kontrole kakovosti pripravljenih datotek za tisk in objavo na spletu.	Intended learning outcomes: Student understands and knows how to properly use: - basic tools, which represent an industrial standard in graphic prepress for printing and web publishing; - basics of technological properties of graphic workflow in digital prepress for print and web publishing; - selecting and editing proper data and information, which are the bases in graphic digital prepress; - links between individual processes of conversion graphic designs in digital graphic prepress; - methods and quality control of prepared files for printing and web publishing.
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Metode poučevanja in učenja:

Predmet je sestavljen iz predavanj, seminarja, vaj in drugih oblik dela. Predavanja (multimedijske prezentacije) se izvaja v živo v predavalnici in/ali prek spleta (online) s pomočjo specifičnih orodij. Vsa gradiva predmeta so dostopna v Moodle spletni učilnici. Seminarske naloge (v obliki grafičnega izdelka) se izvajajo individualno in/ali v skupini (3–4 študenti). Tematika seminarskih nalog oz. izdelka se vedno nanaša na vsebine, ki zaobjemajo področje priprave predlog. Vaje se izvajajo v računalniški učilnici in/ali prek spleta (online) s pomočjo primerne in ustrezne programske opreme, ki omogoča ustrezno grafično pripravo izdelkov. V okviru predmeta se občasno izvajajo strokovni obiski grafičnih podjetij, z namenom spoznavanja različnih vrst delnih ali celovitih krogotokov proizvodnje in operacij v grafičnih podjetjih. Pri predmetu se uporabljajo spletne učilnice (gradivo, kvizi, preverja je znanja, igre, druge aktivnosti) in IKT metode poučevanja (multimedijsko gradivo, praktične demonstracije itd.). Komunikacija in oddaja seminarskih nalog poteka prek spletne učilnice, kjer študentje tudi medsebojno vrednotijo projektno delo. Uporabljajo se inovativne metode poučevanja v smislu obogatitve predavanj z relevantnimi vabljenimi predavanji, povezovanjem z industrijo, seminarskim delom na realnih izzivih iz industrije in gospodarstva.	Learning and teaching methods: The course consists of lectures, seminar, tutorials and other forms of work. Lectures (multimedia presentation) are performed live in the classroom and/or online with the help of specific tools. All course materials are available in the Moodle online classroom. Seminar assignments (in the form of a graphic product) are performed individually and/or in a group (3–4 students). Topics of seminar assignments or the product always refers to the contents that cover the area of graphic prepress. Tutorials are performed in a computer room and/or online with the help of appropriate and suitable software that enables suitable preparation of graphic designs. As a part of the course, professional visits to graphic arts companies will be made from time to time in order to learn about different types of partial or complete production workflows and operations in graphic companies. The course uses online classroom (materials, quizzes, knowledge tests, games, other activities) and ICT teaching methods (multimedia materials, practical demonstrations, etc.). Communication and submission of seminar assignments is done through the online classroom, where students also assess each other's project work. Innovative teaching methods are used in terms of enriching lectures with relevant invited lectures, communication with industry, seminar work on real challenges from industry and business.
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Načini ocenjevanja:	Delež/Weight	Assessment:
Praktično znanje, osvojeno na vajah, in teoretično znanje vsebine predavanj ter drugih literarnih virov se oceni s pomočjo pisnega in/ali ustnega preverjanja, ki se izvede v živo, v predavalnici, ali prek spleta (online) s pomočjo ustreznih programskih rešitev/orodij. Seminarska naloga oz. izdelek je ocenjen na podlagi vsebinske, oblikovne in kontekstualne kakovosti ter predstavitve. Skupna ocena seminarja, vaj in teoretičnega znanja predavanj se oceni z negativno oceno (5) oz. s pozitivnimi ocenami od 6 do 10. Za pozitivno oceno je treba doseči vsaj 55 % ali več. Vaje	30,00 %	The practical knowledge acquired in the tutorials and the theoretical knowledge from the lectures and other literature sources will be tested by a written and/or oral examination, which will be conducted in the lecture hall or online using appropriate software solutions/tools. The seminar assignment i.e. product will be graded on content, design and contextual quality and presentation. The overall grade of the seminar, tutorials and theoretical knowledge of the lectures will be assessed with a negative grade (5) or with positive grades from sufficient 6 to excellent 10. For a positive grade, at least 55 % or more must be achieved. Tutorials
Seminarska naloga oz. izdelek	20,00 %	Seminar assignment i.e. product
Izpit teoretičnega znanja	50,00 %	Exam of theoretical knowledge

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. URBAS, Raša, STANKOVIČ ELESINI, Urška, CIGULA, Tomislav, MAHOVIĆ POLJAČEK, Sanja. Pad printing. V: IZDEBSKA, Joanna (ur.), THOMAS, Sabu (ur.). *Printing on polymers : fundamentals and applications*. Amsterdam [etc.]: Elsevier, 2016, str. 263-278.
2. STANKOVIČ ELESINI, Urška, URBAS, Raša. Microcapsules in printing. V: IZDEBSKA, Joanna (ur.), THOMAS, Sabu (ur.). *Printing on polymers : fundamentals and applications*. Amsterdam [etc.]: Elsevier, 2016, str. 389-396.
3. TOMAŠEGOVIĆ, Tamara, MAHOVIĆ POLJAČEK, Sanja, STRIŽIĆ JAKOVLJEVIĆ, Maja, URBAS, Raša. Effect of the common solvents on UV-modified photopolymer and EPDM flexographic printing plates and printed ink films. *Coatings*, ISSN 2079-6412, 4 February 2020, vol. 10, iss. 2, str. 1-23, ilustr. <https://www.mdpi.com/2079-6412/10/2/136>.
4. ROTAR, Bojan, STANKOVIČ ELESINI, Urška, HAJDU, Peter, LESKOVAR, Blaž, URBAS, Raša. Morphological and dimensional properties of unmodified and modified braille dots produced with UV inkjet printing = Morfološke in dimenzijske lastnosti nemodificirane in modificirane brajice izdelane z UV kapljičnim tiskom. *Materiali in tehnologije*, ISSN 1580-2949. [Tiskana izd.], 2020, vol. 54, iss. 6, str. 879-887, ilustr. <http://mit.imt.si/mit206.html>, doi: 10.17222/mit.2020.016.
5. URBAS, Raša, STANKOVIČ ELESINI, Urška. Color differences and perceptive properties of prints made with microcapsules. *JGED : Journal of Graphic Engineering and Design*, ISSN 2217-379X, Jun 2015, vol. 6, no. 1, str. 15-21.

GRAFIČNI INŽENIRING

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Grafični inženiring
Course title:	Graphic engineering
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Grafične in interaktivne komunikacije, prva stopnja, univerzitetni	Ni členitve (študijski program)	3. letnik	2. semester	izbirni

Univerzitetna koda predmeta/University course code:	0089465
Koda učne enote na članici/UL Member course code:	10014

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	0	0	0	60	4

Nosilec predmeta/Lecturer:	Urška Stanković Elesini
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Vrsta predmeta/Course type:	Izbirni/Elective
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Jeziki/Languages:	Predavanja/Lectures:	Slovenščina
	Vaje/Tutorial:	Slovenščina

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

Pogoj za vključitev v delo je vpis v letnik študija. Izdelana seminarska naloga z zagovorom je pogoj za pristop k končnemu izpitu.

Prerequisites:

The prerequisite for inclusion present enrollment in the study year. Finished project work with final presentation is a prerequisite the approach to the final exam.

Vsebina:

Sistemi; vodenje podjetja in oddelka, organizacija podjetja, zajemanje podatkov, nadzor in analiza dosežkov, optimalizacija zalog, nabava, študij in analiza časa, krmiljenje delovnega procesa, projektni management (cilji, faze projekta, udeleženci v projektu, projektna organizacija, vodenje, planiranje projektov, projektni tim).
Industrijska struktura, pojmovanje proizvodnje ter organizacija, značilnosti in delitev proizvodnje.
Proces planiranja, priprava procesa, izbor tehnologije, določanje opreme, proizvodni interval, tehnološka priprava dela, časovna norma, operativna priprava proizvodnje, planiranje proizvodnega procesa, planiranje kapacitet, naloge materialnega poslovanja, naloge nabavnega oddelka, izdelava in lansiranje

Content (Syllabus outline):

Systems; management of companies and department, company organization, data collection, monitoring and analysis of performance, optimization of stock, acquisition, study and analysis of time, control of the working process, project management (goals, phases of the project, the participants in the project, project organization, management, project planning, project team).
Industry structure, conception and organization of production, characteristics and division of production. The process of planning, preparation of the process, the selection of technology, determining equipment, manufacturing interval, technological preparation of production, work time norm, operational preparation of production, planning of

delovne dokumentacije; informacijski in dokumentacijski sistem; proces investicij. Seminarska naloga: praktična izvedba projekta in projektne načina dela za različne grafične izdelke ter v povezavi z različnimi grafičnimi proizvodnimi procesi.	the production process, capacity planning, material management, purchasing department, production and launching of operational documentation; information and documentation system; process of investments. Seminar work: the practical implementation of the project work for a variety of graphic products in connection with various graphic production processes.
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Temeljna literatura in viri/Readings:

- Bernik, I. Sodobne oblike in pristopi pri organiziranju podjetij in drugih organizacij. Kranj: Moderna organizacija, 1999
 - MOŽINA, S. Management : nova znanja za uspeh. Radovljica: Didakta, 2002
 - POLAJNAR, A. Oblikovanje dela in delovnih mest. Maribor: Fakulteta za strojništvo, 2002
 - KLOPČIČ, S. Vodenje in sodelovanje, moč in odgovornost. Zagorje ob Savi : samozal., 2015
 - STARE, A. Projektni management. Teorija in praksa. Ljubljana: Agencija POTI d.o.o., 2011
 - Stankovič Elesini, Urška. Študij dela in časa. Ljubljana: Naravoslovnotehniška fakulteta, Oddelek za tekstilstvo, 2002. 214 str.
- Dodatna literatura:
- HILL, T. Operations Management. Strategic context and managerial analysis. MacMillan Business, 2000

Cilji in kompetence:

Cilji: Študent se nauči uporabljati znanja grafičnih proizvodnih procesov. Nauči se organizirati projektne tim; nauči se vpeljati projektne rešitve v grafični industrijski poslovni sistem. Spozna uporabnost vrednostne analize pri načrtovanju grafičnih izdelkov in storitev.

Predmetno specifične kompetence:

- sposobnost za reševanje konkretnih delovnih problemov grafične tehnologije z uporabo znanstvenih metod; sistemizacija in vrednotenje zahtevnosti dela v posameznih grafičnih oddelkih ter podjetjih,
- koherentno obvladovanje temeljnega znanja grafične tehnologije in sposobnost povezovanja različnih področij grafične stroke (npr. priprave, tiska, dodelave) v kontekst temeljne grafične stroke,
- razumevanje temeljne grafične stroke ter povezanosti med njenimi poddisciplinami,
- razumevanje in uporaba metod kritične analize razvoja ter njihova uporaba v reševanju konkretnih delovnih problemov; postavitve delovanja, kontrola in analiza projektne tima v grafični proizvodnji, načrtovanje, analiziranje in izdelava grafičnih izdelkov in storitev ter grafičnih procesov,
- razvoj spretnosti pri načrtovanju in izračunavanju tehnoloških zahtev grafičnih izdelkov in storitev.

Objectives and competences:

Objectives: The student learns to use knowledge of graphic production processes. Learns how to organize a project team; learns to introduce a project solution in the graphic industry business system; learns about the usefulness of value analysis in the planning graphic products and services.

Competences:

- the ability to resolve specific work problems of graphics technology using scientific methods; systematization and evaluation of work in the individual graphic departments and enterprises,
- coherent use of the base knowledge of graphics technology and the ability to connect different areas of graphic disciplines (eg. the preparation, printing, finishing) in the context of the basic graphics professionals,
- understanding the basic graphic profession and the connection between its sub-disciplines,
- understanding and use of critical analysis of developments and their use in solving concrete business problems; setting operation, control and analysis of the project team in graphic production, design, analysis and production of graphic products and services and graphical processes
- development of skills in the planning and calculation of the technological requirements of graphic products and services.

Predvideni študijski rezultati:

Znanje in razumevanje:
Zna povezati in uporabiti znanja grafične tehnologije na področju projektiranja grafičnih izdelkov, storitev

Intended learning outcomes:

Knowledge and understanding:
Knows how to integrate and use the knowledge of graphics technology for the graphic product design,

in proizvodnih procesov. Pozna različne metode pri definiranju grafičnih procesov. Pozna pomen vrednostne analize pri načrtovanju izdelkov in storitev. Pozna zahteve za projektno delovanje; zna organizirati in voditi projektno delo. Pozna elemente, ki so pomembni pri projektiranju grafičnih procesov. Zna uporabiti različne metode za vrednotenje zahtevnosti dela in postaviti ocenjevalni model za konkretni primer. Razume pomen različnih tehnoloških postopkov ter njihovo pravilno povezavo in sosledje za načrtovanje in izvedbo optimalnega grafičnega izdelka in celotnega tehnološkega procesa.. Razume pomen projektnega načina dela	services and manufacturing processes. Knows the different methods for defining graphic processes. Knows the importance of value analysis in planning products and services. Knows the requirements for the project operation; knows how to organize and manage project work; knows the elements that are important in the design of graphical processes. Knows how to use a variety of methods for evaluating the complexity of the work and place evaluation model to the case. Understands the significance of different technological processes and their proper connection and succession planning and implementation of optimal graphic product and the whole technological process. Understands the importance of project work.
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Metode poučevanja in učenja:

Predavanja se večinoma izvajajo v predavalnici, kjer je zagotovljena lažja komunikacija ter delo z uporabo inovativnih metod. Pri delu se uporablja spletna učilnica (nalaganje gradiva, videov, povezav, kvizov, domačih nalog, ki so podlaga in uvod v naslednje predavanje; s strani študentov oddaja domačih nalog). V primeru seminarjev se prve ure, ko se določajo vsebine seminarjev izvedejo v predavalnici, kasneje pa se po potrebi 25% ur izvede na daljavo z uporabo IKT. V spletni učilnici se študenti prijavljajo v skupine, tedensko oddajajo seminarske naloge). Tedensko potekajo razgovori, s pomočjo katerih študenti pri seminarski nalogi napredujejo hitreje, končni izdelki pa so kakovostnejši.

Learning and teaching methods:

Lectures are usually held in a classroom, where easier communication and work with innovative methods are ensured. During work, the online classroom Moodle on the NTF platform is used (uploading materials, videos, links, quizzes, homework assignments that serve as a basis and introduction for the next lecture; students use online classroom to submit homework, register in seminar groups, etc.). In seminars, the first lessons, when the content of the seminars is determined, are held in the classroom; later, 25% of the hours are held remotely via ICT. In the online classroom, students register in groups and submit seminar assignments weekly). Constructive discussions are held weekly, with the help of which students make faster progress in seminar work and the final products are of higher quality.

Načini ocenjevanja:

Delež/Weight

Assessment:

Pisni izpit (v predavalnici ali na daljavo)	60,00 %	Written exam (classroom or on distance-remote)
Seminarska naloga (oddaja delnih poročil z uporabo spletne učilnice in končna predstavitev v predavalnici ali na daljavo)	40,00 %	Seminar work (submission of partial reports via online classroom and final presentation in classroom or via distance learning)

Ocenjevalna lestvica:

5 - 10, pri čemer velja, da je pozitivna ocena od 6 - 10

Grading system:

5 - 10, a student passes the exam if he is graded from 6 to 10

Reference nosilca/Lecturer's references:

STANKOVIČ ELESINI, Urška. Analiza in projektiranje procesov v konfekciji : zapiski predavanj. Ljubljana: Naravoslovnotehniška fakulteta, Oddelek za tekstilstvo, 2005. 128 str.
STANKOVIČ ELESINI, Urška. Študij dela in časa. Ljubljana : Naravoslovnotehniška fakulteta, Oddelek za tekstilstvo, 2002. 214 str. (ISBN 961-6045-18-0)
STANKOVIČ ELESINI, Urška. Študij dela in časa : navodila k vajam. Ljubljana : Naravoslovnotehniška fakulteta, Oddelek za tekstilstvo, 2005. 50 str. (ISBN 961-6045-28-8)
VARDJAN, Gregor, STANKOVIČ ELESINI, Urška. Analiza stanja vzdrževalne funkcije v konfekcijskem podjetju. Tekstilec, 2005, let. 48, no. 10-12, str. 255-265. (ISSN 0351-3386)
URBAS, Raša, STANKOVIČ ELESINI, Urška, CIGULA, Tomislav, MAHOVIĆ POLJAČEK, Sanja. Pad

printing. V: Printing on polymers / edited by Joanna Izdebska, Sabu Thomas. - Amsterdam [etc.] : Elsevier, 2016, 263-278.

URBAS, Raša, PAVLOVIĆ, Živko, DRAGANOV, Srđan. and STANKOVIĆ ELESINI, Urška. Offset printing by the microcapsules - influence on the properties of paper substrat. V: Proceedings / 7th International Symposium on Graphic Engineering and Design GRID 2014, November 13-14, 2014, Novi Sad. - Novi Sad : Faculty of Technical Sciences, Department of Graphic Engineering and Design, 2014.

GRAFIČNI MATERIALI

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Grafični materiali
Course title:	Graphic materials
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Grafične in interaktivne komunikacije, prva stopnja, univerzitetni	Ni členitve (študijski program)	1. letnik	2. semester	obvezni

Univerzitetna koda predmeta/University course code:	0089477
Koda učne enote na članici/UL Member course code:	10015

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:	Diana Gregor Svetec, Sabina Bračko
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Vrsta predmeta/Course type:	Obvezni/Compulsory
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Jeziki/Languages:	Predavanja/Lectures:	Slovenščina
	Vaje/Tutorial:	Slovenščina

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

Vpis v letnik študija.
Pogoj za opravljanje študijskih obveznosti je prisotnost pri predavanjih, seminarju in vajah.
Zahtevana prisotnost na vajah je 100 %.
Za pristop k izpitu je pogoj opravljen seminar in kolokvij iz laboratorijskih vaj.

Prerequisites:

Enrolment into the study year.
Prerequisite for performing study obligations is presence at lectures, seminar and tutorials. Requested presence at tutorials is 100 %.
Student can attend the exam after passing Tutorial and Seminar.

Vsebina:

Predavanja: • predstavitev različnih grafičnih materialov s poudarkom na okolju prijaznih grafičnih materialih ter njihovi možnosti recikliranja; • predstavitev postopka izdelave in dodelave papirja ter vpliva surovin in proizvodnih faz na lastnosti papirja; • pregled različnih vrst papirjev; • formati; • sestava, lastnosti in mehanizmi sušenja tiskarskih barv; • materiali za digitalne tehnike tiska; • zgradba in lastnosti lakov in lepil.
Seminar: poglobljena predstavitev dela snovi
Vaje: identifikacija papirnih vlaken, določanje osnovnih lastnosti tiskovnih substratov in drugih grafičnih materialov.

Content (Syllabus outline):

Lectures: • overview of different graphic materials with emphasis on eco-friendly graphic materials and their possibilities of re-use and recycling; • introduction to manufacturing process of paper and its finishing; • influence of raw materials and processing steps on characteristics of papers; • overview of various types of papers; • paper sizes; • composition, properties and drying mechanisms of printing inks; • materials in digital printing; • structure and properties of adhesives and varnishes.
Seminar: presentation of research work.
Tutorial: identification of paper fibres, determination

	of basic properties of printing materials and other graphic materials.
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Temeljna literatura in viri/Readings:

1. C. J. Biermann: Handbook of pulping and papermaking, Academic Press, 1996
 2. G. A. Smook: Handbook for pulp & paper technologists, Angus Wilde Publications Inc., 2002
 3. H. Kipphan: Handbook of Print Media. Springer-Verlag, 2001
 4. B. Thompson: Printing Materials: Science and Technology. Pira International, 2002
 5. G. Novak: Grafični materiali. NTF-Oddelka za tekstilstvo, 2004
 6. N. Eldred: What the Printer Should Know about Ink. Pittsburgh:GATFPress, 2001.
- Literatura je dostopna v knjižnici NTF-Oddelka za tekstilstvo, grafiko in oblikovanje.
Literature is available in the library NTF-Department of Textiles, Graphic Arts and Design

Cilji in kompetence:

Študenti spoznajo osnovne materiale, ki se uporabljajo v tisku in dodelavi grafičnih izdelkov, kot so papir, karton in lepenka, polimerne folije, knjigoveški materiali, tiskarske barve, laki, lepila in drugi pomožni materiali. Seznanijo se z njihovim pridobivanjem, sestavo, strukturo in uporabnostjo. Spoznajo lastnosti grafičnih materialov, povezavo med lastnostmi tiskovnih materialov z lastnostmi materialov s katerimi tiskamo in drugih materialov, ki se uporabljajo pri proizvodnji grafičnih izdelkov. Predmetnospecifične kompetence:

- poznavanje in razumevanje pomena strukture in lastnosti grafičnih materialov v povezavi z njihovo uporabnostjo,
- poznavanje in razumevanje pomena interakcij med različnimi grafičnimi materiali za doseganje kakovostnih grafičnih izdelkov,
- sposobnost povezovanja znanja z različnih področij in aplikacij z namenom optimiranja postopkov izdelave in doseganje večje kakovosti končnih izdelkov,
- sposobnost umeščanja novih informacij in interpretacij pri razvoju grafičnih materialov in njihove uporabnosti.

Objectives and competences:

Students get to know basic materials, which are used in printing and finishing of graphic products, such as paper, cardboard, polymeric foils, binding materials, printing inks, varnishes, adhesives and other materials. They get acquainted with their composition, structure and usability. They learn about the properties of graphic materials and the connection between the properties of printing substrate and printing ink as well as other materials used in the manufacturing of graphic products. Competences:

- knowledge and understanding the importance of the structure and properties of graphic materials in relation to their usefulness,
- knowledge and understanding the importance of interactions between the various graphic materials for achieving high quality graphic products,
- the ability to integrate knowledge from different fields and applications in order to optimize manufacturing processes and achieve higher quality of finished products,
- the ability to include new information and interpretations in the development of graphic materials and their usability.

Predvideni študijski rezultati:

Znanje in razumevanje:
Pozna surovine za proizvodnjo papirja in njihov vpliv na lastnosti tiskovnega materiala; pozna postopek izdelave papirja; pozna vrste papirjev, njihove lastnosti ter uporabo; pozna formate papirja; pozna zgradbo tiskarskih barv za različne tehnike tiska; pozna in razume vpliv sestavin tiskarskih barv na tehnološki postopek in kvaliteto odtisa; pozna zgradbo in lastnosti lakov in lepil.
Razume osnovne fizikalno-kemijske reakcije in interakcije na površinah grafičnih materialov, razume pojme povezane z lastnostmi grafičnih materialov in relacije med posameznimi lastnostmi grafičnih materialov, razume vpliv strukture grafičnih materialov na kakovost končnega izdelka.

Intended learning outcomes:

Knowledge and understanding:
Knows the raw materials for production of paper and their influence on its properties; knows paper manufacturing process; knows types of paper, their characteristics and use; knows paper sizes; knows the structure of printing inks for different printing techniques; knows and understands the influence of printing ink composition on technological process and print quality; knows composition and properties of varnishes and glues.
Understands basic physical and chemical reactions and interactions on surfaces of the graphic materials; understand the concepts related to the properties of graphic materials and relations between the characteristics of graphical materials, understands the

Razume pomen vpeljave krožnega gospodarjenja v procese izdelave grafičnih materialov in trajnostnega razvoja na področju materialov.	influence of the structure of the materials on the quality of the finished product. Understands the importance of introducing circular economy into production of graphic materials and sustainable development in the field of materials.
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Metode poučevanja in učenja:	Learning and teaching methods:
Predavanja, seminar, laboratorijske vaje. Delo poteka pretežno v predavalnici oziroma v laboratoriju in/ali preko spleta s pomočjo ustrezne programske opreme.	Lectures, seminar, laboratory work. The activities are predominantly located in the classroom and laboratory or/and on-line using suitable equipment.

Načini ocenjevanja:	Delež/Weight	Assessment:
Ustni/pisni izpit (50%),	50,00 %	Oral/written exam (50%)
seminarska naloga (20%),	20,00 %	Seminar (20%)
kolokvij iz laboratorijskih vaj (30%).	30,00 %	Tutorial (30%)

Ocenjevalna lestvica:	Grading system:

Reference nosilca/Lecturer's references:

1. DRAGOJEVIĆ, Andreja, GREGOR-SVETEC, Diana, VODOPIVEC, Jedert, LOZO, Branka. Characterization of seventeenth century papers from Valvasor's collection of the Zagreb Archdiocese. *Heritage science*. 19 Mar. 2021, vol. 9, str. 1-20, ilustr. ISSN 2050-7445.
2. GREGOR-SVETEC, Diana, PIVAR, Matej, MUCK, Tadeja. Properties of recycled papers important for printable antennas. *Cellulose chemistry and technology*, ISSN 0576-9787, 2015, vol. 49, no. 7/8, str. 701-708.
3. GREGOR-SVETEC, Diana, ROŽIĆ, Mirela, MUCK, Tadeja, LOZO, Branka. Natural zeolite as filler in base ink jet paper sheet. *Nordic pulp & paper research journal*, ISSN 0283-2631. [Print ed.], 2012, vol. 27, no. 4, str. 721-728.
4. KÖNIG, Silva, MUCK, Tadeja, HLADNIK, Aleš, GREGOR-SVETEC, Diana. Recycled papers in everyday office use. *Nordic pulp & paper research journal*, ISSN 0283-2631. [Print ed.], 2011, vol. 26, no. 3, str. 349-355.
5. BLAZNIK, Barbara, KOVAČ, Franci, BIZJAK, Grega, BRAČKO, Sabina. Fastness of dye-based ink-jet printing inks in aqueous solution in the presence and absence of oxygen. *Color research and application*. [Print ed.]. 25. mar. 2022, vol. 47, no. 5, str. 1193-1199, ilustr. ISSN 0361-2317.
6. MOŽINA, Klementina, BRAČKO, Sabina, KOVAČEVIĆ, Dorotea, BLAZNIK, Barbara, MOŽINA, Klemen. Legibility of prints on paper made from Japanese knotweed. *Bioresources*. 2020, vol. 15, no. 2, str. 3999-4015. ISSN 1930-2126
7. MOŽINA, Klementina, PODLESEK, Anja, BRAČKO, Sabina. Preserving typographic cultural heritage using contemporary digital technology. *Journal of cultural heritage*. 2019, vol. 36, [no.] mar.-apr., str. 166-173, ilustr. ISSN 1296-2074.

INFORMACIJSKE TEHNOLOGIJE

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Informacijske tehnologije
Course title:	Information technologies
Članica nosilka/UL	UL NTF
Member:	

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Grafične in interaktivne komunikacije, prva stopnja, univerzitetni	Ni členitve (študijski program)	1. letnik	1. semester	obvezni

Univerzitetna koda predmeta/University course code:	0089478
Koda učne enote na članici/UL Member course code:	10016

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	30	0	15	90	6

Nosilec predmeta/Lecturer:	Aleš Hladnik
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Vrsta predmeta/Course type:	Obvezni /Compulsory
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Jeziki/Languages:	Predavanja/Lectures:	Angleščina, Slovenščina
	Vaje/Tutorial:	Angleščina, Slovenščina

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

Pogoj za vključitev v delo je vpis v letnik študija in izbira predmeta. Pogoj za pristop k pisnemu izpitu predmeta je 70 % prisotnost pri predavanjih, 100 % prisotnost pri vajah in 70 % prisotnost pri seminarjih in drugih oblikah dela. K pisnemu izpitu lahko pristopijo študentje, ki imajo pozitivno ocenjene vaje in seminar.

Prerequisites:

- For a student to start working: enrollment in the study year and selection of the course.
- For writing the final written exam: presence at lectures (100 %), seminars (70%) and lab work (100%), positive grade for both seminar and lab work.

Vsebina:

- Delovanje računalnika, koda in računalniški program
- Strojna oprema
- Zapis in shranjevanje podatkov: biti in bajti
- Programska oprema
- Tabele in podatkovne baze
- Računalniška omrežja, internet in internetne storitve
- Računalniška varnost in zasebnost
- Analogni in digitalni mediji: slika, zvok, video
- Uvod v programski jezik JavaScript.

V predavanjih je poudarek na spoznavanju trajnostnih načel kot tudi na implementaciji sodobnih

Content (Syllabus outline):

- How computer works, computer code and programme
- Hardware
- Recording and saving data: bits and bytes
- Software
- Data tables and databases
- Computer networks, internet and internet services
- Computer security and privacy
- Analogue and digital media: image, sound, video
- Introduction to JavaScript programming language.

The emphasis is on learning principles of sustainability and on implementation of modern ICT.

IKT. Te so podrobneje predstavljene v študentskih individualnih ali skupinskih seminarskih nalogah.	These are presented in a greater detail in the students' individual or group seminar works.
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Temeljna literatura in viri/Readings:

- Spletni tečaj (MOOC) Computer Science 101: https://www.coursera.org/course/cs101
- E-učbenik za informatiko: http://lusy.fri.uni-lj.si/ucbenik/RIN1/index.html

Cilji in kompetence:

- Poznavanje in razumevanje temeljnih pojmov s področja informacijsko-komunikacijskih tehnologij - Sposobnost opredelitve primerov uporabe in osnovnih značilnosti sodobnih informacijsko-komunikacijskih tehnologij - Razvijanje samoiniciativnosti, ustvarjalnosti in metodičnega razmišljanja	Objectives and competences: - Familiarity with and understanding of fundamental information-communication terms - Ability to define examples and basic characteristics of modern information-communication technologies - Development of self-initiative, creativity and methodical thinking
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Predvideni študijski rezultati:

Znanje in razumevanje: - Poznavanje osnovnih principov delovanja osebne računalnika in razumevanje povezanosti njegove strojne in programske opreme - Poznavanje delovanja sistemov za delo s podatkovnimi tabelami in bazami - Poznavanje značilnosti sodobnega interneta in njegovih aplikacij - Razumevanje pomena programiranja in delov enostavne programske kode - Razumevanje možnosti praktične uporabe računalniških sistemov na področju digitalnih medijev - Poznavanje osnov sintakse in semantike skriptnega programskega jezika JavaScript in zmožnost njegove uporabe pri reševanju praktičnih problemov s področja informacijsko-komunikacijskih tehnologij. Študenti bodo tekom predavanj, seminarjev in vaj spoznali različne digitalne tehnologije, ki omogočajo zeleni gospodarski prehod. Usvojili bodo tudi znanja, povezana z informacijsko in podatkovno pismenostjo, komuniciranjem in sodelovanjem, ustvarjanjem digitalnih vsebin ter algoritmičnim reševanjem problemov.	Intended learning outcomes: Knowledge and understanding: - Knowledge of a personal computer basic operation principles and understanding of computer hardware and software - Knowledge of systems used to work with data tables and databases - Knowledge of characteristics of modern internet and its applications - Understanding of the science and art of programming and decoding of simple programme code snippets - Understanding of various possibilities how computer systems can be implemented in the field of digital media - Knowledge of basic syntax and semantics of the JavaScript scripting language and ability to use it for solving various practical problems in the field of interactive-communication technologies. During the lectures, seminar projects and lab work students will get to know various digital technologies that make a green industry transition possible. The will also gain knowledge and competences related to the information and data literacy, communication and colaboration, digital content creation and algorithmic problem solving.
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Metode poučevanja in učenja:

Predavanja, seminarske vaje, delo v računalniški učilnici. Vaje se izvajajo v računalniški učilnici in/ali prek spleta (online) s pomočjo primerne in ustrezne programske opreme.	Learning and teaching methods: Lectures, seminar projects, work in a computer lab. Lab work takes place in a computer lab and/or via Internet (online) using suitable software.
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Načini ocenjevanja:

Načini ocenjevanja:	Delež/Weight	Assessment:
Pisni izpit	50,00 %	Written exam
Seminarska naloga	25,00 %	Seminar project

Vaje	25,00 %	Lab work
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Ocenjevalna lestvica:

5 - 10, pri čemer velja, da je pozitivna ocena od 6 - 10

Grading system:

5 - 10, a student passes the exam if he is graded from 6 to 10

Reference nosilca/Lecturer's references:

- LAZAR, Mihael, HLADNIK, Aleš. Comparison of artificial neural network and polynomial approximation models for reflectance spectra reconstruction. Sensors, 2023, vol. 23, no. 2, DOI: <https://doi.org/10.3390/s23021000>, ISSN 1424-8220
- KODŽOMAN, Duje, HLADNIK, Aleš, PAVKO-ČUDEN, Alenka, ČOK, Vanja. Assessment and semantic categorization of fabric visual texture preferences. AUTEX research journal, 2022, DOI: <https://doi.org/10.2478/aut-2022-0006>, ISSN 1470-9589
- HLADNIK, Aleš, POLJIČAK, Ante. Improving performance of content based image retrieval system with color features. Acta graphica, 2016, vol. 27, no. 4, p. 7-12, <https://actagraphica.hr/index.php/actagraphica/article/view/107/94>, ISSN 0353-4707

INFORMATIKA IN METODOLOGIJA DIPLOMSKEGA DELA

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Informatika in metodologija diplomskega dela
Course title:	Information sources and methodology of thesis work
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Grafične in interaktivne komunikacije, prva stopnja, univerzitetni	Ni členitve (študijski program)	3. letnik	1. semester	obvezni

Univerzitetna koda predmeta/University course code:	0089495
Koda učne enote na članici/UL Member course code:	10017

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	15	0	0	60	4

Nosilec predmeta/Lecturer:	Danica Dolničar
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Vrsta predmeta/Course type:	Obvezni/Compulsory
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Jeziki/Languages:	Predavanja/Lectures:	Angleščina, Slovenščina
	Vaje/Tutorial:	Angleščina, Slovenščina

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

Priporočena prisotnost študentov pri pouku: predavanja 70 %, vaje 100 %, seminar 90 %, druge oblike dela 90 %.

Pogoji za pristop k izpitu so opravljene vaje in seminarski izdelek.

Prerequisites:

Recommended attendance: lectures 70%, lab 100%, seminar 90%, other forms of work 90%.

Conditions for the exam are completed practical work and the seminar product.

Vsebina:

Uvod v informatiko. Digitalizacija in informacijska družba. Informacijska pismenost. Primarni viri informacij v tiskani in elektronski obliki. Priprava referenc po standardu ISO 690, citiranje, bibliografski slogi. Priprava iskalnih profilov za osnovno in napredno iskanje. Bibliografske zbirke: struktura, lastnosti, primeri uporabe, bibliometrične analize. Intelktualna lastnina: avtorske pravice, patenti, blagovne znamke, modeli in vzorci, geografske označbe. Licence in dostop do znanstvenih podatkov v digitalni družbi. Združevalni iskalniki. Faktografske in multimedijske baze podatkov: tipi, uporaba, dostopnost. Osnovne heuristične informacijske metode in tehnike za urejanje podatkov. Zgradba

Content (Syllabus outline):

Introduction to Informatics. Digitalisation and the information society. Information literacy. Primary sources of information in printed and electronic form. Preparation of references in accordance with ISO 690 standard, citation, bibliographic styles. Preparation of search profiles for basic and advanced searches. Bibliographic databases: structure, properties, applications, bibliometric analysis. Intellectual property: copyright, patents, trademarks, designs and models, geographical indications. Licences and access to scientific data in a digital society. Federated search engines. Factual and multimedia database: types, usage and accessibility. Basic heuristic information methods and techniques

diplomskega dela, znanstvenega članka, patenta. Vsebinska zasnova in časovno načrtovanje diplomske raziskave. Postavljanje namena, ciljev in delovnih hipotez v raziskovalnem delu. Obdelava raziskovalnih podatkov. Metodološki pristopi in orodja za predstavitev rezultatov raziskovalnega/umetniškega dela v digitalnih okoljih.	for data structuring. Design of a diploma thesis, scientific article, patent. Design and timing of the research for diploma thesis. Setting purpose, objectives and working hypotheses in the research. Processing of research data. Methodological approaches and tools for the presentation of the results of the research / artistic work in digital environments.
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Temeljna literatura in viri/Readings:

Osnovna študijska gradiva so študentom vsako leto na voljo v spletni učilnici = Fundamental study materials for students are available each year in the online classroom.

Merila in kazalci informacijske pismenosti v visokem šolstvu. 2010, Ljubljana: Zveza bibliotekarskih društev Slovenije. Dostopno <http://www.old.zbds-zveza.si/dokumenti/merila-in-kazalci-informacijske-pismenosti-v-visokem-solstvu.pdf> = Information literacy competency standards for higher education, 2000, ACRL <http://www.ala.org/ala/mgrps/divs/acrl/standards/informationliteracycompetency.cfm> .

Chowdhury, G.G. Introduction to modern information retrieval. Third edition, London: Facet Publishing, 2010.

Cilji in kompetence:

Cilji:

Študent se informacijsko in metodološko usposobi za izdelavo diplomskega dela; samostojno zna poiskati kvalitetne informacijske vire s pomočjo podatkovnih zbirk in spletnih iskalnikov; obvlada pravilno citiranje literature; pozna osnove intelektualne lastnine; podatke zna urediti v logične strukture in iz njih pripraviti vsebinsko sintezo; usposobi se za pisanje znanstvenih in strokovnih besedil, zlasti diplomskega dela; vsebinsko in časovno zna načrtovati diplomsko raziskavo; sodeluje v razpravi, postavljanju in dokazovanju delovnih hipotez ter predstavljanju rezultatov znanstvenega in/ali umetniškega dela; Prevzema odgovornost za svoje delo.

Predmetno specifične kompetence:

- dvig ravni informacijske pismenosti v skladu s standardi v visokem šolstvu,
- obvladovanje informacijskih strategij in podatkovnih zbirk za samostojno iskanje, zajemanje in obdelavo znanstvenih in tehničnih informacij v digitalni informacijski družbi,
- poznavanje, razumevanje in spoštovanje različnih kategorij intelektualne lastnine in licenc za dostop do digitalnih oblik podatkov,
- uporaba standardov in slogov za citiranje literature,
- uporaba heurističnih informacijskih metod za urejanje in sintezo informacij v znanje,
- sposobnost pisanja preprostejših znanstvenih in tehničnih besedil in predstavljanja znanstvenih informacij v digitalnih okoljih

Objectives and competences:

Objectives:

The student gets information and methodological support for the diploma work; is able to find quality information sources using databases and search engines; masters the correct citation of literature; knows the basics of intellectual property; is able to structure data into logical structures and prepare a substantive synthesis; is capable of writing scientific and technical texts, in particular the thesis; is able to plan contents and timing of the graduation research; participates in discussions, in setting up and evaluating working hypotheses, and presenting results of scientific and/or artistic work; takes responsibility for his/her work.

Subject-specific competencies:

- upgrading the level of information literacy according to the standards for higher education,
- knowing the strategies and databases for searching, acquisition and processing of scientific and technical information in the digital information society,
- knowing, understanding and using different categories of intellectual property and licences for access to digital data formats,
- using standards and styles of literature citation,
- using of heuristic information methods for structuring and synthesis of information into knowledge,
- ability to write simple scientific and technical texts and the presentation of scientific information in digital environments

Predvideni študijski rezultati:

Intended learning outcomes:

Znanje, razumevanje in uporaba: - citiranja različnih tipov primarnih dokumentov po standardu ISO690 v različnih slogih, - bibliografskih in faktografskih zbirk za področje študija, - profilov za enostavno in napredno iskanje informacij v podatkovnih zbirkah in/ali s pomočjo spletnih iskalnikov, - pravnih in etičnih vidikov intelektualne lastnine, - značilne zgradbe diplomskega dela, znanstvenega in strokovnega članka in patenta - heurističnih metod za urejanje podatkov v sisteme, - metodoloških osnov za načrtovanje projektnega dela, postavljanje delovnih hipotez, obdelavo rezultatov, izdelavo pisnih izdelkov in ustnih predstavitev za področje študija. - obvladovanje osnovnih orodij za predstavljanje znanstvenih informacij v digitalnih okoljih	Knowledge, understanding and use of: - citing different types of primary documents according to standard ISO690 in a variety of styles - bibliographic and factual databases in fields of study, - profiles for simple and advanced information searches in databases and / or web search engines, - legal and ethical aspects of intellectual property, - characteristic structure of the diploma thesis, scientific and technical articles, patents, - heuristic methods for structuring of data into systems, - methodological approaches for planning project work, setting working hypotheses, processing of the results, producing written assignments, and oral presentations in the field of study. - proficiency in basic tools for presenting scientific information in digital environments
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Metode poučevanja in učenja:

Predavanja v predavalnici z demonstracijami primerov uporabe specializiranih podatkovnih zbirk in iskalnikov, vaje v računalniški učilnici, seminarsko delo s predstavitvami izdelkov (osnutkov diplomskih raziskav študentov) in razpravo v obliki študentke konference, ki jo vodita študenta koordinatorja in profesorica. Pri delu se uporablja spletna učilnica Moodle na NTF platformi za nalaganje študijskih gradiv, navodil za vaje in seminar, oddajo delovnih listov študentov, izdelkov vaj, izdelkov seminarjev, predlogov popravkov in izboljšav v vrstniškem recenzijem postopku, ocenjevalnih listov. Po potrebi lahko študijsko delo poteka na daljavo z uporabo videokonferenčnih okolij in spletne učilnice Moodle.

Learning and teaching methods:

Lectures in a lecture room with demonstrations of examples of specialised databases and search engines, practical work in a computer room, seminar work with presentations of students' products (studiploma thesis research drafts) and discussions in the form of a student conference led by student coordinators and professor. The Moodle online classroom on the NTF platform is used for uploading of study materials, computer lab and seminar instructions, submission of student worksheets, computer lab products, seminar products, suggestions for corrections and improvements in the peer-review process, evaluation sheets. If necessary, study work can also be carried out online using videoconferencing tools and the Moodle online classroom.

Načini ocenjevanja:	Delež/Weight	Assessment:
Pisni/Ustni izpit	50,00 %	Written/Oral exam
Ocena vaj	25,00 %	Practical exercises
Ocena seminarskega izdelka (ocene profesorja in povprečne ocene vrstniškega ocenjevanja se upoštevajo 1:1) Vse delne ocene morajo biti pozitivne.	25,00 %	Assessment of a seminar work (professor's marks and peer assessment average marks are weighted 1:1) All partial grades must be positive.

Ocenjevalna lestvica:

5 - 10, pri čemer velja, da je pozitivna ocena od 6 - 10

Grading system:

5 - 10, a student passes the exam if he is graded from 6 to 10

Reference nosilca/Lecturer's references:

- DOLNIČAR, Danica, BOH PODGORNİK, 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](https://doi.org/10.5772/intechopen.109436). [COBISS.SI-ID [156185859](#)]
- DOLNIČAR, Danica, BOH PODGORNİK, 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]

- 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]
- DOLNIČAR, Danica, BOH PODGORNIK, Bojana, BARTOL, Tomaž, ŠPERNJAK, Andreja, ŠORGO, Andrej. Predlog meril in kazalcev informacijske pismenosti za srednje šole = Proposed information literacy standards and performance indicators for secondary education. Knjižnica : revija za področje bibliotekarstva in informacijske znanosti. [Tiskana izd.]. 2018, 62, [št.] 1/2, str. 69-91. ISSN 0023-2424. [COBISS.SI-ID 1412446]
- 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]
- ŠORGO, Andrej, BARTOL, Tomaž, DOLNIČAR, Danica, BOH PODGORNIK, Bojana. Attributes of digital natives as predictors of information literacy in higher education. British journal of educational technology. [Print ed.]. 2017, vol. 48, no. 3, str. 749-767. [COBISS.SI-ID 1261406]
- BOH PODGORNIK, Bojana, DOLNIČAR, Danica, ŠORGO, Andrej, BARTOL, Tomaž. Development, testing, and validation of an information literacy test (ILT) for higher education. Journal of the Association for Information Science and Technology. 2016, vol. 67, iss. 10, str. 2420-2436. [COBISS.SI-ID 1585756]

INTERAKTIVNI MEDIJI 1

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Interaktivni mediji 1
Course title:	Interactive media 1
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Grafične in interaktivne komunikacije, prva stopnja, univerzitetni	Ni členitve (študijski program)	2. letnik	2. semester	obvezni

Univerzitetna koda predmeta/University course code:	0089484
Koda učne enote na članici/UL Member course code:	10018

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	30	0	15	90	6

Nosilec predmeta/Lecturer:	Aleš Hladnik
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Vrsta predmeta/Course type:	Obvezni/Compulsory
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Jeziki/Languages:	Predavanja/Lectures:	Angleščina, Slovenščina
	Vaje/Tutorial:	Angleščina, Slovenščina

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

Pogoj za vključitev v delo je vpis v letnik študija in izbira predmeta. Pogoj za pristop k pisnemu izpitu predmeta je 70 % prisotnost pri predavanjih, 100 % prisotnost pri vajah in 70 % prisotnost pri seminarjih in drugih oblikah dela. K pisnemu izpitu lahko pristopijo študentje, ki imajo pozitivno ocenjene vaje in seminar.

Prerequisites:

- For a student to start working: enrollment in the study year and selection of the course.
- For writing the final written exam: presence at lectures (100 %), seminars (70%) and lab work (100%), positive grade for both seminar and lab work.

Vsebina:

- Interakcija človek-računalnik
- Uporabniški vmesnik, spletna uporabnost in uporabniška izkušnja
- Oblikovanje in razvoj spletnih mest
- Mobilne tehnologije in komunikacije
- Osnove programskega jezika Python in njegova uporaba (spletno luščenje, vizualizacija in analiza masovnih podatkov, generativna umetnost, računalniške igre)

Content (Syllabus outline):

- Human-computer interaction
- User interface, web usability and user experience
- Web site design and development
- Mobile technologies and communications
- Fundamentals of Python programming language and its use (web scraping, big data visualization and analysis, generative art, computer games)

Temeljna literatura in viri/Readings:

- Rogers, Y.; Preece, J.; Sharp, H.: Interaction Design - Beyond Human-Computer Interaction. 2nd edn. John Wiley & Sons, 2007.

Dodatna literatura:

- Domača stran Jakoba Nielsena: <http://www.useit.com/>

- Domača stran Dona Normana: <http://www.jnd.org/>

- E-učbenik za informatiko: <https://lusy.fri.uni-lj.si/ucbenik/book/index.html>

Cilji in kompetence:

Cilj predmeta je seznaniti študente z osnovnimi znanji in koncepti s področja interaktivnih medijev, njihove interdisciplinarnosti in povezanosti s sorodnimi področji sodobnih informacijsko-komunikacijskih tehnologij. Študenti bodo spoznali uporabnost programskega jezika Python za različne namene povezane z interaktivnostjo medijev.

Objectives and competences:

The objective of this course is to present to the students the basic knowledge and concepts of the field of interactive media, its interdisciplinarity and relationships with related fields of modern information-communication technologies. Students will learn applicability of Python programming language related to media interactivity.

Predvideni študijski rezultati:

Znanje in razumevanje:

- Poznavanje zvrsti interaktivnih medijev in njihove povezanosti s sodobnimi digitalnimi mediji
- Poznavanje različnih načinov interakcije med človekom in računalnikom ter oblik uporabniških vmesnikov
- Razumevanje trenutnega stanja in smeri razvoja interneta in njegovih storitev
- Sposobnost oblikovanja in razvoja spletnih mest ter njihovega vrednotenja
- Poznavanje najnovejših tehnologij mobilnega komuniciranja
- Poznavanje osnovne sintakse in semantike skriptnega programskega jezika Python in zmožnost njegove uporabe pri reševanju praktičnih problemov s področja interaktivnih medijev

Študenti bodo tekom predavanj, seminarjev in vaj spoznali različne digitalne tehnologije, ki omogočajo zeleni gospodarski prehod. Seznanili se bodo z razvojem in uporabo naprednih digitalnih veščin (umetna inteligenca, robotika, računalništvo v oblaku, blokovna veriga, kibernetska varnost).

Intended learning outcomes:

Knowledge and understanding:

- Knowledge of interactive media forms and their connection with contemporary digital media
- Knowledge of various human-computer interaction modes and user interface types
- Understanding of current internet services and its future trends
- Ability to design and develop web sites and to perform their evaluation
- Knowledge of the state-of-the-art mobile communication technologies.
- Knowledge of basic syntax and semantics of the Python scripting language and ability to use it for solving various practical problems in the field of interactive media

During the lectures, seminar projects and lab work students will get to know various digital technologies that make a green industry transition possible. They will become familiar with the development and use of advanced digital skills such as artificial intelligence, robotics, cloud computing, block chains, cybersecurity.

Metode poučevanja in učenja:

Predavanja, seminarske vaje, delo v računalniški učilnici. Vaje se izvajajo v računalniški učilnici in/ali prek spleta (online) s pomočjo primerne in ustrezne programske opreme.

Learning and teaching methods:

Lectures, seminar projects, work in a computer lab. Lab work takes place in a computer lab and/or via Internet (online) using suitable software.

Načini ocenjevanja:

Delež/Weight

Assessment:

Pisni izpit	50,00 %	Written exam
Seminarska naloga	25,00 %	Seminar project
Vaje	25,00 %	Lab work

Ocenjevalna lestvica:

5 - 10, pri čemer velja, da je pozitivna ocena od 6 - 10

Grading system:

5 - 10, a student passes the exam if he is graded from 6 to 10

Reference nosilca/Lecturer's references:

- KAVČIČ, Alenka, PODLESEK, Anja, KOMIDAR, Luka, HLADNIK, Aleš, BOH PODGORNİK, Bojana, BOHAK, Ćiril, DEPOLLI STEINER, Katja, GRIL, Alenka, LESAR, Źiga, MAROLT, Matija, PEĀJAK, Sonja, PESEK, MatevŹ, PIRC, Tina, PUKLEK LEVPUŠĀEK, Melita, PEKLAJ, Ćirila. What can off- and online measures tell about students' self-regulation and their achievement while learning science expository hypertext. Sustainability, 2022, vol. 14, no. 9, p. 1-19, DOI: <https://doi.org/10.3390/su14095686>, ISSN 2071-1050
- SEDOVŠEK, Robert, POGAĀNIK, MatevŹ, HLADNIK, Aleš. Rich media mobile advertising: comparison of gestures used for navigation through a photo gallery. TehniĀki vjesnik, 2016, vol. 23, no. 4, p. 1095-1102, DOI: <https://doi.org/10.17559/TV-20150727122900>, ISSN 1330-3651
- HLADNIK, Aleš, POLJIĀAK, Ante. Improving performance of content based image retrieval system with color features. Acta graphica, 2016, vol. 27, no. 4, p. 7-12, <https://actagraphica.hr/index.php/actagraphica/article/view/107/94>, ISSN 0353-4707

INTERAKTIVNI SISTEMI 1

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Interaktivni sistemi 1
Course title:	Interactive systems
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Grafične in interaktivne komunikacije, prva stopnja, univerzitetni	Ni členitve (študijski program)	3. letnik	1. semester	obvezni

Univerzitetna koda predmeta/University course code:	0099372
Koda učne enote na članici/UL Member course code:	10888

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	30	0	15	90	6

Nosilec predmeta/Lecturer:	Danica Dolničar
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Vrsta predmeta/Course type:	Obvezni/Compulsory
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Jeziki/Languages:	Predavanja/Lectures:	Angleščina, Slovenščina
	Vaje/Tutorial:	Angleščina, Slovenščina

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

Priporočena prisotnost študentov pri pouku: predavanja 70 %, vaje 100 %, seminar 90 %, druge oblike dela 90 %.

Pogoji za pristop k izpitu so opravljene laboratorijske vaje, seminar in projektni izdelek.

Prerequisites:

Recommended attendance: lectures 70%, lab 100%, seminar 90%, other forms of work 90%.

Conditions for the exam are completed lab work, seminar and project work.

Vsebina:

- Spoznavanje interaktivnih sistemov v digitalni družbi: opredelitev, razvoj, osnovna znanja in razumevanja, primeri.
- Sodobni tehnološki dosežki v interaktivnih sistemih: vmesniki, tehnologije, naprave, izvedbe, rešitve, vplivi na okolje in trajnostni vidiki.
- Aplikacije interaktivnih sistemov v industriji, medicini, izobraževanju, umetnosti, oglaševanju in drugih področjih.
- Interaktivno e-učenje: sodobne IKT izobraževalne tehnologije, večpredstavne vsebine; interaktivni učni elementi, sistemi za upravljanje e-učenja, metodologija, programska orodja, izvedbe, aplikacije.

Content (Syllabus outline):

- Familiarization with interactive systems in the digital society: definition, development, basic knowledge and understanding, examples.
- New technological developments in interactive systems: interfaces, technologies, equipment, implementation, environmental impacts and sustainability aspects.
- Applications of interactive systems in industry, medicine, education, arts, advertising and other fields.
- Interactive e-learning: modern ICT educational technologies, multimedia contents, interactive learning elements, learning management systems, methodology, software tools, implementation,

• Načrtovanje in izdelava preprostejših interaktivnih aplikacij za e-učenje.	applications. • Design and production of simple interactive applications for e-learning.
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Temeljna literatura in viri/Readings:

Osnovna študijska gradiva so študentom vsako leto na voljo v spletni učilnici – vključno s povzetki predavanj, hiperpovezavami do dodatnih gradiv in vprašanji za ponavljanje.

Dodatna študijska gradiva: izbrana poglavja iz e-knjig (za študente dostopna preko portala DIKUL):

Tsihrintzis G.A., 2010. Intelligent Interactive Multimedia Systems and Services, Springer eBooks, ISBN: 978-3-642-14618-3

Blandford A., Doherty G., 2007. Interactive Systems Design, Specification, and Verification. Springer eBooks, ISBN: 978-3-540-69554-7

Jain L.C., Virvou M., 2008. Intelligent Interactive Systems in Knowledge-Based Environments. Springer eBooks, ISBN: 978-3-540-77471-6

Howlett R.J., Jeong J., Damiani E., Jain L.C., 2009. New Directions in Intelligent Interactive Multimedia Systems and Services. Springer eBooks, ISBN: 978-3-642-02937-0

Cilji in kompetence:

Cilji:

- Študent se seznani z interdisciplinarnim področjem interaktivnih sistemov, relevantnih za oglaševalsko, založniško in izobraževalno dejavnost na področju grafičnih in interaktivnih komunikacij ter na drugih področjih digitalne družbe.
- Seznani se s komponentnimi tehnologijami, zasnovo in implementacijo sodobnih interaktivnih sistemov na tem področju, uporabo novih materialov in interaktivnih tehnologij, ki prispevajo k prehodu v ogliščno nevtralno družbo.

Predmetno specifične kompetence:

- Nadgradnja teoretičnih in praktičnih znanj in razumevanja interaktivnosti, sistemov in aplikacij.
- Sposobnost izbire osnovnih tehnoloških gradnikov, opreme, orodij in metod v načrtovanju interaktivnega sistema.
- Poznavanje osnovnih parametrov vrednotenja interaktivnega sistema.
- Sposobnost zasnove, izdelave, predstavitve in vrednotenja interaktivnega sistema na izbranem primeru interaktivnih večpredstavnih vsebin za e-učenje.

Objectives and competences:

Goals:

- The student is introduced to the interdisciplinary field of interactive systems, relevant for advertising, editorial and educational activities in the field of graphic and interactive communications. and on other domains of the digital society.
- The student learns about the technological components, design and implementation of modern interactive systems in this area, the use of new materials and interactive technologies that contribute to the transition towards a carbon-neutral society.

Subject-specific competencies:

- Upgrading of theoretical and practical knowledge and understanding of interactivity, systems and applications.
- Ability to select basic technological building blocks, equipment, tools and methods in the design of interactive systems.
- Knowledge of basic parameters for the evaluation of interactive systems.
- Ability to design, manufacture, present and evaluate an interactive system on a selected example of interactive multimedia contents for e-learning.

Predvideni študijski rezultati:

Znanje in razumevanje:

- osnovnih teoretičnih in tehnoloških izhodišč interaktivnih sistemov;
- izbire in digitalne priprave večpredstavnih vsebin v zasnovi interaktivnih sistemov;
- tehnoloških gradnikov in metodoloških pristopov za vgrajevanje interaktivnih vsebin v sisteme za e-učenje;
- pomena in uporabe interaktivnosti v sodobnih informacijskih sistemih in sorodnih aplikacijah;
- zlivanja (integracije) večpredstavnih vsebin in konvergence storitev v sodobnih digitalnih medijih;
- pomena interaktivnih sistemov v digitalni družbi in potencialov pri prehodu v ogliščno nevtralno družbo.

Intended learning outcomes:

Knowledge and understanding of the:

- theoretical and technological bases of interactive systems;
- selection and preparation of digital multimedia contents in the design of interactive systems;
- technological elements and methodological approaches in the integration of interactive contents into e-learning systems;
- importance and use of interactivity in modern information systems and related applications;
- fusion (integration) of multimedia contents and convergence services in the modern digital media.

Uporaba: • Načrtovanje, zasnova in gradnja preprostejših multimedijских interaktivnih sistemov za e-učenje. • Uporaba metodologij za evalvacijo interaktivnih sistemov.	• the importance of interactive systems in a digital society and their potential in the transition to a carbon-neutral society. Application: • Planning, design and construction of simple multimedia interactive systems for e-learning. • Use of methodologies for the evaluation of interactive systems.
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Metode poučevanja in učenja:

Predavanja z demonstracijami v multimedijско opremljeni predavalnici, vaje v računalniški učilnici, seminarsko delo s predstavitvami in razpravo, vodeno samostojno delo in izdelava projektnega izdelka. Pri delu se uporablja spletna učilnica Moodle na NTF platformi za nalaganje študijskih gradiv, navodil za vaje, seminar in projekt, oddajo izdelkov vaj, seminarjev in projektov, ocenjevalnih listov za vrstniško ocenjevanje študentov in komunikacije s študenti.. Po potrebi lahko študijsko delo poteka na daljavo z uporabo videokonferenčnih okolij, prosto dostopne programske opreme in orodij ter spletne učilnice Moodle.

Learning and teaching methods:

Lectures with demonstrations in a multimedia-equipped lecture room, lab practice in a computer lab, seminar work with presentations and discussions, guided self study and production of a project product. The Moodle online classroom on the NTF platform is used for uploading of study materials, computer lab, seminar and project instructions, submission of computer lab results, seminar and project products, evaluation sheets in students' peer-review process, and communication with students. If necessary, study work can also be carried out online using videoconferencing tools, freely available software tools, and the Moodle online classroom.

Načini ocenjevanja:

Delež/Weight

Assessment:

Pisni/Ustni izpit	40,00 %	Written/Oral exam
Ocena vaj	30,00 %	Lab practice
Ocena kratkega seminarja (ocene profesorja in povprečne ocene vrstniškega ocenjevanja se upoštevajo 1:1)	10,00 %	Assessment of a short seminar (professor's marks and peer assessment average marks are weighted 1:1)
Ocena projektnega izdelka (ocene profesorja in povprečne ocene vrstniškega ocenjevanja se upoštevajo 1:1)	20,00 %	Assessment of the project product (professor's marks and peer assessment average marks are weighted 1:1)

Ocenjevalna lestvica:

5 - 10, pri čemer velja, da je pozitivna ocena od 6 - 10

Grading system:

5 - 10, a student passes the exam if he is graded from 6 to 10

Reference nosilca/Lecturer's references:

- 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](https://doi.org/10.21125/edulearn.2023.0449). [COBISS.SI-ID [160167939](#)]
- DOLNIČAR, D., BOH PODGORNIK, B., FERK SAVEC, V.. The Students' Perceptions Using 3DChemMol Molecular Editor for Construction and Editing of Molecular Models. *Acta chimica slovenica*. 2022, vol. 69, str. 167-186. [COBISS.SI-ID [101359107](#)],
- DOLNIČAR, Danica, BOH PODGORNIK, Bojana, FERK SAVEC, Vesna. Inovativne možnosti računalniške vizualizacije strukture molekul. V: KLEMEN, Taja (ur.), MLINAREC, Katarina (ur.), FERK SAVEC, Vesna (ur.). *Trajnosti naproti s soustvarjanjem na področju STEAM izobraževanja : zbornik povzetkov : Ljubljana, Pedagoška fakulteta, 21. 9. 2022*. Ljubljana: UL, Pedagoška fakulteta, 2022. Str. 46. https://digitalna.uni-lj.si/wp-content/uploads/2022/09/ZBORNIK-PRISPEVKOV_12_9_2022_KONCEN.pdf. [COBISS.SI-ID [122447875](#)]
- DOLNIČAR, Danica, BOH PODGORNIK, Bojana. New chemical compound 3D modelling tool for students and chemistry teachers. V: DEVETAK, Iztok (ur.). *Eurovariety 2021 : 9th European Variety in*

University Chemistry Education Conference : 7-9 July 2021, Ljubljana, Slovenia, online conference : book of abstracts. Ljubljana: Faculty of Education, 2021. Str. 74. ISBN 978-961-253-279-6.

<http://www.eurovariety2021.si/Book%20of%20abstracts.pdf>. [COBISS.SI-ID 70324739]

- GABRIJELČIČ TOMC, Helena, STANKOVIČ ELESINI, Urška, MUCK, Deja, BOH PODGORNIK, Bojana, DOLNIČAR, Danica, AHTIK, Jure. Uporaba IKT orodij na Katedri za informacijsko in grafično tehnologijo. V: FERK SAVEC, Vesna (ur.), RUGELJ, Jože (ur.). Izzivi in priložnosti uporabe informacijsko komunikacijske tehnologije v pedagoškem procesu na področju naravoslovja, tehnologije in matematike. Ljubljana: Univerza, 2019. Str. 167-185. ISBN 978-961-6410-62-5. <https://repozitorij.uni-lj.si/IzpisGradiva.php?id=111360>. [COBISS.SI-ID 3654512]
- VRTAČNIK, Margareta, DOLNIČAR, Danica, SCHLAMBERGER, Niko, SVOLJŠAK, Špela. The experience of the SLOOP2DESC courses in Slovenia. V: FULANTELLI, Giovanni (ur.), OPREA, Lucian (ur.). *SLOOP2DESC Project - Sharing learning objects in an open perspective to develop European skills and competences*. Galati: Europlus publishing, 2011. Str. 49-58. [COBISS.SI-ID 1467996]
- MURRAY, Maria, VRTAČNIK, Margareta, DOLNIČAR, Danica, FULANTELLI, Giovanni. A lesson learned and recommendations for future actions in e-learning. V: FULANTELLI, Giovanni (ur.), OPREA, Lucian (ur.). *SLOOP2DESC Project - Sharing learning objects in an open perspective to develop European skills and competences*. Galati: Europlus publishing, 2011. Str. 59-61. [COBISS.SI-ID 1468252]

INTERAKTIVNOST IN ANIMACIJE

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Interaktivnost in animacije
Course title:	Interactivity and animation
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Grafične in interaktivne komunikacije, prva stopnja, univerzitetni	Ni členitve (študijski program)	2. letnik	1. semester	obvezni

Univerzitetna koda predmeta/University course code:	0089487
Koda učne enote na članici/UL Member course code:	10889

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:	Helena Gabrijelčič Tomc
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Vrsta predmeta/Course type:	Obvezni/Compulsory
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Jeziki/Languages:	Predavanja/Lectures: Slovenščina
	Vaje/Tutorial: Slovenščina

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

Pristop k predmetu:
Vpis v študij letnika. Osnovno znanje uporabe računalnika.
Pristop k izpitu:
K izpitu lahko pristopijo študenti/ke, ki imajo opravljen izpitni projekt, seminar in vaje ter izpolnjeno predpisano prisotnost pri vseh sklopih predmeta.
Prisotnost:
Pri predmetu se zahteva naslednja prisotnost: predavanja 80 %, seminar in druge oblike dela 90 %, vaje 100 %.

Prerequisites:

Course:
Enrolment in the study year. Basic knowledge of computer use.
Exam/Assessment:
Students who have completed the exam project, seminar and practical course and who have met the attendance requirements for all sections of the course can take the exam.
Presence:
Parts of the subject require the presence of: Lectures 80%, seminar and other forms of work 90 %, Practical Course 100 %.

Vsebina:

- Interaktivnost in interaktivna komunikacija.
- Študij značilnosti delokrogov zasnove, oblikovanja, povezovanja in prenosa vsebin v interaktivnih medijih.
- Priprava in načrtovanje referenc grafičnih elementov z uporabo risarsko ilustratorske opreme (digitalna tablica).

Content (Syllabus outline):

- Interactivity and interactive communication.
- Study of workflow from basic idea to design, properties and integration of content in interactive media.
- Preparation and planning of references of graphic elements using drawing and illustration equipment (digital tablet).

• Oblikovanje interakcij. • Načrtovanje, priprava in produkcija grafičnih elementov večpredstavnostnih izdelkov, s poudarkom na gibanju (animacijah). • Osnove slovnice grafike v gibanju in oblikovanja gibanja. • Osnove grafičnih elementov in animacij v interaktivnih medijih. • Teorija in praksa osnovnih vizualnih elementov gibajočih slik. • Elementi računalniško generiranih animacij. • Načrtovanje vrste vsebin in funkcionalnosti, njihove povezave in navigacije v interaktivnih medijih. • Analiza pomena tekstovnih, grafičnih, slikovnih in zvočnih vsebin v interaktivnih medijih. • Informacijska arhitektura in žični modeli interaktivnih grafičnih medijev (interaktivne animacije in grafika v gibanju). • Razvoj, prototipiranje in testiranje interaktivnih grafičnih medijev (interaktivne animacije in grafika v gibanju). • Razvojna okolja za generiranje in vizualizacijo statičnih, gibajočih in interaktivnih grafičnih elementov. • Interdisciplinarna področja razvoja interaktivnih komunikacijskih rešitev s poudarkom na trajnostnem načrtovanju in oblikovanju vsebin večpredstavnosti in interaktivnih medijev.	• Interaction design. • Planning, pre- production and production of graphic elements of multimedia products, with an emphasis on motion design (animation). • Basics of grammar of motion graphics and motion design. • Basics of graphic elements and animations in interactive media. • Theory and practice of basic visual elements of moving pictures. • Elements of computer-generated animation. • Design content types and functionality, their connectivity and navigation in interactive media. • Analysis of the semantics of text, graphics, image and audio content in interactive media. • Information architecture and wire models of interactive graphic media (interactive animations and graphics in motion). • Development, prototyping and testing of interactive graphic media (interactive animations and motion graphics). • Development environments for generating and visualizing static, moving and interactive graphic elements. • Interdisciplinary fields of development of interactive communication solutions with an emphasis on sustainable planning and design of multimedia and interactive media content.
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Temeljna literatura in viri/Readings:

1. Isabel Meirelles: Design for Information: An Introduction to the Histories, Theories, and Best Practices Behind Effective Information Visualizations, Rockport Publishers, 2013.
2. Tullis, Thomas ; Albert, William: Measuring the user experience : collecting, analyzing, and presenting usability metrics, Elsevier/Morgan Kaufmann, 2008
3. Parush, Avi: Conceptual design for interactive systems : designing for performance and user experience, Morgan Kaufmann Publishers, 2015

Dodatna literatura:

1. Don Norman: The Design of Everyday Things, Basic Books, 2013.
2. Jesse James Garrett: The Elements of User Experience: User-Centered Design for the Web and Beyond, Peachpit Pr, 2002
3. Mark A. Simon: Producing Independent 2D Character Animation: Making & Selling A Short Film, 2012
4. Steve Roberts: Character Animation Fundamentals: Developing Skills for 2D and 3D Character Animation, 2012

Cilji in kompetence:

Cilj je študente seznaniti z bistvom interaktivnosti in interaktivne komunikacije, s poudarkom na orodjih in tehnikah za razvoj interaktivnih aplikacij.

Kompetence:

- Razumevanje in poznavanje konceptov interaktivnosti in interaktivne komunikacije skozi različne časovne in prostorske dimenzije.
- Usposobljenost za načrtovanje interaktivne računalniške grafike in animacij, s poudarkom na ustvarjanju učinkovite uporabniške izkušnje.

Objectives and competences:

Basic goals of a course are the introduction and advanced approaches of interactive design, interactive communication through tools and techniques of production of animation and interactive applications.

Subject-specific competences:

- Understanding and knowledge of the concepts of interactivity and interactive communication across various temporal and spatial dimensions.

• Pridobivanje znanja o naprednih tehnikah načrtovanja interakcij med uporabnikom in interaktivno aplikacijo. • Kritična analiza in izbira ključnih elementov interaktivne računalniške grafike in animacij, vključno z besedili, slikami, animacijami ter kompleksnejšimi funkcionalnostmi in rešitvami. • Pridobitev osnovnega razumevanja razvojnih okolij za interaktivno računalniško grafiko. • Razumevanje pomena uporabniške izkušnje in uporabnosti v interaktivni računalniški grafiki in animacijah. • Razumevanje sodobne merilne in predstavitvene opreme za produkcijo večpredstavnosti in vizualizacijo končnih upodobitev. • Praktično usposabljanje za uporabo IKT orodij pri prenosu znanj načrtovanja interaktivnih medijev in večpredstavnostnih vsebin na različna interdisciplinarna področja (didaktika in izobraževanje, naravoslovje, tehnika, kulturna in naravna dediščina, spletne tehnologije, računalniške igre in razširjene resničnosti).	• Proficiency in designing interactive computer graphics and animations, with an emphasis on creating an effective user experience. • Acquiring knowledge of advanced techniques for planning interactions between the user and the interactive application. • Critical analysis and selection of key elements in interactive computer graphics and animations, including text, images, animations, as well as more complex functionalities and solutions. • Gaining basic understanding of development environments for interactive computer graphics. • Understanding the importance of user experience and usability in interactive computer graphics and animations. • Understanding of modern measurement and presentation equipment for multimedia production and visualization of final renderings. • Practical training in utilizing ICT tools for knowledge transfer in designing interactive media and multimedia content across various interdisciplinary fields (didactics and education, natural sciences, engineering, cultural and natural heritage, web technologies, computer games, and augmented realities).
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Predvideni študijski rezultati:

Razumevanje teoretičnih osnov interaktivnih medijev in faz načrtovanja, produkcije in testiranja rešitev v interaktivni računalniški grafiki.
Spretnost IKT usmerjenega prenosa znanj načrtovanja interaktivnih medijev in vsebin večpredstavnosti na interdisciplinarna področja (didaktika in izobraževanje, naravoslovje, tehnika, naravna in kulturna dediščina, spletne tehnologije, računalniške igre in razširjene resničnosti).

Intended learning outcomes:

Understanding of theoretical background of interactive media and phases of planning, production and testing of interactive computer graphic.
The skill of ICT-oriented transfer of knowledge of planning interactive media and multimedia content to interdisciplinary fields (didactics and education, natural sciences, technology, natural and cultural heritage, web technologies, computer games and augmented reality).

Metode poučevanja in učenja:

Predavanja, seminar (samostojno ali skupinsko projektno delo), računalniške vaje in vodeno individualno delo.
Sklopi predmeta se izvajajo v računalniških in drugih fakultetnih učilnicah/predavalnicah in/ali preko spleta (online) s pomočjo primerne in ustrezne programske opreme, ki omogoča delo.

Learning and teaching methods:

Lectures, seminar (individual or group project work), computer exercises and guided individual work.
Course assemblies are conducted in computer and other faculty classrooms/lecture rooms and/or online with the help of suitable and appropriate software that enables work.

Načini ocenjevanja:

Delež/Weight

Assessment:

Izpit teoretskih znanj in postopkov dela in ocena projektnega dela. Pogoji za pristop k zagovoru projektnega dela so opravljene računalniške vaje in pozitivno ocenjeno teoretično znanje postopkov dela.	60,00 %	Exam of theoretical knowledge and work procedures and evaluation of project work Prerequisites to the final presentation of project are completed computer tutorials and positive grade of theoretical knowledge of work procedure.
Ocena iz računalniških vaj Ocena od 6 - 10 je pozitivna	40,00 %	Completed computer tutorials Rating: positive – marks 6-10

Ocenjevalna lestvica:

5 - 10, pri čemer velja, da je pozitivna ocena od 6 - 10

Grading system:

5 - 10, a student passes the exam if he is graded from 6 to 10

Reference nosilca/Lecturer's references:

- KARO, Nuša, GABRIJELČIČ TOMC, Helena. The use of animation as a teaching tool to learn about the meaning and function of ozone. V: BLAZNIK, Barbara (ur.). 9th Conference on Information and Graphic Arts Technology : proceedings : 11.-12. April 2024, Ljubljana, Slovenija. Ljubljana: Faculty of Natural Sciences and Engineering, Department of Textiles, Graphic Arts and Design, Chair of Information and Graphic Arts Technology, 2024. str. 211-216
- KRAJNČIČ, Naja, WEINGERL, Primož, GABRIJELČIČ TOMC, Helena. Character design as a means of expression for successful animation. V: BLAZNIK, Barbara (ur.). 9th Conference on Information and Graphic Arts Technology : proceedings : 11.-12. April 2024, Ljubljana, Slovenija. Ljubljana: Faculty of Natural Sciences and Engineering, Department of Textiles, Graphic Arts and Design, Chair of Information and Graphic Arts Technology, 2024. str. 204-210
- STANKOVIĆ ELESINI, Urška, KOGELNIK, Mojca, KRAJNC, Gaja, HRKAČ, Tanja, GABRIJELČIČ TOMC, Helena. Oblikovanje animacije za 4. razred osnovne šole: o koži pri predmetu Naravoslovje in tehnika = Designing an animation for the 4th grade of elementary school: about the skin in the subject Science and Technology. V: ČIRGIĆ, Adnan (ur.). EDUvision 2021 : 11. mednarodna konferenca : "Novi izzivi današnjega časa - priložnosti za vključevanje inovativnih rešitev v izobraževanje 21. stoletja" : 25.-27. november 2021 : [zbornik prispevkov]. Elektronska izd. Ljubljana [i. e. Polhov Gradec]: EDUvision, 2021. Str. 306-321
- MUŠIČ, Jaka, GABRIJELČIČ TOMC, Helena. A comparison of current solutions for creating web animations on Apple hardware. Journal of print and media technology research. 2022, vol. 11, no. 2, str. 129-140.
- SMOLE, Vera, GABRIJELČIČ TOMC, Helena, KAVČIČ, Alenka. Uporaba novih medijev v narečnem slovaropisju na primeru Slovarja starega orodja v govoru Loškega Potoka. Rasprave Instituta za hrvatski jezik i jezikoslovje. 2020, vol. 46, no. 2, str. 1039-1057

IZBIRNI PREDMET 1

UČNI NAČRT PREDMETA/COURSE SYLLABUS

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

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Grafične in interaktivne komunikacije, prva stopnja, univerzitetni	Ni členitve (študijski program)	2. letnik	2. semester	obvezni

Univerzitetna koda predmeta/University course code:	0111830
Koda učne enote na članici/UL Member course code:	11100

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
30	20	30	10	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:
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Vsebina:

	Content (Syllabus outline):
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Temeljna literatura in viri/Readings:

Cilji in kompetence:

	Objectives and competences:
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Predvideni študijski rezultati:

	Intended learning outcomes:
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Metode poučevanja in učenja:

	Learning and teaching methods:
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Načini ocenjevanja:

Delež/Weight	Assessment:
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Ocenjevalna lestvica:

Grading system:

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Reference nosilca/Lecturer's references:

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IZBIRNI PREDMET 2

UČNI NAČRT PREDMETA/COURSE SYLLABUS

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

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Grafične in interaktivne komunikacije, prva stopnja, univerzitetni	Ni členitve (študijski program)	2. letnik	2. semester	obvezni

Univerzitetna koda predmeta/University course code:	0111831
Koda učne enote na članici/UL Member course code:	11101

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	15	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:
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Ocenjevalna lestvica:

Grading system:

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Reference nosilca/Lecturer's references:

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IZBIRNI PREDMET 3

UČNI NAČRT PREDMETA/COURSE SYLLABUS

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

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Grafične in interaktivne komunikacije, prva stopnja, univerzitetni	Ni členitve (študijski program)	3. letnik	2. semester	obvezni

Univerzitetna koda predmeta/University course code:	0111832
Koda učne enote na članici/UL Member course code:	11102

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
35	25	23	0	7	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:
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Ocenjevalna lestvica:

Grading system:

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Reference nosilca/Lecturer's references:

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IZBIRNI PREDMET 4

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Izbirni predmet 4
Course title:	Optional course 4
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Grafične in interaktivne komunikacije, prva stopnja, univerzitetni	Ni členitve (študijski program)	3. letnik	2. semester	obvezni

Univerzitetna koda predmeta/University course code:	0111833
Koda učne enote na članici/UL Member course code:	11103

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
35	25	23	0	7	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:

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Prerequisites:

Vsebina:

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Content (Syllabus outline):

Temeljna literatura in viri/Readings:

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Cilji in kompetence:

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Objectives and competences:

Predvideni študijski rezultati:

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Intended learning outcomes:

Metode poučevanja in učenja:

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Learning and teaching methods:

Načini ocenjevanja:

Delež/Weight Assessment:

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Ocenjevalna lestvica:

Grading system:

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Reference nosilca/Lecturer's references:

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IZBIRNI PREDMET 5

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Izbirni predmet 5
Course title:	Optional course 5
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Grafične in interaktivne komunikacije, prva stopnja, univerzitetni	Ni členitve (študijski program)	3. letnik	2. semester	obvezni

Univerzitetna koda predmeta/University course code:	0111834
Koda učne enote na članici/UL Member course code:	11104

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
32	15	11	0	2	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:
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Ocenjevalna lestvica:

Grading system:

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Reference nosilca/Lecturer's references:

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IZBIRNI PREDMET 6

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Izbirni predmet 6
Course title:	Optional course 6
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Grafične in interaktivne komunikacije, prva stopnja, univerzitetni	Ni členitve (študijski program)	3. letnik	2. semester	obvezni

Univerzitetna koda predmeta/University course code:	0111835
Koda učne enote na članici/UL Member course code:	11105

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
32	15	11	0	2	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:**

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Ocenjevalna lestvica:

Grading system:

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Reference nosilca/Lecturer's references:

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KEMIJA 1

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Kemija 1
Course title:	Chemistry 1
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Grafične in interaktivne komunikacije, prva stopnja, univerzitetni	Ni členitve (študijski program)	1. letnik	1. semester	obvezni
Načrtovanje tekstilij in oblačil, prva stopnja, univerzitetni	Ni členitve (študijski program)	1. letnik	1. semester	obvezni

Univerzitetna koda predmeta/University course code:	0068727
Koda učne enote na članici/UL Member course code:	10019

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

Nosilec predmeta/Lecturer:	Urška Lavrenčič Štangar
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Vrsta predmeta/Course type:	Obvezni/Compulsory
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Jeziki/Languages:	Predavanja/Lectures:	Slovenščina
	Vaje/Tutorial:	Slovenščina

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

Vpis v letnik študija.
Obvezna prisotnost: Predavanja – 70 %; Vaje – 100 %.

Prerequisites:

Enrolment into the study year.
Compulsory attendance: Lectures – 70 %; Tutorials – 100 %.

Vsebina:

Metode, definicije in osnovni pojmi v kemiji;
Atomi, molekule, ioni in spojine;
Kemijske reakcije splošno in reakcije v vodnih raztopinah;
Termokemija;
Elektronska zgradba atoma, periodičnost, kemijska vez in zgradba molekul;
Plini, tekočine in trdne snovi in medmolekulske sile;
Raztopine;
Osnove kemijske kinetike;
Kemijsko ravnotežje;
Kislina in baze;
Spontanost kemijskih reakcij;
Elektrokemija;

Content (Syllabus outline):

Methods, definitions and fundamental concepts in chemistry;
Atoms, molecules, ions and compounds;
Chemical reactions in general and reactions in aqueous solutions;
Thermochemistry;
Electronic structure of atom, periodicity, chemical bond and structure of molecules,
Gases, liquids, solids and intermolecular forces, Solutions;
Fundamentals of chemical kinetics;
Chemical equilibrium;
Acids and bases. Spontaneity of chemical reactions;
Electrochemistry,

Atomsko jedro in jedrska kemija; Osnove kemijskega računanja (množina snovi, elementna analiza, računanje množinskega razmerja pri reakcijah v plinskih zmesih in raztopinah).	Atomic nucleus and nuclear chemistry; The fundamental of stoichiometry (amount of substance, elemental analysis, calculation of amount ratio in chemical reactions taking place in gases or solutions).
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Temeljna literatura in viri/Readings:

- B. ČEH: Splošna in anorganska kemija. Zbirka pojmov in nalog z odgovori in rešitvami, 2. dopolnjena izdaja, Založba UL FKKT, Ljubljana, 2015, 240 str.
- B. ČEH: Kemijsko računanje in osnove kemijskega ravnotežja, Univ. založba, Ljubljana, 2006, 198 str.
- B. ČEH: Splošna kemija, Založba UL FKKT, Ljubljana, 2018, 360 str.
- S.S. ZUMDAHL, S.A. ZUMDAHL, D.J. DECOSTE: Chemistry, deseta izdaja, Cengage Learning, Boston, 2018, 1219 str.

Dodatna literatura:

Cilji in kompetence:

Pri predmetu se študentje naučijo temeljnih prijemov in konceptov, ki so potrebni za razumevanje lastnosti in obnašanja anorganskih in organskih snovi.

Objectives and competences:

The students learn the basic concepts of chemistry and stoichiometry with the aim of understanding of the properties and behavior of the inorganic and organic substances.

Predvideni študijski rezultati:

Znanje in razumevanje:
Razvijanje sposobnosti lastnega učenja osnovnih predmetov in nato prilagajanje ter uporaba znanja na svojem strokovnem področju.

Intended learning outcomes:

Knowledge and understanding:
The abilities of acquiring and sharing of fundamental chemical knowledge and concepts and linking them with other (related) topics.

Metode poučevanja in učenja:

Predavanja, pisanje na tablo, PowerPoint predstavitev, prikazovanje kemijskih eksperimentov.

Learning and teaching methods:

Oral lectures, blackboard writing skills, Power-Point presentation, demonstration of chemical experiments.

Načini ocenjevanja:

Delež/Weight

Assessment:

Vaje	30,00 %	Exercises (coursework)
Pisni izpit	70,00 %	Writing exam

Ocenjevalna lestvica:

Grading system:

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Reference nosilca/Lecturer's references:

- ŠULIGOJ, Andraž, CERC KOROŠEC, Romana, ŽERJAV, Gregor, NOVAK TUŠAR, Nataša, LAVRENČIČ ŠTANGAR, Urška. Solar-driven photocatalytic films : synthesis approaches, factors affecting environmental activity, and characterization features. *Topics in current chemistry* (2022) 380:5
- KUMAR, Praveen, VERMA, Shilpi, KAUR, Ramanpreet, PAPAC, Josipa, KUŠIČ, Hrvoje, LAVRENČIČ ŠTANGAR, Urška. Enhanced photo-degradation of N-methyl-2-pyrrolidone (NMP) : influence of matrix components, kinetic study and artificial neural network modelling. *Journal of hazardous materials* 434 (2022) 128807.
- TALWAR, Steffi, VERMA, Anoop Kumar, SANGAL, Vikas Kumar, LAVRENČIČ ŠTANGAR, Urška. Once through continuous flow removal of metronidazole by dual effect of photo-Fenton and photocatalysis in a compound parabolic concentrator at pilot plant scale. *Chemical engineering journal* 388 (2020) 124184.
- KUMAR, Praveen, CERC KOROŠEC, Romana, LAVRENČIČ ŠTANGAR, Urška. Highly active and efficient Cu-based hydrotalcite-like structured materials as reusable heterogeneous catalysts used for transcobalamin reaction. *Journal of colloid and interface science* 585 (2021) 549-559.

5. ŽENER, Boštjan, MATOH, Lev, RODIČ, Peter, ŠKUFGA, David, HEATH, Ester, LAVRENČIČ ŠTANGAR, Urška. Removal of 18 bisphenols co-present in aqueous media by effectively immobilized titania photocatalyst. *Journal of environmental chemical engineering* 9 (2021) 106814.

KEMIJA 2

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Kemija 2
Course title:	Chemistry 2
Članica nosilka/UL	UL NTF
Member:	

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Grafične in interaktivne komunikacije, prva stopnja, univerzitetni	Ni členitve (študijski program)	1. letnik	2. semester	obvezni
Načrtovanje tekstilij in oblačil, prva stopnja, univerzitetni	Ni členitve (študijski program)	1. letnik	2. semester	obvezni

Univerzitetna koda predmeta/University course code:	0068728
Koda učne enote na članici/UL Member course code:	10020

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:	Uroš Grošelj
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Vrsta predmeta/Course type:	Obvezni/Compulsory
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Jeziki/Languages:	Predavanja/Lectures:	Slovenščina
	Vaje/Tutorial:	Slovenščina

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

Vpis v program.
Uspešno opravljene laboratorijske vaje (obvezna 100 % prisotnost) so pogoj za pristop k pisnemu izpitu. Za pozitivno oceno pri predmetu Kemija 2 mora biti študent/-ka pozitivno ocenjen/-a pri vsakem posameznem deležu, ki sestavlja končno oceno. Ocenjevalna lestvica (skladno s Statutom UL in fakultetnimi pravili): 5 nezadostno, zadostno 6, dobro 7, prav dobro 8, prav dobro 9 in odlično 10.

Prerequisites:

Enrolment in the programme.
Successfully completed laboratory course (100 % attendance obligatory) is required for taking an exam in Chemistry 2. To pass the course, the student must have completed successfully (with the passing grade) all the course parts. The grading scale (according to the University of Ljubljana Statute and the faculty regulations): 5 fail, 6 satisfactory, 7 good, 8 very good, 9 very good and 10 excellent.

Vsebina:

Struktura in reaktivnost v organski kemiji: kemijske vezi v organskih molekulah, elektroni in tvorba vezi, hibridne orbitale in vezi v molekulah, načini zapisa formul organskih molekul, poimenovanje organskih spojin, funkcionalne skupine v organskih molekulah, nasičene in nenasičene molekule, halogenirane organske spojine;

Content (Syllabus outline):

Structure and reactivity in organic chemistry: the chemical bonds in organic molecules, the electrons and bond formation, the hybrid orbitals and bonds in molecules, ways of drawing formulas of the organic molecules, naming of the organic compounds, functional groups in organic molecules, the saturated and unsaturated molecules, the halogenated organic compounds;

Izomerija organskih spojin: tipi izomerije; Reaktivnost organskih spojin: pregled tipičnih reakcijskih intermediatov in njihove značilnosti, reakcijski mehanizmi, kislost in bazičnost organskih spojin; Pretvorbe organskih spojin: tipi kemijskih reakcij v organski kemiji, elektrofilni in nukleofilni, pretvorbe nasičenih spojin, pretvorbe nenasičenih spojin, pretvorbe aromatskih spojin; Makromolekule in polimeri: pregled in tipične lastnosti aminokislin, ogljikovih hidratov, peptidov in lipidov.	Isomerism of organic compounds: types of isomerism; Reactivity of organic compounds: survey of the typical reaction intermediates and their properties, reaction mechanisms, acidity and basicity of organic compounds; Transformations of organic compounds: types of the chemical reactions in organic chemistry, electrophiles and nucleophiles, transformations of saturated compounds, transformations of unsaturated compounds, transformations of aromatic compounds; Macromolecules and polymers: survey and typical properties of amino acids, carbohydrates, peptides and lipides.
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Temeljna literatura in viri/Readings:

- John McMurry: Fundamentals of ORGANIC CHEMISTRY, Seventh Edition, Brooks/Cole Cengage Learning 2007, 2011; ISBN-13: 978-1-4390-4971-6
 - Darko Dolenc, Organska kemija, 2019, založnik: UL FKKT, ISBN: 9789617078008
- Dodatna literatura/Additional readings
- D. J. Hart, C. M. Hadad, L. E. Craine, H. Hart: ORGANIC CHEMISTRY - A brief course, Brooks/Cole, 2012; ISBN-13: 978-1-111-42624-8

Cilji in kompetence:

Poznavanje osnovnega znanja iz organske kemije in obvladovanje praktičnega laboratorijskega znanja in spretnosti, ki se uporabljajo pri sintezi, izolaciji in čiščenju organskih spojin. Študenti pridobijo temeljno znanje organske kemije, ki je potrebno za to študijsko smer in je tudi dobra podlaga za nadaljevanja študija na magistrskem študijskem programu.

Objectives and competences:

Achieving basic knowledge of organic chemistry and managing practical laboratory techniques and skills used in the synthesis, isolation and purification of organic compounds. The students acquire fundamental knowledge of organic chemistry needed in this field of study, and this course is a good basis for continuation of the study on the Master's Degree.

Predvideni študijski rezultati:

Znanje in razumevanje:
Študent pridobi osnovno znanje s področja organske kemije. Organske spojine zna razvrstiti v razrede spojin (alkani, alkeni, karbonili, aromati,...), obvlada imenovanje enostavnih spojin in pozna njihovo zgradbo. Pridobi znanje o različnih zapisih formul in na osnovi strukture lahko sklepa o določenih lastnostih spojin. Zna osnove stereokemije in je sposoben primerjati stabilnost konformerov, pozna osnovne reakcijske intermedie in njihove tipične značilnosti. Obvlada osnovne tipe mehanizmov organskih reakcij in razlikuje elektrofile in nukleofile in ima določeno znanje o njihovi reaktivnosti. Prepozna makromolekule in polimere in njihove bistvene značilnosti in pozna osnovne gradnike makromolekul.
Z uporabo osnovnih laboratorijskih tehnik je

Intended learning outcomes:

Knowledge and understanding:
The student acquires a basic knowledge in the field of organic chemistry. The student is able to classify organic compounds into classes of compounds (alkanes, alkenes, carbonyls, aromatics,...), is able to designate simple organic compounds, and has knowledge on their structure. Acquires knowledge on various possible drawings of formulas, and is able to infer on certain properties of the compounds. Has basic knowledge on stereochemistry, and is able to compare the stability of the conformers, knows the basic reaction intermediates and their typical properties. Understands the basic types of mechanisms of organic reactions, and is able to distinguish electrophiles and nucleophiles and has certain knowledge on their reactivity. Student is able to recognize macromolecules and polymers and their main properties, and knows the monomers of these

sposoben samostojno izvesti enostavne postopke sinteze, izolacije in čiščenja organskih spojin.	macromolecules. The student is able to independently perform a simple method of synthesis, isolation and purification of organic compounds by using the basic laboratory techniques.
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Metode poučevanja in učenja: Predavanja, seminarske vaje, laboratorijske vaje. Predavanja in seminarske vaje se izvajajo v predavalnici ali izjemoma preko spleta (online) s pomočjo primerne in ustrezne programske opreme. Vaje se izvajajo zgolj v laboratoriju, preverjanje znanja (pisni izpit) se izvaja v predavalnici.	Learning and teaching methods: Lectures, seminars, laboratory exercises. Lectures and seminars will be held in a lecture hall or exceptionally online using appropriate and adequate software. Laboratory exercises take place only in the laboratory, exams are held in the lecture hall.
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Načini ocenjevanja:	Delež/Weight	Assessment:
Laboratorijske vaje	30,00 %	Laboratory exercises
Pisni izpit Uspešno opravljene laboratorijske vaje so pogoj za pristop k pisnemu izpitu. Za pozitivno oceno pri predmetu Kemija 2 mora biti študent/-ka pozitivno ocenjen/-a pri vsakem posameznem deležu, ki sestavlja končno oceno. Ocenjevalna lestvica (skladno s Statutom UL in fakultetnimi pravili): 5 – znanje ne ustreza minimalnim kriterijem, 6 – znanje ustreza le minimalnim kriterijem, 7 – dobro znanje z več pomanjkljivostmi, 8 –dobro znanje s posameznimi pomanjkljivostmi, 9 – zelo dobro znanje z manjšimi napakami in 10 zjemno znanje brez ali z zanemarljivimi napakami.	70,00 %	Examination Successfully completed laboratory course is required for taking an exam in Chemistry 2. To pass the course, the student must have completed successfully (with the passing grade) all the course parts. The grading scale (according to the University of Ljubljana Statute and the faculty regulations): 5 fail, 6 satisfactory, 7 good, 8 very good, 9 very good and 10 excellent.

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. RIČKO, Sebastijan, MEDEN, Anže, CIBER, Luka, ŠTEFANE, Bogdan, POŽGAN, Franc, SVETE, Jurij, GROŠELJ, Uroš. Construction of vicinal tetrasubstituted stereogenic centers via a Mannich-type organocatalyzed addition of Δ^2 -pyrrolin-4-ones to isatine imines. *Advanced Synthesis & Catalysis*, ISSN 1615-4150. [Print ed.], 2018, vol. 360, iss. 6, str. 1072-1076, ilustr. <https://onlinelibrary.wiley.com/doi/full/10.1002/adsc.201701384>, doi: [10.1002/adsc.201701384](https://doi.org/10.1002/adsc.201701384). [COBISS.SI-ID [1537675459](https://nbn-resolving.org/urn:nbn:si:coibis-1537675459)]
2. RIČKO, Sebastijan, MEDEN, Anže, IVANČIČ, Anže, PERDIH, Andrej, ŠTEFANE, Bogdan, SVETE, Jurij, GROŠELJ, Uroš. Organocatalyzed deracemisation of Δ^2 -pyrrolin-4-ones. *Advanced Synthesis & Catalysis*, ISSN 1615-4150. [Print ed.], 2017, vol. 359, iss. 13, str. 2288-2296, ilustr. <http://onlinelibrary.wiley.com/doi/10.1002/adsc.201700539/full>, doi: [10.1002/adsc.201700539](https://doi.org/10.1002/adsc.201700539). [COBISS.SI-ID [1537417667](https://nbn-resolving.org/urn:nbn:si:coibis-1537417667)]
3. RIČKO, Sebastijan, SVETE, Jurij, ŠTEFANE, Bogdan, PERDIH, Andrej, GOLOBIČ, Amalija, MEDEN, Anže, GROŠELJ, Uroš. 1,3-diamine-derived bifunctional organocatalyst prepared from camphor. *Advanced Synthesis & Catalysis*, ISSN 1615-4150. [Print ed.], 2016, vol. 358, iss. 23, str. 3786-3796, ilustr. <http://onlinelibrary.wiley.com/doi/10.1002/adsc.201600498/full>, doi: [10.1002/adsc.201600498](https://doi.org/10.1002/adsc.201600498). [COBISS.SI-ID [1537274819](https://nbn-resolving.org/urn:nbn:si:coibis-1537274819)]

LIKOVNE ANALIZE GRAFIČNIH IZDELKOV 1

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Likovne analize grafičnih izdelkov 1
Course title:	Artistic analysis of graphic products
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Grafične in interaktivne komunikacije, prva stopnja, univerzitetni	Ni členitve (študijski program)	3. letnik	1. semester	obvezni

Univerzitetna koda predmeta/University course code:	0089496
Koda učne enote na članici/UL Member course code:	10229

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	0	0	15	60	4

Nosilec predmeta/Lecturer:	Marica Starešinič
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Vrsta predmeta/Course type:	Obvezni/Compulsory
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Jeziki/Languages:	Predavanja/Lectures: Slovenščina
	Vaje/Tutorial: Slovenščina

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

Pogoj za vključitev v delo je vpis v letnik študija.
Pogoja za pristop k izpitu sta predstavitev ter oddano poročilo seminarja.

Prerequisites:

Enrolment in the study year.
For the final exam guided seminar on selected theme has to be completed successfully.

Vsebina:

Spoznavanje in razumevanje vidnih in nevidnih strukturnih, konstrukcijskih, kompozicijskih, estetskih in psiholoških značilnosti grafičnega izdelka; vrste grafičnih izdelkov, njihovo oblikovanje; načini razporejanja sestavin vzorčnih enot; vrste vzorcev; kompozicija; zgodovinski pregled slogovnih obdobij in njihov vpliv na oblikovanje; likovna analiza

Uvod v estetsko problematiko oblikovanja grafičnih izdelkov, neposredna povezava med likovno teorijo in oblikovanjem ter izvedbo grafičnih izdelkov. Predstavitev kompozicijskih silnic in strukturalnih grafov, ki so pomembni pri ustvarjanju grafičnih izdelkov, neposredna likovna analiza posameznih primerov s primerjalnimi variacijami in komentarji, priprava seminarских nalog z zagovori in

Content (Syllabus outline):

Learning about and understanding hidden and visible construction, composition, aesthetic and communication characteristics of a graphic product; linking artistic theory, design and production of a graphic product; compositional vectors in structural graphics; artistic analysis.

Introduction to the aesthetic problem of designing graphic products, direct connection between art theory and design and implementation of graphic products. Presentation of compositional forces and structural graphs, important in the creation of graphic products. History of graphic design. Artistic analysis of individual designs with the comparative variations and comments, preparation of seminars with presentations of the strengths and weaknesses of

dokazovanjem dobrih in slabih strani oblikovanja, vizualnega učinka in sporočilne izraznosti grafičnega izdelka. Predstavitve zgodovine grafičnega oblikovanja. Predstavitev velikega števila dobrih in slabih rešitev s komentarjem in dokazovanjem.	design, visual impact and messaging values of graphic product. Introduction of a large number of good and bad graphic design solutions with commentary.
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Temeljna literatura in viri/Readings:

- FIELL, C., in FIELL, P. Graphic Design for the 21st Century : 100 of the World's Best Graphic Designers. Köln : Taschen, 2002.
- MUHOVIČ JOŽEF: Vidno in nevidno, Inštitut Nove revije, 2019.
- The Best of Newspaper Design. Providence : Society of Newspaper Design, 1997.
- JUTE, A. Grids : the Structure of Graphic Design. Crans- Pres-Celigny : RotoVision, 1996.
- REPOVŠ, J. Kako nastaja in deluje učinkovita, tržno usmerjena celostna grafična podoba kot del simbolnega identitetnega sistema organizacij. Ljubljana : Studio Marketing, 1995.
- MEGGS, P. B. A History of Graphic Design. New York : John Wiley & Sons, 1998.
- DABNER, D. Graphic Design School : the Principles and Practices of Graphic Design. London : Thames and Hudson, 2004.
- Članki v revijalnem tisku.
- Elektronske publikacije digitalnih knjižnic na svetovnem spletu.
- Tiskane publikacije ter strokovna poročila.

Literatura je dosegljiva v knjižnici Oddelka za tekstilstvo, NTF, ter preko programa Moodle.

Cilji in kompetence:

Opaziti, spoznati, razumeti, razložiti skrivne (nevidne) in vidne konstitucijske, kompozicijske, estetske in sporočilne značilnosti grafičnega izdelka, izhajajoč iz likovne analize, ki se posredno veže na razumevanje, sinteze ali samostojnega ustvarjanja in oblikovanja novih grafičnih izdelkov.

Objectives and competences:

Observed recognize , understand , explain the secret (invisible) and visible constitutive, compositional , aesthetic and messaging features graphic product, starting from the visual analysis , which is indirectly bound to understand the synthesis or self- creation and the creation of new graphic products

Predvideni študijski rezultati:

Znanje in razumevanje:

- Vpliv na splošno in specifično občutljivost posameznika v opazovanju, analiziranju in vrednotenju, naravnih, civilizacijskih, oblikovalskih in umetniških vizualnih sistemov,
- funkcionalna uporabnost zlatega reza in drugih proporcijskih odnosov pri načrtovanju grafičnih izdelkov ,
- analiziranje povezave med ploskovnimi in prostorskimi (plastično iluzivnimi) efekti in poudarjanje razlik med njimi,
- analiziranje morfološko – likovno strukturalne zgradbe grafičnega izdelka s pomočjo likovnih prvin in odnosov med likovnimi sistemi,
- analiziranje velikega števila grafičnih izdelkov z variacijami ter primerjava med posameznimi oblikovalskimi rešitvami glede na njihov namen,
- zgodovinska primerjava grafičnih izdelkov med nekoč in danes.

Intended learning outcomes:

Knowledge and understanding:

- Effects on the general and specific sensitivity of the individual in the observation, analysis and evaluation, natural, cultural, artistic design and visual systems,
- Functional usefulness of the golden ratio and proportions in the planning of graphic products
- Analyzing the links between surface and volumen (plastic iluzivnimi) Effects and highlight the differences between them,
- Analyzing the fine structural building product with the help of graphic art elements and relationships between art systems,
- Analyzing a large number of graphic products with variations and comparison between different design solutions for different purpose,
- Historical comparison of graphic products in the past and today.

Metode poučevanja in učenja:

Predavanja, izdelava vodenega seminarja na izbrano temo.

Learning and teaching methods:

Lectures, and implemetation of guided seminar on seleceted theme.
Lectures are in classroom or on-line using Moodle.

Predavanja potekajo v učilnici ali on-line preko programa Moodle	
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Načini ocenjevanja:	Delež/Weight	Assessment:
Pisni/Ustni izpit	50,00 %	Written/Oral examination
Seminarska naloga	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:

GODLER, Marjeta, STAREŠINIČ, Marica. *Space illusions dance : [razstava] : Galéria Umelka, Slovak Union of Visual Arts, 5th - 24th August, 2014, Bratislava, Slovakia.* 2014. [COBISS.SI-ID [3049072](#)]

GODLER, Marjeta, STAREŠINIČ, Marica. *Vesolje - veselje v nas : [samostojna razstava] : 33. festival idrijske čipke, 20. - 22. junij 2014, Idrija = "Space - the joy in us" exhibition : 33. idrija lace festival, 20. - 22. June 2014.* 2014. [COBISS.SI-ID [3023728](#)]

AHTIK, Jure (avtor razstave, mentor), KOČEVAR, Tanja Nuša (avtor razstave, mentor), STAREŠINIČ, Marica (avtor razstave, mentor). *Muvit/6x60 in NTF : razstava študentov 2. letnika, Naravoslovnotehniške fakultete, Univerze v Ljubljani : Maraton filmskega ustvarjanja Muvit/6x60, Celje, 16. - 19. avgust 2017.* 2017. [COBISS.SI-ID [3396976](#)]

STAREŠINIČ, Marica, SIMONČIČ, Barbara, BRAČKO, Sabina. Using a digital camera to identify colors in urban environments. *Journal of imaging science and technology*, ISSN 1062-3701, 2011, vol. 55, no. 6, str. 060201/1-060201/4, ilustr., doi: [10.2352/J.ImagingSci.Technol.2011.55.6.060201](#). [COBISS.SI-ID [2684272](#)]

AHTIK, Jure, MUCK, Deja, STAREŠINIČ, Marica. Detail diversity analysis of novel visual database for digital image evaluation. *Acta polytechnica Hungarica*, ISSN 1785-8860, 2017, vol. 14, no. 6, str. 115-132. <http://www.uni-obuda.hu/journal/Issue77.htm>. [COBISS.SI-ID [3458416](#)]

AHTIK, Jure, STAREŠINIČ, Marica. Eye movement analysis of image quality parameters compared to subjective image quality assessment = Analiza pokreta očiju u određivanju parametara kvalitete slike u usporedbi sa subjektivnom procenom kvalitete slike. *Tehnički vjesnik : znanstveno-stručni časopis tehničkih fakulteta Sveučilišta u Osijeku*, ISSN 1330-3651, 2017, vol. 24, no. 6, str. 1833-1839. http://hrcak.srce.hr/index.php?show=clanak&id_clanak_jezik=280290. [COBISS.SI-ID [3452784](#)]

JAVORŠEK, Dejana, MOČNIK, Janja, STAREŠINIČ, Marica. Analyses of colour appearances on different display devices = Analiza interpretacije barv na različnih prikazovalnih napravah. *Tekstilac : glasilo slovenskih tekstilcev*, ISSN 0351-3386. [Tiskana izd.], 2015, letn. 58, št. 2, str. 100-107, ilustr. [COBISS.SI-ID [3139440](#)]

MATEMATIKA 1

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Matematika 1
Course title:	Mathematics 1
Članica nosilka/UL	UL NTF
Member:	

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Grafične in interaktivne komunikacije, prva stopnja, univerzitetni	Ni členitve (študijski program)	1. letnik	1. semester	obvezni
Načrtovanje tekstilij in oblačil, prva stopnja, univerzitetni	Ni členitve (študijski program)	1. letnik	1. semester	obvezni

Univerzitetna koda predmeta/University course code: 0642798

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: Obvezni/Compulsory

Jeziki/Languages:

Predavanja/Lectures:	Slovenščina
Vaje/Tutorial:	Slovenščina

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

Vpis v 1. letnik.
Obvezna udeležba pri predmetu: predavanja 70%, vaje 90%.

Prerequisites:

Entering first year class.
Mandatory participation: lectures 70%, tutorials 90%.

Vsebina:

Števila (naravna in cela števila, racionalna in realna števila, kompleksna števila).
Matrike (računanje z matrikami, determinante, obrnljive matrike, sistemi linearnih enačb, Cramerjeva metoda, Gaussova metoda).
Vektorji (vektorji v ravnini in prostoru, skalarni, vektorski in mešani produkt, premice in ravnine v R^3).
Zaporedja in vrste (osnove, aritmetično in geometrijsko zaporedje, stekališča, limite, vrste, konvergenca).

Content (Syllabus outline):

Numbers (integers, rational and real numbers, complex numbers).
Matrices (operations with matrices, determinants, inverse of a matrix, systems of linear equations, Cramer's method, Gauss' method).
Vectors (vectors in plane and space, inner product, vector product and mixed product, lines and planes in R^3).
Sequences and series (basics, arithmetic and geometric sequences, accumulation points, limits, series, convergence).

Temeljna literatura in viri/Readings:

- BRAČIČ, Janko, *Matematika za visokošolske strokovne programe*, Ljubljana : Naravoslovnotehniška fakulteta, Oddelek za materiale in metalurgijo, 2016.
- BRAČIČ, Janko, *Matematika 1-2: števila, funkcije, linearna algebra*, Ljubljana : Naravoslovnotehniška fakulteta, Oddelek za materiale in metalurgijo, 2021.
- BRAČIČ, Janko, *Priprave na izpit iz matematike*, Naravoslovnotehniška fakulteta, 2022, 179 str.

Spletni strani:

- <http://sl.wikipedia.org/wiki/Kategorija:Matematika>;
- <http://mathworld.wolfram.com/>

Cilji in kompetence:

Predmet obravnava elementarno linearno algebro. Študenti se seznaniijo z osnovnimi pojmi iz linearne algebre in njihovo uporabo. Večina izrekov je podanih brez dokazov. Poudarek je na učenju standardnih metod za reševanje problemov iz linearne algebre. Namen vaj je utrditev predavane snovi in pridobitev računske prakse. Predmet je podlaga tako za strokovne kakor za druge osnovne predmete.

Objectives and competences:

Elementary linear algebra is presented. Students becomes familiar with basic notions from linear algebra and get skilled in their use. Theorems are usually stated without proofs. The emphasis is on standard methods for solving problems related to linear algebra. The aim of the tutorials is in practicing. The subject is a basis for several other subjects.

Predvideni študijski rezultati:

Študenti so seznanijeni z osnovnimi pojmi in metodami iz linearne algebre in jih znajo uporabiti na svojem strokovnem področju.

Intended learning outcomes:

Students are familiar with basic notions and methods in linear algebra and they are able to use this knowledge in their own professional area.

Metode poučevanja in učenja:

Predavanja in vaje s praktičnimi računskimi primeri in nalogami.

Learning and teaching methods:

Lectures and tutorials with explicit numerical examples and exercises.

Načini ocenjevanja:

Delež/Weight

Assessment:

Pisni del izpita, ki pokriva celotno snov, je opravljen, če kandidat doseže vsaj 50% točk. Pisni del izpita se lahko opravi s kolokviji (tekom semestra sta dva kolokvija, ki vsak pokriva le del snovi). Pisni del je opravljen s kolokviji, če kandidat zbere na kolokvijih v povprečju 50% točk ali več.

70,00 %

The written part of the exam, which covers the entire subject, is passed if the candidate achieves at least 50% of the points. The written part of the exam can be done with colloquia (there are two colloquia during the semester, each covering only a part of the subject). The written part is passed with colloquia, if the candidate collects on average 50% of points or more.

Teoretični del izpita pokriva celotno snov in ga kandidat lahko opravlja, če je že opravil pisni del izpita. Teoretični del izpita se lahko opravlja s testom, ki ga kandidat piše, ali z ustnim izpitom. Teoretični del izpita je opravljen, če je kandidat zbral vsaj 50% točk na testu oz. je vsaj na 50% vprašanj na ustnem izpitu pravilno odgovoril.

30,00 %

The theoretical part of the exam covers the entire subject and a candidate can take it if he has already passed the written part of the exam. The theoretical part of the exam can be prepared as a test written by a candidate or as an oral exam. The theoretical part of the exam is passed if the candidate has collected at least 50% of the points on the test or has answered correctly at least 50% of the questions in the oral exam.

Ocenjevalna lestvica:

Grading system:

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Reference nosilca/Lecturer's references:

1. BRAČIĆ, Janko, KANDIĆ, Marko, *Hyperinvariant subspaces for sets of polynomially compact operators*. Annals of Functional Analysis 13, Article number: 71 (2022).
2. BRAČIĆ, Janko, KANDIĆ, Marko, *On the normalizer of the reflexive cover of a unital algebra of linear transformations*. Linear Algebra and its Applications 653 (2022), 207-230.
3. BRAČIĆ, Janko. *Local commutants and ultrainvariant subspaces*. Journal of mathematical analysis and applications, vol. 506, iss. 2, art. 125693, 2022, (19 str.).
4. BRAČIĆ, Janko, DIOGO, Cristina, ZAJAC, Michal. *Reflexive sets of operators*. Banach journal of mathematical analysis: an international electronic journal, vol. 12, no. 3, 2018, str. 751-771.
5. BRAČIĆ, Janko. *Arens regularity and weakly compact operators*. Filomat, vol. 32, no. 14, 2018, str. 4993-5002.

MATEMATIKA 2

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Matematika 2
Course title:	Mathematics 2
Članica nosilka/UL	UL NTF
Member:	

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Grafične in interaktivne komunikacije, prva stopnja, univerzitetni	Ni členitve (študijski program)	1. letnik	2. semester	obvezni
Načrtovanje tekstilij in oblačil, prva stopnja, univerzitetni	Ni členitve (študijski program)	1. letnik	2. semester	obvezni

Univerzitetna koda predmeta/University course code: 0642799

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: Obvezni/Compulsory

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

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

Vpis v 1. letnik.
Obvezna udeležba pri predmetu: predavanja 70%, vaje 90%.

Prerequisites:

Entering first year class.
Mandatory participation: lectures 70%, tutorials 90%.

Vsebina:

Osnove realnih funkcij ene spremenljivke (osnovni pojmi, računanje s funkcijami, inverz bijektivne funkcije, pregled elementarnih funkcij, zveznost, limite).
0
Odvod (definicija odvoda in odvodi elementarnih funkcij, pravila za odvajanje, geometrijski pomen odvoda, naraščanje/padanje funkcij, konveksnost/konkavnost, stacionarne točke in njihova klasifikacija, uporaba odvoda, diferencial funkcije).
Integral (tabela nedoločenih integralov, tehnike integriranja: uvedba nove spremenljivke, metoda per-partes, integrali nekaterih racionalnih funkcij, definicija določenega integrala, uporaba določenega integrala pri računanju ploščin krivočrtnih likov in

Content (Syllabus outline):

Basics of real functions of one variable (basic notions, operations between functions, inverse, outline of elementary functions, continuity, limits).
Derivative (definition of the derivative and derivatives of elementary functions, derivative rules, geometrical meaning of the derivative, increasing/decreasing of functions, convexity/concavity, stationary points and their classification, application of the derivative, differential of a function).
Integrals (table of indefinite integrals, different integration technics: new variable, per-partes, integration of rational functions, definition of definite integral, applications: area, volume, length of an arc of a curve).

prostornin/površin rotacijskih teles, dolžina loka krivulje).	
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Temeljna literatura in viri/Readings:

- BRAČIČ, Janko, *Matematika za visokošolske strokovne programe*, Ljubljana : Naravoslovnotehniška fakulteta, Oddelek za materiale in metalurgijo, 2016.
- BRAČIČ, Janko, *Matematika 1-2: števila, funkcije, linearna algebra*, Ljubljana : Naravoslovnotehniška fakulteta, Oddelek za materiale in metalurgijo, 2021.
- BRAČIČ, Janko, *Priprave na izpit iz matematike*, Naravoslovnotehniška fakulteta, 2022, 179 str.

Spletni strani:

- <http://sl.wikipedia.org/wiki/Kategorija:Matematika>;
- <http://mathworld.wolfram.com/>

Cilji in kompetence:

Predmet obravnava elementarno teorijo funkcij ene spremenljivke. Študenti se seznanijo z osnovnimi pojmi iz realne analize in z njihovo uporabo. Večina izrekov je podanih brez dokazov. Poudarek je na učenju standardnih metod za reševanje problemov iz teorije funkcij ene spremenljivke. Namen vaj je utrditev predavane snovi in pridobitev računske prakse. Predmet je podlaga tako za strokovne kakor za druge osnovne predmete.

Objectives and competences:

Elementary theory of real functions of one variable is presented. Students become familiar with basic notions from real analysis and get skilled in their use. Theorems are usually stated without proofs. The emphasis is on standard methods for solving problems related to functions of one variable. The aim of the tutorials is in practicing. The subject is a basis for several other subjects.

Predvideni študijski rezultati:

Študenti so seznani z osnovnimi pojmi in metodami iz teorije realnih funkcij ene spremenljivke in jih znajo uporabiti na svojem strokovnem področju.

Intended learning outcomes:

Students are familiar with basic notions and methods in the theory of real functions of one variable and they are able to use this knowledge in their own professional area.

Metode poučevanja in učenja:

Predavanja in vaje s praktičnimi računskimi primeri in nalogami.

Learning and teaching methods:

Lectures and tutorials with explicit numerical examples and exercises.

Načini ocenjevanja:

Delež/Weight

Assessment:

Pisni del izpita, ki pokriva celotno snov, je opravljen, če kandidat doseže vsaj 50% točk. Pisni del izpita se lahko opravi s kolokviji (tekom semestra sta dva kolokvija, ki vsak pokriva le del snovi). Pisni del je opravljen s kolokviji, če kandidat zbere na kolokvijih v povprečju 50% točk ali več.	70,00 %	The written part of the exam, which covers the entire subject, is passed if the candidate achieves at least 50% of the points. The written part of the exam can be done with colloquia (there are two colloquia during the semester, each covering only a part of the subject). The written part is passed with colloquia, if the candidate collects on average 50% of points or more.
Teoretični del izpita pokriva celotno snov in ga kandidat lahko opravlja, če je že opravil pisni del izpita. Teoretični del izpita se lahko opravlja s testom, ki ga kandidat piše, ali z ustnim izpitom. Teoretični del izpita je opravljen, če je kandidat zbral vsaj 50% točk na testu oz. je vsaj na 50% vprašanj na ustnem izpitu pravilno odgovoril.	30,00 %	The theoretical part of the exam covers the entire subject and a candidate can take it if he has already passed the written part of the exam. The theoretical part of the exam can be prepared as a test written by a candidate or as an oral exam. The theoretical part of the exam is passed if the candidate has collected at least 50% of the points on the test or has answered correctly at least 50% of the questions in the oral exam.

Ocenjevalna lestvica:

Grading system:

Reference nosilca/Lecturer's references:

1. BRAČIĆ, Janko, KANDIĆ, Marko, *Hyperinvariant subspaces for sets of polynomially compact operators*. Annals of Functional Analysis 13, Article number: 71 (2022).
2. BRAČIĆ, Janko, KANDIĆ, Marko, *On the normalizer of the reflexive cover of a unital algebra of linear transformations*. Linear Algebra and its Applications 653 (2022), 207-230.
3. BRAČIĆ, Janko. *Local commutants and ultrainvariant subspaces*. Journal of mathematical analysis and applications, vol. 506, iss. 2, art. 125693, 2022, (19 str.).
4. BRAČIĆ, Janko, DIOGO, Cristina, ZAJAC, Michal. *Reflexive sets of operators*. Banach journal of mathematical analysis: an international electronic journal, vol. 12, no. 3, 2018, str. 751-771.
5. BRAČIĆ, Janko. *Arens regularity and weakly compact operators*. Filomat, vol. 32, no. 14, 2018, str. 4993-5002.

MEDIJSKE VIZUALIZACIJE

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Medijske vizualizacije
Course title:	Media visualisation
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Grafične in interaktivne komunikacije, prva stopnja, univerzitetni	Ni členitve (študijski program)	3. letnik	2. semester	izbirni

Univerzitetna koda predmeta/University course code:	0089456
Koda učne enote na članici/UL Member course code:	10230

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
15	30	15	0	0	60	4

Nosilec predmeta/Lecturer:	Jure Ahtik
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Vrsta predmeta/Course type:	Izbirni/Elective
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Jeziki/Languages:	Predavanja/Lectures:	Angleščina, Slovenščina
	Vaje/Tutorial:	Angleščina, Slovenščina

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

Pogoj za vključitev v delo je vpis v letnik študija in pozitivno ocenjena sprejemna naloga. Omejitve je 20 vpisanih študentov. Pogoj za pristop k ustnemu izpitu predmeta so 70 % prisotnost pri predavanjih in seminarju ter 100 % prisotnost pri vajah.

Prerequisites:

Enrolment in the study year and positively assessed admission task. The limit is 20 enrolled students. The condition for taking the oral exam of the course is 70% attendance at lectures and seminars and 100% attendance at tutorials.

Vsebina:

Zahtevne vsebine s področja oblikovanja vizualnih komunikacij ter obravnave specifične problematike vsakega področja posebej na podlagi številnih primerov. Spremljanje in analiza celotnega postopka od začetne ideje do končne realizacije izdelka v obliki tiskovine, knjižne opreme, plakata, embalaže, vabila, postavitev internetne strani, izdelave logotipa itd. Praktične izvedbene naloge s posameznega področja s poudarkom na kvalitetni rešitvi odnosa med idejo, namenom in končnim rezultatom ter likovni analizi doseženih rezultatov. Poseben poudarek je na trajnostnih in okolju prijaznih rešitvah, kot npr. uporaba okolju prijaznih grafičnih materialov in snovanje dolgoročnih komunikacijskih rešitev.

Content (Syllabus outline):

Advanced topics in the field of visual communications design and treatment of specific issues of each area, based on numerous examples. Monitoring and analysis of the entire process from the initial idea to the final realization of the product in the form of printed matter, book design, posters, packaging, invitations, website layouts, creation of a logo, etc. Practical implementation of tasks in a particular area, with an emphasis on high-quality solution to the relationship between the idea, the purpose and the end result and visual analysis of the results achieved. Special emphasis is placed on sustainable and environmentally friendly solutions, such as the use of environmentally friendly graphic

	materials and the creation of long-term communication solutions.
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Temeljna literatura in viri/Readings:

1. FIELLE, C. in P., Graphic Design for the 21 Century 100 of the World s Best Grafic Designers, Taschen, 2002.
2. The Best of Newspaper Design Society of Newspaper Design, 1997.
3. JUTE. A., Grids the Structure of Graphic Design, Mac and Windows, 1996.
4. REPOUŠ. J., Celostna grafična podoba, Edicija Studio marketing, Ljubljana: 1995.
5. MEGGS, P. B., A History of Graphic Design, Canada, 1998.
6. DABUER, D., Graphic Design School, The principles and practices of graphic design, Thames and Hudson, 2004.
7. BUTINA, M., Prvine likovne prakse, Debora, Ljubljana:1997

Literatura je dosegljiva v knjižnici Oddelka za tekstilstvo, grafiko in oblikovanje

Cilji in kompetence:

Seznanjanje in spoznavanje tehničnih, oblikovalskih in vizualno – estetskih parametrov pri ustvarjanju različnih izdelkov s področja vizualnih komunikacij, oglaševanja in predstavitev v javnem prostoru ter sposobnost praktične izvedbe tovrstnih projektov s pomočjo ustreznega estetskega prilagajanja zahtevanim potrebam.

Predmetno specifične kompetence:

- Razvijanje sposobnosti za samostojno, skupinsko, projektno, raziskovalno delo.
- Razvijanje ustvarjalne imaginacije in kreativne vizualne interpretacije.
- Seznanjanje z metodičnimi procesi oblikovanja širših in bolj poglobljenih zasnov.
- Vzpostavljane kritičnih razmerij do lastnih del s pomočjo prečiščevanja svojih miselnih konceptov ter tehničnih pristopov in procesov izgradnje produktov.
- Razvoj veščin in spretnosti v uporabi različnih računalniških programov na področju oblikovanja medijskih vizualizacij.
- Sposobnost izvedbe zastavljenih nalog s poudarkom na jedrnatosti, urejenosti, razumljivosti, berljivosti in logični zaporednosti v kombinaciji s slikovnim gradivom.
- Sposobnost zasnove celotne grafične podobe s področja medijskih vizualizacij.
- Sposobnost snovanja dolgotrajnih in okolju prijaznih komunikacijskih rešitev.

Poznavanje sistematične metodologije oblikovanja od idejnega projekta, analize, definicije ciljev, sinteze, glavnega projekta do zaključka izvedbe in uporabe.

Objectives and competences:

Getting to know technical, design and visual– aesthetic parameters to create different products in the field of visual communications, advertising and presentation in the public space and the ability of the practical implementation of such projects by means of an appropriate aesthetic adjustments.

Subject-specific competencies:

- Developing the ability for independent, group, project, research work.
- Developing creative imagination and creative visual interpretations.
- Getting to know a methodical process of creating a broader deeper designs.
- Establishing critical relations to their own works through refining their mental concepts and technical approaches and processes of product construction.
- Computer skills development.
- Skills to carry out set tasks with a focus on brevity, orderliness, understandability, readability and logical sequence in combination with the visual materials.
- The ability to design the entire graphic image of the media visualizations.
- Ability to design long-term and environmentally friendly communication solutions.

Knowing systematic methodology of conceptual design, analysis and definition of objectives of the main project until the completion

Predvideni študijski rezultati:

Znanje s področja medijske vizualizacije, ki zajema teoretično, praktično (tehnično) kot tudi estetsko podlago, slonečo na individualni kreativnosti in izvirnosti posameznika. Razumevanje tehničnih, tehnoloških, okolju prijaznih, estetskih in izraznih

Intended learning outcomes:

Knowledge of media visualization, which includes theoretical, practical (technical) as well as the aesthetic basis leaning on individual creativity and originality of the individual. Understanding of the technical, technological, environmentally friendly,

zakonitosti oblikovanja in predstavitev svojih idej v obliki multimedijskih vizualizacij s težnjo po kvaliteti doseženih rezultatov. Praktična uporaba temeljnih oz. splošnih principov oblikovanja na posameznih primerih s sposobnostjo utemeljevanja in evalvacije doseženih rezultatov. Refleksija razumevanja teorije in izkušenj pri delu na konkretnih nalogah ustvarjajo podlago za nadaljnje delo v industriji oz. samostojno ter omogoča istočasno kritično vrednotenje rezultatov dela med izhodiščno idejo in zaključnim izdelkom, njegovo sporočilno estetsko in psihološko uporabnostjo ter sinhronizacijo z zahtevami tržišča. Spretnosti uporabe različnih postopkov oz. načinov interpretacije medijskih vizualizacij, spretnost prilagajanja različnim zahtevnim stopnjam ter oblikam vsebin, velikosti, strukturi, stilnim posebnostim, kompleksnosti vzorcev in povezavi tipografije, fotografije in vizualnih poudarkom oz. akcentom.	aesthetical and expressive view on the creation and presentation of their ideas in the form of multimedia visualization with a tendency for the quality results. The practical application of fundamental or. general design principles in individual cases, the ability of reasoning and evaluation of the achieved results. Understanding of the theory and experience when working on tasks of creating the basis for further work in the industry or. independently and simultaneously providing a critical evaluation of the results of the work between the initial idea and the final product, its communication value, psychological usability and synchronisation with the demands of the market. Skills of using different procedures or. ways of media visualization interpretation, ability to adopt to different challenging levels and forms of content, size, structure, style, the complexity of the patterns and relationships between typography, photography and other elements.
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Metode poučevanja in učenja:

Predavanja, projektno delo, individualne naloge, vaje in izdelki. Pedagoški proces je lahko deloma izveden na daljavo. Za izvedbo predmeta je predvidena uporaba spletne učilnice. Pri predavanjih je predvidena udeležba strokovnjaka s področja vidnega sporočanja in oglaševanja.

Learning and teaching methods:

Lectures, project work, individual assignments, tutorials, products. The pedagogical process can be partly carried out remotely. The use of an online classroom is planned for the implementation of the course. The participation of an expert in the field of visual communication and advertising is planned for the lectures.

Načini ocenjevanja:

Načini ocenjevanja:	Delež/Weight	Assessment:
Ustni izpit	20,00 %	Oral exam
Dokončane naloge	80,00 %	Completed assignments

Ocenjevalna lestvica:

5 - 10, pri čemer velja, da je pozitivna ocena od 6 - 10

Grading system:

5 - 10, a student passes the exam if he is graded from 6 to 10

Reference nosilca/Lecturer's references:

- AHTIK, Jure, MUCK, Deja, STAREŠINIČ, Marica. Detail diversity analysis of novel visual database for digital image evaluation. *Acta polytechnica Hungarica*, ISSN 1785-8860, 2017, vol. 14, no. 6, str. 115-132.
- AHTIK, Jure. Comparison of ICC and DNG colour profile workflows based on colorimetric accuracy. *Journal of print and media technology research*, ISSN 2223-8905, 2017, vol. 6, no. 3, str. 115-121.
- AHTIK, Jure, STAREŠINIČ, Marica. Eye movement analysis of image quality parameters compared to subjective image quality assessment = Analiza pokreta očiju u određivanju parametara kvalitete slike u usporedbi sa subjektivnom procjenom kvalitete slike. *Tehnički vjesnik : znanstveno-stručni časopis tehničkih fakulteta Sveučilišta u Osijeku*, ISSN 1330-3651, 2017, vol. 24, no. 6, str. 1833-1839.
- STAREŠINIČ, Marica, AHTIK, Jure, SIMONČIČ, Barbara, BRAČKO, Sabina. Določanje barve objektov v urbanem okolju s spektrometrijo = Determination of object colours in urban environments using spectroradiometry. *Tekstilec : glasilo slovenskih tekstilcev*, ISSN 0351-3386. [Tiskana izd.], 2012, letn. 55, št. 2, str. 87-91, ilustr.
- AHTIK, Jure. Introducing a new anaglyph method : compromise anaglyph. V: ENLUND, Nils (ur.), LOVREČEK, Mladen (ur.). *Advances in printing and media technology : [proceedings of the 39th International Research Conference iargai, Ljubljana, Slovenia, September 2012]. Vol. 39*. Darmstadt: International Association of Research Organizations for the Information, Media and Graphic Arts Industries. 2012, str. 91-9

6. STAREŠINIČ, Marica, AHTIK, Jure, UČAKAR, Andrej, JAVORŠEK, Dejana. Evaluation of changes in urban environments using orthophoto maps. V: COHEN, Alexis (ur.). *Urban and built environments : sustainable development, health implications and challenges*, (Urban development and infrastructure). New York: Nova Science Publishers. 2015, str. [41]-53, ilustr.
7. AHTIK, Jure. *Tehnike upodabljanja anaglifnih slik za uporabo v umetnosti*. Ljubljana: [J. Ahtik], 2011. XIII, 96 f., ilustr.
8. AHTIK, Jure (avtor razstave, mentor), KOČEVAR, Tanja Nuša (avtor razstave, mentor), STAREŠINIČ, Marica (avtor razstave, mentor), KOS, Primož (avtor razstave, mentor). *Končna.pdf : razstava študentov 2. letnika Grafične in medijske tehnike ter Grafičnih in interaktivnih komunikacij, Oddelka za tekstilstvo, grafiko in oblikovanje, Naravoslovnotehniške fakultete, Univerze v Ljubljani : Klub ZOO, Tržaška cesta 2, Ljubljana, 6. - 20. 6. 2017*. 2017.
9. AHTIK, Jure (avtor razstave, mentor), KOČEVAR, Tanja Nuša (avtor razstave, mentor), STAREŠINIČ, Marica (avtor razstave, mentor). *Muvit/6x60 in NTF : razstava študentov 2. letnika, Naravoslovnotehniške fakultete, Univerze v Ljubljani : Maraton filmskega ustvarjanja Muvit/6x60, Celje, 16. - 1 avgust 2017*. 2017.

MERJENJE BARVE

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Merjenje barve
Course title:	Colour metrics in graphic arts
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Grafične in interaktivne komunikacije, prva stopnja, univerzitetni	Ni členitve (študijski program)	2. letnik	2. semester	obvezni

Univerzitetna koda predmeta/University course code:	0089485
Koda učne enote na članici/UL Member course code:	10024

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	30	0	15	90	6

Nosilec predmeta/Lecturer:	Sabina Bračko
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Vrsta predmeta/Course type:	Obvezni/Compulsory
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Jeziki/Languages:	Predavanja/Lectures:	Angleščina, Slovenščina
	Vaje/Tutorial:	Angleščina, Slovenščina

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

Vpis v letnik študija.
Pogoj za opravljanje študijskih obveznosti je prisotnost pri predavanjih, seminarju in vajah.
Zahtevana prisotnost na vajah je 100 %.
Študent lahko pristopi k izpitu, ko je opravil seminar, projektno nalogo ter kolokvij iz laboratorijskih vaj.

Prerequisites:

Enrolment into the study year.
Prerequisite to complete study obligations is participation at lectures, seminar and tutorials.
Requested presence at tutorials is 100 %.
Student can attend the exam after finishing Project, Tutorial and Seminar.

Vsebina:

Predavanja: Svetloba in barva. Vzroki za nastanek barve snovi in teles v naravi. Osnovne lastnosti barve. Zaznavanje barve pri človeku. Teorije barvnega vida. Psihologija barv. Interdisciplinarne razsežnosti barve. Barvni kontrasti, barvna konstanca in metamerija. Uvrščanje barv v barvne zbirke, barvne sisteme in barvne prostore. CIE sistem in predpisi za merjenje barve. Razvoj enačb za določanje barvnih razlik. Določanje beline in porumenitve. Instrumentalno vrednotenje barve. Kolorimetrija in spektrofotometrija. Predpisi in standardi na področju merjenja barve.
Seminar: podroben študij izbranih vsebin.

Content (Syllabus outline):

Lectures: Light and colour. Causes for colour formation in nature. Basic properties of colour. Perceiving colour. Theories of colour vision. Psychology of colour. Interdisciplinary dimensions of colour. Colour contrasts, colour constancy and metamerism. Colour order systems, collections, colour spaces. CIE system and regulations for colour measurement. Development of equations for colour differences. Whiteness and yellowness of materials. Instrumental evaluation of colour. Colorimetry and spectrophotometry. Regulations and standards concerning colour measurement.
Seminar: detailed study of selected topic.

Vaje: uporaba standardov in instrumentalnih metod za merjenje barve in beline. Druge oblike študija: projektno delo, povezano z izbrano aktualno temo ali dogodkom.	Tutorial: application of standards and instrumental methods for whiteness and colour measurement. Other forms of study: project work regarding selected topic or event.
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Temeljna literatura in viri/Readings:

1. Interdisciplinarnost barve. 1.del: V znanosti: Ur. S. Jeler in M. Kumar. Maribor: DKS, 2001.
2. Colour Physics for Industry. 2nd ed. Ed by R. McDonald. Bradford: SDC, 1997.
3. Color for Science, Art and Technology. Ed by K. Nassau. Amsterdam: Elsevier, 1998.
4. K. Schl pfer: Farbmetrik in der Reproduktionstechnik und im Mehrfarbe druck. St. Gallen: UGRA, 1993.
5. R.W.G. Hunt: The Reproduction of Colour. Kingston-upon-Thames: Fountain Press, 1995.
6. S. Bra ko, B. Blaznik: *Osnove merjenja barv : priro nik za vaje*. Ljubljana: Naravoslovnotehni ska fakulteta, 2022.

Cilji in kompetence:

 tudent se seznani s teoreti nimi osnovami nastanka barve ter z zaznavanjem barve pri  loveku. Spozna osnove metod za numerično vrednotenje barve. Spozna standarde za merjenje barve ter se seznani s posebnostmi pri upodabljanju barve v razli nih medijih.

Predmetno specifi ne kompetence:

- poznavanje in razumevanje razvoja barvne metrike,
- sposobnost za re evanje konkretnih problemov na podro ju merjenja in vrednotenja barve z uporabo sodobnih raziskovalnih metod in postopkov,
- sposobnost povezovanja znanja z drugih podro ij z namenom re evanja konkretnih problemov pri merjenju in upodabljanju barve,
- sposobnost ume canja novih znanj ter njihova kriti na presoja,
- razvoj instrumentalnih ve  in in znanja na podro ju merjenja barve.

Objectives and competences:

Student is introduced to the theoretical basics of colour formation and human colour perception. He/she learns the basics of the numerical evaluation of colour. He gains knowledge about the standards of colour measuring and specifics connected with the reproduction of colour in different media.

Competences:

- knowing and understanding the progress of colour metrics,
- ability to resolve specific task connected with measurement and evaluation of colour using novel research methods and procedures,
- ability to connect knowledge and experiences from different fields to resolve technical problems,
- ability to adapt new skills and their critical evaluation,
- development of instrumental skills in the field of colour measurement.

Predvideni  tudijski rezultati:

Znanje in razumevanje:

- razumevanje fizikalnih dejavnikov pri nastanku barve,
- poznavanje fiziolo skih in psiholo skih dejavnikov pri zaznavanju barve,
- razumevanje interdisciplinarnega vidika barve,
- poznavanje temeljnih predpisov in standardov na podro ju numeričnega vrednotenja barve,
- razumevanje posebnosti pri upodabljanju barve v razli nih medijih,
- obvladovanje metod za instrumentalno vrednotenje barve,
- povezovanje teoreti nih osnov barvne metrike z aktualnimi prakti nimi problemi,
- sposobnost analize in vrednotenja zunanjih in notranjih fizikalno kemijskih dejavnikov pri nastanku barve,
- sposobnost analize in primerjave razli nih barvnih sistemov in prostorov.

Intended learning outcomes:

Knowledge and understanding:

- understanding the process of colour formation,
- understanding physiological and psychological factors involved with colour perception,
- understanding interdisciplinary aspect of colour,
- knowing basic standards and regulations for numerical evaluation of colour,
- understanding characteristics concerning the reproduction of colour in different media,
- mastering the methods for instrumental colour evaluation,
- connecting theoretical basics of colour measurement with current tasks or problems,
- capability to analyse and evaluate internal and external physical and chemical factors connected with colour formation,
- capability to analyse and compare different colour systems and colour spaces.

Metode pou evanja in u enja:

Learning and teaching methods:

Predavanja, projektno delo, seminar in laboratorijske vaje, ki potekajo pretežno v predavalnici oziroma v laboratoriju in/ali preko spleta s pomočjo ustrezne programske opreme.	Lectures, project work, seminar, laboratory work. The activities are predominantly located in the classroom and laboratory and/or on-line using suitable equipment.
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Načini ocenjevanja:	Delež/Weight	Assessment:
Poročilo o opravljenih vajah in kolokvij	30,00 %	Tutorial
Predstavitev projekta	15,00 %	Project
Zagovor seminarske naloge	15,00 %	Seminar
Pisni in/ali ustni izpit Ocena: pozitivno: 6–10, negativno: 5.	40,00 %	Written and/or oral exam Positive: 6–10; Negative: 5.

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. BLAZNIK, Barbara, KOVAČ, Franci, BIZJAK, Grega, BRAČKO, Sabina. Fastness of dye-based ink-jet printing inks in aqueous solution in the presence and absence of oxygen. *Color research and application*. [Print ed.]. 25. mar. 2022, vol. 47, no. 5, str. 1193-1199, ilustr. ISSN 0361-2317.
2. STJEPIC, Marta, BRAČKO, Sabina. Colour memory analysis for selected associative colours = Analiza barvnega spomina za izbrane asociativne barve. *Tekstilec : glasilo slovenskih tekstilcev*. [Tiskana izd.]. 2021, vol. 64, [no.] 3, str. 260-271, ilustr. ISSN 0351-3386.
3. MOŽINA, Klementina, BRAČKO, Sabina, KOVAČEVIĆ, Dorotea, BLAZNIK, Barbara, MOŽINA, Klemen. Legibility of prints on paper made from Japanese knotweed. *Bioresources*. 2020, vol. 15, no. 2, str. 3999-4015. ISSN 1930-2126
4. KAVČIČ, Urška, MRAOVIĆ, Matija, BRAČKO, Sabina, MUCK, Deja. Printed thermochromic displays. *Coloration technology : the journal of the Society of Dyers and Colourists*. Feb. 2019, vol. 135, no. 1, str. 60-66. ISSN 1472-3581.
5. MOŽINA, Klementina, PODLESEK, Anja, BRAČKO, Sabina. Preserving typographic cultural heritage using contemporary digital technology. *Journal of cultural heritage*. 2019, vol. 36, [no.] mar.-apr., str. 166-173, ilustr. ISSN 1296-2074.

NAČRTOVANJE EKOLOŠKE EMBALAŽE

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Načrtovanje ekološke embalaže
Course title:	Design of sustainable packaging
Članica nosilka/UL	UL NTF
Member:	

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Grafične in interaktivne komunikacije, prva stopnja, univerzitetni	Ni členitve (študijski program)	3. letnik	2. semester	izbirni

Univerzitetna koda predmeta/University course code:	0089466
Koda učne enote na članici/UL Member course code:	11099

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	45	0	15	90	6

Nosilec predmeta/Lecturer: Diana Gregor Svetec, Klementina Možina

Vrsta predmeta/Course type: Izbirni/Elective

Jeziki/Languages:

Predavanja/Lectures:	Slovenščina
Vaje/Tutorial:	Slovenščina

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

Vpis v letnik študija.
Pogoj za opravljanje študijskih obveznosti je prisotnost pri predavanjih, drugih oblikah študija in vajah. Zahtevana prisotnost pri drugih oblikah študija in na vajah je 100 %.

Prerequisites:

Enrolment into the study year.
Prerequisites for performing study obligations is presence at lectures, other forms of study and tutorials. Requested presence at other forms of study and tutorials is 100 %.

Vsebina:

Predavanja: trajnostni embalažni materiali; biopolimeri; postopek načrtovanje embalaže z upoštevanjem smernic trajnostnega razvoja; ekološko grafično oblikovanje; življenjski krog embalaže. Vaje: spoznati celoten postopek načrtovanja, oblikovanja in izdelave trajnostne embalaže. Druge oblike študija: praktični primeri ekološkega oblikovanja.

Content (Syllabus outline):

Lectures: sustainable packaging materials; biopolymers; processes of sustainable packaging design of product; eco-design; life cycle of packaging.
Tutorial: implement the whole proces of planning, design and producing of sustainable packaging.
Other forms of study: practical examples of eco-design.

Temeljna literatura in viri/Readings:

- Jedlicka, W. Packaging Sustainability. Springer, 2009
 - Niaounakis, M. Biopolymers: Reuse, Recycling, and Disposal. Elsevier, 2013
 - Ebnesajjad, S. Handbook of Biopolymers and Biodegradable Plastics. Elsevier, 2013
 - Birkeland, J. Design for sustainability. London, Earthscan, 2002 (e-knjiga)
 - Sherin, A. SustainAble : a handbook of materials and applications for graphic designers and their clients, Beverly : Rockport Publishers, cop. 2008
 - Evropske direktive in zakonodaja RS/ European directive and RS legislation
 - E-revije in e-knjige iz podatkovnih zbirk univerze / E-journals and e-books from university databases
- Literatura je dostopna v knjižnici NTF-Oddelka za tekstilstvo, grafiko in oblikovanje, Centralni tehniški knjižnici in preko medknjižnične izposoje.
- Literature is available in library NTF-Department of Textiles, Graphic Arts and design, Central technical library and through library exchange.

Cilji in kompetence:

Študenti spoznajo embalažo z vidika trajnostnega razvoja. Seznanijo se z biopolimeri in ostalimi ekološkimi embalažnimi materiali. Spoznajo procese pri načrtovanju in izdelavi embalaže, ki so do okolja manj obremenjujoči in ekološki krogotok embalaže.

Predmetnospecifične kompetence:

S poznavanjem in razumevanjem trajnostnih embalažnih materialov, načrtovanja in oblikovanja embalaže v skladu s trajnostnim razvojem vplivati na razvoj grafične stroke ter razviti sposobnost reševanja konkretnih delovnih problemov s poudarkom na ekologiji.

Uporaba informacijsko-komunikacijske tehnologije pri načrtovanju embalaže, posredovanju in obdelavi podatkov ter zasledovanju novosti.

Objectives and competences:

Students get know the packaging from sustainability viewpoint. They get knowledge about biopolymers and other ecological packaging materials, as well as processes of packaging manufacturing that are environment friendly and life-cycle of packaging.

Competences:

With understanding of sustainable packaging materials, sustainable packaging design and ecological life-cycle of packaging student can influence on the development of graphic field and to develop the ability of solving actual working problems with a stress on ecology.

Usage of information-communication technology at packaging development, data evaluation and following innovations.

Predvideni študijski rezultati:

Znanje in razumevanje:

študent pozna vlogo trajnostne embalaže in njen vpliv na okolje. Pozna postopke načrtovanja embalaže v skladu s trajnostnim razvojem in ekološkim oblikovanjem le-te.

Razume pomembnost uvajanja trajnostnega razvoja v podjetniško strategijo pri načrtovanju embalaže ter upoštevanje ekološkega krogotoka embalaže.

Intended learning outcomes:

Knowledge and understanding:

student knows the role of sustainable packaging and its influence on environment, and the process of development and eco-design of packaging according to sustainability.

Understands the importance of implementing sustainability in marketing strategy at packaging design and applying ecological life-cycle of packaging.

Metode poučevanja in učenja:

Klasična in interaktivna predavanja, poučevanje z uporabo IKT tehnologije, projektno delo, diskusije, interpretacije, skupinsko delo, individualno delo pri vajah.

Vse oblike (predavanja/seminar/vaje) se lahko izvajajo v živo v učilnicah ali preko spleta (online) v spletnih učilnicah, z uporabo specifičnih orodij ter ustrezne programske opreme.

Learning and teaching methods:

Classic and interactive lectures, teaching using IKT technology, project work in groups, discussions, interpretation, group work, individual work at tutorials.

All forms (lectures/seminar/tutorials) can be conducted live in classrooms or online in online classrooms, using specific tools and suitable software.

Načini ocenjevanja:

Delež/Weight

Assessment:

Ustni/pisni izpit (v predavalnici ali na daljavo)	40,00 %	Oral/written exam (in classroom or on-line)
Vaje	30,00 %	Tutorial
Druge oblike študija	30,00 %	Other forms of study

Ocenjevalna lestvica:

5 - 10, pri čemer velja, da je pozitivna ocena od 6 - 10

Grading system:

5 - 10, a student passes the exam if he is graded from 6 to 10

Reference nosilca/Lecturer's references:

Diana Gregor Svetec:

JOHANSSON, Caisa, BRAS, Julien, MONDRAGON, Inaki, NECHITA, Petronela, PLACKETT, David, ŠIMON, Peter, GREGOR-SVETEC, Diana, VIRTANEN, Sanna, GIACINTI BASCHETTI, Marco, BREEN, Chris, CLEGG, Francis, AUCEJO, Susana. Renewable fibers and bio-based materials for packaging applications - a review of recent developments. *Bioresources*, ISSN 1930-2126, 2012, vol. 7, no. 2, str. 2506-2552.

GREGOR-SVETEC, Diana. Načrtovanje plastične embalaže za boljšo reciklabilnost. V: VOLFAND, Jože (ur.), AMBROŽ, Goran. *Razvoj embalaže v krožnem gospodarstvu : priročnik*. Celje: Fit media, 2019. Str. 133-141, ilustr. Zbirka Zelena Slovenija. ISBN 978-961-6283-59-5.

GREGOR-SVETEC, Diana. Reciklabilnost papirne in kartonske embalaže ter postopki recikliranja. V: VOLFAND, Jože (ur.), AMBROŽ, Goran. *Razvoj embalaže v krožnem gospodarstvu : priročnik*. Celje: Fit media, 2019. Str. 144-150, ilustr. Zbirka Zelena Slovenija. ISBN 978-961-6283-59-5.

ŠTAMPFL, Veronika, GREGOR-SVETEC, Diana. Use of Ecofont software in digital printing on permanent papers. *Journal of print and media technology research*. 2018, vol. 7, no. 2, str. 67-77, ilustr. ISSN 2223-8905.

Klementina Možina:

KOVAČEVIĆ, Dorotea, BROZOVIĆ, Maja, MOŽINA, Klementina. Do prominent warnings make packaging less attractive?. *Safety science*, Dec., vol. 110, str. 336-343, 2018.

MOŽINA, Klementina, MAJNARIĆ, Igor, KOVAČEVIĆ, Dorotea. Do Braille cells influence legibility of texts for the sighted?. *Tehnički vjesnik : znanstveno-stručni časopis tehničkih fakulteta Sveučilišta u Osijeku*, ISSN 1330-3651, 2020, vol. 27, no. 2, str. 429-434.

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.

NAČRTOVANJE PISAV

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Načrtovanje pisav
Course title:	Typeface design
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Grafične in interaktivne komunikacije, prva stopnja, univerzitetni	Ni členitve (študijski program)	3. letnik	2. semester	izbirni

Univerzitetna koda predmeta/University course code:	0089467
Koda učne enote na članici/UL Member course code:	10028

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:	Klementina Možina
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Vrsta predmeta/Course type:	Izbirni/Elective
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Jeziki/Languages:	Predavanja/Lectures:	Slovenščina
	Vaje/Tutorial:	Slovenščina

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

Pristop k predmetu:
vpis v letnik študija in izbira predmeta.
Pristop k izpitu:
K izpitu lahko pristopijo študenti/ke, ki imajo opravljen izpitni projekt, seminar in vaje ter izpolnjeno predpisano prisotnost pri vseh sklopih predmeta.
Prisotnost:
Pri predmetu se zahteva naslednja prisotnost: predavanja 80 %, seminar 100 %, vaje 100 %.

Prerequisites:

Course:
Student has applied in the year and elected the course.
Exam/Assesment:
Students who have completed the exam project, seminar and practical course and who have met the attendance requirements for all sections of the course can take the exam.
Presence:
Parts of the subject require the presence of: Lectures 80%, Seminar 100%, Practical Course 100%.

Vsebina:

Predavanja:
Elementi in moduli črk, razmerja, skelet, duktus, skladnost, kontrast, ritem, oblika in protioblika, glif, metrika, ligature, naglasna znamenja, različice pisave, nabor črkovnih znakov, preverjanje berljivosti/čitljivosti, konvencije; teorija poteze, parametrično in modularno oblikovanje.

Content (Syllabus outline):

Lectures:
Elements and letter modules, proportions, skeleton, ductus, consistency, contrast, rhythm, form and counterform, glyph, metrics, ligatures, diacritical marks, type variations, character set, readability/legibility test, conventions; theory of the stroke, parametric and modular design.

Seminar: Zbiranje, analiziranje črkovnega gradiva, skiciranje in risanje, razvoj kritičnega mišljenja, digitalizacija, vodena individualna naloga: oblikovanje in realizacija pisave ter njena uporabnost. Vaje: Uporaba programov za digitalno realizacijo in prototipiranje pisave.	Seminar: Collecting , analyzing letterforms, sketching and drawing, developing critical thinking, digitalization, conducted individual assignment: design and type production, use of typeface. Lab exercises: Use of font editor tools (digital).
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Temeljna literatura in viri/Readings:

- BAINES, P. in HASLAM, A., 2005. *Type and typography*. London: Laurence King.
- CHENG, K., 2020. *Designing type*. New Haven: Yale University Press.
- COLES, S., 2006. *The anatomy of type: a graphic guide to 100 typefaces*. New York: Harper Design.
- HOCHULI, J., 2008. *Detail in typography: letters, letterspacing, words, wordspacing, lines, linespacing, columns*. London: Hyphen Press.
- MOŽINA, K., 2009. *Mikrotipografija*. Ljubljana: Naravoslovnotehniška fakulteta.
- RUDER, E., 2009. *Typographie*. Zurich: Verlag Niggli AG.
- SMEIJERS, F., 1996. *Counterpunch : making type in the sixteenth century, designing typefaces now*. London: Hyphen Press.
- TRACY, W., 2003. *Letters of credit : a view of type design*. Boston: David R. Godine.
- UNGER, G., 2007. *While you're reading*. New York: Mark Batty.
- WITTNER, B., THOMA, S. & HARTMANN, T. 2019. *Bi-Scriptual: Typography and Graphic Design with Multiple Script Systems*. Salenstein: Niggli.

Cilji in kompetence:

Cilji:
Študent spozna tehnološke, funkcionalne, kulturne, družbene vplive na načrtovanje pisav. Spozna tehnološke zahteve, oblikovne parametre in optične kompenzacije pri načrtovanju pisav. V ustreznem računalniškem programu zmore realizirati pisavo. Zna predvideti uporabnost izdelane pisave v širšem kontekstu grafičnega oblikovanja. Pozna strokovno terminologijo.

Predmetnospecifične kompetence:

- poznavanje in razumevanje metod oblikovanja pisav,
- razumevanje in uporaba in teorij (teorija poteze)
- uporaba oblikovnih parametrov pri načrtovanju pisave,
- poznavanje vpliva jezika, kulture, družbenega dogajanja, in tehnologije na načrtovanje pisav,
- razvoj prostoročnih spretnosti za načrtovanje/oblikovanje pisav,
- prototipiranje pisav
- razvoj spretnosti pri uporabi ustreznih računalniških programov za realizacijo/izdelavo pisav,
- sposobnost kritične presoje lastnih in stvaritev kolegov.

Objectives and competences:

Goals:
Student knows technical, functional, cultural, social impacts on typeface design. Knows technological conditions and design parameters, optical compensations, legibility issues.
Uses font editor software to generate a font and know how to use it in a context of graphic design.
Knows terminology.

Course specific competences:

- understands methods of typeface design.
- understands and uses theories (the stroke)
- uses design parameters for type design
- knows language, culture, social and technical impact on type design
- develops hand drawing skills for designing type
- knows how to prototype letterforms
- develops skills for font editors and vector drawing
- ability to evaluate own and colleagues' designs

Predvideni študijski rezultati:

Znanje in razumevanje:
Razume povezavo med duktusom, orodjem in obliko črke, specificira posamezne elemente in iz njih tvori skladno pisavo. Pozna dejstva, ki vplivajo na razvoj

Intended learning outcomes:

Knowledge and understanding:
Understands connection between ductus, tool and letterform, specifies its elements and creates a consistent typeface. Knows facts important for type

pisav. Razume čitljivost znakov in berljivosti pisave v samem kontekstu njene izdelave. Uporaba: Zna uporabiti računalniški program za realizacijo svoje pisave. Refleksija: Razume teorijo in njeno uporabo v praktičnih primerih; kontekstualizira svojo stvaritev in jo kritično presoja. Prenosljive spretnosti: Veščine in znanja uporabi pri ostalih grafično oblikovalskih predmetih, razume pomembnost izbora pisave v specifičnem posredovanju informacij/grafičnem oblikovanju.	design. Understands legibility and readability issues in context of type production. Use: Uses computer programs for type design execution. Reflexion: Understands theory and its usage in practical design activities; contextualizes and evaluates it. Applicable skills: Uses knowledge and skills at design related courses, understands the importance of consistent visual language in visual communication.
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Metode poučevanja in učenja:	Learning and teaching methods:
Predavanja, moderirana skupinska seminarska diskusija, računalniške vaje, individualne konzultacije. Sklopi predmeta se izvajajo v računalniških in drugih fakultetnih učilnicah/predavalnicah in/ali preko spleta (online) s pomočjo primerne in ustrezne programske opreme za delo.	Lectures, moderated group discussion, seminar work, computer lab exercises, one to one tutorials. Course assemblies are conducted in computer and other faculty classrooms/lecture rooms and/or online with the help of suitable and appropriate software that enables work.

Načini ocenjevanja:	Delež/Weight	Assessment:
Dokumentacija sprotne delovne in aktivne skupne udeležbe in sodelovanje pri predmetu (predavanja, seminar, vaje).	20,00 %	Documentation of work and active common participation and cooperation in the course (lectures, seminars, exercises).
Realizacija in oddaja izpitnega projekta.	50,00 %	Realised final project.
Vprašanja na zagovoru, tj. izpit.	30,00 %	Exam questions, i.e. 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:
Možina, K., <i>Knjižna tipografija</i>. Ljubljana : Filozofska in Naravoslovnotehniška fakulteta, 2003, https://www.dlib.si/stream/URN:NBN:SI:DOC-6YLGQIG8/64f60a3c.-ec5e-4293-adc9-674b38605004/PDF. Franken, G., Podlesek, A., Možina, K., Eye-tracking study of reading speed from LCD displays: influence of type style and type size, <i>Journal of eye movement research</i>, vol. 8, no. 1, str. 1–8, 2015. Pušnik N., Podlesek A., Možina K.; Typefaces comparison- Does the x-height of lower-case letters increased to the size of upper-case letters speed up recognition?, <i>International journal of industrial ergonomics</i>, 54(2016):164-169, 2016. Možina, K., <i>Mikrotipografija</i>. Ljubljana: Naravoslovnotehniška fakulteta, 2009, https://image.linotype.com/files/pdf/Mikrotipografija.pdf. Možina, K., <i>Tipografska kunnst: Upodobitev informacij</i>. Ljubljana: Naravoslovnotehniška fakulteta, 2023.

NAČRTOVANJE UPORABNIŠKIH VMESNIKOV

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Načrtovanje uporabniških vmesnikov
Course title:	User interface planning
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Grafične in interaktivne komunikacije, prva stopnja, univerzitetni	Ni členitve (študijski program)	2. letnik	2. semester	izbirni

Univerzitetna koda predmeta/University course code:	0099560
Koda učne enote na članici/UL Member course code:	10262

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	15	0	0	60	4

Nosilec predmeta/Lecturer:	Jože Guna
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Vrsta predmeta/Course type:	Izbirni/Elective
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Jeziki/Languages:	Predavanja/Lectures:	Angleščina, Slovenščina
	Vaje/Tutorial:	Angleščina, Slovenščina

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

Pogoji za pristop k izpitu so pozitivno opravljene vaje in seminarski projekt..
Priporočena prisotnost na predavanjih je 70%, na vajah 100% ter seminarju 90%.

Prerequisites:

Conditions for the exam are successfully completed practical work and the seminar project.
The recommended attendance at lectures is 70%, at laboratory work 100% and at the seminar project 90%.

Vsebina:

- Metode načrtovanja uporabniške izkušnje po metodi - Uporabniško usmerjeno načrtovanje
- Na uporabnika/človeka osredotočen razvoj uporabniških vmesnikov
- Načrtovanje interakcij
- Uporabnost
- Identifikacija uporabniških skupin, person
- Analiza uporabniških potreb
- Informacijska arhitektura
- Prototipiranje uporabniškega vmesnika in interakcij (skica, žični model, interaktivni prototip)
- Vizualna podoba

Content (Syllabus outline):

- User experience design method - User-centred design
- User/human centred user interface development
- Interactions design
- Usability
- Identification of user groups, personas
- Analysis of user needs and requirements
- Information architecture
- User interface and interaction prototyping (sketch, wireframe, interactive prototype)
- Design
- User experience evaluation, presentation and application of typical evaluation methods

• Vrednotenje uporabniške izkušnje, predstavitev in uporaba tipičnih metod za vrednotenje • Metode za pripravo in izvedbo postopka vrednotenja uporabniške izkušnje in uporabnosti ter analizo rezultatov • tehnologije in uporaba naprav za sledenje pogleda pri načrtovanju in vrednotenju uporabniške izkušnje	• Methods for preparation and implementation of user experience and usability evaluation experiment and analysis of results • technology and use of eye-tracking devices in user experience design and evaluation
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Temeljna literatura in viri/Readings:

Temeljna literatura • Krug, S. »Don't Make Me Think: A Common Sense Approach to Web Usability, 3rd Edition«, New riders, 2014, ISBN-13: 978-0321965516, Dodatna literatura • William, A. and Tullis, T.»Measuring the user experience: collecting, analyzing, and presenting usability metrics«. Newnes, 2013, ISBN-13: 978-0124157811 • Norman, D, A.»The design of everyday things: Revised and expanded edition«. Basic books, 2013, ISBN 978-0-465-05065, • Hartson, Rex, and Pardha S. Pyla. The UX Book: Process and guidelines for ensuring a quality user experience. Elsevier, 2012.	
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Cilji in kompetence:

Študentje pridobijo in praktično aplicirajo znanja iz interdisciplinarnega področja načrtovanja uporabniške izkušnje, interakcij ter uporabniških vmesnikov po metodi na človeka/uporabnika osredotočenega načrtovanja. Poseben poudarek je na praktični uporabi uveljavljenih metodologij za analizo, načrtovanje, implementacijo ter vrednotenje uporabniške izkušnje in uporabnosti. Predmetno specifične kompetence: • razumevanje in praktična aplikacija metode na uporabnika osredotočenega razvoja rešitev • identifikacija ciljnih uporabnikov in njihovih dejanskih potreb • izdelava informacijske arhitekture • uporaba metod in orodij za prototipiranje uporabniških vmesnikov in interakcij • razumevanje in aplikacija metod za vrednotenje uporabniške izkušnje • načrtovanje in izvedba postopka vrednotenja uporabniške izkušnje, izdelava ustreznih scenarijev in nalog za testne uporabnike ter določanje časovnih okvirjev in faz razvoja • poznavanje in sposobnost kreativnega vključevanja interaktivnosti v sodobne produkte in storitve, vključujoč mobilne aplikacije, razširjeno resničnost • poznavanje načinov modeliranja uporabnikov v interaktivnih medijih in sistemih • vloga rešitev za sledenje pogleda pri vrednotenju uporabniške izkušnje	Students acquire and practically apply knowledge from the interdisciplinary field of planning user experience, interactions and user interfaces according to the User Centred Design method. Special emphasis is on the practical application of established methodologies for analysis, planning, implementation and evaluation of user experience and usability. Subject-specific competences: • understanding and practical application of the user-centred design development method • identification of target users and their actual needs • information architecture • the use of methods and tools for prototyping user interfaces and interactions • understanding and application of user experience evaluation methods • planning and implementation of the user experience evaluation process, creation of appropriate scenarios and tasks for test users, and determination of time frames and phases of development • knowledge and ability to creatively integrate interactivity into modern products and services, including mobile applications, extended reality • knowledge of user modeling methods in interactive media and systems • the role of eye-tracking solutions in the user experience evaluation process
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Predvideni študijski rezultati:

Znanje in razumevanje:	Intended learning outcomes:
	Knowledge and understanding of:

• poglobljeno poznavanje načinov načrtovanja uporabniških vmesnikov in interakcij • poglobljeno poznavanje načinov vrednotenja uporabniških vmesnikov in interakcij • razumevanje vloge uporabniških vmesnikov v povezavi s sodobnimi interaktivnimi storitvami • praktična aplikacija znanja na v obliki seminarskega projekta	• in-depth knowledge of how to design user interfaces and interactions • in-depth knowledge of user interfaces and interactions evaluation process • understanding the role of user interfaces in connection with modern interactive services • practical application of knowledge in the form of a seminar project
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Metode poučevanja in učenja:

Predavanja z demonstracijami primerov, vaje v računalniški učilnici, seminarsko projektno delo s predstavitvami izdelkov in razpravo. Aktivnosti poučevanja in učenja potekajo na fakulteti in/ali prek spleta (online). Uporaba spletne učilnice in IKT metod poučevanja (multimedijsko gradivo, praktične demonstracije). Uporaba inovativnih metod poučevanja v smislu obogatitve predavanj z relevantnimi vabljenimi predavanji, povezovanje z industrijo, seminarsko delo na realnih izzivih iz industrije, uporaba sodobnih metod poučevanja s primeri iz prakse. Uporaba skupinskih metod dela.

Learning and teaching methods:

Lectures with demonstrations of examples, practical work in a computer room, seminar project work with presentations and discussions. Teaching and learning activities take place at the faculty and/or online. Use of the online classroom and ICT teaching methods (multimedia content, practical demonstrations). Use of innovative teaching methods in terms of enriching lectures with relevant invited lectures, connecting with the industry, seminar work on real challenges from industry, use of modern teaching methods with examples from practice. Use of team work methods.

Načini ocenjevanja:

Delež/Weight

Assessment:

Pisni/Ustni izpit Vse delne ocene morajo biti pozitivne.	50,00 %	Written/Oral exam All partial grades must be positive.
Ocena vaj	25,00 %	Practical exercises
Ocena seminarskega projektne izdelka	25,00 %	Assessment of a seminar 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
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Reference nosilca/Lecturer's references:

1. GUNA, Jože, POLAJNAR HORVAT, Katarina, PODJED, Dan. People-centred development of a smart waste bin. *Sensors*. Feb.-1 2022, iss. 3, 1288, str. 1-14, ilustr. ISSN 1424-8220. <https://www.mdpi.com/1424-8220/22/3/1288>, DOI: [10.3390/s22031288](https://doi.org/10.3390/s22031288). [COBISS.SI-ID [96699651](#)]
2. SOMRAK, Andrej, POGAČNIK, Matevž, GUNA, Jože. Impact of different types of head-centric rest-frames on VRISE and user experience in virtual environments. *Applied sciences*. Feb.-2 2021, no. 4, 1593, str. 1-31, ilustr. ISSN 2076-3417. <https://www.mdpi.com/2076-3417/11/4/1593>, DOI: [10.3390/app11041593](https://doi.org/10.3390/app11041593).
3. SOMRAK, Andrej, HUMAR, Iztok, HOSSAIN, M. Shamim, ALHAMID, Mohammed F., HOSSAIN, M. Anwar, GUNA, Jože. Estimating VR sickness and user experience using different HMD technologies : an evaluation study. *Future generation computer systems*. [Print ed.]. 2019, vol. 94, str. 302-316, ilustr. ISSN 0167-739X. <https://www.sciencedirect.com/science/article/pii/S0167739X18325044>, DOI: [10.1016/j.future.2018.11.041](https://doi.org/10.1016/j.future.2018.11.041). [COBISS.SI-ID [12274772](#)]
4. BURGER, Gregor, GUNA, Jože, POGAČNIK, Matevž. Suitability of inexpensive eye-tracking device for user experience evaluations. *Sensors*. Jun. 2018, no. 6, 1822, str. 1-17, ilustr. ISSN 1424-8220. <http://www.mdpi.com/1424-8220/18/6/1822>, DOI: [10.3390/s18061822](https://doi.org/10.3390/s18061822). [COBISS.SI-ID [12045396](#)]
5. GUNA, Jože, JAKUS, Grega, POGAČNIK, Matevž, TOMAŽIČ, Sašo, SODNIK, Jaka. An analysis of the precision and reliability of the leap motion sensor and its suitability for static and dynamic tracking. *Sensors*. Feb. 2014, vol. 14, no. 2, str. 3702-3720, ilustr. ISSN 1424-8220. <http://www.mdpi.com/1424-8220/14/2/3702>, DOI: [10.3390/s140203702](https://doi.org/10.3390/s140203702). [COBISS.SI-ID [10430036](#)]

OBLIKOVANJE EMBALAŽE

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Oblikovanje embalaže
Course title:	Packaging design
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Grafične in interaktivne komunikacije, prva stopnja, univerzitetni	Ni členitve (študijski program)	3. letnik	2. semester	izbirni

Univerzitetna koda predmeta/University course code:	0089468
Koda učne enote na članici/UL Member course code:	10035

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	15	0	0	60	4

Nosilec predmeta/Lecturer:	Urška Vrabič Brodnjak
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Vrsta predmeta/Course type:	Izbirni/Elective
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Jeziki/Languages:	Predavanja/Lectures:	Angleščina, Slovenščina
	Vaje/Tutorial:	Angleščina, Slovenščina

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

Pristop k predmetu:
vpis v letnik študija in izbira predmeta.
Pristop k izpitu:
opravljen izpitni projekt, pozitivno opravljen vodeni seminar in računalniške vaje.

Prerequisites:

Course:
Student has applied in the year and elected the course.
Exam/Assesment:
Student has executed final project, seminar and computer lab exercises.

Vsebina:

Predavanja:
Predavanja so vezana na spodaj omenjene tematike, ki se glede na obseg in aktualnost lahko deloma spremenijo.
1. Principi oblikovanja embalaže
2. Trajnostni razvoj, krožno gospodarstvo in vpliv na oblikovanje embalaže (materiali, okoljska problematika)
3. Odpadna embalaža v novi funkcionalnosti
4. Oblikovanje embalaže za neembalirano hrano (problematika, uporaba, materiali, grafika)
5. Modularnost pri embalaži (uporabnost, blagovne znamke, tipologija, likovni elementi)

Content (Syllabus outline):

Lectures:
Lectures are linked to the topics mentioned below, which can be partially changed depending on their scope and actuality.
1. Basic principles of packaging design
2. Sustainable development, circular economy and design of packaging (materials, environmental concerns)
3. Packaging waste in new life form
4. Packaging of non-packed foods (reuse, smaller series, natural materials)
5. Modularity on packaging design (usefulness, brands, typology, design elements)

6. Tipologija embalaže različnih izdelkov (prehrambenih, kozmetičnih ipd.-stereotipi) 7. Embalaža za specifične izdelke (likovni elementi embalaže, oblikotvornost, materialnost, prosojnost, narativnost, inovativnost) 8. Dematerializacija in ergonomija embalaže 9. Biopolimeri kot izziv pri oblikovanju embalaže in trajnostnih, zelenih pristopih <i>Seminar:</i> Razvojno in raziskovalno naravnane naloge na teme obravnavane pri predavanjih. Delo v parih ali manjših skupinah. <i>Vaje:</i> Uporaba programov za digitalno vektorsko in bitno grafiko. Oblikovanje embalaže različnih izdelkov glede na tematiko vezano na seminarje ali glede na ločeno nalogo.	6. Series of packaging units (visual language, unity, diversity, design constants and variables, consistency, typography) 7. Packaging design for specific products (design elements, visual language, unity, diversity, design constants and variables, consistency, typography) 8. Packaging dematerialization and ergonomics. 9. Biopolymers as challenge at packaging design, sustainable and green approaches <i>Seminar:</i> Research assignments on given topics, handed as portfolio of work. Work in groups or small teams. <i>Exercises:</i> Use of design programs for vector and bitmap digital graphics. Work on packaging design based on theme at seminars or based on separate given task.
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Temeljna literatura in viri/Readings:

Kozak, Gisela Ruth, and Julius Wiedemann. *Package design now!*. Taschen, 2008.

Keller, Aaron. "Design Matters: Packaging 01: An Essential Primer for Today's Competitive Market." (2008).

Klimchuk, Marianne R., and Sandra A. Krasovec. *Packaging design: Successful product branding from concept to shelf*. John Wiley & Sons, 2012.

Allard, Sylvain. *Boxed & labelled!: new approaches to packaging design*. Gestalten, 2011.

Stewart, Bill. *Packaging design strategy*. Pira International, 1994.

Fishel, Catharine. *The perfect package: how to add value through graphic design*. Rockport Publishers, 2003.

LUPTON, Ellen, *Graphic design: the new basics* / Ellen Lupton and Jennifer Cole Phillips. — 1st ed. — New York: Princeton Architectural Press ; Baltimore : Maryland Institute College of Art, cop. 2008.

Vsa omenjena literatura je dostopna v knjižnici Oddelka za tekstilstvo, grafiko in oblikovanje, NTF.

Cilji in kompetence:

Cilji:
Študent spozna sistematično načrtovanje pod specifičnimi parametri, ki veljajo za oblikovanje embalaže in veščine uporabi pri realizaciji nalog v kontekstu grafičnih komunikacij za embalažne enote.

Predmetnospecifične kompetence:

- poznavanje in razumevanje pomena različnih materialov in vsebinskih elementov pri oblikovanju trajnostne embalaže
- poznavanje in razumevanje pomena grafično/likovnih elementov (tipografija, fotografija, ilustracija)
- koherentno obvladovanje in povezovanje likovnih elementov v vizualno celoto
- spozna optimizacijo izvedbenih postopkov
- razvoj spretnosti pri uporabi ustreznih računalniških programov
- sposobnost za reševanje konkretnih grafično-komunikacijskih problemov
- sposobnost kritične presoje lastnih in stvaritev kolegov

Objectives and competences:

Goals:
Student knows systematic planing based on specific parameters for packaging design. He uses skills while realising assignments in packaging design context.

Course specific competences:

- understands meaning of different materials and visual languages of sustainable packaging design
- understands graphic elements (typography, illustration, photography, ...)
- connects the visuals in coherent whole
- knows optimization for production
- develops digital drawing skills
- ability to solve specific communication design problems
- ability to evaluate own and colleagues' designs

Predvideni študijski rezultati:

Intended learning outcomes:

Znanje in razumevanje: Razume specifično načrtovanje in oblikovanje embalažnih enot. Zna razviti optimalno vizualno konsistenco za posamezno embalažo ali serijo, vključujoč trajnostne rešitve. Uporaba: Zna uporabiti računalniške programe in orodja za realizacijo in prezentacijo svojih stvaritev. Refleksija: Razume teorijo in njeno uporabo v praktičnih primerih; kontekstualizira svojo stvaritev in jo kritično presoja. Prenosljive spretnosti: Veščine in znanja uporabi pri ostalih grafično komunikacijskih predmetih, razume pomen konsistentnega vizualnega jezika ob posredovanju grafičnih informacij.	Knowledge and understanding: Understands specifics of designing packaging units. Can develop optimal visual consistency for a series of packaging, with included green, sustainable approaches. Use: Uses computer programs for design execution. Reflexion: Understands theory and its usage in practical design activities; contextualizes and evaluates it. Applicable skills: Uses knowledge and skills at design related courses, understands the importance of consistent visual language in visual communication.
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Metode poučevanja in učenja:

Frontalna predavanja, moderirana skupinska seminarska diskusija, računalniške vaje, individualne konzultacije.

Predavanja se izvajajo v živo v predavalnici in/ali prek spleta (online) s pomočjo specifičnih orodij.

Seminarska dela se izvajajo individualno in/ali v skupini (3–4 študenti). Tematika seminarских nalog oz. izdelka se vedno nanaša na vsebine in področja oblikovanja embalaže.

Vaje se izvajajo v računalniški učilnici in/ali prek spleta (online) s pomočjo primerne in ustrezne programske opreme, ki omogoča ustrezno grafično pripravo in izdelavo embalaž.

Learning and teaching methods:

Frontal lectures, moderated group discussion, seminar work, computer lab exercises, one to one tutorials.

Lectures are performed live in the classroom and/or online with the help of specific tools.

Seminar assignments are performed individually and/or in a group (3–4 students). Topics of seminar assignments or the product always refers to the contents that cover of the packaging design.

Tutorials are performed in a computer room and/or online with the help of appropriate and suitable software that enables suitable preparation of final graphic design and packaging.

Načini ocenjevanja:

Delež/Weight

Assessment:

Dokumentacija seminarskega dela in študijskega procesa ter vaj (dnevnik in portfolio)	40,00 %	Documented student's work (portfolio and diary)
Realizacija in oddaja izpitnega projekta	40,00 %	Realised final project
Ustna predstavitev izpitnega projekta	20,00 %	Final project oral presentation

Ocenjevalna lestvica:

5 - 10, pri čemer velja, da je pozitivna ocena od 6 - 10

Grading system:

5 - 10, a student passes the exam if he is graded from 6 to 10

Reference nosilca/Lecturer's references:

VRABIČ BRODNJAK, Urška. Načrtovanje in oblikovanje embalaže : univerzitetni učbenik. 1. izd. Ljubljana: Naravoslovnotehniška fakulteta, 2022. 94 str.

ZAKONJŠEK, Iva, VRABIČ BRODNJAK, Urška. Embalaža iz kartona invazivne rastlinske vrste japonskega dresnika za rezane špoke rož = Cardboard packaging made from an invasive plant species of the japanese knotweed for cut flower bouquets. Papir : revija Društva inženirjev in tehnikov papirništva. [Tiskana izd.]. 2022, letn. 50, št. 28, str. 40-43.

JESTRATIJEVIC, Iva, MAYSTOROVICH, Irina, VRABIČ BRODNJAK, Urška. The 7 Rs sustainable packaging framework: systematic review of sustainable packaging solutions in the apparel and footwear industry. Sustainable production and consumption. March 2022, vol. 30, str. 331-340.

JESTRATIJEVIC, Iva, VRABIČ BRODNJAK, Urška. Sustainable and innovative packaging solutions in the fashion industry: global report. Sustainability. 2022, vol. 14, iss. 20, 14 str.

VRABIČ BRODNJAK, Urška, MOŽINA, Klemen. Invasive alien plant species for use in paper and packaging materials. *Fibers*. [Online ed.]. 31. oct. 2022, vol. 8, iss. 10, article 94, str. 1-13.

VRABIČ BRODNJAK, Urška. Oblikovanje ekološke embalaže in uporaba primernih materialov. V: VOLFAND, Jože (ur.), AMBROŽ, Goran. *Razvoj embalaže v krožnem gospodarstvu : priročnik*. Celje: Fit media, 2019. Str. 67-69.

VRABIČ BRODNJAK, Urška. Znanstvene ilustracije kot glavni elementi grafičnega izdelka = Scientific illustrations as the main elements of a graphic product. *Papir : revija Društva inženirjev in tehnikov papirništva*, ISSN 0350-6614. [Tiskana izd.], 2017

Projekt Mlekarna Planika 2022: FRANKEN, Gregor (avtor razstave, mentor), VRABIČ BRODNJAK, Urška (avtor razstave, mentor). *Redesign : Mlekarna Planika : razstava v okviru predmeta Oblikovanje embalaže*, sodelujejo študentje 3. letnikov Grafičnih in interaktivnih komunikacij ter Grafične in medijske tehnike, Naravoslovnotehniške fakultete, Univerze v Ljubljani, 16.5.2022.

Mentorica pri projektu razstave »Cankar ne jezi se«: KOROŠEC, Andreja (urednik, grafični oblikovalec, fotograf), PROTIČ, Eni (urednik, fotograf), PIŽMOHT, Sara (urednik, fotograf), ĐEREK, Valerija (urednik, fotograf). *Cankar ne jezi se = [Cankar ludo game] : Atrij ZRC, Ljubljana, 3.-17. 7. 2018*. Ljubljana:

Naravoslovnotehniška fakulteta, Oddelek za tekstilstvo, grafiko in oblikovanje, Katedra za informacijsko in grafično tehnologijo, 2018. 54 str., ilustr.

Projekt KRAS 2018: mentorica študentom pri predmetu Oblikovanje embalaže, pri projektu oblikovanja nove podobe in embalaže za blagovno znamko KRAS, v študijskem letu 2017/2018.

OBLIKOVANJE INFORMACIJ

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Oblikovanje informacij
Course title:	Information design
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Grafične in interaktivne komunikacije, prva stopnja, univerzitetni	Ni členitve (študijski program)	2. letnik	2. semester	izbirni

Univerzitetna koda predmeta/University course code:	0089457
Koda učne enote na članici/UL Member course code:	10036

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:	Primož Fijavž
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Vrsta predmeta/Course type:	Izbirni/Elective
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Jeziki/Languages:	Predavanja/Lectures: Angleščina, Slovenščina
	Vaje/Tutorial: Angleščina, Slovenščina

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

Pristop k predmetu:
vpis v letnik študija in izbira predmeta.
Pristop k izpitu:
K izpitu lahko pristopijo študenti/ke, ki imajo opravljen izpitni projekt, seminar in vaje ter izpolnjeno predpisano prisotnost pri vseh sklopih predmeta.
Prisotnost:
Pri predmetu se zahteva naslednja prisotnost: predavanja 80 %, seminar 80 %, vaje 90 %.

Prerequisites:

Course:
Student has applied in the year and elected the course.
Exam/Assesment:
Students who have completed the exam project, seminar and practical course and who have met the attendance requirements for all sections of the course can take the exam.
Presence:
Parts of the subject require the presence of: Lectures 80%, Seminar 80%, Practical Course 90%.

Vsebina:

Predavanja:
Teoretične definicije oblikovanja informacij, kaj predstavlja, kdo ga opravlja, zakaj je vedno bolj pomembno. Vpogled v raziskovanje in odkrivanje informacij. Oblikovalski komplet pomemben za ustrezno oblikovanje informacij. Študije različnih primerov (tisk, informacijska grafika, interaktivni primeri, okolje, eksperimentalne vsebine).

Content (Syllabus outline):

Lectures:
Theoretical definitions of information design, what it represents, who performs it, why it is important. Insights into information exploration and discovery. Design tool kit important for the proper information design. Studies of various examples (printing, information graphics, interactive examples, environment, experimental content).

Teme: Osnove likovnih in grafičnih gradnikov. Hierarhija podatkov in odnosi. Ustreznost postopkov za učinkovito prototipiranje in testiranje. Vizualno izrazoslovje. Orodja pomembna za oblikovanje informacij. Študije primerov. Seminar: Niz razvojno/raziskovalno naravnanih nalog na omenjene teme, oddane v obliki dnevnika oz. portfolia. Vaje: Uporaba programov za digitalno vektorsko in bitno grafiko.	Topics: The basics of visual and graphic elements. Data hierarchy and relationships. Appropriateness of procedures for effective prototyping and testing. Visual terminology. Tools important for information design. Case studies. Seminar: Set of research assignments on given topics, handed in as portfolio of work. Lab exercises: Use of applications for vector and bitmap digital graphics.
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Temeljna literatura in viri/Readings:

- BUTINA, M., 1995. *Slikarsko mišljenje: od vizualnega k likovnemu*. Ljubljana: Cankarjeva založba.
- COATES, K. & ELLISON, A., 2014. *An introduction to information design*. England: Laurence King Publishing.
- CROW, D., 2010. *Visible signs: an introduction to semiotics in the visual arts*. Lausanne: AVA Academia.
- FLETCHER, A., 2003. *The art of looking sideways*. London: Phaidon.
- HOLLIS, R., 1995. *Graphic Design: A Concise History*. New York: Thames & Hudson, Inc.
- JACOBSEN, R. 1999. *Information design*. Massachusetts: MIT Press.
- LUPTON, E., 1999. *Design writing research: writing on graphic design*. London: Phaidon.
- LUPTON, E., 2008. *Graphic design: the new basics*. New York: Princeton Architectural Press.
- MEIRELLES, I. 2013. *Design for Information*. Massachusetts: Rockport Publishers, Inc.
- MÜLLER-Brockmann, J., 2007. *Grid systems in graphic design*. Swiss: Niggli.
- TUFTE, E. R., 1997. *The visual display of quantitative information*. Cheshire (Connecticut): Graphics Press.

Cilji in kompetence:

Cilji:
Študent spozna izrazni in informacijskih potencial različnih elementov iz grafične palete in jih uporabi pri oblikovanju/realizaciji konkretnih nalog.

Predmetnospecifične kompetence:

- razumevanje in prevajanje vsebine v vizualno,
- poznavanje in razumevanje pomena posameznih grafičnih prijemov,
- razumevanje in uporaba teorij,
- uporaba elementov pri načrtovanju identitet,
- kontekstualizacija grafičnega jezika,
- razvoj kompozicijskih spretnosti,
- razvoj spretnosti pri uporabi ustreznih računalniških programov,
- sposobnost za reševanje konkretnih grafično-komunikacijskih problemov,
- sposobnost kritične presoje lastnih in stvaritev drugih.

Objectives and competences:

Goals:
Student knows artistic and informational potential for different elements from designer's palette. Uses them in his designs.

Course specific competences:

- understanding and translating the content into visual elements,
- understands meaning of different graphic approaches,
- understands and uses theories,
- develops visual identities,
- contextualizes visual language,
- develops composing skills,
- develops digital drawing skills,
- ability to solve specific communication design problems,
- ability to evaluate own and others' designs.

Predvideni študijski rezultati:

Znanje in razumevanje:
Razume specifično posameznih likovno/grafičnih prvin in jih smiselno sintetizira v razširjene kompozicije s konsistentno aplikacijo grafičnega/vizualnega jezika.

Intended learning outcomes:

Knowledge and understanding:
Understands specifics of graphic design basics and synthesizes them into larger compositions with consistent visual language application.

Use:

Uporaba: Zna uporabiti računalniške programe in opremo za realizacijo svojih stvaritev. Refleksija Razume teorijo in njeno uporabo v praktičnih primerih; kontekstualizira svojo stvaritev in jo kritično presoja. Prenosljive spretnosti Veščine in znanja uporabi pri ostalih grafično komunikacijskih predmetih, razume pomen konsistentnega vizualnega jezika ob posredovanju grafičnih informacij.	Uses computer programs for design execution. Reflexion: Understands theory and its usage in practical design activities; contextualizes and evaluates it. Applicable skills: Uses knowledge and skills at design related courses, understands the importance of consistent visual language in visual communication.
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Metode poučevanja in učenja:	Learning and teaching methods:
Predavanja, skupinsko seminarsko delo, računalniške vaje, individualne konzultacije. Sklopi predmeta se izvajajo v računalniških in drugih fakultetnih učilnicah in/ali preko spleta (online) s pomočjo primerne in ustrezne programske opreme, ki omogoča delo.	Lectures, moderated group discussion, seminar work, computer lab exercises, one to one tutorials. Course assemblies are conducted in computer and other faculty classrooms and/or online with the help of suitable and appropriate software that enables work.

Načini ocenjevanja:	Delež/Weight	Assessment:
Dokumentacija sprotne delo in aktivna skupna udeležba in sodelovanje pri predmetu (predavanja, seminar, vaje).	20,00 %	Documentation of work and active common participation and cooperation in the course (lectures, seminars, exercises).
Realizacija in oddaja izpitnega projekta.	50,00 %	Realised final project.
Vprašanja na zagovoru.	10,00 %	Exam questions.
Ustna predstavitev izpitnega projekta.	20,00 %	Final project oral presentation.

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:
Projekt FIJAVŽ, Primož, KENDA, Boštjan Botas; Regionalni center za ravnanje z odpadki – RCERO Ljubljana. Podoba arhitekture, označevalni sistem, celostna podoba. Snaga d. o. o., Ljubljana, 2017. Razstava KUČAN, Ana, JAVORNIK, Luka, BREZAR, Zaš, KENDA, Boštjan Botas, FIJAVŽ, Primož, RAUCH, Peter, KOŠTRUN, Peter, KALAN, Sašo, SOBOČAN, Urb; <i>Vsi odtenki zelene / All Shades of Green</i>. Slovenska predstavitev na 12. mednarodni razstavi arhitekture - Bienale v Benetkah, Muzej in galerije mesta Ljubljane, Galerija A+A, Benetke, 2010 Objavljena raziskava BERK, Ksenija, FIJAVŽ, Primož, KENDA, Boštjan Botas; Clear the Land of Mine. V <i>Out of Balance - Kritik der Gegenwart / Reader Information Design</i>, Edited by S. Kraft, P. Oswalt, J. Krausse, C. Weiss, U. Kleefisch-Jobst. Aachen: ARCH+ Verlag, 2013, 108–109. Objavljeni znanstveni prispevek na konferenci FIJAVŽ Primož; <i>Self-Reflection and Awareness</i>, Design × Nachhaltigkeit, DGTF Tagung, Kiel, Nemčija, 2022.

OSNOVE 3D ANIMACIJ IN SIMULACIJ

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Osnove 3D animacij in simulacij
Course title:	Basics of 3D animation and simulation
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Grafične in interaktivne komunikacije, prva stopnja, univerzitetni	Ni členitve (študijski program)	3. letnik	2. semester	izbirni

Univerzitetna koda predmeta/University course code:	0554373
Koda učne enote na članici/UL Member course code:	10251

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
15	15	30	0	0	60	4

Nosilec predmeta/Lecturer:	Helena Gabrijelčič Tomc
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Vrsta predmeta/Course type:	izbirni/elective
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Jeziki/Languages:	Predavanja/Lectures:	Slovenščina
	Vaje/Tutorial:	Slovenščina

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

Pristop k predmetu:
Vpis v študij letnika. Osnovno znanje uporabe računalnika. Pogoji za pristop k predmetu je izbran in vpisan predmet Osnove 3D modeliranja.

Pristop k izpitu:
K izpitu lahko pristopijo študenti/ke, ki imajo opravljen izpitni projekt, seminar in vaje ter izpolnjeno predpisano prisotnost pri vseh sklopih predmeta.

Prisotnost:
Pri predmetu se zahteva naslednja prisotnost: predavanja 80 %, seminar in druge oblike dela 90 %, vaje 100 %.

Prerequisites:

Course:
Enrolment in the study year. Basic knowledge of computer use. The prerequisite for joining the course is to select and enroll in the course Basics of 3D Modelling.

Exam/Assessment:
Students who have completed the exam project, seminar and practical course and who have met the attendance requirements for all sections of the course can take the exam.

Presence:
Parts of the subject require the presence of: Lectures 80%, seminar and other forms of work 90 %, Practical Course 100 %.

Vsebina:

- 3D računalniška animacija: razvoj, zgodovina, pregled
- Animacijski cevovod, produkcijske faze

Content (Syllabus outline):

- 3D computer animation: development, history, overview
- Animation pipeline, production stages

• Priprava in načrtovanje referenc za animiranje z uporabo risarsko ilustratorske opreme (digitalna tablica), oblikovanje gibanja • Osnovne animacijske tehnike • Ključne sličice in določanje ključnih stanj objektov in ključnih poz likov • Osnovne operacije sprememb (premik, rotacija, skaliranje) • Animiranje s preoblikovalci • Gibanje po poti, nadzor in omejitve gibanja • Morfiranje in 3D interpolacije oblik • Animiranje tekstur, luči in kamere • Osnovno animiranje likov (hierarhija, kontrole, kosti, koža) • Osnovno animiranje tehničnih objektov • Sistemi delcev, gruč in avtonomni agenti. • Simuliranje dinamičnih objektov (vlaknine, tekstil, trki, trda in elastična telesa). • Simuliranje tekočin, plinov in drugih naravnih pojavov. • Zajem iz slik, videa in 3D rekonstrukcija gibanja. • Hibridne tehnike in proceduralno animiranje • Pregled področij uporabe 3D animacij in simulacij, ki temeljijo na sodobnih pristopih digitizacije objektov in okolij, na človeka in planet usmerjene uporabe 3D digitalnih okolij z animiranimi elementi in elementi simulacij ter okoljih razširjenih resničnosti.	• Preparation and planning of references for animation using drawing and illustration equipment (digital tablet), motion design • Basic animation techniques • Key frames, defining key states of objects and key poses of characters, interpolation • Basic change operations (shift, rotation, scaling) • Animating with modifiers • Animation along the path, constraints and motion control • Morphing and 3D shape interpolation • Animating textures, lights and cameras • Basic character animation (hierarchy, controls, bones, skin) • Basic animation of technical objects • Particle systems, flocks and autonomous agents. • Dynamic objects simulations (collision, hair and fur, cloth, rigid and soft bodies). • Simulating liquids, gases, plants and other natural phenomena • Capture from images, video and 3D motion reconstruction. • Hybrid techniques and procedural animation • Overview of areas of application of 3D animations and simulations based on modern approaches of digitization of objects and environments, human and planet-oriented use of 3D digital environments with animated and simulation elements, and augmented reality environments.
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Temeljna literatura in viri/Readings:

1. GABRIJELČIČ TOMC, Helena, KOČEVAR, Tanja Nuša, ISKRA, Andrej. 3D animacije ustvarjanje od giba do simulacije. Ljubljana: Naravoslovnotehniška fakulteta, Oddelek za tekstilstvo, grafiko in oblikovanje, 2021.
2. ERZETIČ Blaž, GABRIJELČIČ Helena. 3D od točke do upodobitve, 2. izdaja, Pasadena, 2010.
3. CHOPINE, AMI. 3D art essentials : the fundamentals of 3D modeling, texturing, and animation, Amsterdam [etc.] : Elsevier : Focal Press, 2011.

Dodatna literatura:

1. [BEANE Andy](#), 3D Animation Essentials 1st Edition, Sybex, 2012.
2. RATNER Peter, 3-D human modeling and animation, 3rd ed. Wiley, 2010.
3. HUGHES, John et all. Computer Graphics: Principles and Practice. 3rd ed. Addison-Wesley Professional, 2013.

Cilji in kompetence:

Cilj je seznaniti študenta o pomenu 3D računalniške animacije v grafičnih in interaktivnih komunikacijah in avdio-vizualnih medijih.

Predmetno-specifične kompetence:

- Spoznavanje osnovnih tehnik in orodij 3D animacij.
- Kritična presoja določanja osnovnih pristopov 3D animiranja enostavnih in kompleksnejših objektov.
- Obvladovanje kompozicijskih pravil in kadriranja pri postavitvi scene in načrtovanju animacije.

Objectives and competences:

Aim of the course is understanding the importance of 3D computer animation in graphic and interactive communication, audio-visual media.

Subject-specific competences:

- Knowledge of basic 3D animation techniques and tools.
- Critical assessment of defining basic 3D animation approaches for simple and complex objects.
- Mastering compositional rules and framing in scene setting and animation planning.

- Razumevanje cevovoda animacij od načrtovanja do končnega izrisa ter poznavanje osnovnih postopkov optimizacije modelov, tekstur in drugih nastavitev za končno produkcijo. - Razumevanje sodobne merilne in predstavitvene opreme za produkcijo animacij in vizualizacijo končnih upodobitev. - Praktične spretnosti prenosa znanj po principih na človeka in planet usmerjenih pristopov 3D animiranja in simuliranja na uporabna področja vizualnih komunikacij v izobraževanju, naravoslovju, tehniki, naravni in kulturni dediščini, spletnih tehnologijah, računalniških igrah in razširjenih resničnosti.	- Understanding the animation pipeline from design to final rendering and knowledge of basic optimization processes for models, textures and other settings for final production. - Understanding of modern measurement and presentation equipment for animation production and visualization of final renderings. - Practical knowledge transfer skills based on the principles of human- and planet-oriented approaches of 3D animation and simulation to useful areas of visual communication in education, natural science, technology, natural and cultural heritage, online technologies, computer games and extended reality.
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Predvideni študijski rezultati:

Razumevanje teoretičnih in praktičnih osnov 3D animacij in simulacij, načrtovanja in produkcije ter vpeljave v delokrog izdelave avdio-vizualnih medijev. Sposobnost prenosa znanj produkcije 3D animacij in simulacij na interdisciplinarna področja. Razumevanje uporabne vrednosti 3D animacij in simulacij na področjih vizualnih komunikacij v izobraževanju, naravoslovju, tehniki, naravni in kulturni dediščini, spletnih tehnologijah, računalniških igrah in razširjenih resničnosti.

Intended learning outcomes:

Understanding of the theoretical and practical basics of 3D animations and simulations, planning and production and their introduction to the field of audio-visual media production. Ability to transfer knowledge of 3D animation production and simulations to interdisciplinary fields. Understanding the usability of 3D animations and simulations in the fields of visual communication in education, science, technology, natural and cultural heritage, web technologies, computer games and augmented reality.

Metode poučevanja in učenja:

Predavanja, seminar (samostojno projektno delo), računalniške vaje in vodeno individualno delo. Sklopi predmeta se izvajajo v računalniških in drugih fakultetnih učilnicah/predavalnicah in/ali preko spleta (online) s pomočjo primerne in ustrezne programske opreme, ki omogoča delo.

Learning and teaching methods:

Lectures, seminar (individual project work), computer exercises and guided individual work. Course assemblies are conducted in computer and other faculty classrooms/lecture rooms and/or online with the help of suitable and appropriate software that enables work.

Načini ocenjevanja:

Delež/Weight

Assessment:

Izpit teoretskih znanj in postopkov dela in ocena projektnega dela. Pogoji za pristop k zagovoru projektnega dela so opravljene računalniške vaje in pozitivno ocenjeno teoretično	70,00 %	Exam of theoretical knowledge and work procedures and evaluation of project work Prerequisites to the final presentation of project are completed computer tutorials and positive grade of theoretical knowledge of work procedure.
Ocena iz računalniških vaj	30,00 %	Completed computer tutorials
Ocena od 6 - 10 je pozitivna		Rating: positive – marks 6-10

Ocenjevalna lestvica:

5 - 10, pri čemer velja, da je pozitivna ocena od 6 - 10

Grading system:

5 - 10, a student passes the exam if he is graded from 6 to 10

Reference nosilca/Lecturer's references:

- GABRIJELČIČ TOMC, Helena, KOČEVAR, Tanja Nuša, ISKRA, Andrej. 3D animacije - ustvarjanje od giba do simulacije. 1. natis. Ljubljana – Oddelek za tekstilstvo, grafiko in oblikovanje. ISBN 978-961-6900-28-7

- UČAKAR, Andrej, STERLE, Ana, VUGA, Martina, TRČEK PEČAK, Tamara, TRČEK, Denis, AHTIK, Jure, KOŠAK, Karin, MUCK, Deja, GABRIJELČIČ TOMC, Helena, KOČEVAR, Tanja Nuša. 3D digital preservation, presentation, and interpretation of wooden cultural heritage on the example of sculptures of the FormaViva Kostanjevica na Krki collection. *Applied sciences*. 2022, vol. 12, iss. 17, str. 1-17
- KNIFIC KOŠIR, Aja, GABRIJELČIČ TOMC, Helena. Visual effects and their importance in the field of visual media creation. *JGED : Journal of Graphic Engineering and Design*. 2022, vol. 13, no. 2, str. 5-13
- REBERŠEK-GAVRIČ, Žan, AHTIK, Jure, GABRIJELČIČ TOMC, Helena. The influence of 3D visualizations on attractiveness perspicuity and stimulation using the website interface of a marketing agency as an example. V: BOLANČA MIRKOVIĆ, Ivana (ur.). *Zbornik radova = Proceedings*. 27. međunarodna konferencija tiskarstva, dizajna i grafičkih komunikacija Blaž Baromić 2023, Zagreb, Hrvatska, 28. - 29. rujna 2023. Zagreb: Sveučilište u Zagrebu, Grafički Fakultet: = University of Zagreb, Faculty of Graphic Arts, 2023. Str. 145-155
- SMAREGLIA, Celeste Sanja, SULIČ, Jure, STANKOVIĆ ELESINI, Urška, HRKAČ, Tanja, GABRIJELČIČ TOMC, Helena. 3D animacija in AR aplikacija kot didaktično orodje za razumevanje delovanja kože pri predmetu biologije = 3D animation and AR application as a didactic tool for understanding the function of the skin in the subject of biology. V: OREL, Mojca (ur.), BRALA-MUDROVČIĆ, Jasminka (ur.), MILETIĆ, Josip (ur.). *EDUvision 2023 : 13th international conference : "New Contemporary Challenges - Opportunities for Integrating Innovative Solutions into 21st Century Education" : 22-24 November 2023 : [the book of papers]*. Electronic ed. Polhov Gradec: EDUvision, 2023. Str. 1274-1291

OSNOVE 3D MODELIRANJA

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Osnove 3D modeliranja
Course title:	Basics of 3D modelling
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Grafične in interaktivne komunikacije, prva stopnja, univerzitetni	Ni členitve (študijski program)	2. letnik	2. semester	izbirni

Univerzitetna koda predmeta/University course code:	0089469
Koda učne enote na članici/UL Member course code:	10241

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:	Helena Gabrijelčič Tomc
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Vrsta predmeta/Course type:	Izbirni/Elective
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Jeziki/Languages:	Predavanja/Lectures: Angleščina, Slovenščina
	Vaje/Tutorial: Angleščina, Slovenščina

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

Pristop k predmetu:
Vpis v študij letnika. Osnovno znanje uporabe računalnika.
Pristop k izpitu:
K izpitu lahko pristopijo študenti/ke, ki imajo opravljen izpitni projekt, seminar in vaje ter izpolnjeno predpisano prisotnost pri vseh sklopih predmeta.
Prisotnost:
Pri predmetu se zahteva naslednja prisotnost: predavanja 80 %, seminar in druge oblike dela 90 %, vaje 100 %.

Prerequisites:

Course:
Enrolment in the study year. Basic knowledge of computer use.
Exam/Assessment:
Students who have completed the exam project, seminar and practical course and who have met the attendance requirements for all sections of the course can take the exam.
Presence:
Parts of the subject require the presence of: Lectures 80%, seminar and other forms of work 90 %, Practical Course 100 %.

Vsebina:

- 3D računalniška grafika: razvoj, zgodovina, pomen.
- Geometrično ozadje 3D računalniške grafike.
- Priprava in načrtovanje referenc za modeliranje z uporabo risarsko ilustratorske opreme (digitalna tablica)
- Enostavni in kompleksnejši postopki 3D modeliranja (osnovne transformacije, modeliranje s

Content (Syllabus outline):

- 3D computer graphic: development, history, trends.
- Geometrical background of 3D computer graphic.
- Preparation and planning of references for modelling using drawing and illustration equipment (digital tablet)
- Fundamentals of 3d modelling (basic transformations, primitives modelling, polygonal

primitivi, poligonsko modeliranje, modeliranje k krivuljami in NURBS-i, preoblikovalci). •Pomen topologije za produkcijo. •Subdivizija. •Digitalno kiparjenje. •3D modeliranje iz slik in videa in retopologija. • Proceduralni in algoritemski pristopi modeliranja. •Postavitev na sceno: objekt, luči, kamera. •Teksture in materiali. •Mape in teksturiranje (projekcijsko in enostavno UV mapiranje). •Teoretične osnove simulacije svetlobnih interakcij v 3D prostoru. •Luči in generiranje senc v 3D prostoru. •Teoretično ozadje 3D osvetljevanja. •Virtualna kamera in pomen kompozicije. •Tehnike in algoritmi osnovnih in naprednih upodobljevalnikov. • Pregled uporabnih področij 3D modeliranja, teksturiranja, osvetljevanja in upodabljanja z namenom na človeka in planet usmerjene uporabe računalniške grafike (računalniške vizualizacije, animacije, računalniške igre, razširjene resničnosti s poudarkom na navidezni resničnosti)	modelling, modelling with NURBS, modifiers and deformers) •Topology and production. •Subdivision surface modelling. •Digital sculpturing. •3D modelling from images and video and retopology. • Procedural and algorithmic modelling approaches. •Scene setting: object, lighting, camera. •Textures and materials. •Maps and texturing (projection and simple UV mapping). •Theoretical basis of light interactions in 3D space. •Light and shadow generation in 3D space. •Theoretical background of 3D lightning. •Virtual camera and the composition. •Techniques and algorithms of simple and advanced rendering engines. • Overview of areas of application of 3D modelling, texturing, lighting and rendering with the aim of human and planet-oriented use of computer graphics (computer visualization, animation, computer games, augmented reality with an emphasis on virtual reality)
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Temeljna literatura in viri/Readings:

- ERZETIČ Blaž, GABRIJELČIČ Helena. 3D od točke do upodobitve, 2. izdaja, Pasadena, 2010.
- GABRIJELČIČ TOMC, Helena, KOČEVAR, Tanja Nuša, ISKRA, Andrej. 3D animacije ustvarjanje od giba do simulacije. Ljubljana: Naravoslovnotehniška fakulteta, Oddelek za tekstilstvo, grafiko in oblikovanje, 2021.
- CHOPINE, AMI. 3D art essentials : the fundamentals of 3D modeling, texturing, and animation, Amsterdam [etc.] : Elsevier : Focal Press, 2011.

Dodatna literatura:

- VAUGHAN. William. Digital Modeling. 1st ed. New Riders, Pearson Education, 2012.
- BIRN Jeremy. Digital Lighting & Rendering, 3rd ed. New Riders, 2013.
- HUGHES, John et all. Computer Graphics: Principles and Practice. 3rd ed. Addison-Wesley Professional, 2013

Cilji in kompetence:

Cilj je seznaniti študenta o pomenu 3D računalniške grafike v grafičnih in interaktivnih komunikacijah in avdio-vizualnih medijih.

Predmetno-specifične kompetence:

- Spoznavanje osnovnih in naprednih tehnik in orodij 3D modeliranja s poudarkom na topologiji.
- Kritična presoja določanja osnovnih in kompleksnih tekstur in materialov s zahtevnimi postopki mapiranja.
- Obvladovanje kompozicijskih pravil pri postavitvi scene ter kompleksnih postopkov 3D osvetljevanja s poudarkom na razumevanju simulacij svetlobnih interakcij s 3D materialom.
- Razumevanje metod in delovanja algoritmov za enostavno in napredno upodabljanje.
- Praktične spretnosti prenosa znanj po principih na človeka in planet usmerjenih pristopov 3D modeliranja, teksturiranja, osvetljevanja in

Objectives and competences:

Aim of the course is understanding the importance of 3D computer graphic in graphic and interactive communication, audio-visual media.

Subject-specific competences:

- Knowledge of basic and advanced 3d modelling techniques and tools with the emphasis on topology.
- Critical evaluation and design of simple and advanced textures and materials with advanced mapping procedures.
- Management of compositional rules in scene setting and complex procedures of 3D illumination with the emphasis on understanding the interactions between light and 3D material.
- Understanding rendering methods and working of rendering algorithms for simple and advanced rendering.
- Practical skills of transferring knowledge according to the principles of human and planet-oriented

upodabljanja na uporabna področja vizualizacij, animacij, računalniških iger in razširjenih resničnosti.	approaches of 3D modelling, texturing, lighting and rendering to the useful fields of visualizations, animations, computer games and extended reality.
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Predvideni študijski rezultati:	Intended learning outcomes:
Razumevanje teoretičnih osnov in obvladovanje prenosa v prakso osnovnih in zahtevnejših tehnik 3D modeliranja (s poudarkom na topologiji), osvetljevalnih sistemov, teksturiranja, postavitve scene, upodabljanja. Sposobnost uporabe znanj 3D računalniške grafike, s poudarkom na modeliranju in statičnih vizualizacijah na interdisciplinarnih področjih. Razumevanje uporabne vrednosti 3D računalniške grafike na področjih zajema topologije objektov, vizualizacij, animacij, iger in razširjenih resničnosti.	Understanding of theoretical basis and practical use of 3D simple and advanced modelling, textures, mapping, virtual illumination, scene setting and rendering. Ability to apply 3D computer graphics skills, with an emphasis on modelling and static visualizations in interdisciplinary areas. Understanding the usability of 3D computer graphics in the fields of acquisition of the objects' topology, visualizations, animations, games, and extended reality.

Metode poučevanja in učenja:	Learning and teaching methods:
Predavanja, seminar (samostojno projektno delo), računalniške vaje in vodeno individualno delo. Sklopi predmeta se izvajajo v računalniških in drugih fakultetnih učilnicah/predavalnicah in/ali preko spleta (online) s pomočjo primerne in ustrezne programske opreme, ki omogoča delo.	Lectures, seminar (individual project work), computer exercises and guided individual work. Course assemblies are conducted in computer and other faculty classrooms/lecture rooms and/or online with the help of suitable and appropriate software that enables work.

Načini ocenjevanja:	Delež/Weight	Assessment:
Izpit teoretskih znanj in postopkov dela in ocena projektnega dela. Pogoji za pristop k zagovoru projektnega dela so opravljene računalniške vaje in pozitivno ocenjeno teoretično znanje postopkov dela.	70,00 %	Exam of theoretical knowledge and work procedures and evaluation of project work Prerequisites to the final presentation of project are completed computer tutorials and positive grade of theoretical knowledge of work procedure.
Ocena iz računalniških vaj	30,00 %	Completed computer tutorials
Ocena od 6 - 10 je pozitivna		Rating: positive – marks 6-10

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:
• ERZETIČ, Blaž, GABRIJELČIČ, Helena. 3D od točke do upodobitve. 1. natis. Ljubljana: Pasadena, 2009. 201 str., ilustr. ISBN 978-961-6361-99-6. • GABRIJELČIČ TOMC, Helena, KOČEVAR, Tanja Nuša, ISKRA, Andrej. 3D animacije ustvarjanje od giba do simulacije. Ljubljana: Naravoslovnotehniška fakulteta, Oddelek za tekstilstvo, grafiko in oblikovanje, 2021. 211 str., ilustr. ISBN 978-961-6900-28-7. • SMAREGLIA, Celeste Sanja, SULIČ, Jure, STANKOVIĆ ELESINI, Urška, HRKAČ, Tanja, GABRIJELČIČ TOMC, Helena. 3D animacija in AR aplikacija kot didaktično orodje za razumevanje delovanja kože pri predmetu biologije = 3D animation and AR application as a didactic tool for understanding the function of the skin in the subject of biology. V: OREL, Mojca (ur.), BRALA-MUDROVČIČ, Jasminka (ur.), MILETIĆ, Josip (ur.). EDUvision 2023 : 13th international conference : "New Contemporary Challenges - Opportunities for Integrating Innovative Solutions into 21st Century Education" : 22-24 November 2023 : [the book of papers]. Electronic ed. Polhov Gradec: EDUvision, 2023. Str. 1274-1291 • GABRIJELČIČ TOMC, Helena, CULJKAR, Petra, ZUPIN, Živa, MOŽINA, Klementina. Legibility of 3D printed typography at smaller sizes. Ergonomics. [Print ed.]. 2023, vol. 66, no. 12, str. 2091–2105 • REBERŠEK-GAVRIČ, Žan, AHTIK, Jure, GABRIJELČIČ TOMC, Helena. The influence of 3D

visualizations on attractiveness perspicuity and stimulation using the website interface of a marketing agency as an example. V: BOLANČA MIRKOVIĆ, Ivana (ur.). Zbornik radova = Proceedings. 27. međunarodna konferencija tiskarstva, dizajna i grafičkih komunikacija Blaž Baromić 2023, Zagreb, Hrvatska, 28. - 29. rujna 2023. Zagreb: Sveučilište u Zagrebu, Grafički Fakultet: = University of Zagreb, Faculty of Graphic Arts, 2023. Str. 145-155

OSNOVE LIKOVNEGA IZRAŽANJA

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Osnove likovnega izražanja
Course title:	Basics of artistic expression
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Grafične in interaktivne komunikacije, prva stopnja, univerzitetni	Ni členitve (študijski program)	2. letnik	1. semester	obvezni

Univerzitetna koda predmeta/University course code:	0089486
Koda učne enote na članici/UL Member course code:	11282

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:	Marica Starešinič
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Vrsta predmeta/Course type:	Obvezni /Compulsory
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Jeziki/Languages:	Predavanja/Lectures: Angleščina, Slovenščina
	Vaje/Tutorial: Angleščina, Slovenščina

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

Vsebina:

Umetnost, oblikovanje in vizualne zaznave in Likovni jezik, semiologija, sintaksa Zakonitosti gestalta.
Razlikovanje figure in ozadja, vloga kontrasta in asimilacije zakoni organizacije vidnega polja.
Svetlo-temno, valeur in sence. Kontrasti.
Barva. Barvno zaznavanje. Barva fizikalno.
Barvni modeli. Barvni kontrasti Estetika barve
Morfološke likovne prvine. Točka, linija, oblika, 2D, 3D, prostor
Prostor, čutne in psihične prvine prostora.
Iluzija prostora prostorski ključ.
Likovna sintaksa.
Elementi kompozicije in variable, velikost, teža, položaj, smer, število, gostota, tekstura.
Likovna materializacija v različnih risarskih medijih

Seminar:

Content (Syllabus outline):

Art, design and visual perception.
Art language, semiology, sintaxis
The gestalt legality.
Differentiating figures and background, the role of contrast and assimilation organization
Light-dark valeur and shadow. Contrasts
Color. Colour perception. Colour physical
Colour models. Color contrasts
Aesthetics of color
Morphological art elements. Point, line, shape, 2D, 3D, space.
Space, sensory and psychological space, an Illusion of depth, spatial keys.
Art syntax.
The elements of composition and variables, size, weight, position, direction, number, density, texture.
Art materialization in various drawing media

Grafično oblikovanje in vizualne komunikacije Strategije oblikovanja z uporabo vizualnih, likovnih in tipografskih elementov Študent se seznani s postopki vizualizacije ideje v grafičnih medijih Simbolna identiteta blagovne znamke	seminar: Graphic design and visual communication Design strategies using visual, artistic and typographic elements Students are acquainted with the procedures of visualization ideas in graphic media Symbolic brand identity
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Temeljna literatura in viri/Readings:

- BUTINA, M. Elementi likovne prakse. Ljubljana : Mladinska knjiga, 1982.
 - BUTINA, M. Mala likovna teorija. Ljubljana : Debora, 2000.
 - ITTEN, J. Design and Form. London : Thames and Hudson, 1975.
 - ITTEN, Johannes, Umetnost barve
 - KLEIN, Naomi, Designing New Brand Identity
 - Šuštaršič, N., Butina, M., De Gleria, B., Skubin, I., & Zornik, K. Likovna teorija: učbenik za likovno teorijo v vzgojno-izobraževalnem programu umetniška gimnazija - likovna smer : Debora, 2007.
- Dodatna literatura
- KUEPPERS, H. Harmonielehre der Farben. Köln : DuMont, 1989

Cilji in kompetence:

Sposobnost razvijanja vizualne senzibilnosti,
 Sposobnost selekcioniranja vidnega v povezavi s cilji,
 Sposobnost likovnega produktivnega mišljenja,
 Sposobnost posploševanja in abstrahiranja,
 Sposobnost mimetičnega organiziranja slikovnega polja,
 Sposobnost vizualiziranja in ustvarjanja
 iluzije tretje dimenzije na dvodimenzionalni ploskvi,
 Sposobnost uporabe barve
 Sposobnost uporabe risarskih in slikarskih tehnik in postopkov,
 Obvladovanje osnove perspektive in aksonometrije
 Sposobnost gradnje kompozicije

Objectives and competences:

The course presents students with knowledge on the links and interdependencies basic artistic elements and procedures. Students get acquainted with the basics of visual language, techniques of artistic expression and understanding of visual communication and graphic design

Ability to develop visual sensibility,
 The ability to filter visible in relation to the objectives,
 The ability of artistic productive thinking,
 The ability of generalization and abstraction,
 The ability to organize the mimetic image field,
 The ability to visualize and create
 The illusion of a third dimension to the two-dimensional surface,
 The ability to use color
 The ability to use drawing and painting techniques and procedures,
 The basics of perspective and axonometry
 The ability of composition building

Predvideni študijski rezultati:

Znanje in razumevanje:
 Predmet predstavi študentu znanja o povezavah in soodvisnostih temeljnih likovnih prvin in postopkov.
 Študent se seznani z osnovami likovnega jezika, tehnikami likovnega izražanja in razumevanja vizualnih komunikacij in grafičnega oblikovanja

Intended learning outcomes:

Knowledge and understanding:
 The course presents students with knowledge on the links and interdependencies basic artistic elements and procedures. Students get acquainted with the basics of visual language, techniques of artistic expression and understanding of visual communication and graphic design

Metode poučevanja in učenja:

Predavanja, seminarji, raziskovalni seminarji, projektno delo.

Learning and teaching methods:

Lectures, seminars, research seminars, project work.

Načini ocenjevanja:	Delež/Weight	Assessment:
Pisni izpit	70,00 %	Written examination
Projekt	30,00 %	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:

1. GODLER, Marjeta, STAREŠINIČ, Marica. *Space illusions dance : [razstava] : Galéria Umelka, Slovak Union of Visual Arts, 5th - 24th August, 2014, Bratislava, Slovakia.* 2014. [COBISS.SI-ID [3049072](#)]
2. GODLER, Marjeta, STAREŠINIČ, Marica. *Vesolje - veselje v nas : [samostojna razstava] : 33. festival idrijske čipke, 20. - 22. junij 2014, Idrija = "Space - the joy in us" exhibition : 33. idrija lace festival, 20. - 22. June 2014.* 2014. [COBISS.SI-ID [3023728](#)]
3. AHTIK, Jure (avtor razstave, mentor), KOČEVAR, Tanja Nuša (avtor razstave, mentor), STAREŠINIČ, Marica (avtor razstave, mentor). *Muvit/6x60 in NTF : razstava študentov 2. letnika, Naravoslovnotehniške fakultete, Univerze v Ljubljani : Maraton filmskega ustvarjanja Muvit/6x60, Celje, 16. - 19. avgust 2017.* 2017. [COBISS.SI-ID [3396976](#)]
4. STAREŠINIČ, Marica, SIMONČIČ, Barbara, BRAČKO, Sabina. Using a digital camera to identify colors in urban environments. *Journal of imaging science and technology*, ISSN 1062-3701, 2011, vol. 55, no. 6, str. 060201/1-060201/4, ilustr., doi: [10.2352/J.ImagingSci.Technol.2011.55.6.060201](#). [COBISS.SI-ID [2684272](#)]
5. AHTIK, Jure, STAREŠINIČ, Marica. Eye movement analysis of image quality parameters compared to subjective image quality assessment = Analiza pokreta očiju u određivanju parametara kvalitete slike u usporedbi sa subjektivnom procjenom kvalitete slike. *Tehnički vjesnik : znanstveno-stručni časopis tehničkih fakulteta Sveučilišta u Osijeku*, ISSN 1330-3651, 2017, vol. 24, no. 6, str. 1833-1839. http://hrcak.srce.hr/index.php?show=clanak&id_clanak_jezik=280290. [COBISS.SI-ID [3452784](#)]
6. JAVORŠEK, Dejana, MOČNIK, Janja, STAREŠINIČ, Marica. Analyses of colour appearances on different display devices = Analiza interpretacije barv na različnih prikazovalnih napravah. *Tekstilci : glasilo slovenskih tekstilcev*, ISSN 0351-3386. [Tiskana izd.], 2015, letn. 58, št. 2, str. 100-107, ilustr. [COBISS.SI-ID [3139440](#)]

PODJETNIŠTVO

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Podjetništvo
Course title:	Entrepreneurship
Članica nosilka/UL	UL NTF
Member:	

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Grafične in interaktivne komunikacije, prva stopnja, univerzitetni	Ni členitve (študijski program)	3. letnik	2. semester	izbirni
Oblikovanje tekstilij in oblačil, prva stopnja, univerzitetni	Ni členitve (študijski program)	2. letnik, 3. letnik	2. semester	izbirni

Univerzitetna koda predmeta/University course code:	0068758
Koda učne enote na članici/UL Member course code:	10246

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:	BLAŽ ZUPAN
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Vrsta predmeta/Course type:	Izbirni /Elective
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Jeziki/Languages:	Predavanja/Lectures:	Slovenščina
	Vaje/Tutorial:	Slovenščina

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

Študent oz. kandidat mora imeti predmet opredeljen kot študijsko obveznost.

Pogoj za pristop k pisnemu in/ali ustnemu izpitu predmeta so 70 % prisotnost pri predavanjih, 100 % prisotnost pri vajah in 90 % prisotnost pri seminarjih in drugih oblikah dela. K pisnemu in/ali ustnemu izpitu predmeta lahko pristopijo študentje šele ko imajo pozitivno ocenjene vaje in seminar in izpolnjeno predpisano prisotnost pri vseh sklopih predmeta.

Prerequisites:

The course must be assigned to the student.

The condition for taking the written and/or oral exam of the course is 70% attendance at lectures, 100% attendance at exercises and 90% attendance at seminars and other forms of work. Students can take the written and/or oral exam of the course only after they have received a positive assessment of the exercises and the seminar and have met the required attendance for all sections of the course.

Vsebina:

Študenti bodo v okviru predmeta spoznali: Pomen podjetništva v gospodarstvu in temeljne pojme podjetništva; Prepoznavanje poslovnih priložnosti; Pet korakov razvoja novih izdelkov in storitev – opazovanje, brainstorming, hitro prototipiranje, izboljšanje prototipov in implementacija rešitve; Dizajnerski način razmišljanja – tehnični, poslovni,

Content (Syllabus outline):

Students will learn: - entrepreneurship and its role in socio-economic development; - recognition of business opportunities; - five steps of the product/service development process: observation, brainstorming, rapid prototyping, testing and refinement and implementation; - design thinking: desirability, feasibility and viability of new solutions; -

človeški vidik; Praktična aplikacija metode razvoja novih izdelkov in dizajnerskega procesa; Osnove računovodstva in financiranja; Poslovno načrtovanje, pomen in vsebino marketinške/prodajne funkcije v podjetju - metode raziskovanja trga, porabnikov, konkurence - poslovno komunikacijo.	practical application of new product development methodologies and design thinking; - basics of accounting and financing; - business planning, governmental policies to promote entrepreneurship; - importance and definition of the marketing/ sales at a company; - market, customer and competition research methods; - business communication.
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Temeljna literatura in viri/Readings:

- Maurya, Ash (2014): Delaj vitko – Od načrta A do načrta, ki deluje. Pasadena. Dostopno na: <https://www.leanslovenia.com/delajvitko>
 - Antončič in ostali (2022): Podjetništvo – glavi dejavnik razvoja. Dostopno na: <http://maksi2.ef.uni-lj.si/zaloznistvoslike/499/Podjetni%C5%A1tvo.pdf>
- Dodatna literatura in viri (Additional course materials):
aktualna gradiva, objavljena na spletni strani predmeta./Additional current materials are published on the course website.

Cilji in kompetence:

Cilj predmeta je študentom razviti sposobnost timskega dela, prevzemanja odgovornosti in samoiniciativnega delovanja pri reševanju človeških, tehničnih in ekonomskih problemov povezanih z razvojem novih produktov in storitev. Študentje z uporabo dizajnerskega pristopa in hitrega prototipiranja izdelajo delujoč prototip rešitve podj. problema;

Študentje si pri predmetu pridobijo naslednje specifične kompetence:
Prepoznati in oceniti priložnosti; uravnavati tveganje; učinkovito komunicirati; vztrajati; ustvarjalno rešiti problem; učinkovito rabiti vire; delovati gverilsko; ustvarjati vrednost; ohranjati fokus; prilagajati se; biti samoučinkovit; se mrežiti; sprejemati odločitve; sklepati posle in se pogajati.

Objectives and competences:

The objective of the course is to develop skills such as teamwork, responsibility, self-initiative, and the ability to solve any societal, technical or business problem associated with the development of new products and services. Student will use design thinking and rapid prototyping to produce a working prototype as a solution to a given entrepreneurial problem.

Student acquires the following specific competencies: Opportunity recognition and assessment; risk management; effective communication; perseverance; innovative thinking, creative problem solving; efficient use of resources; guerrilla skills; creating value; maintaining focus; resilience; self-efficacy; networking; decision making; deal making and negotiation.

Predvideni študijski rezultati:

Znanje in razumevanje:
Študent bo spoznal in razumel:
Pojme s področja podjetništva in gospodarstva, organizacije dela, vodenja projektov, marketinga; Osnovne zakonitosti kreativnega razvoja novih izdelkov in storitev ter podjetniške dejavnosti s poudarkom na primerih iz prakse kakor tudi iz študentovih življenjskih potreb ter izkušenj; Skozi dizajnerski način razmišljanja in s pomočjo d.school metodologije študent reši konkreten poslovni ali življenjski problem in osvoji znanje, ki ga lahko replicira v profesionalnem in osebnem življenju;
Pepoznavanje podjetniških priložnosti, analiza podatkov in informacij za sprejemanje poslovnih odločitev, izdelava prototipov, antropološke in etnografske metode spremljanja potrošnikov, izpeljava rešitve problema. Dokumentacija procesa z

Intended learning outcomes:

Knowledge and comprehension
Student will recognise and understand:
- concepts in the field of entrepreneurship and the economy as a whole, management, project management, marketing; and
- the basic principles of the creative development of new products and services, and entrepreneurial activities, with an emphasis on cases from practical experience, and from the student's needs and life experiences.
Through a design thinking methodology, student solves a specific business or social problem, and acquires knowledge that can be replicated in their professional and personal life.
Identification of business opportunities, analysis of data and information for business decision-making, prototyping, anthropological and ethnographic methods of customer analysis, and the implementation of a solution to a specific problem.

multimedijskimi metodami, samostojna priprava finančnih in poslovnih analiz	Documentation of the process using multimedia and the independent preparation of financial and business analyses (marketing, sales, etc.).
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Metode poučevanja in učenja:	Learning and teaching methods:
Predavanja s pomočjo različnih AV sredstev; Delo na konkretnem projektu, aktualnem problemu; Predstavitve sprotne dela, poročila in komentarji s strani mentorjev in študentov; Uporaba multimedijske tehnologije za spremljanje napredka, Internet, video; Aktivno mentorstvo s strani pedagogov, asistentov, praktikov - podjetnikov; Terensko delo – analiza trga, testiranje prototipov, uporaba rešitve problema, praktične vaje d.school metodologije. Vaje se izvajajo v učilnici ali preko spleta s pomočjo ustrezne programske opreme (ZOOM; Teams, ipd).	Lectures using audio-visual technology. Work on a specific project in the form of a real business or social problem. Ongoing work will be presented regularly, with feedback given by mentors and students. The use of multimedia (Internet, video, etc.) to monitor progress. Active mentoring will be provided by teachers, assistants, practitioners-entrepreneurs. Fieldwork: market analysis, prototype testing, application of a solution to a problem, and practical exercises using the design thinking methodology. Tutorials are conducted in classroom or via ZOOM, Teams, etc.

Načini ocenjevanja:	Delež/Weight	Assessment:
Projektna naloga in vmesna poročila, končna predstavitev	60,00 %	Project work, interim reports and final presentation
Domače naloge, sodelovanje	20,00 %	Homework and active participation
Izpit pisni in/ali ustni	20,00 %	Written and/or oral examination

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. DEBARILEV, Stojan, JANESKA-ILIEV, Aleksandra, STRIPEIKIS, Osvaldas, ZUPAN, Blaž. What can education bring to entrepreneurship? : formal versus non-formal education. Journal of small business management. 2022, vol. 60, iss. 1, str. 219-252. 2. PUSTOVRH, Aleš, JAKLIČ, Marko, BOLE, Domen, ZUPAN, Blaž. How to create a successful regional startup ecosystem : a policy-making analysis. Lex localis : revija za lokalno samoupravo. [Tiskana izd.]. Jul. 2019, vol. 17, iss. 3, str. 749-770, ilustr. 3. ZUPAN, Blaž, CANKAR, Franc, SETNIKAR-CANKAR, Stanka. The development of an entrepreneurial mindset in primary education. European journal of education. [Print ed.]. Sep. 2018, vol. 53, iss. 3, str. 427-439. 4. ZUPAN, Blaž, STRITAR, Rok, SLAVEC GOMEZEL, Alenka. Unlocking latent creativity with rapid prototyping = Spodbujanje latentne ustvarjalnosti s hitrim prototipiranjem. Traditiones : zbornik Inštituta za slovensko narodopisje, ISSN 0352-0447, 2017, vol. 46, no. 1/2, str. 183-187, doi: 10.3986/Traditio2017460204. 5. LIKAR, Borut, CANKAR, Franc, ZUPAN, Blaž. Educational model for promoting creativity and innovation in primary schools. Systems research and behavioral science : the official journal of the International Federation for Systems Research, ISSN 1092-7026, Mar./Apr. 2015, vol. 32, iss. 2, str. 205-213, doi: 10.1002/sres.2261. 6. ZUPAN, Blaž, SVETINA NABERGOJ, Anja. Razvoj podjetniških kompetenc s pomočjo dizajnerskega pristopa. Economic and business review, ISSN 1580-0466. [Tiskana izd.], 2014, vol. 16, posebna št., str. 49-74, ilustr. 7. CANKAR, Franc, DEUTSCH, Tomi, ZUPAN, Blaž, SETNIKAR-CANKAR, Stanka. Schools and promotion of innovation = Škole i promicanje inovacije. Hrvatski časopis za odgoj i obrazovanje : [CJE], ISSN 1848-5189. [Tiskana izd.], 2013, vol. 15, sp. ed. no. 2, str. 179-211. [COBISS.SI-ID 4164782],

8. VADNJAL, Jaka, ZUPAN, Blaž. Family business as a career opportunity for women. South East European journal of economics and business, ISSN 1840-118X, Nov. 2011, vol. 6, no. 2, str. 27-36, tabele. [COBISS.SI-ID 513010818],
9. VADNJAL, Jaka, ZUPAN, Blaž. The role of women in family businesses. Economic and business review, ISSN 1580-0466. [Tiskana izd.], June 2009, vol. 11, no. 2, str. 159-177, tabele. [COBISS.SI-ID 18637798]

POSLOVNE INFORMACIJSKE APLIKACIJE

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Poslovne informacijske aplikacije
Course title:	Business information applications
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Grafične in interaktivne komunikacije, prva stopnja, univerzitetni	Ni členitve (študijski program)	3. letnik	2. semester	izbirni

Univerzitetna koda predmeta/University course code:	0099373
Koda učne enote na članici/UL Member course code:	10920

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

Nosilec predmeta/Lecturer:	Raša Urbas, Urška Stanković Elesini
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Vrsta predmeta/Course type:	Izbirni/Elective
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Jeziki/Languages:	Predavanja/Lectures:	Angleščina, Slovenščina
	Vaje/Tutorial:	Angleščina, Slovenščina

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

Pogoj za vključitev v delo je vpis v letnik študija in izbira predmeta ter aktivna udeležba na vseh segmentih predmeta.
Izdelana seminarska naloga z zagovorom je pogoj za pristop h končnemu pisnemu izpitu.
Pogojena prisotnost pri posameznih učnih enotah:

- predavanja: 70 % in
- seminar: 80 %.

Prerequisites:

The prerequisite for inclusion present enrollment in the study year and selection of the subject as well as active participation in all segments of the course.
Finished seminar work and presentation is a condition for the final written exam.
Conditional attendance for individual course units:
- lectures: 70% and
- seminar: 80%.

Vsebina:

Študentje se seznani z informatizacijo, informacijsko kulturo ter nujnost preobrazbe podjetja v skladu z informatizacijskimi trendi, kar povečuje in zagotavlja konkurenčno prednost podjetja. Študentje se seznani tudi z računalniško podprtimi sistemi v grafičnem podjetju; spozna pretok informacij, ki so pogoj za uspešno delovanje celotnega informacijskega sistema (IS).

Del predavanj je namenjen tudi uvajanju in nadzorovanju uvajanja IS ter vključuje:

Content (Syllabus outline):

Students are acquainted with the informatization, information culture, and the necessity of company transformation in accordance with the informatization trends, which increases and provides competitive advantage of the company. Students are also acquainted with computer-based systems in the graphics company; they are introduced with the flow of information, which present the basics for the successful functioning of the whole information system (IS).

- mesto in vloga IS v podjetju ter; - opredelitev osnovnih pojmov IS; - izhodišče sodobnega načrtovanja IS; - strateško načrtovanje IS (tj. ocena trenutnega stanja, pristopi in značilnosti sodobne metodologije uvajanja IS, faze pri graditvi IS, pregled osnovnih aplikativnih področij IS); - organizacijska in upravljalvska problematika načrtovanja IS; varnost in zaščita IS; - opredeljevanje in vrednotenje učinkov IS; - ljudje in IS; - etičnost IS; - spoznavanje različnih IS, ki so na voljo na slovenskem tržišču in so primerni za manjša in srednje velika grafična podjetja.	Part of lectures is devoted to the introduction and control of the deployment of IS into the company, and includes: - position and role of IS in the company and; - identification of basic IS concepts; - bases of modern IS planning; - IS strategic planning (ie. Assessment of current situation, approaches, and features of modern methodology of IS deployment phase in building IS, overview of the basic IS application domains); - organizational and management issues of IS planning; safety and security of IS; - identification and evaluation of the IS effects - people and IS; - ethnicity of IS; - learning about the various IS, which are available on the Slovenian market and are suitable for small and medium-sized graphics companies.
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Temeljna literatura in viri/Readings:

Beynon-Davies P. Business information systems (2019)

McKinney E. Jr., Kroenke D. Processes, Systems, and Information: An Introduction to MIS (2018)

Cilji in kompetence:

Cilj predmeta je usposobiti študenta za sodelovanja pri izdelovanju, uvajanju in vzdrževanju računalniško podprtih sistemov ter celotnega IS v podjetju. Glede na omenjeno, so predmetno specifične kompetence naslednje:

- spoznavanje možnosti uvedbe računalniško podprtih sistemov v proizvodnem procesu ter njih vrednotenje s stališča stroškov in humanizacije dela;
- razumevanje nujnosti preobrazbe podjetja v smislu IS;
- vzporedno povezovanje temeljnega in strokovnega znanja z uvajanjem IS v podjetje;
- sposobnost analiziranja delovnih procesov v proizvodnji (tudi CIM sistemov) in na podlagi tega sposobnost nudenja pomoči pri strateškem uvajanju in organiziranju IS;
- prepoznavanje in razreševanje problemov, nastalih pri uvajanju IS;
- opredeljevanje in vrednotenje učinkov IS;
- upoštevanje in zagovarjanje humanizacije dela pri uvajanju IS s poudarkom na etičnosti IS;
- prepoznavanje ustreznega IS za grafično podjetje glede na njeno velikost, vrsto in zahtevnost procesov itd.
- vodenje projektnega tima pri uvajanju IS.

Objectives and competences:

The aim of this course is to train students for participation in the production, deployment and maintenance of computerized systems and the entire IS in the company. In view of the above, the object-specific competences following:

- to study the possibility of introducing computer based systems in the production process and their evaluation from the standpoint of cost and humanization of work;
- understanding the necessity of transformation of the company in terms of IS;
- parallel integration of basic and expertise by introducing the IS in the company;
- ability to analyze business processes in production (including CIM systems) and on the basis of the ability to provide assistance in strategic deployment and organization of IS;
- identification and solution of problems arising in the implementation of the IS;
- identification and evaluation of the effects of the IS;
- respecting and defending the humanization of work in the implementation of IS with an emphasis on ethics IS;
- identification of the appropriate IS graphics company regardless of its size, nature and complexity of the processes, etc.
- management of the project team in the implementation of IS.

Predvideni študijski rezultati:

- Študent pozna računalniško podprte sisteme ter njih povezanost z IS;

Intended learning outcomes:

- Student knows the computer based systems and their integration with the IS;

- zna izbrati in urediti ustrezne podatke, ki so osnova sledljivosti v IS; - pozna vrste IS in njih uporabnost glede na vrsto proizvodnje; - prepozna probleme pri uvajanju IS; - pozna odgovore in rešitve na omenjene probleme; - zna opredeliti in razgraditi stroške, povezane z uvedbo IS; - razume pomen in vlogo IS v proizvodnem podjetju; - razume razsežnosti IS; - razume probleme, ki nastajajo pri uvajanju IS s stališča komunikacije ali uvajanja ljudi; - razume strategijo in metode uvajanja IS.	- has the ability to select and edit the relevant data, which are the basis for traceability IS; - knows the types of IS and their applicability, depending on the type of production; - identifies the problems in the implementation of IS; - knows the answers and solutions to these problems; - knows how to identify and lower the costs associated with the introduction of the IS; - understands the importance and the role of IS in a manufacturing company; - understands the dimensions of IS; - understands the problems arising from the introduction of the IS from the standpoint of communication or introducing people; - understands the strategy and implementation methods of IS.
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Metode poučevanja in učenja:

Predmet je sestavljen iz predavanj in seminarja. Predavanja (multimedijske prezentacije) nudijo teoretične osnove za seminarje;

- seminarske naloge se izvajajo individualno ter vključujejo delo z ustrezno programsko opremo v računalniški učilnici;
- v okviru predmeta se izvajajo strokovni obiski grafičnih podjetij;
- namen obiskov je spoznavanje različnih vrst delnih ali celovitih IS v grafičnih podjetjih.

Aktivnosti poučevanja in učenja potekajo na fakulteti in/ali prek spleta (online).

Pri predmetu se uporabljajo spletne učilnice in IKT metode poučevanja (multimedijsko gradivo, praktične demonstracije itd.).

Uporabljajo se inovativne metode poučevanja v smislu obogatitve predavanj z relevantnimi vabljenimi predavanji, povezovanjem z industrijo, seminarskim delom na realnih izzivih iz industrije in gospodarstva.

Learning and teaching methods:

The course consists of lectures and seminars. Lectures (multimedia presentation) offer theoretical basis for the seminars;

- seminar work is carried out individually, and includes work with the appropriate software in the computer room;
- the course will be carried out technical visits graphic companies;
- purpose of the visits is to recognize the different types of partial or complete IS in graphic companies.

Teaching and learning activities take place at the faculty and/or online.

The course uses online classrooms and ICT teaching methods (multimedia materials, practical demonstrations, etc.).

Innovative teaching methods are used in terms of enriching lectures with relevant invited lectures, communication with industry, seminar work on real challenges from industry and business.

Načini ocenjevanja:

Delež/Weight

Assessment:

seminar oz. izdelek	50,00 %	seminar i.e. product
izpit teoretičnega znanja	50,00 %	exam of theoretical knowledge
Praktično znanje, osvojeno pri izdelavi seminarske naloge in teoretično znanje pridobljeno na predavanjih ter iz drugih literarnih virov se oceni s pomočjo pisnega in/ali ustnega preverjanja, ki se izvede v živo, v predavalnici, ali prek spleta (online) s pomočjo ustreznih programskih rešitev/orodij. Seminarska naloga oz. izdelek je ocenjen na podlagi vsebinske, oblikovne in kontekstualne zasnove ter predstavitve. Skupna ocena seminarske naloge in teoretičnega znanja predavanj se oceni z negativno oceno 5 ali s pozitivnimi ocenami od 6 do 10. Za pozitivno oceno je treba doseči vsaj 55 % ali več.		The practical knowledge acquired with seminars and the theoretical knowledge from the lectures and other literature sources is graded by a written and/or oral examination, which is conducted in the classroom or online using suitable software solutions/tools. The seminar, i.e. the product, is graded according to content, design, context quality as well as presentation. The overall grade of the seminar and the theoretical knowledge of the lectures is graded with a negative grade 5 or with positive grades from 6 to 10. For a positive grade, at least 55 % or more must be achieved.

Ocenjevalna lestvica:

5 - 10, pri čemer velja, da je pozitivna ocena od 6 - 10

Grading system:

5 - 10, a student passes the exam if he is graded from 6 to 10

Reference nosilca/Lecturer's references:

1. STANKOVIČ ELESINI U., ZAKRAJŠEK Š., CERAR E., MAROLT M., GODEC P., URBAS R. Informatizacija slovenskih tekstilnih, oblačilnih in usnjarskopredelovalnih podjetij. Tekstilec, 2015, let. 58, št. 4, str. 281−300.
2. CERAR E., URBAS R., STANKOVIČ ELESINI U. Razvoj informacijske infrastrukture v letih 1960–1991 s primeri iz slovenske tekstilne industrije. Annales Series Historia et Sociologia, 2017, 1.
3. STANKOVIČ ELESINI U. Analiza in projektiranje procesov v konfekciji : zapiski predavanj. Ljubljana: Naravoslovnotehniška fakulteta, Oddelek za tekstilstvo, 2005. 128 str.
4. URBAS R., STANKOVIČ ELESINI U., CIGULA T., MAHOVIĆ POLJAČEK S. Pad printing. V: IZDEBSKA J. (ur.), THOMAS S. (ur.). Printing on polymers: fundamentals and applications. Amsterdam [etc.]: Elsevier, 2016, str. 263-278.
5. STANKOVIČ ELESINI U., URBAS R. Microcapsules in printing. V: IZDEBSKA J. (ur.), THOMAS S. (ur.). Printing on polymers: fundamentals and applications. Amsterdam [etc.]: Elsevier, 2016, str. 389-396.
6. STANKOVIČ ELESINI U., LESKOVŠEK M., BERNIK S., ŠUMIGA B., URBAS R. Influence of co-current spray drying conditions on agglomeration of melamine-formaldehyde microcapsules. Drying technology, ISSN 0737-3937, [in press] 2016, 36 str., doi: 10.1080/07373937.2015.1131713.

PRAKTIČNO USPOSABLJANJE

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Praktično usposabljanje
Course title:	Practical training
Članica nosilka/UL	UL NTF
Member:	

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Grafične in interaktivne komunikacije, prva stopnja, univerzitetni	Ni členitve (študijski program)	2. letnik, 3. letnik	2. semester	izbirni

Univerzitetna koda predmeta/University course code: 0642796

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
0	0	0	0	0	120	4

Nosilec predmeta/Lecturer: Habilitiran učitelj

Vrsta predmeta/Course type: Izbirni/Elective

Jeziki/Languages:

Predavanja/Lectures:	Slovenščina
Vaje/Tutorial:	Slovenščina

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

Vpis v 2. ali 3. letnik študija.

Prerequisites:

Enrolment into the 2nd or 3rd study year.

Vsebina:

Praktično usposabljanje (PU) se izvaja v gospodarskih družbah s področja grafične, medijske, papirno-predelovalne, založniške, oblikovalske in/ali oglaševalske dejavnosti.

Konkretna vsebina PU se prilagodi delovnemu procesu gospodarske družbe.

Diplomante se usposablja za vodenje tehnološko zahtevnih procesov v grafični in medijski dejavnosti ter na področju interaktivnih komunikacij.

Osnovno vsebino programa sestavljajo naslednji segmenti:

- informativno spoznavanje delovanja gospodarske družbe vključuje seznanitev z: organizacijo družbe, tokom informacij, organizacijo proizvodnega procesa, načinom zbiranja in obdelave podatkov, povezanostjo med oddelki in službami, organizacijo zagotavljanja kakovosti in podobno;

Content (Syllabus outline):

Practical training (PT) takes place in companies in the fields of graphic arts, media, paper processing, publishing, design and/or advertising.

The specific content of PT training is adapted to the company's work processes.

Graduates are trained to manage technologically demanding processes in the graphic arts and media industry, and in the field of interactive communications.

The basic programme content consists of the following segments:

- informative familiarisation with the company's work processes, incl. company organisation, information flow, production process organisation, method of data collection and processing, link between departments and services, organisation of quality assurance etc.;
- partial active familiarisation with the production process taking on smaller work tasks in the

• delno aktivno spoznavanje delovanja proizvodnega procesa ob sprejemanju manjših delovnih zadolžitve na relaciji: razvoj – planiranje in načrtovanje proizvodnje – proizvodni proces – obvladovanje kakovosti; • aktivno vključevanje v delovni proces: razvoj, planiranje in načrtovanje izdelkov in proizvodnih procesov ter storitev, vodenje zaključenih proizvodnih procesov, obvladovanje kakovosti. Stopnja aktivnega vključevanja je odvisna od velikosti in vrste proizvodnega programa družbe in je rezultat sodelovanja med organizatorjem in mentorjem praktičnega usposabljanja na fakulteti in mentorjem, ki je v gospodarski družbi zadolžen za izvajanje PU.	relation of: development – production planning – production process – quality control; • active participation in the work process: development, planning and projecting of products, production processes and services, management of completed production processes, quality management. The degree of active participation depends on the size and nature of the company's production programme and is the result of cooperation between the coordinator and mentor of the PT at the Faculty and the mentor of practical training at the company.
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Temeljna literatura in viri/Readings:

Glede na izbrano temo PU se temeljna literatura nahaja v obliki monografij, člankov, prispevkov v zbornikih konferenc, posvetovanj in seminarjev, raziskovalnih nalog (seminarske, diplomske, magistrske, doktorske), standardov, zakonov kot tudi komercialnih predstavitev dejavnosti podjetij itd. Lahko je internega značaja in predstavlja dokumentacijo v podjetjih ali ustanovah ali/in pa je dostopna preko knjižnic Oddelka za tekstilstvo, grafiko in oblikovanje (NTF) in ostalih knjižnic ter spleta.

Depending on the chosen topic of PT, the basic literature is represented by monographs, articles, contributions to conference proceedings, conferences and seminars, research papers (seminar papers, diploma and master's theses, dissertations), standards, laws, as well as the business presentations of companies etc. They can be internal in nature and represent documentation in companies or institutions and/or they are accessible through the libraries of the Department of Textiles, Graphic Arts and Fashion Design (Faculty of Natural Sciences and Engineering), and other libraries as well as the Internet.

Cilji in kompetence:

Cilji:

Osnovni cilj PU je omogočiti študentom preverjanje posredovanih teoretičnih znanj v okolju, v katerem bodo delovali po zaključenem izobraževanju, in jih nadgraditi z znanji, ki so značilni za proizvodno delovno okolje in jih ni mogoče pridobiti pri teoretičnem delu v šoli. Praksa poteka v povezavi študenta in mentorja v podjetju in na fakulteti.

Predmetno specifične kompetence:

Študenti naj bi se pri PU seznanili s funkcijami načrtovanja in izvajanja poslovne politike gospodarske družbe, vodenja, planiranja proizvodnje, načrtovanja novih izdelkov, strojno opremo, tehnološkimi postopki in zagotavljanjem kakovosti. Načrtovano je, da bi se študenti pri PU čimbolj aktivno vključevali v izvajanje primernih delovnih nalog.

Objectives and competences:

Objectives:

The basic aim of PT is to give students the opportunity to test the theoretical knowledge they have acquired in the environment they will work in after their graduation and to expand it with the knowledge that is typical of the productive work environment and cannot be acquired in theoretical studies at the Faculty. PT consists of a connection between the student and their mentor in the company and the Faculty.

Subject-specific competencies :

At PT, students are expected to learn the functions of planning and implementing the company's policies, management, production planning, new products design, hardware, technological processes and quality assurance. It is planned that the students will be actively involved in the implementation of corresponding work tasks at PT.

Predvideni študijski rezultati:

Znanje in razumevanje:

Poznavanje funkcije načrtovanja in izvajanja poslovne politike gospodarske družbe, poznavanje vodenja proizvodnje, poznavanje planiranja proizvodnje, poznavanje načrtovanja novih izdelkov/storitev, poznavanje strojne opreme, poznavanje tehnoloških postopkov, poznavanje obdelave in prenosa

Intended learning outcomes:

Knowledge and understanding:

Knowledge of the function of planning and implementing business policy, knowledge of production management, knowledge of production planning, knowledge of planning new products/services, knowledge of hardware, knowledge of technological processes, knowledge of

podatkov, poznavanje zagotavljanje kakovosti, poznavanje logistike, poznavanje ekonomike in poslovanja. Študenti razumejo, kako teoretična spoznanja prenesti, preveriti in nadgraditi na praktičnih primerih, pri čemer razumejo delovanje procesov, ki se odvijajo v gospodarski družbi.	data processing and transmission, knowledge of quality assurance, knowledge of logistics, knowledge of economics and business administration. Students understand how to transfer, test and extend theoretical knowledge to practical examples, as well as the functioning of processes in a company.
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Metode poučevanja in učenja:	Learning and teaching methods:
Delovna praksa. Možno je tudi delo na terenu in/ali projektno delo v okviru delovne prakse.	Practical training. As a part of the practical training, it is also possible to work in the field and/or do project work.

Načini ocenjevanja:	Delež/Weight	Assessment:
Metoda ocenjevanja: izdelava seminarske naloge. Ocenjevalna lestvica: opravljen/nje opravljen.	100,00 %	Assessment method: preparation of a seminar paper. Grading scale: passed/failed.

Ocenjevalna lestvica:	Grading system:

Reference nosilca/Lecturer's references:

RAZVIJANJE UPORABNIŠKIH VMESNIKOV

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Razvijanje uporabniških vmesnikov
Course title:	User interface developing
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Grafične in interaktivne komunikacije, prva stopnja, univerzitetni	Ni členitve (študijski program)	3. letnik	2. semester	izbirni

Univerzitetna koda predmeta/University course code:	0554374
Koda učne enote na članici/UL Member course code:	10273

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:	Jože Guna
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Vrsta predmeta/Course type:	izbirni/elective
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Jeziki/Languages:	Predavanja/Lectures:	Slovenščina
	Vaje/Tutorial:	Slovenščina

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

Pogoj za vključitev v delo je vpis v letnik študija in izbira predmeta.
K izpitu lahko pristopijo študenti/ke, ki imajo opravljen izpitni projekt in seminar.
Pri predmetu se zahteva naslednja prisotnost: predavanja 80 %, seminar 100 %.

Prerequisites:

Prerequisite is enrollment in the year of study and choosing the course.
Students who have completed the exam project and seminar are eligible to take the exam.
The attendance requirements for the course are as follows: lectures 80%, seminar 100%.

Vsebina:

- Osnove spletnih tehnologij:** komunikacija med odjemalcem in strežnikom, spoznavanje protokola HTTP in sistema DNS; vloga HTML, CSS in Javascript; Document Object Model (DOM); brskalniki in upodobitveni modeli; strežniške tehnologije in programski jeziki; razlika med apache/nginx in node.js strežniki; podatkovni strežniki in baze; razlika med SQL in NoSQL podatkovnimi bazami; tradicionalne, več-stranske aplikacije (MPA) in eno-stranske aplikacije (SPA).
- Orodja za razvijalce:** urejevalniki kode; sistemi za upravljanje z izvorno kodo; node.js in orodja

Content (Syllabus outline):

- Fundamentals of web technologies:** client-server communication – HTTP(S), DNS; role of HTML, CSS and Javascript; Document Object Model (DOM); browsers and rendering engines; server technologies and back-end languages: apache/nginx vs. node.js; databases: SQL vs. NoSQL database; traditional, multiple-page applications (MPA) vs. single-page applications (SPA).
- Developer tools:** code editors; distributed version control systems; node.js and package managers; task runners and package/module bundlers; frameworks and libraries; CSS

za upravljanje in vključevanje modulov; orodja za upravljanje opravil in združevanje modulov; programska ogrodja in knjižnice; predprocesorji CSS, programski vmesniki (API) in storitve; učinkovitost spletnih strani in testiranje. • HTML: strukturni elementi, semantični elementi, dostopnost, metapodatki, optimizacija za iskalnike (SEO). • CSS: predprocesorski jezik SASS, Media Queries, napredni CSS selektorji; metode za postavitev strani; CSS animacije in prehodi; CSS transformacije. • Javascript: spremenljivke (var, let, const); podatkovni tipi; funkcije; pogojni stavki; zanke; obseg spremenljivk; DOM in dogodkovno programiranje; ES6; Fetch API; Promises; JSON.	preprocessors; APIs and services; web performance and testing. • HTML: structural elements; semantic elements; accessibility; metadata; search engine optimization (SEO). • CSS: preprocessor scripting languages (SASS); Media Queries; CSS Advanced selectors; layout methods; CSS animations and transitions; CSS transforms. • Javascript: variables: var, let, const; data types; functions; conditional statements; loops; scopes; DOM and event-driven programming; ES6; Fetch API; Promises; JSON.
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Temeljna literatura in viri/Readings:

Temeljna literatura

- Duckett, Jon. JavaScript & jQuery: interactive front-end web development. Wiley, 2014, str. 622, 14.

Dodatna literatura

- FRAIN, B. *Responsive Web Design with HTML5 and CSS3 - Second Edition*. Packt Publishing Ltd, 2015.
- ANDREW, R. *The New CSS Layout*. A Book Apart, 2017.
- GRIGSBY, J. *Progressive web apps*. A Book Apart, 2018.
- MARQUIS, M. *Javascript For Web Designers*. A Book Apart, 2016.
- Marcotte, E. *Responsive Web Design*. A Book Apart, 2011.
- Haverbeke, M. *Eloquent Javascript, 3rd Edition: A Modern Introduction to Programming*. No Starch Press, 2018.
- Simpson, K. *You Don't Know JS: Up & Going*. O'Reilly Media, 2015.

Cilji in kompetence:

Študent se poglobljeno seznani z razvijanjem uporabniških vmesnikov spletnih mest in aplikacij. Teoretično znanje o spletu, ključnih tehnologijah in gradnikih, nadgradi s tehničnimi/praktičnimi znanji in veščinami, ko so potrebna za izgradnjo uporabniku prijaznih, dostopnih in učinkovitih spletnih mest in aplikacij.

Predmetno specifične kompetence:

- poglobljeno znanje o spletnih tehnologijah, komunikaciji med strežnikom in odjemalcem, zalednih (angl. backend) in obličnih (angl. frontend) tehnologijah,
- dobro poznavanje orodji za razvijalce in delokrogov pri razvijanju spletnih mest oz. aplikacij,
- nadgradnja osnov HTML in CSS jezikov,
- poglobljeno poznavanje metod in tehnik odzivnega dizajna – optimizacija spletnih strani za uporabo na različnih napravah oz. zaslonih,
- sposobnost uporabe Javascript programskega jezika za doseg interaktivnosti in vzpostavitev funkcionalnosti.

Objectives and competences:

In this course, students learn how to build state-of-the-art web-based user interfaces. Theoretical knowledge about the web (World Wide Web), its key technologies and essential building blocks, is extended with practical knowledge and skills, which are necessary to build user-friendly, accessible and efficient websites and applications.

Subject-specific competencies:

- in-depth knowledge about web technologies, client-server communication, backend and frontend technologies,
- knowledge about the technical tools and techniques necessary to build modern websites and applications,
- extended knowledge about HTML and CSS,
- in-depth knowledge about different methods and techniques for building responsive websites and applications – optimization for viewing on different devices,
- capability to use Javascript programming language to achieve interactivity and functionality.

Predvideni študijski rezultati:

Intended learning outcomes:

Študent pridobi poglobljeno teoretično znanje o spletnih tehnologijah in delovanju spletnih mest oz. aplikacij.	Student gains in-depth theoretical knowledge about technologies that power the web.
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Metode poučevanja in učenja:	Learning and teaching methods:
Predavanja, seminar, konzultacije Aktivnosti poučevanja in učenja potekajo na fakulteti in/ali prek spleta (online). Uporaba spletne učilnice in IKT metod poučevanja (multimedijsko gradivo, praktične demonstracije).	Lectures, seminar, consultations Teaching and learning activities take place at the faculty and/or online. Use of the online classroom and ICT teaching methods (multimedia material, practical demonstrations).

Načini ocenjevanja:	Delež/Weight	Assessment:
Dokumentacija sprotne dela in aktivna udeležba in sodelovanje pri predmetu (predavanja, seminar)	25,00 %	Maintaining documentation of ongoing work and actively participating in course activities, including lectures and seminars.
Zaključni projekt.	50,00 %	Final project.
Predstavitev zaključnega projekta in ustni izpit.	25,00 %	Presentation of the final project and oral 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:
GUNA, Jože, POLAJNAR HORVAT, Katarina, PODJED, Dan. People-centred development of a smart waste bin. <i>Sensors</i>. Feb.-1 2022, iss. 3, 1288, str. 1-14, ilustr. ISSN 1424-8220. https://www.mdpi.com/1424-8220/22/3/1288, DOI: 10.3390/s22031288. [COBISS.SI-ID 96699651] SOMRAK, Andrej, POGAČNIK, Matevž, GUNA, Jože. Impact of different types of head-centric rest-frames on VRISE and user experience in virtual environments. <i>Applied sciences</i>. Feb.-2 2021, no. 4, 1593, str. 1-31, ilustr. ISSN 2076-3417. https://www.mdpi.com/2076-3417/11/4/1593, DOI: 10.3390/app11041593. GUNA, Jože, GERŠAK, Gregor, HUMAR, Iztok, SONG, Jeungeun, DRNOVŠEK, Janko, POGAČNIK, Matevž. Influence of video content type on users' virtual reality sickness perception and physiological response. <i>Future generation computer systems</i>. [Print ed.]. Feb. 2019, vol. 91, str. 263-277, ilustr. ISSN 0167-739X. https://www.sciencedirect.com/science/article/pii/S0167739X18316546, DOI: 10.1016/j.future.2018.08.049. [COBISS.SI-ID 12193876] SOMRAK, Andrej, HUMAR, Iztok, HOSSAIN, M. Shamim, ALHAMID, Mohammed F., HOSSAIN, M. Anwar, GUNA, Jože. Estimating VR sickness and user experience using different HMD technologies : an evaluation study. <i>Future generation computer systems</i>. [Print ed.]. 2019, vol. 94, str. 302-316, ilustr. ISSN 0167-739X. https://www.sciencedirect.com/science/article/pii/S0167739X18325044, DOI: 10.1016/j.future.2018.11.041. [COBISS.SI-ID 12274772] BURGER, Gregor, GUNA, Jože, POGAČNIK, Matevž. Suitability of inexpensive eye-tracking device for user experience evaluations. <i>Sensors</i>. Jun. 2018, no. 6, 1822, str. 1-17, ilustr. ISSN 1424-8220. http://www.mdpi.com/1424-8220/18/6/1822, DOI: 10.3390/s18061822. [COBISS.SI-ID 12045396]

STATISTIKA

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Statistika
Course title:	Statistics
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Grafične in interaktivne komunikacije, prva stopnja, univerzitetni	Ni členitve (študijski program)	2. letnik	1. semester	obvezni

Univerzitetna koda predmeta/University course code:	0089488
Koda učne enote na članici/UL Member course code:	10885

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:	Stanislav Praček
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Vrsta predmeta/Course type:	Obvezni /Compulsory
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Jeziki/Languages:	Predavanja/Lectures:	Slovenščina
	Vaje/Tutorial:	Slovenščina

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

Pristop k predmetu:
vpis v letnik študija in izbira predmeta.
Pristop k izpitu:
K izpitu lahko pristopijo študenti/ke, ki imajo opravljene vaje ter izpolnjeno predpisano prisotnost pri predmetu.
Prisotnost:
Pri predmetu se zahteva naslednja prisotnost: predavanja 80 %, vaje 90 %.

Prerequisites:

Course:
Student has applied in the year and elected the course.
Exam/Assesment:
Students who have completed the practical course and who have met the attendance requirements of the course can take the exam.
Presence:
Parts of the subject require the presence of: Lectures 80%, Practical Course 90%.

Vsebina:

I Osnove statistike I.1 Uvod, osnovni pojmi I.2 Statistične funkcije (povprečje, mediana, modus,..) I.3 Statistične funkcije za vzorčenje (varianca, kovarianca, standardni odklon,...)
II. Obdelava podatkov II.1 Uvod v obdelavo podatkov II.2 Tabeliranje in urejanje podatkov II.3 Statistična obdelava podatkov II.4 Računalniško podprta obdelava podatkov

Content (Syllabus outline):

I Basic statistics I.1 Introduction, basic concepts I.2 statistical features (mean, median, mode, ...) I.3 Statistical Functions sampling (variance, covariance, standard deviation, ...)
II. Data processing II.1 Introduction II.2 tabulation of data processing and data management II.3 Statistical data processing II.4 Computer supported data processing

III. Verjetnost III.1 Osnove verjetnosti III.2 Pogojna verjetnost IV. Teoretične porazdelitve IV.1 Normalna porazdelitev IV.2 t-porazdelitev IV.3 Binomska porazdelitev IV.4 Poissonova porazdelitev IV.5 F-porazdelitev V. Vzorčenje podatkov, načini zbiranja, priprava in osnovni prikaz V.1 Statistično zaupanje V.2 Statistične količine (korelacija, korelacijski koeficient,...) V.3 Linearna regresija in regresijska premica V.4 Družboslovna statistika in metode zbiranja podatkov V.5 Kodiranje, vnašanje in urejanje podatkov V.6 Razvrščanje enot v skupine V.7 Osnovni prikazi podatkov	III. Probability III.1 Basic probability III.2 Conditional probability IV. Theoretical distributions IV.1 Normal distribution IV.2 t-Distribution IV.3 Binomial distribution IV.4 Poisson distribution IV.5 F-distribution V. Sampling of data, methods of collection, preparation and basic presentation V.1 statistical confidence V.2 statistical quantities (correlation coefficient of correlation, ...) V.3 Linear regression and the regression line V.4 Sociological statistics and methods of gathering data V.5 Coding, entry and editing of data V. 6 Grouping V.7 Basic data views
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Temeljna literatura in viri/Readings:

- Graf, U., Hening, H.J., Wilrich P.T.: Statistische Methoden, Heidelberg, Springer Verlag 1974.
- Freund, R.J., Wilson, W.J.: Statistical Methods, Academic Press, 1996.
- Sachs, L.: Angewandte Statistik, (7.izd.) Berlin, Springer Verlag 1999.
- Weiss, N.A.: Elementary statistics (4. izd.) Addison Wesley Longman, 1999.
- dr. Aleksander Bajt, dr. Franjo Štiblar: Statistika za družboslovce, 2002
- Praček S.: Vaje iz statistike z rešitvami [Elektronski vir], študijsko gradivo, 2011
- Praček Stanislav, Statistika NTF-Oddelek za Tekstilstvo, Univerzitetni učbenik, 2015.

Cilji in kompetence:

Cilj in namen predmeta je naučiti študente osnove statistike.

Predmetno specifične kompetence:

Študent pozna in zna uporabljati metode zbiranja, urejevanja, prikazovanja ter vrednotenja rezultatov meritev na objektivni in deduktiven način.

Pozna strokovno izrazoslovje statistike in statistične računske metode vrednotenja ene, dveh ali več temeljnih skupnosti. Prav tako pozna osnovne teoretičnih modelnih porazdelitev, ki predstavljajo splošno temeljno znanje za deduktivno statistično analizo.

Pozna pojem družboslovne statistike, način zbiranja in obdelave podatkov

Zna pripraviti statistične podatke na podlagi vzorčenja s pomočjo računalniških orodij in jih interpretirati v naravnem jeziku

Predmet navaja študente na kritično presojo rezultatov s preverjanjem veljavnosti ničelne in alternativne hipoteze ter omogoča sprejemanje razumnih odločitev v praksi na osnovi deduktivne statistične analize in s tem reševanja tehnoloških problemov ali sposobnosti ohranjanja in skrbi za kakovost izdelkov. Hkrati pa študentom ponuja obdelavo in prikaz podatkov na praktični način s pomočjo računalniških orodij.

Objectives and competences:

The aim and purpose of the course is to teach students the fundamentals of statistics.

Subject-specific competencies:

The student knows and is able to use the methods of collecting, editing, presenting and evaluating the results of measurements in an objective and deductive manner;

The student knows the terminology and statistical calculation method of valuation of one, two or more population. It is also aware of the underlying theoretical model distribution representing the general basic knowledge of deductive statistical analysis;

The student knows what sociological statistics means, the way of collecting and data processing;

The student knows to prepare statistical data based on sampling within help of computer tools and student knows to interpretation of data in natural language;

The subject stating students to critically assess the different results of the verification of the null and alternative hypotheses, and allows for make sound decisions in practice based on deductive statistical analysis, and thereby solving technological problems or the keeping and care for the quality of the products. In the same time it offers students data processing and presenting of data on practical way with computer supporting tools.

Predvideni študijski rezultati:

Intended learning outcomes:

Znanje in razumevanje: Osnovno znanje in razumevanje statistike in statistične deduktivne analize. Poznavanje različnih metod statističnega vrednotenja meritev ene, dveh ali več temeljnih skupnosti. Sposobnost matematično rešiti naloge razlik dveh srednjih vrednosti, izračunati linearne korelacije dveh ali večih spremenljivk, in z regresijsko analizo postaviti linearni model med dvema spremenljivkama. Pridobljeno znanje, elementarne matematične metode in vrednotenje rezultatov omogočajo sklepno analizo in nedvoumen odgovor na zastavljena vprašanja o veljavnosti ničelne (H0) ali alternativne hipoteze (H1). Vzorčenje podatkov na podlagi družboslovne statistike z računalniško podporo in interpretacija podatkov v naravnem jeziku.	Knowledge and understanding: Basic knowledge and understanding of statistics and statistical deductive analysis. Knowing the different methods of statistical evaluation of measurements of one, two or more population. Ability to solve mathematical exams, the difference of two averages to calculate the linear correlation of two or more variables, and by a regression analysis to put a linear model between the two variables. The acquired knowledge, elementary mathematical methods and evaluation of results allows for concluding analysis and unequivocal answer to the questions about the validity of the null (H0) and alternative hypothesis (H1). Sampling off data based on sociological statistics with using of computer and interpretation of data in natural language.
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Metode poučevanja in učenja: Predavanja so neposredno povezana z vajami, pri katerih študentje praktično spoznajo in razumejo temeljne osnove statistične teorije in matematično-statistične metode. Vaje obsegajo reševanje računskih nalog z neposrednimi problemi povezanimi s tekstilno stroko ter od vsakega udeleženca zahtevajo aktivno in neposredno reševanje nalog pred avditorijem ostalih udeležencev. V okviru vaj študentje obdelajo rezultate ankete (družboslovna statistika) s pomočjo računalnika ter jih grafično in v besedi predstavijo. Dodatno pojasnjevanje nekaterih vsebin predmeta je na željo posameznih študentov v času govorilnih ur. Dodatno pojasnjevanje nekaterih vsebin predmeta je na željo posameznih študentov v času govorilnih ur. Sklopi predmeta se izvajajo v računalniških in drugih fakultetnih učilnicah/predavalnicah in/ali preko spleta (online) s pomočjo primerne in ustrezne programske opreme za delo.	Learning and teaching methods: Lectures are directly related to the exercises in which the students learn practical and understand about basic fundamentals of statistical theory and mathematical-statistical methods. Exercises comprise a solving problems with direct problems associated with the textile profession and from each participant require an active and direct solving exams in front of the auditorium of the other participants. Additional clarifying of certain content of the course is at the request of individual students during consultation hours. Within exercises students processing results of survey (sociological statistics) with computer supporting tools and represent results in grafical and writable way. Course assemblies are conducted in computer and other faculty classrooms/lecture rooms and/or online with the help of suitable and appropriate software that enables work.
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Načini ocenjevanja:	Delež/Weight	Assessment:
Pisni izpit	100,00 %	Written examination

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: PRAČEK, Stanislav. Statistika. V Ljubljani: Naravoslovnotehniška fakulteta, Oddelek za tekstilstvo, 2015. 1 optični disk (CD-ROM). PRAČEK, Stanislav. Vaje iz statistike z rešitvami : Ljubljana: Naravoslovnotehniška fakulteta, Oddelek za tekstilstvo, 2011. 1 el. optični disk (CD-ROM). PRAČEK, Stanislav. Theory of string motion. <i>International journal of nonlinear sciences and numerical simulation</i>, 2007, let. 8, št. 3, str. 451-460. PRAČEK, Stanislav, PUŠNIK, Nace. Fictitious forces. TRJ, ISSN 0040-5175, 2016, vol. , no. , 10 str., ilustr. http://trj.sagepub.com
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PRAČEK, Stanislav, PUŠNIK, Nace, FRANKEN, Gregor, SIMONČIČ, Barbara. Balloon theory. TRJ, ISSN 0040-5175, 2016, vol. 86, no. 14, str. 1522-1532

PRAČEK, Stanislav, PUŠNIK, Nace. The effect of winding angle on unwinding yarn. Transactions of FAMENA, 2017, vol. 40, no. 3, str. 29-42.

PRAČEK, Stanislav. Dynamic optimization model for unwinding yarn.: a simulation study. International journal of civil engineering and technology, 2018, vol. 9, no. 11, str. 1854-1862.

STROKOVNA ANGLEŠČINA

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Strokovna angleščina
Course title:	English for specific purposes
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Grafične in interaktivne komunikacije, prva stopnja, univerzitetni	Ni členitve (študijski program)	2. letnik	2. semester	obvezni

Univerzitetna koda predmeta/University course code:	0089489
Koda učne enote na članici/UL Member course code:	10067

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

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

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	Prerequisites:
Vpis v letnik. Pogoj za pristop k izpitu: 90 % prisotnost na srečanjih.	Enrolment into study year. Requirement to sit the exam: 90% presence at seminar.

Vsebina:	Content (Syllabus outline):
- Branje in strategije branja, uvajanje v diskurz strokovnih in tehničnih besedil s področja grafike (tiskanje, barve, fotografija, tipografija, embalaža, trajnostnost itd.), - določanje ključnih besed, pisanje povzetkov, - uporaba slovarjev, glosarjev in drugih informacijskih virov, - pisanje sestavkov in poročil, - opisovanje grafov, - poslovna komunikacija (pisanje pisem, prošnji, življenjepisa, javno nastopanje), - sodelovanje v razpravah.	-Reading and reading strategies, introduction into discussing technical and professional texts from the field of graphic arts (printing, colour, photography, typography, packaging, sustainability etc.), -defining and understanding keywords, writing abstracts, -using dictionaries, glossaries and other information sources, -writing reports, -describing graphs, -business communication (business correspondence, writing letters of application and CVs, giving public presentations), -taking active part in discussions.

Temeljna literatura in viri/Readings:

- Luštek Preskar, B. (2020) *English for Specific Purposes – Graphic Arts*. Ljubljana: Naravoslovnotehniška fakulteta, Oddelek za tekstilstvo, grafiko in oblikovanje.
- Didaktizirani material, ki ga pripravi predavatelj sam.
- Materiali dostopni na spletnih straneh na temo stroke.
- Spletni slovarji in glosarji, splošni ter terminološki.

Literatura je dosegljiva v knjižnici Oddelka za tekstilstvo, grafiko in oblikovanje, NTF.

Literature is available in the library at the Faculty of Natural Sciences and Engineering, Department of Textiles, Graphic Arts and Design.

Cilji in kompetence:

Dograjevanje splošnega znanja angleščine na višjo stopnjo z uvajanjem strokovnih tekstov.

Predmetno specifične kompetence:

- izpopolnjevanje kompetenc v ustnem in pisnem izražanju,
- širjenje besednega zaklada in gradnja strokovnega besedišča,
- ozaveščanje o aktualnih perečih temah s področja stroke (trajnostnost, recikliranje itd.),
- razvijanje bralnih spretnosti.

Objectives and competences:

Upgrading general knowledge of English to a higher level by introducing technical and professional texts.

Course-specific competences:

- meeting competences in oral and written communication,
- enriching the existing vocabulary and building technical vocabulary,
- raising awareness of current hot topics from the field of graphic arts (sustainability, recycling etc.),
- getting familiar with reading strategies to improve reading skills.

Predvideni študijski rezultati:

Znanje in razumevanje:

- seznanitev s osnovnim strokovnim besediščem z določenih področij grafike,
- poglobljeno znanje posameznih slovničnih struktur,
- povzemanje/parafraziranje,
- pisanje povzetkov, sestavkov in projektnih poročil,
- pisne in ustne komunikacijske spretnosti,
- predstavitve v angleščini,
- poslovna komunikacija.

Intended learning outcomes:

Knowledge and understanding:

- acquiring basic terminology from certain fields of graphic arts,
- in-depth knowledge of specific grammatical structures,
- summarising/paraphrasing,
- writing abstracts, paragraphs and project reports,
- oral and written communication skills,
- giving presentations in English,
- business communication.

Metode poučevanja in učenja:

- Predavanja,
 - vaje,
 - samostojno delo,
 - delo v parih/skupinah.
- Uporaba spletne učilnice in IKT metod poučevanja. Medpredmetno povezovanje z drugim predmetom pri izdelavi seminarske naloge in predstavitvi le-te. Delo poteka na fakulteti ali preko spletne platforme.

Learning and teaching methods:

- Lectures,
 - practical work,
 - individual work,
 - work in pairs/groups.
- Using online classroom and ICT teaching methods. Cross-curricular cooperation with another course at preparation and presentation of the seminar paper. Work takes place live or online via an online platform.

Načini ocenjevanja:

Delež/Weight

Assessment:

Pisni in ustni izpit	50,00 %	Written and oral exam
Zadolžitve tekom semestra	50,00 %	Various assignments during the semester
Ocenjevalna lestvica: 6–10 pozitivno, 5 negativno.		Grading scale: 6–10 pass, 5 fail.

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
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Reference nosilca/Lecturer's references:

- LUŠTEK PRESKAR, Barbara. English for specific purposes. [Graphic arts]. Ljubljana: Naravoslovnotehniška fakulteta, Oddelek za tekstilstvo, grafiko in oblikovanje, 2020. 160 str., ilustr. ISBN 978-961-6900-27-0. [COBISS.SI-ID 28249603]
- LUŠTEK PRESKAR, Barbara. English for specific purposes. Textile engineering. Ljubljana: Naravoslovnotehniška fakulteta, Oddelek za tekstilstvo, 2011. 128 str., ilustr. ISBN 978-961-6045-95-7. [COBISS.SI-ID 257973760]
- 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 visokoškolskim ustanovama: = Association of LSP Teachers at Higher Education Institutions. 2019, str. 144-157, ilustr. Od teorije do prakse u jeziku struke (Zbornik radova). ISSN 1849-9279. [COBISS.SI-ID 17231107]
- 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, ilustr. ISSN 0038-0474. https://www.sodobna-pedagogika.net/clanki/03-2021_analiza-uporabnosti-in-namembnosti-vecpredmetnega-zvezka-pri-pouku-v-prvem-razredu-osnovne-sole/. [COBISS.SI-ID 83967747]
- 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. ISBN 978-961-286-298-5. <http://press.um.si/index.php/ump/catalog/view/433/436/706-2>. [COBISS.SI-ID 3654000]

STUDIJSKA FOTOGRAFIJA

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Studijska fotografija
Course title:	Studio photography
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Grafične in interaktivne komunikacije, prva stopnja, univerzitetni	Ni členitve (študijski program)	3. letnik	1. semester	obvezni

Univerzitetna koda predmeta/University course code:	0559673
Koda učne enote na članici/UL Member course code:	10976

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
15	15	30	0	0	60	4

Nosilec predmeta/Lecturer:	Jure Ahtik
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Vrsta predmeta/Course type:	Obvezni/Compulsory
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Jeziki/Languages:	Predavanja/Lectures:	Angleščina, Slovenščina
	Vaje/Tutorial:	Angleščina, Slovenščina

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

Pogoj za vključitev v delo je vpis v letnik študija.
Pogoj za oddajo izpitne naloge je 70 % prisotnost pri seminarju ter 100 % prisotnost pri vajah.

Prerequisites:

Enrolment in the study year. The condition for submitting the exam paper is 70% attendance at the seminar and 100% attendance at the tutorials.

Vsebina:

Digitalni fotoaparati, njihova oprema in uporaba, skenerji, tiskalniki, tehnični parametri in načini uporabe. Računalniška uporaba fotografij z ustrežno programsko opremo, načini uporabe v tehničnem in likovnem smislu. Osnovne razlike med digitalno in klasično fotografijo, upravljanje barv, uglaševanje ekrana in tiskalnika, osnovna pravila fotografiranja, slog in stil v fotografiji, oblikovanje in oprema fotografij in fotografskih razstav. Medsebojno kombiniranje in dopolnjevanje fotografije in tipografije, kolažna fotografija, razrezi in prelivi ozadja. Uporaba fotografije pri vizualnih komunikacijah, estetika in likovna analiza oblikovalskih in fotografskih del, dokazovanje kvalitete in slabosti. Naravni in civilizacijski vzorci, njihov vpliv na fotografijo, različne tematike v

Content (Syllabus outline):

Digital cameras, equipment and the use of scanners, printers, technical parameters and modes of operation. Computer use of photos with adequate software applications in technical and artistic terms. Basic differences between digital and conventional photography, colour management, tuning screens and printers, basic rules of photography, style in photography, design of photographic exhibitions. Mutual combining and complementing photography and typography, photo collage, and background. Using photography in visual arts artistic analysis of design and photographic works, demonstrating the qualities and weaknesses. Natural and cultural patterns, their influence on photography, various themes in photography.
Tutorial: studio photography and computer

fotografiji. Vaje: studijska fotografija in računalniška obdelava fotografij, (spoznavanje tehničnih parametrov, pristopov k delu, estetskih in izraznih zahtev in rešitev). Vodene individualne naloge: Računalniška korekcija, oblikovanje in preoblikovanje fotografije glede na kompozicijske, splošno estetske in specifično izrazne zahteve. Poseben poudarek je na trajnostnih in okolju prijaznih pristopih in tehnologijah. Za namene vaj in seminarja je predvidena uporaba fotografske opreme in računalnikov.	postproduction of photos (learn technical parameters, approaches to work, aesthetic and expressive requirements and solutions). Individual assignments: computer correction, transforming photos according to the compositional and other requirements. Special emphasis is placed on sustainable and environmentally friendly approaches and technologies. For the purposes of tutorials and seminars, the use of photographic equipment and computers is foreseen.
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Temeljna literatura in viri/Readings:

1. INTIHAR, M., E-fotografija (prenovljena in razširjena izdaja), Ljubljana: Samozaložba, 2003.
2. ANG, T., Digitalna fotografija, Ljubljana: Tehniška založba;2000.
3. SLAVEC, D., Fotografija, Ljubljana: Much, 2000.
4. HEDGECOE, J., The new manual of photography, 2003. LONG, B., Complete Digital Photography, Massachusetts, 2001.

Literatura je dosegljiva v knjižnici Oddelka za tekstilstvo, grafiko in oblikovanje.

Cilji in kompetence:

Uporaba digitalne fotografije kot sodobnega, hitrega, učinkovitega in fleksibilnega medija pri prenosu in uporabi vizualnih podatkov v sporočilno in estetsko funkcijo.

Predmetno specifične kompetence:

- kompleksno in vseobsegajoče znanje s področja digitalne fotografije in računalniške obdelave slike z ustrezno programsko opremo in načini uporabe v tehničnem in likovnem smislu,
- sposobnost uporabe profesionalne fotografske in računalniške opreme,
- znanje s področja medsebojne splošne uporabe fotografije in tipografije,
- znanja s področja slogov in stilov v fotografiji,
- znanja s področja oblikovanja, opreme fotografij in priprave fotografskih razstav,
- sposobnost študijskega osvetljevanja,
- sposobnost za individualno in projektno delo na področju fotografije (izdelava semirasko naloge in fotografskih izdelkov),
- sposobnost izbora ustrezne fotografske opreme s posebnim poudarkom na trajnosti,
- razumevanje okoljskega vpliva različnih fotografskih procesov.

Objectives and competences:

The use of digital photography as a modern, developing, efficient and flexible medium for the transfer and use of visual data messages and aesthetic functions.

Subject-specific competencies:

- complex knowledge of digital photography and computer image processing with appropriate software and applications in the technical and artistic sense,
- ability to use professional photographic and computer equipment,
- knowledge of a general use of photography and typography,
- knowledge of photography styles,
- knowledge of design and setting of photographic exhibitions,
- ability to use studio lightning,
- the ability for individual and project work in the field of photography (making seminar work and photographic products),
- the ability to select appropriate photographic equipment with special emphasis on sustainability,
- understanding the environmental impact of different photographic processes.

Predvideni študijski rezultati:

Znanje s področja digitalne fotografije, poznavanje nekaterih najpomembnejših svetovnih in slovenskih fotografov in njihovih del. Poseben poudarek je na študijski fotografiji. Uporaba znanja s področja digitalne fotografije v grafični proizvodnji, samostojno delovanje na področju fotografije (tudi

Intended learning outcomes:

Digital photography knowledge, recognising some of Slovenian and world wide photographers and their work. Main objective is studio photography. Students will also be able to use digital photography in a professional graphic production, individual work as photographers, (also in graphic design and in

grafično oblikovanje in oglaševanje) ter priprave fotografskih razstav ter razstav grafičnih izdelkov, s poudarkom na okolju prijaznih rešitvah.	advertising) and set their photography exhibitions, with an emphasis on environmentally friendly solutions.
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Metode poučevanja in učenja:

Predavanja, vodene individualne naloge. Pedagoški proces je lahko deloma izveden na daljavo. Za izvedbo predmeta je predvidena uporaba spletne učilnice. Pri predavanjih je predvidena udeležba strokovnjaka s področja vidnega sporočanja in oglaševanja. Končna naloga pri seminarju je v medpredmetni povezavi s Tipografijo v različnih medijih.

Learning and teaching methods:

Lectures and guided individual work. The pedagogical process can be partly carried out remotely. The use of an online classroom is planned for the implementation of the course. The participation of an expert in the field of visual communication and advertising is planned for the lectures. The final assignment in the tutorials is in the cross-curricular connection with Typography in various media.

Načini ocenjevanja:

Delež/Weight

Assessment:

Oddaja izpitne naloge	60,00 %	Submitting exam tasks
Ocena iz vaj	40,00 %	Completed tutorials

Ocenjevalna lestvica:

5 - 10, pri čemer velja, da je pozitivna ocena od 6 - 10

Grading system:

5 - 10, a student passes the exam if he is graded from 6 to 10

Reference nosilca/Lecturer's references:

1. AHTIK, Jure. Comparison of ICC and DNG colour profile workflows based on colorimetric accuracy. *Journal of print and media technology research*, ISSN 2223-8905, 2017, vol. 6, no. 3, str. 115-121.
 2. AHTIK, Jure, MUCK, Deja, STAREŠINIČ, Marica. Detail diversity analysis of novel visual database for digital image evaluation. *Acta polytechnica Hungarica*, ISSN 1785-8860, 2017, vol. 14, no. 6, str. 115-132.
 3. AHTIK, Jure. Introducing a new anaglyph method : compromise anaglyph. V: ENLUND, Nils (ur.), LOVREČEK, Mladen (ur.). *Advances in printing and media technology : [proceedings of the 39th International Research Conference iarigai, Ljubljana, Slovenia, September 2012]. Vol. 39*. Darmstadt: International Association of Research Organizations for the Information, Media and Graphic Arts Industries. 2012, str. 91-95.
 4. AHTIK, Jure, MUCK, Deja, STAREŠINIČ, Marica. A novel database for evaluation of digital images. V: URBAS, Raša (ur.). *Abstracts, 7th Symposium of Information and Graphic Arts Technology*, Ljubljana, 5-6 June 2014. Ljubljana: Faculty of Natural Sciences and Engineering, Department of Textiles, Chair of Information and Graphic Art Technology. 2014, str. 49.
 5. BIDOVEC, Katja, AHTIK, Jure, PUŠNIK, Maruša. Kulturni in družbeni vidiki razvoja modne fotografije v slovenskem prostoru. V: PUŠNIK, Maruša (ur.), FAJT, Elena (ur.). *Moda in kultura oblačenja*. 1. izd. Maribor: Aristej. 2014, str. 185-204, fotogr.
 6. AHTIK, Jure. *Tehnike upodabljanja anaglifnih slik za uporabo v umetnosti*. Ljubljana: [J. Ahtik], 2011. XIII, 96 f., ilustr.
- Avtor in soavtor več razstav in objavljenih fotografij.

TEORIJA GRAFIČNIH PROCESOV

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Teorija grafičnih procesov
Course title:	Theory of graphic processes
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Grafične in interaktivne komunikacije, prva stopnja, univerzitetni	Ni členitve (študijski program)	2. letnik	1. semester	obvezni

Univerzitetna koda predmeta/University course code:	0089490
Koda učne enote na članici/UL Member course code:	10956

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:	Maja Klančnik, Sabina Bračko
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Vrsta predmeta/Course type:	Obvezni/Compulsory
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Jeziki/Languages:	Predavanja/Lectures: Slovenščina
	Vaje/Tutorial: Slovenščina

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

Vpis v letnik študija. Pogoji za opravljanje študijskih obveznosti je prisotnost pri predavanjih, seminarju in vajah. Zahtevana prisotnost na vajah je 100 %. Za pristop k izpitu je pogoj opravljen seminar in kolokvij iz laboratorijskih vaj.

Prerequisites:

Enrolment into the study year. Prerequisite to complete study obligations is participation at lectures, seminar and tutorials. Requested presence at tutorials is 100 %. Student can attend the exam after passing tutorial and seminar.

Vsebina:

Osnove fotokemije. Naravni in umetni svetlobni viri. Fotoefekt in fotoelektrične celice. Fotokemija barvil in pigmentov. Kemikromizem: vrste, mehanizmi. Reologija: idealni in neidealni sistemi. Viskoznost tiskarskih barv in metode merjenja. Vpliv reoloških lastnosti snovi na proces tiska in kakovost odtisa. Koloidni sistemi. Površinska napetost (površinska energija). Močenje (Youngova enačba). Adhezijska energija. Kohezijska energija. Kapilarni pojavi. Pomen površinske energije v procesu tiskanja. Pomen površinske energije v procesu lepljenja. Obdelave površin tiskovnih materialov. Selektivno močenje. Razlaga principa ofsetnega tiska s selektivnim močenjem in površinskimi energijami. Adsorpcija

Content (Syllabus outline):

Basics of photochemistry. Natural and artificial light sources. Photo effect and photoelectrical cells. Photochemistry of dyes and pigments. Chemichromism. Rheology: ideal and non-ideal systems. Viscosity of printing inks and methods of measurement. The influence of rheological properties on the printing process and print quality. Colloidal systems. Surface tension (surface energy). Wetting (Young equation). Adhesion energy. Cohesion energy. Capillary action. Importance of surface energy in the printing process. Importance of surface energy in the adhesion process. Surface treatments of printing materials. Selective wetting. Explanation of principle of offset printing with selective wetting and

(fizikalna, kemijska). Površinsko aktivna sredstva (lastnosti, značilnosti, zgradba, delitev in uporaba v grafični industriji).	surface energy. Adsorption (physical, chemical). Surface active agents (properties, characteristics, structure, classification, application in the graphic industry).
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Temeljna literatura in viri/Readings:

1. B. Thompson: Printing Materials: Science and Technology. Leatherhead: Pira International, 1998.
2. N.R. Eldred: Chemistry for the Graphic Arts. Pittsburgh: GATF Press, 2001.
3. R.M. Christie et al.: The Chemistry of Colour Application. Oxford: Blackwell Science Ltd, 2000.
4. P. Suppan: Chemistry and Light. Cambridge: The Royal Society of Chemistry, 1994.
5. Z. Janović: Polimerizacije i polimeri, Zagreb: Hrvatsko društvo kemijskih inženjera i tehnologa, 1997.
6. A.W. Adamson, A.P. Gast: Physical Chemistry of Surfaces, 6th ed., New York: John Wiley & Sons, Inc., 1997.

Cilji in kompetence:

Študent se seznani s fizikalno kemijskimi osnovami grafičnih materialov in tehnologije grafičnih procesov. Pridobi znanje na področju fotokemije, površinske kemije, polimerne kemije in reologije.

Kompetence:

- obvladovanje temeljnih raziskovalnih metod in postopkov za analizo teoretičnih osnov grafičnih procesov,
- sposobnost za reševanje aktualnih delovnih problemov na področju različnih grafičnih materialov z uporabo znanstvenih metod in postopkov,
- sposobnost analize, sinteze in predvidevanja rešitev oziroma posledic na osnovi teoretičnih znanj o posameznih grafičnih procesih,
- sposobnost umeščanja novih znanj in podatkov s področja grafičnih materialov in procesov v kontekst stroke.

Objectives and competences:

The students are introduced to physical and chemical basics of graphic materials and processes by acquiring knowledge in the field of photochemistry, surface chemistry, polymer chemistry and rheology.

Competences:

- mastering basic research methods and procedures for analysing theoretical basis of graphic processes,
- ability to resolve problems connected with different graphic materials using scientific research methods and procedures,
- ability to analyse and predict solutions and consequences on the basis of theoretical knowledge concerning graphic processes,
- ability to apply newly gained knowledge and information into professional field of graphic materials and processes.

Predvideni študijski rezultati:

Znanje in razumevanje:
Poznavanje in razumevanje osnovnih zakonitosti fotokemije. Poznavanje lastnosti najpogostejših svetlobnih virov. Razumevanje vpliva zgradbe pigmentov in barvil na njihovo barvo in ostale lastnosti. Poznavanje in razumevanje reoloških lastnosti grafičnih materialov v povezavi s tehnološkimi postopki. Poznavanje in razumevanje fizikalnih in kemijskih interakcij med grafičnimi materiali. Poznavanje in razumevanje osnov površinske kemije. Poznavanje in razumevanje površinskih pojavov grafičnih materialov in pomena površinske kemije v tehnologiji grafičnih procesov.

Intended learning outcomes:

Knowledge and understanding:
Understanding basic principles of photochemistry. Understanding properties of the most frequent light sources. Knowledge about the influence of constitution of dyes and pigments on their colour and other characteristics. Knowing and understanding the rheological properties of graphic materials in relation to the technological process. Knowing and understanding the interactions between graphic materials. Knowing and understanding the surface tension properties of graphic materials and the importance of surface chemistry in the graphic technology.

Metode poučevanja in učenja:

Predavanja, seminar in laboratorijske vaje, ki potekajo pretežno v predavalnici oziroma v laboratoriju in/ali preko spleta s pomočjo ustrezne programske opreme.

Learning and teaching methods:

Lectures, seminar, laboratory work. The activities are predominantly located in the classroom and laboratory and/or on-line using suitable equipment.

Načini ocenjevanja:

Delež/Weight

Assessment:

Poročilo o opravljenih vajah in kolokvij

20,00 %

Tutorial (20%)

Zagovor seminarske naloge	20,00 %	Seminar (20%)
Pisni /Ustni izpit Ocena: pozitivno: 6–10, negativno: 5.	60,00 %	Written/Oral exam (60%) Positive: 6–10; Negative: 5.

Ocenjevalna lestvica:

Grading system:

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Reference nosilca/Lecturer's references:

1. BLAZNIK, Barbara, KOVAČ, Franci, BIZJAK, Grega, **BRAČKO, Sabina**. Fastness of dye-based ink-jet printing inks in aqueous solution in the presence and absence of oxygen. *Color research and application*. [Print ed.]. 25. mar. 2022, vol. 47, no. 5, str. 1193-1199, illustr. ISSN 0361-2317.
2. MOŽINA, Klementina, **BRAČKO, Sabina**, KOVAČEVIĆ, Dorotea, BLAZNIK, Barbara, MOŽINA, Klemen. Legibility of prints on paper made from Japanese knotweed. *Bioresources*. 2020, vol. 15, no. 2, str. 3999-4015. ISSN 1930-2126
3. MOŽINA, Klementina, PODLESEK, Anja, **BRAČKO, Sabina**. Preserving typographic cultural heritage using contemporary digital technology. *Journal of cultural heritage*. 2019, vol. 36, [no.] mar.-apr., str. 166-173, ilustr. ISSN 1296-2074.
4. **KLANČNIK, Maja**. Printing with natural dye extracted from *Impatiens glandulifera* Royle. *Coatings*. 13 April 2021, vol. 11, iss. 4, str. 1-12, ilustr. ISSN 2079-6412.
5. **KLANČNIK, Maja**. Screen printing with natural dye extract from Japanese knotweed rhizome. *Fibers and polymers*. 19 May 2021, vol. , no. , 9 str. ISSN 1229-9197.
6. **KLANČNIK, Maja**, RIJAVEC, Brigita, PIVAR, Matej, MUCK, Deja. Vpliv substrata in nanosa tiskarske barve na delovanje RFID-anten = Influence of printing material and printing ink layer on RFID antenna operation. *Tekstilec*, ISSN 0351-3386, 2018, vol. 61, no. 3, str. 162-170.
7. VRABIČ BRODNJAK, Urška, GREGOR-SVETEC, Diana, **KLANČNIK, Maja**. Enzymatic treated viscose fibers functionalized by chitosan. *Tappi journal*. ISSN 0734-1415, 2018, vol. 17, no. 8, str. 447-457.

TIPOGRAFIJA

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Tipografija
Course title:	Typographic design
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Grafične in interaktivne komunikacije, prva stopnja, univerzitetni	Ni členitve (študijski program)	2. letnik	1. semester	obvezni

Univerzitetna koda predmeta/University course code:	0089491
Koda učne enote na članici/UL Member course code:	10078

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

Nosilec predmeta/Lecturer:	Klementina Možina
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Vrsta predmeta/Course type:	Obvezni/Compulsory
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Jeziki/Languages:	Predavanja/Lectures: Slovenščina
	Vaje/Tutorial: Slovenščina

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

Vpis v letnik študija.
Za pristop h končnemu izpitu sta pogoja: opravljene vse zadolžitve in pozitivno ocenjeno znanje pridobljeno pri (računalniških) vajah.
Pri čemer mora biti prisotnost pri vajah 100%.

Prerequisites:

Enrolment in the programme.
For the final exam conditions are: completed all assignments and a positive assessment of the knowledge acquired in the (computer) exercises.
Attendance at exercises must be 100%.

Vsebina:

Spoznavanje temeljev tipografije; zgodovinski razvoj pisave in tipografskih elementov; deli črk, različice pisave, pisava, oblika znakov, tipografski merski sistem; digitalizacija tipografije in vloga fonta; značilnosti posameznih črkovnih slogov; elementi razporejanja besedila, ligature, razpiranje, prirezovanje, prostor med črkami in besedami, razmik, dolžina vrstice, poravnava na levo naslonilo, na desno naslonilo, sredinsko in na polni format, zrcalo, mreža, beli robovi; mikrotipografija; korektura in korekturna znamenja (slovenska).

Content (Syllabus outline):

Learning about the basis of typography; the historic development of typefaces and typographic elements; parts of the characters variations in typeface weight and width, font and typographic measurement systems; digitalised typefaces and meaning of font; the characterisation of individual type styles; elements of text position, ligatures, tracking, kerning, letter and word space, leading, line length, flush-left, flush-right, centred, justified, layout, grids, margins; typesetting various typewriting; detail-typography; proofreading proofreading marks (Slovene).

Temeljna literatura in viri/Readings:

Baines, P., Haslam, A., *Type & typography*. London : Laurence King Publishing, 2002.

Bringhurst, R., *The Elements of Typographic Style*. Vancouver : Hartley & Marks, 2008.
 Felici, J., *The Complete Manual of Typography*. Berkeley : Adobe Press, 2003.
 Možina, K., *Knjižna tipografija*. Ljubljana : Filozofska fakulteta in Naravoslovnotehniška fakulteta, 2003,
<https://www.dlib.si/stream/URN:NBN:SI:DOC-6YLGQIG8/64f60a3c-ec5e-4293-adc9-674b38605004/PDF>.
 Možina, K., *Mikrotipografija*. Ljubljana : Naravoslovnotehniška fakulteta, 2009,
<https://image.linotype.com/files/pdf/Mikrotipografija.pdf>.
 Možina, K., *Tipografska kunsť: Upodobitev informacij*. Ljubljana: Naravoslovnotehniška fakulteta, 2023.
 Müller-Brockmann, J., *Grid, systems in graphic design: a visual communication manual for graphic designers, typographers and three dimensional designers*. Zürich : Niggli, 2007.
 White, A. W., *Type in Use: Effective typography for electronic publishing*, New York : W.W. Norton & Company, 1999.
Literatura je dostopna v knjižnici Oddelka za tekstilstvo, grafiko in oblikovanje, NTF.

Cilji in kompetence:

Cilji:

Študent spozna temeljne elemente tipografije, njihove posamezne dele ter njihovo namembnost in uporabnost pri razporejanju besedila po pomenskih sklopih. Spozna zgodovinski razvoj pisave in naknadne razporeditve v posamezne črkovne sloge. Seznan se s tipografskimi pravili in korekturnimi znamenji.

Predmetno specifične kompetence:

- poznavanje in razumevanje pomena posameznih elementov tipografije,
 - sposobnost za reševanje konkretnih delovnih problemov v pripravi besedila,
 - koherentno obvladovanje temeljnega tipografskega znanja in sposobnost povezovanja s potrebami nadaljnih grafičnih in/ali informacijskih proizvodnih postopkov,
 - sposobnost umeščanja novih interpretacij (tehnoloških rešitev) v kontekst temeljnega področja tipografije,
 - razumevanje temeljnega področja tipografije ter pomena povezanosti z dejavnostmi, ki potekajo vzporedno (korektura besedila) in zaporedno (nadaljni grafični postopki: priprava za tisk, tisk, dodelava),
 - razvoj spretnosti pri uporabi tipografskih elementov, uporabi grafičnih programov za oblikovanje in prelom besedila,
 - sposobnost generiranja novih idej (kreativnosti) v uporabi in razporejanju tipografskih elementov.
- Uporaba informacijsko-komunikacijske tehnologije v prevzemu in nadaljnjem posredovanju podatkov in osnovnega gradiva pri tipografski obdelavi podatkov.

Objectives and competences:

Objectives:

Student learns about basic elements in typography, their parts and their purpose and usefulness in the organization of the text according to semantic clusters. Learns about the historical development of typography and the subsequent allocation of the individual typographic styles. They are acquainted with the typographic rules and correction marks.

Subject-specific competencies:

- knowledge and understanding of the importance of individual typographic elements,
 - the ability to solve real work problems in typographic prepress,
 - coherent management of the basic typographic skills and ability to connect with the needs of further graphics and/or information production processes,
 - the ability to include new interpretations (technological solutions) in the context of the basic areas of typography,
 - understanding the core area of typography and the importance of the activities taking place in parallel (proofreading) and sequential (further graphical processes: prepress, printing, finishing),
 - the development of skills in the use of typographic elements, the use of graphic designing software and text layout,
 - ability to generate new ideas (creativity) in the use and allocation of typographic elements.
- The use of information and communication technology in the acquisition and subsequent transmission of data and basic material for typographic processing of data.

Predvideni študijski rezultati:

Znanje in razumevanje:

Pozna zgodovinski razvoj posameznih tipografskih elementov, njihove značilnosti in njihove sodobne različice; pozna značilnosti posameznih črkovnih slogov in njihov zgodovinski razvoj, zna jih prepoznati v individualnih pisavah; pozna razlikosti v razporejanju besedila; pozna pravila mikrotipografije; pozna pomen korekture ter različna

Intended learning outcomes:

Knowledge and understanding:

Knows the historical development of individual typographic elements, their characteristics and their modern versions; knows the characteristics of individual typographic styles and their historical development, able to identify them in individual typefaces; knows the differences in the text layout; knows the detail-typographic rules; knows the

znamenja, ki se zanjo uporabljajo. Razume pomen in vlogo posameznih tipografskih elementov v obdelavi besedila; razume vlogo pisave za posamezne vrste besedila in njeno sposobnost za različno posredovanje informacij; razume hierarhijo razporejanja besedila za različno posredovanje informacij; razume pomen kakovostne priprave besedila za nadaljne grafične postopke.	importance of the proofreading and different proofreading marks. He/She understands the importance and role of typographic elements in the processing of the text; understands the role of fonts for different types of text and its ability for variable transmission of information; understands the hierarchy of text mapping for different communication and information; understands the importance of text quality preparation for further graphical operations.
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Metode poučevanja in učenja:	Learning and teaching methods:
Predavanja, računalniške vaje, vodeno individualno delo. Pri delu študenti dobijo gradivo na spletnih povezavah predmeta. Predavanja in vaje se lahko izvajajo v živo (predavalnica, računalniška učilnica) in/ali na daljavo z uporabo primerne programske opreme.	Lectures, computer exercises, guided individual work. During work, students get material on the online links of the subject. Lectures and exercises can be conducted in a classroom/a computer room and/or online using suitable software tools.

Načini ocenjevanja:	Delež/Weight	Assessment:
Pisni/Ustni izpit (v predavalnici ali na daljavo) Pozitivno: 6–10 (60–100 %) Negativno: 5 (0–59 %)	70,00 %	Written/Oral exam (in a classroom or online) Positive: 6–10 (60–100%) Negative: 5 (0–59%)
Ocena znanja iz računalniških vaj, izdelki posameznih računalniških vaj	30,00 %	The assessment of knowledge of computer tutorials, individual computer exercises

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:
Možina, K., <i>Knjižna tipografija</i>. Ljubljana : Filozofska fakulteta in Naravoslovnotehniška fakulteta, 2003, https://www.dlib.si/stream/URN:NBN:SI:DOC-6YLGQIG8/64f60a3c-ec5e-4293-adc9-674b38605004/PDF. Možina, K., <i>Mikrotipografija</i>. Ljubljana : Naravoslovnotehniška fakulteta, 2009, https://image.linotype.com/files/pdf/Mikrotipografija.pdf. Možina, K., <i>Tipografska kunšt: Upodobitev informacij</i>. Ljubljana: Naravoslovnotehniška fakulteta, 2023. Možina, K., Bračko, S., Kovačević, D., Blaznik, B., Možina, K. Legibility of prints on paper made from Japanese knotweed. <i>Bioresources</i>, vol. 15, no. 2, str. 3999–4015, 2020.

TIPOGRAFIJA V RAZLIČNIH MEDIJAH

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Tipografija v različnih medijih
Course title:	Typography in various media
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Grafične in interaktivne komunikacije, prva stopnja, univerzitetni	Ni členitve (študijski program)	3. letnik	1. semester	obvezni

Univerzitetna koda predmeta/University course code:	0089497
Koda učne enote na članici/UL Member course code:	10079

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: Klementina Možina

Vrsta predmeta/Course type: Obvezni/Compulsory

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

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

Vpis v letnik študija.
Za pristop h končnemu izpitu so pogoji: opravljene vse zadolžitve in pozitivno ocenjeno znanje pridobljeno pri (računalniških) vajah, opravljeno in predstavljeno seminarsko delo ter opravljen izpit pri predmetu Tipografija (2. letnik). Pri čemer mora biti prisotnost pri vajah in seminarju 100%.

Prerequisites:

Enrolment in the programme.
For the final exam conditions are: completed all assignments and a positive assessment of the knowledge acquired in the (computer) exercises, completed and presented seminar work, and passed course Typography (2nd year). Attendance at exercises and seminars must be 100%.

Vsebina:

Spoznavanje vpliva posameznih umetnostnih slogov in različnih tehnoloških možnosti na tipografijo; različni mediji; umetnostni slogi; uporabnost tipografije v različnih medijih in za različne vrste besedila; vidnost, čitljivost, branje, percepcija, naprave za sledenje očesnim premikom; oblikovanje in načrtovanje pisav; vpliv barve na uporabnost tipografije v različnih medijih in za različne vrste besedila; zapisi obdelanega besedila za različne medije.

Content (Syllabus outline):

Learning about the influence of individual styles and various technological possibilities on typography; various media; artistic styles; the use of typography in various media and for various type of text; visibility, legibility, reading and perception, eyetracking technology; typeface design; the effect of colour on the usability of a typography in various media and for various type of text; identifying and using different font formats; entry of a processed text.

Temeljna literatura in viri/Readings:

Cheng, K., *Designing Type*. London : Laurence and King, 2020.
 Možina, K., Barva v tipografiji. V *Interdisciplinarnost barr*, 1. del., Maribor : Društvo koloristov Slovenije, str. 341–364, 2001.
 Možina, K., *Knjižna tipografija*. Ljubljana : Filozofska fakulteta in Naravoslovnotehniška fakulteta, 2003,
<https://www.dlib.si/stream/URN:NBN:SI:DOC-6YLGQIG8/64f60a3c-ec5e-4293-adc9-674b38605004/PDF>.
 Tracy, W., *Letters of credit: A view of type design*. London : Gordon Fraser Gallery, 2003.
 Trufte, E. R., *The Visual Display of Quantitative Information*. Cheshire : Graphics press, 2001.
Literatura je dostopna v knjižnici Oddelka za tekstilstvo, grafiko in oblikovanje, NTF.

Cilji in kompetence:

Cilji:

Študent spozna pomen razvoja tehnologije glede na zapise nabora črkovnih znakov in njihovo uporabo. Spozna vpliv posameznih umetnostnih slogov na tipografijo. Spozna elemente, ki vplivajo na čitljivost različnih vrst besedila v različnih medijih, spozna različne metode preverjanja čitljivosti, vključno s tehnologijo za sledenje očesnim premikom. Spozna tehnološke in oblikovne zahteve pri načrtovanju in oblikovanju pisav. Seznani se s primerno pripravo besedila za tipografsko oblikovanje, z različnimi računalniškimi programi za obdelavo besedila in različnimi zapisi obdelanega besedila za različne medije.

Predmetno specifične kompetence:

- poznavanje in razumevanje pomena in uporabnosti posameznih elementov tipografije za različne grafične izdelke in v različnih medijih,
- poznavanje različnih metod in tehnologij vrednotenja čitljivosti besedila,
- poznavanje vloge posameznih elementov oblikovanja pisav,
- uporaba estetskih parametrov pri načrtovanju in oblikovanju pisave,
- sposobnost za reševanje konkretnih delovnih problemov v pripravi besedila za različne grafične izdelke in v različnih medijih,
- sposobnost umeščanja novih interpretacij (tehnoloških rešitev za različne grafične izdelke in v različnih medijih) v kontekst temeljnega področja tipografije,
- koherentno obvladovanje temeljnega tipografskega znanja in sposobnost povezovanja s potrebami nadaljnih grafičnih in/ali informacijskih proizvodnih postopkov za različne grafične izdelke in v različnih medijih.

Objectives and competences:

Objectives:

Student learns about the importance of developing technologies according to the records set of typographic characters and their use. Realizes the impact of individual artistic styles on typography. Learns about the elements that affect the legibility of different types of texts in different media, learns about different methods of checking legibility, including eyetracking technology. Learns about the technological and design requirements for designing typefaces. Knows about the proper preparation of the text of the typographical design, with various computer programs and a variety of records processed text for a number of different media.

Subject-specific competencies:

- knowledge and understanding of the importance and usefulness of individual elements of typography in various graphic products and in various media,
- knowledge of different methods and techniques of evaluation legibility,
- knowledge of the role of individual type design elements,
- the use of aesthetic parameters in the design of the typeface,
- the ability for preventing the specific working problems of text in the drafting of different graphic products and in various media,
- the ability to include new interpretations (technology solutions for a variety of graphic products and in various media) in the context of the basic typography,
- coherent management of the basic typographic skills and ability to connect with the needs of further graphics and/or information production processes for a variety of graphic products and in various media.

Predvideni študijski rezultati:

Znanje in razumevanje:

Pozna posamezne tipografske elemente in njihovo vplivnost na čitljivost besedila; pozna vpliv različnih umetnostnih slogov na tipografijo; pozna raznolikosti posredovanja informacij za različne grafične izdelke in v različnih medijih; zna uporabiti različne metode za preverjanje čitljivosti, vključno s tehnologijo za

Intended learning outcomes:

Knowledge and understanding:

Learns specific typographic elements and their influence on the legibility; aware of the impact of different artistic styles on typography; learns diversity to provide information for a variety of graphic products and in various media; knows to use various methods for legibility, including eyetracking

sledenje očesnim premikom; zna upoštevati tehnološke in oblikovne zahteve pri načrtovanju in oblikovanju pisav; zna pripraviti, obdelati in zapisati besedilo za različne medije. Razume pomen tehnološkega razvoja in njegovega vpliva na tipografsko oblikovanje; razume različne pojavne oblike čitljivosti povezane s tehnološkim razvojem; razume vlogo vidnosti in čitljivosti v različnih grafičnih izdelkih in za različne medije, razume uporabo tehnologije za sledenje očesnim premikom; razume pomen kakovostne priprave, obdelave in zapisa besedila za nadaljne grafične in/ali informacijske postopke.	technology; knows how to take account of technological and design requirements for the designing typefaces; knows how to prepare and process typography for different media. He/She understands the importance of technological development and its impact on the typographic design; understand the different forms of legibility related to technological development; understands the visibility and legibility of different graphic products and for various media, also understands the use of eyetracking technology; understands the importance of quality in producing, processing and format text for further graphic and/or information procedures.
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Metode poučevanja in učenja:	Learning and teaching methods:
Predavanja, seminarsko delo, računalniške vaje, vodeno individualno delo. Končna naloga pri vajah je v medpredmetni povezavi s Studijsko fotografijo. Pri delu študenti dobijo gradivo na spletnih povezavah predmeta. Predavanja, seminarji in vaje se lahko izvajajo v živo (predavalnica, računalniška učilnica) in/ali na daljavo z uporabo primerne programske opreme.	Lectures, seminar work, computer exercises, guided individual work. The final assignment in the exercises is in the cross-curricular connection with Studio photography. During work, students get material on the online links of the subject. Lectures, seminars and exercises can be conducted in a classroom/a computer room and/or online using suitable software tools.

Načini ocenjevanja:	Delež/Weight	Assessment:
Pisni izpit ali pisni in usni izpit (v predavalnici ali na daljavo) Pozitivno: 6–10 (60–100 %) Negativno: 5 (0–59 %)	60,00 %	Written exam or written and oral exam (in a classroom or online) Positive: 6–10 (60–100%) Negative: 5 (0–59%)
Ocena znanja iz računalniških vaj, izdelki posameznih računalniških vaj in seminarska naloga	40,00 %	The assessment of knowledge of computer tutorials, individual computer exercises and 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:
Možina, K., Barva v tipografiji. V <i>Interdisciplinarnost barv</i>, 1. del., Maribor : Društvo koloristov Slovenije, str. 341–364, 2001. Franken, G., Podlesek, A., Možina, K., Eye-tracking study of reading speed from LCD displays: influence of type style and type size, <i>Journal of eye movement research</i>, vol. 8, no. 1, str. 1–8, 2015. Kovačević, D., Brozović, M., Možina, K. Improving visual search in instruction manuals using pictograms. <i>Ergonomics</i>, vol. 59, no. 11, str. 1405–1419, 2016. Možina, K., Podlesek, A., Bračko, S. Preserving typographic cultural heritage using contemporary digital technology. <i>Journal of cultural heritage</i>, vol. 36, [No.] mar.–apr., str. 166–173, 2019. Možina, K., Bračko, S., Kovačević, D., Blaznik, B., Možina, K. Legibility of prints on paper made from Japanese knotweed. <i>Bioresources</i>, vol. 15, no. 2, str. 3999–4015, 2020.

TISKARSKI POSTOPKI 1

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Tiskarski postopki 1
Course title:	Printing processes 1
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Grafične in interaktivne komunikacije, prva stopnja, univerzitetni	Ni členitve (študijski program)	1. letnik	1. semester	obvezni

Univerzitetna koda predmeta/University course code:	0089482
Koda učne enote na članici/UL Member course code:	11274

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	30	0	15	90	6

Nosilec predmeta/Lecturer:	Deja Muck
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Vrsta predmeta/Course type:	Obvezni/Compulsory
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Jeziki/Languages:	Predavanja/Lectures:	Angleščina, Slovenščina
	Vaje/Tutorial:	Angleščina, Slovenščina

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

Vpis v program. Pogoj za opravljanje obveznosti je prisotnost na predavanjih, seminarjih in vajah. Zahtevana prisotnost na vajah je 100 %.

Prerequisites:

Enrolment in the programme. Attendance at lectures, seminars and tutorials is a prerequisite for fulfilling obligations. The attendance requirement for tutorials is 100%.

Vsebina:

Uvod v grafične medije:
-svetloba, barva, mešanje barv, rastriranje,
-izdelava barvnih izvlečkov, RIP (rastrski
upodobitveni procesor)

Pregled, delitev in primerjava različnih
konvencionalnih in digitalnih tehnologij tiska.
Vrednotenje kakovosti tiska na osnovi
denzitometričnih in spektrofotometričnih analiz.
Tehnologija ofsetnega tiska, tiskarski stroji za tisk na
pole:
-konstrukcijske značilnosti sodobnih tiskarskih
strojev
-tiskovni členi, vlagalni, prenosni, obračalni in
izlagalni sistemi

Content (Syllabus outline):

Introduction into graphic media:
-light, colour, mixing of colours, halftoning, colour
separations, RIP (Raster Image Processor).

An overview, classification and comparison of
various conventional and digital printing
technologies.
Evaluation of print quality on the basis of
densitometric and spectrophotometric analysis.
Printing machines for sheet-fed offset printing:
- construction of modern printing machines
- printing unit, feeder and delivery units, perfecting
units
- dampfening and color units
- drying of prints

-vlažilni in barvilni sistemi -sušenje odtisov Akcidenčne ofsetne rotacije: -konstrukcijske značilnosti sodobnih tiskarskih strojev -tiskovni členi, vlažilni in barvni sistemi -vlagalni in izlagalni sistemi -sušenje odtisov Oplemenitenje tiskovin -premazovanje, lakiranje Dejavniki, ki vplivajo na kakovost ofsetnega tisa: vrsta rastra -tiskarska barva in tiskovni material -gumijeva prevleka (napona) -vrsta tiskarskega stroja -tiskovna forma ...	Web-fed offset printing machines: - construction of modern printing machines - printing unit, dampening and color systems - feeder and delivery systems - drying of prints Print finishes: -coating, varnishing Factors affecting the quality of offset printing: - type of halftone screening -ink and printing material - offset blanket - type of printing machine - printing form -...
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Temeljna literatura in viri/Readings:

- KUZNETSOV, Y. V., Principles of Image Printing Technology, Springer, 2021.
 - MAJNARIĆ I., Osnove digitalnog tiska, Manualia Universitatis studiorum Zagrabensis, 2015.
 - KUMAR, M. Tehnologija grafičnih procesov, Tretja, prenovljena in razširjena izdaja, Center RS za poklicno izobraževanje, Ljubljana, 2008.
 - KIPPAN, H. Handbook of Print Media : Technologies and Production Methods. Berlin [etc.] : Springer, 2001.
 - AULL, M. Tehnologija tiska. Ljubljana : Tehniška založba Slovenije, 1997.
 - MacPHEE, J. Fundamentals of Lithographic Printing, Pittsburgh : GATF Press, 1998.
 - FIELD, G. Color and Its Reproduction. Pittsburgh : GATF Press, 1999.
 - LEUTERT, A. Allgemeine Fachkunde der Drucktechnik. Baden : Baden Verlag, 1993.
 - TESCHNER, H. Offsetdrucktechnik. Fellbach : Fachschriften Verlag, 1997.
 - SCHLÄPFER, K. Farbmessung in der Reproduktionstechnik und im Mehrfarbendruck. St. Gallen : UGRA, 1993.
 - LOOS, H. Farbmessung. Itzehoe : Verlag Beruf+Schule, 1989.
- Dodatna literatura in viri/Supplementary literature:
- ZAPKA W., Handbook of Industrial Inkjet Printing, Wiley-VCH Verlag GmbH & Co. KGaA, 2018.
 - Spletni strani proizvajalcev ofsetnih tiskarskih strojev (Heidelberg, MAN Roland, KBA, Komori, Müller-Martini ...), tiskovnih materialov (Sappi ...), tiskarskih barv (Flint Ink, Sun Chemical, Huber ...) in naprav za vodenje procesov (X-Rite, Techkon ...).
 - Spletna stran The Print Guide, Gordon Pritchard.
 - Standardi (SIST-ISO), specifikacije (Fogra, SystemBrunner, IFRA, SWOP, SNAP, GraCol, NAA ...).

Cilji in kompetence:

Poznavanje in razumevanje osnov barvnega reproduciranja.
 Poznavanje in razumevanje konvencionalnih in digitalnih tiskarskih tehnik.
 Poznavanje in razumevanje prednosti in pomanjkljivosti različnih tiskarskih tehnik in konstrukcijskih značilnosti tiskarskih strojev in rotacij.
 Sposobnost povezovanja znanja z različnih področij in aplikacij na podlagi poznavanja tehnik tiska in tehnologije oplemenitenja tiskovin.
 Sposobnost umeščanja novih informacij in spoznanj na področju tehnike ofsetnega tiska in oplemenitenja tiskovin na tiskarskem stroju.
 Razumevanje in uporaba standardiziranih

Objectives and competences:

Knowledge and understanding of colour reproduction.
 Knowledge and understanding of conventional and digital printing techniques.
 Knowledge and understanding of the strengths and weaknesses of different printing techniques and structural characteristics of printing machines and rotations.
 Ability to integrate knowledge from different fields and applications based on the knowledge of printing techniques and technology of processing of prints.
 Ability to include new information and knowledge in the field of art offset printing and finishing printed on a printing machine.
 Understanding and use of standardized testing

preskuševalnih metod za vodenje procesa tiska in določanju kakovosti odtisov.	methods for the management of the printing process and determining the quality of prints.
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Predvideni študijski rezultati: Znanje in razumevanje: Študentje bodo osvojili najnovejša znanja s področja vseh najpomembnejših tehnologij tiska. Pridobili bodo tudi praktična znanja s področja tiska. Spoznali bodo vzroke za nastanek napak in odpravo le teh.	Intended learning outcomes: Knowledge and understanding: Students will get the latest knowledge in the field of the most important printing technologies. They will also gain practical knowledge in the field of printing. They will learn the causes of the defects and the elimination of them.
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Metode poučevanja in učenja: Predavanja, seminarji, laboratorijske vaje in / ali projektno delo potekajo v predavalnici, v laboratoriju in / ali preko spleta s pomočjo ustrezne opreme.	Learning and teaching methods: Lectures, seminars, laboratory exercises, and/or project work will take place in the lecture hall, in the laboratory, and/or online using appropriate equipment.
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Načini ocenjevanja:	Delež/Weight	Assessment:
Teoretični del, predavanja: pisni in/ali ustni izpit	60,00 %	Theoretical part, lectures: written and/or oral exam
Vaje	40,00 %	Tutorial

Ocenjevalna lestvica: 5 - 10, pri čemer velja, da je pozitivna ocena od 6 - 10	Grading system: 5 - 10, a student passes the exam if he is graded from 6 to 10
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Reference nosilca/Lecturer's references: Izvirni znanstveni članki / Original scientific article: GREGOR-SVETEC, Diana, LESKOVŠEK, Mirjam, VRABIČ BRODNJAK, Urška, STANKOVIČ ELESINI, Urška, MUCK, Deja, URBAS, Raša. Characteristics of HDPE/cardboard dust 3D printable composite filaments. <i>Journal of materials processing technology</i> . February 2020, vol. 276, 9 str. KAVČIČ, Urška, MRAOVIČ, Matija, BRACKO, Sabina, MUCK, Deja. Printed thermochromic displays. <i>Coloration technology : the journal of the Society of Dyers and Colourists</i> . Feb. 2019, vol. 135, no. 1, str. 60-66. AHTIK, Jure, MUCK, Deja, STAREŠINIČ, Marica. Detail diversity analysis of novel visual database for digital image evaluation. <i>Acta polytechnica Hungarica</i> . 2017, vol. 14, no. 6, str. 115-132. KLANČNIK, Maja, RIJAVEC, Brigita, PIVAR, Matej, MUCK, Deja. Vpliv substrata in nanosa tiskarske barve na delovanje RFID-anten = Influence of printing material and printing ink layer on RFID antenna operation. <i>Tekstilec : glasilo slovenskih tekstilcev</i> . [Tiskana izd.]. 2018, vol. 61, no. 3, str. 162-170. VRABIČ BRODNJAK, Urška, MUCK, Deja. Printing quality of chitosan-rice starch coated packaging paper. <i>Bulgarian chemical communications</i> . [Print ed.]. 2017, vol. 49, special iss. 1, str. 86-92. Mentorstvo pri diplomskih delih / Supervisor for undergraduate theses: BRCE, Jon. <i>Izdelava in uporaba 3D tiskane forme za slepi tisk : diplomsko delo = Design and production of travel journal : diploma thesis</i> . Ljubljana: [J. Brce], 2020. XII, 43 f., ilustr. DJURIĆ, Aleš. <i>Izdelava nalepk in magnetov s termokromnimi barvami : diplomsko delo = Printing of stickers and magnets using thermochromic colors : diploma thesis</i> . Ljubljana: [A. Djurić], 2020. IX, 37 str., ilustr. ROŠER, Anja. <i>Izdelava pripomočka za prepoznavanje in učenje barv slabovidnih otrok : diplomsko delo = Development of accessory for easier learning and recognition of colours for visually impaired children : diploma thesis</i> . Ljubljana: [A. Rošer], 2020. XI, 31 f., ilustr. ŽIŽEK, Mojca. <i>Reliefna reprodukcija umetniškega dela : diplomsko delo = Relief reproduction of an artwork : diploma thesis</i> . Ljubljana: [M. Žžek], 2020. XIII, 59 f., ilustr. KOBAL, Ivana. <i>Tisk na tekstil z uporabo funkcionalnih barv : diplomsko delo = Printing on textile with functional inks : diploma thesis</i> . Ljubljana: [I. Kobal], 2020. VIII, 33 f., ilustr.

TISKARSKI POSTOPKI 2

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Tiskarski postopki 2
Course title:	Printing processes 2
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Grafične in interaktivne komunikacije, prva stopnja, univerzitetni	Ni členitve (študijski program)	2. letnik, 3. letnik	2. semester	izbirni

Univerzitetna koda predmeta/University course code:	0089458
Koda učne enote na članici/UL Member course code:	10893

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	30	0	15	90	6

Nosilec predmeta/Lecturer:	Deja Muck
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Vrsta predmeta/Course type:	Izbirni /Elective
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Jeziki/Languages:	Predavanja/Lectures:	Angleščina, Slovenščina
	Vaje/Tutorial:	Angleščina, Slovenščina

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

Vpis v program. Pogoj za opravljanje obveznosti je prisotnost na predavanjih, seminarjih in vajah. Zahtevana prisotnost na vajah je 100 %.

Prerequisites:

Enrolment in the programme. Attendance at lectures, seminars and tutorials is a prerequisite for fulfilling obligations. The attendance requirement for tutorials is 100%.

Vsebina:

Poglobljeno spoznavanje fizikalno-kemijskih osnov:

- konvencionalnih tehnologij: flekso tiska in sitotiska,
- digitalnih tehnologij: kapljični tisk, elektrofotografija,
- najnovejši razvoj tehnologij tiska

Spoznati specifične lastnosti posameznih tehnologij njihovih prednosti in slabosti ter dejavnikov, ki vplivajo na tiskarsko in tiskovno prehodnost;

Standardizacija procesov tiska;
Povezava tehnologij tiska z grafično pripravo (osnove RIP) in grafično dodelavo;
Spoznavanje osnov tiska elektronike, funkcionalnega

Content (Syllabus outline):

In depth learning about the physical and chemical basics of:

- conventional printing technologies: flexography and screen printing,
- digital printing technologies: electrophotography, inkjet
- the latest development of printing technologies

Recognize the specific features of individual technologies, their advantages, disadvantages and quality factors, which affect runability and printability;
Standardization of printing process;
Interaction of printing with prepress (basics of RIP) and print finishing
The basics of printed electronics, functional printing

tiska in 3D-tiska; Izdelava poskusnega tiska pri digitalnih tehnologijah in prototipov pri tisku elektronike in 3D-tisku.	and basics of 3D printing. Creating a soft- and hard-proof with digital technologies and prototypes at printing electronics and 3D-printing.
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Temeljna literatura in viri/Readings:

- KUZNETSOV, Y. V., Principles of Image Printing Technology, Springer, 2021.
 - ZAPKA W., Handbook of Industrial Inkjet Printing, Wiley-VCH Verlag GmbH & Co. KGaA, 2018.
 - MAJNARIĆ I., Osnove digitalnog tiska, Manualia Universitatis studiorum Zagrabienensis, 2015.
 - KUMAR, M. Tehnologija grafičnih procesov, Tretja, prenovljena in razširjena izdaja, Center RS za poklicno izobraževanje, Ljubljana, 2008.
 - HIRD, K., F., FINLEY, C., E., Offset Lithographic Technology, fourth edition, 2009
 - KIPPHAN, H. Handbook of Print Media. Berlin [etc.] : Springer, 2001.
 - SUGUMAR, C. The Technique of Screen Printing, Published by C. Sugumar, Kandy, Sri Lanka, 2011.
 - ROSEN, M., OHTA, N. Color Desktop printer Technology, Taylor&Francis, CRC Press, 2006.
 - Flexography : Principles and Practices. Ronkonkoma : Foundation of Flexographic Technical Association, 1997.
 - GIORGIANI, E. J., in MADDEN, T. E. Digital Color Management : Encoding Solutions. Reading : Addison-Wesley, 1998.
 - BRTESS, S. Postscriptum on Color Management. LOGO, 1999.
 - HOFF, S. Screen Printing : Contemporary Approach. Albany [etc.] : Delmar Publishers, 1997.
 - Handbook for Screen Printers. Thal : SEFAR, 1999.
- Dodatna literatura in viri/Supplementary literature:
- ZAPKA W., Handbook of Industrial Inkjet Printing, Wiley-VCH Verlag GmbH & Co. KGaA, 2018.
 - ABBOTT, S., How to be a great Screen printer, MacDermid Autotype Ltd, 2008.
 - Spletne strani proizvajalcev ofsetnih tiskarskih strojev (Heidelberg, MAN Roland, KBA, Komori, Müller-Martini ...), tiskovnih materialov (Sappi ...), tiskarskih barv (Flint Ink, Sun Chemical, Huber ...) in naprav za vodenje procesov (X-Rite, Techkon ...).
 - Spletna stran The Print Guide, Gordon Pritchard.
 - Standardi (SIST-ISO), specifikacije (Fogra, SystemBrunner, IFRA, SWOP, SNAP, GraCol, NAA ...).

Cilji in kompetence:

Študenti poglobljeno spoznajo fizikalno-kemijske osnove perspektivnih konvencionalnih in digitalnih tehnologij tiska;
Spoznajo standarde vsake posamezne tehnologije tiska. Seznanijo se z vlogo in izdelavo poskusnega tiska;
Seznani se z vlogo in delovanjem RIP-a v digitalnih in digitaliziranih procesih tiska;
Seznani se z osnovami tiska elektronike, funkcionalnega tiska in 3D tiska.

Objectives and competences:

Students learn in-depth physico-chemical bases of prospective conventional and digital printing technologies;
Get information about standardization of each printing technologies.
Get acquainted with the role and making soft and hard proofs;
Get acquainted with the role and functioning of RIP in digital and digitized printing processes;
Get acquainted with the basics of printing electronics, functional printing and 3D printing.

Predvideni študijski rezultati:

Znanje in razumevanje:
Pozna fizikalno-kemijske osnove najpomembnejših konvencionalnih in digitalnih tehnologij tiska;
Pozna standarde posameznih tehnologij tiska.
Pozna tehnike poskusnega tiska in tehnike določanja kakovosti odtisov;
Razume povezovanje tiska z grafično pripravo in dodelavo, vpliv različnih dejavnikov na kakovost tiska ter potrebo po vodenju procesa tiska z upoštevanjem vpliva različnih procesnih spremenljivk, razume in pozna standarde;

Intended learning outcomes:

Knowledge and understanding:
Knowing of physico-chemical bases about the most important conventional and digital printing technologies;
Knowing the standards for each printing technologies.
Knowing the techniques for making soft- and hard-proofs and methods for print quality determination;
Understanding the connecting of printing with prepress and print finishing, the impact of various factors on print quality and the need for printing

Pozna osnove tiska elektroniške, funkcionalnega tiska in 3D tiska.	process management, understands and knows the standards; Knowing the basics of printing electronics, functional printing and 3D printing.
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Metode poučevanja in učenja:	Learning and teaching methods:
Predavanja, seminar, laboratorijske vaje, projektno delo potekajo v predavalnici ali laboratoriju in / ali preko spleta s pomočjo ustrezne opreme.	Lectures, seminars, laboratory exercises, project work take place in a lecture hall or laboratory and/or online using appropriate equipment.

Načini ocenjevanja:	Delež/Weight	Assessment:
Teoretični del, predavanja: pisni in / ali ustni izpit	50,00 %	Theoretical part, lectures: written and / or oral exam
Seminarska naloga in / ali poročilo o projektne delu	20,00 %	Seminar and / or report of project work
Vaje	30,00 %	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:

Izvirni znanstveni članki / Original scientific article:

GREGOR-SVETEC, Diana, LESKOVŠEK, Mirjam, VRABIČ BRODNJAK, Urška, STANKOVIČ ELESINI, Urška, MUCK, Deja, URBAS, Raša. Characteristics of HDPE/cardboard dust 3D printable composite filaments. *Journal of materials processing technology*. February 2020, vol. 276, 9 str.

KAVČIČ, Urška, MRAOVIČ, Matija, BRAČKO, Sabina, MUCK, Deja. Printed thermochromic displays. *Coloration technology : the journal of the Society of Dyers and Colourists*. Feb. 2019, vol. 135, no. 1, str. 60-66.

AHTIK, Jure, MUCK, Deja, STAREŠINIČ, Marica. Detail diversity analysis of novel visual database for digital image evaluation. *Acta polytechnica Hungarica*. 2017, vol. 14, no. 6, str. 115-132.

KLANČNIK, Maja, RIJAVEC, Brigita, PIVAR, Matej, MUCK, Deja. Vpliv substrata in nanosa tiskarske barve na delovanje RFID-anten = Influence of printing material and printing ink layer on RFID antenna operation. *Tekstilec : glasilo slovenskih tekstilcev*. [Tiskana izd.]. 2018, vol. 61, no. 3, str. 162-170.

VRABIČ BRODNJAK, Urška, MUCK, Deja. Printing quality of chitosan-rice starch coated packaging paper. *Bulgarian chemical communications*. [Print ed.]. 2017, vol. 49, special iss. 1, str. 86-92.

Mentorstvo pri diplomskih delih / Supervisor for undergraduate theses:

BRCE, Jon. *Izdelava in uporaba 3D tiskane forme za slepi tisk : diplomsko delo = Design and production of travel journal : diploma thesis*. Ljubljana: [J. Brce], 2020. XII, 43 f., ilustr.

DJURIČ, Aleš. *Izdelava nalepk in magnetov s termokromnimi barvami : diplomsko delo = Printing of stickers and magnets using thermochromic colors : diploma thesis*. Ljubljana: [A. Djurič], 2020. IX, 37 str., ilustr.

ROŠER, Anja. *Izdelava pripomočka za prepoznavanje in učenje barv slabovidnih otrok : diplomsko delo = Development of accessory for easier learning and recognition of colours for visually impaired children : diploma thesis*. Ljubljana: [A. Rošer], 2020. XI, 31 f., ilustr.

ŽIŽEK, Mojca. *Reliefna reprodukcija umetniškega dela : diplomsko delo = Relief reproduction of an artwork : diploma thesis*. Ljubljana: [M. Žižek], 2020. XIII, 59 f., ilustr.

KOBAL, Ivana. *Tisk na tekstil z uporabo funkcionalnih barv : diplomsko delo = Printing on textile with functional inks : diploma thesis*. Ljubljana: [I. Kobal], 2020. VIII, 33 f., ilustr.

TISKOVNE FORME

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Tiskovne forme
Course title:	Printing plates
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Grafične in interaktivne komunikacije, prva stopnja, univerzitetni	Ni členitve (študijski program)	2. letnik	2. semester	obvezni

Univerzitetna koda predmeta/University course code:	0089492
Koda učne enote na članici/UL Member course code:	10953

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	15	0	0	60	4

Nosilec predmeta/Lecturer:	Maja Klančnik
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Vrsta predmeta/Course type:	Obvezni/Compulsory
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Jeziki/Languages:	Predavanja/Lectures:	Slovenščina
	Vaje/Tutorial:	Slovenščina

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

Prerequisites:

Vpis v letnik študija. Pogoj za opravljanje študijskih obveznosti je prisotnost pri predavanjih, seminarju in vajah. Zahtevana prisotnost na vajah je 100 %. Za pristop k izpitu je pogoj opravljen seminar in kolokvij iz laboratorijskih vaj.

Enrolment into the study year. Prerequisite to complete study obligations is participation at lectures, seminar and tutorials. Requested presence at tutorials is 100 %. Student can attend the exam after passing the tutorials and the seminar.

Vsebina:

Tiskarska plošča, tiskovna forma: funkcija, sestava, materiali.
Osnovne razlike tiskovnih form v posameznih klasičnih tehnikah tiska.
Fotokemični in mehanski postopki pri izdelavi tiskovne forme. Pozitivni in negativni kopirni postopek. Klasična in digitalna izdelava tiskovne forme. Upodobljevalne enote. Digitalna izdelava tiskovne forme izven (iz računalnika na tiskarsko ploščo) in v tiskarskem stroju (iz računalnika na tiskarski stroj/direktno upodabljanje).
Struktura tiskarskih plošč in tehnologije izdelave

Content (Syllabus outline):

Printing plates, printing master: function, composition, materials.
Basic differences of printing masters in the classical printing techniques.
Photochemical and mechanical procedures in the platemaking process. Positive and negative copying procedure. Analog and digital platemaking. Plate imagesetters. Digital platemaking outside (Computer to Plate) and inside the printing presses (Computer to Press/ Direct Imaging).
Composition of printing plates and technologies of platemaking for wet offset and waterless offset

tiskovne forme za mokri in suhi ofsetni (ploski) tisk. Struktura tiskarskih plošč in tehnologije izdelave tiskovne forme za fleksotisk. Struktura tiskarskih plošč in tehnologije izdelave tiskovne forme za knjigotisk. Sita in tehnologije izdelave tiskovne forme (šablone) za sito tisk Struktura gravurnih valjev in tehnologije izdelave tiskovne forme za globoki tisk. Struktura tiskarske plošč in tehnologije izdelave tiskovne forme za tampotisk.	printing. Composition of printing plates and technologies of platemaking for flexographic printing. Composition of printing plates and technologies of platemaking for letterpress printing. Screens and technologies of platemaking for screen printing. Composition of gravure cylinders and technologies of platemaking for gravure printing. Composition of printing plates and technologies of platemaking for pad transfer printing.
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Temeljna literatura in viri/Readings:

- Klančnik, Maja. *Tiskovne forme : študijsko gradivo*. Ljubljana: Naravoslovnotehniška fakulteta, Oddelek za tekstilstvo, grafiko in oblikovanje, 2021. 1 zv. (loč. pag.), ilustr. [COBISS.SI-ID [73356547](#)],
- Kipphan, H. Handbook of Print Media, Technologies and Production Methods. Verlag; Berlin; Heidelberg; New York : Springer, 2001.
- Eldred, N. R. Chemistry for the Graphic Arts. 3rd edition. Pittsburg : GafPress, 2001.
- Thomson, B. Printing Materials: Science and Technology. Letherhead : Pira Int., 1998.
- Crouch, J. P. Flexography Primer. 2nd edition. Pittsburg : GafPress, 2000.
- Flexo Printing Technology. Edited by K. H. Meyer. 4th edition. St. Galen : Coating Books for specialists, 2000.
- Hudoklin, V., in Appolonio, Z. Sitotisk, Ljubljana : ČGP Delo, 1978.
- Dyknes, Y. Flexography: Principles & Practise. Vol. 4. 5th edition. Ronkonkoma : Foundation of flexographic technical association, 1999.

Cilji in kompetence:

Študent se podrobno seznani z vrstami tiskarskih plošč za različne tehnike tiska. Spozna klasične in digitalne tehnološke postopke izdelave različnih tiskovnih form in se nauči izdelati tiskovne forme najbolj zastopanih tehnik tiska. Seznani se s kemijskimi reakcijami in fizikalno kemijskimi spremembami, ki se dogajajo v posameznih fazah izdelave tiskovne forme.

Kompetence:

- poznavanje in razumevanje osnov ter razvoja tiskarskih plošč in tehnologij izdelave tiskovnih form za različne tehnike tiska,
- sposobnost razlikovanje med različnimi vrstami tiskarskih plošč, postopki izdelave tiskovne forme in tehnikami tiska,
- sposobnost uvajanja in vodenja tehnologije izdelave tiskovnih form,
- sposobnost uporabe teoretičnega znanja in ugotovitev za kritično analiziranje in reševanje konkretnih delovnih problemov,
- poznavanje strokovne terminologije,
- sposobnost umeščanja novih znanj in informacij v kontekst grafične stroke.

Objectives and competences:

The students are precisely introduced to different types of printing plates for different printing techniques. They get knowledge about analogue and digital technological procedures of platemaking of different printing masters and how to make printing master for the most often printing techniques. They are introduced with chemical and physical-chemical changes in the individual phases of platemaking.

Competences:

- knowing and understanding the bases and development of printing plates and technologies of platemaking for different printing techniques,
- ability to distinguish between different types of printing plates, procedures of platemaking and printing techniques,
- ability to introduce and lead the technology of platemaking,
- ability to use of theoretical knowledge and findings for critical analyses and solving working problems,
- knowing the professional terminology,
- ability to apply newly gained knowledge and information into graphic professional field.

Predvideni študijski rezultati:

Poznavanje strukture različnih tiskarskih plošč. Razumevanje razlike med tiskovnimi formami za različne tehnike tiska. Razumevanje principa

Intended learning outcomes:

Knowing the composition of different printing plates. Understanding the differences between printing masters for different printing techniques.

pozitivnega in negativnega postopka izdelave tiskovne forme. Razumevanje fotokemičnih in fizikalnih procesov izdelave. Razumevanje klasičnega in digitalnega postopka upodabljanja tiskarskih plošč. Poznavanje digitalnih osvetljevalnih (upodobljevalnih) enot. Poznavanje in razumevanje različnih tehnologij, kemijskih reakcij in fizikalno kemijskih sprememb v posameznih fazah izdelave tiskovnih form. Poznavanje stanja izdelave tiskovne forme doma in v svetu.	Understanding the principle of positive and negative procedure of platemaking. Understanding the photochemical and physical processes of platemaking. Understanding the classical and digital procedures of imaging of printing plates. Knowing the plate imagesetters. Knowing and understanding the different technologies, chemical reactions, physical-chemical changes in the particular phases of platemaking. Knowing the state of platemaking at home and in the world.
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Metode poučevanja in učenja:	Learning and teaching methods:
Predavanja, seminar, laboratorijske vaje, ki potekajo v predavalnici oziroma v laboratoriju in/ali preko spleta s pomočjo ustrezne računalniške opreme.	Lectures, seminar, tutorials, that take place in a classroom or in a laboratory and/or online using appropriate computer equipment.

Načini ocenjevanja:	Delež/Weight	Assessment:
Vaje	20,00 %	Tutorial
Seminarska naloga	10,00 %	Seminar
Pisni/Ustni izpit Ocena: pozitivno: 6–10, negativno: 5.	70,00 %	Written/Oral exam Positive: 6–10; Negative: 5.

Ocenjevalna lestvica:	Grading system:

Reference nosilca/Lecturer's references:
1. KLANČNIK, Maja. Printing with natural dye extracted from Impatiens glandulifera Royle. Coatings. 13 April 2021, vol. 11, iss. 4, str. 1-12, ilustr. ISSN 2079-6412. 2. KLANČNIK, Maja. Screen printing with natural dye extract from Japanese knotweed rhizome. Fibers and polymers. 19 May 2021, vol. , no. , 9 str. ISSN 1229-9197. 3. JEREB, Ana, JAVORŠEK, Dejana, KLANČNIK, Maja. Comparision of two thermal decomposition offset printing plates. Acta graphica, ISSN 0353-4707. [Print ed.], 2014, vol. 25, no. 3/4, str. 91-100, ilustr. 4. KLANČNIK, Maja, RIJAVEC, Brigita, PIVAR, Matej, MUCK, Deja. Vpliv substrata in nanosa tiskarske barve na delovanje RFID-anten = Influence of printing material and printing ink layer on RFID antenna operation. <i>Tekstilec</i>, ISSN 0351-3386, 2018, vol. 61, no. 3, str. 162-170.

TRENDI PRI RAZVOJU EMBALAŽE

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Trendi pri razvoju embalaže
Course title:	Trends in packaging development
Članica nosilka/UL	UL NTF
Member:	

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Grafična in medijska tehnika, prva stopnja, visokošolski strokovni	Ni členitve (študijski program)	3. letnik	2. semester	izbirni
Grafične in interaktivne komunikacije, prva stopnja, univerzitetni	Ni členitve (študijski program)	3. letnik	2. semester	izbirni

Univerzitetna koda predmeta/University course code: 0644019

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	30	0	15	90	6

Nosilec predmeta/Lecturer: Diana Gregor Svetec

Vrsta predmeta/Course type: Izbirni/Elective

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

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

Vpis v letnik študija. Pogoj za vpis je opravljen predmet Embalažni materiali in tehnologija. Pogoj za opravljanje študijskih obveznosti je prisotnost pri predavanjih, seminarju in vajah. Zahtevana prisotnost na vajah in pri drugih oblikah dela je 100 %, pri seminarjih 80 % in predavanjih 50 %.

Prerequisites:

Enrolment into the year of study. The requirement for enrollment is a passed course Packaging Materials and Technology. Prerequisites for performing study obligations is presence at lectures, seminar and tutorials. Requested presence at tutorials and other forms of tutorials is 100 %, at seminar 80 % and lectures 50 %.

Vsebina:

Predavanja: Novosti in trendi na področju embalaže; embalaža z dodano vrednostjo, trajnostna embalaža, zakonodaja, predpisi in sistemi ravnanja z embalažo; Predstavitev naprednih embalaž: jedilna, samogrelna, samoohlajevalna, embalaža posebnih oblik, z zaščito pred ponarejanjem, večfunkcionalna, aktivna, inteligentna, interaktivna in druge vrste napredne embalaže; embalaža prilagojena različnim starostnim skupinam in osebam s posebnimi potrebami. Seznanitev s trajnostno embalažo: vpliv embalaže na okolje, recikliranje, biorazgradnja, ekološko

Content (Syllabus outline):

Lectures: News and trends in packaging field; packaging with added value, sustainable packaging, legislation and systems for packaging management. Introduction to advanced packaging: edible, self-heating, self-cooling, packaging with special shapes and functions, with anti-counterfeit function, active, intelligent, interactive and other kind of advanced packaging; Packaging suited for different age groups and for people with special needs. Introduction to sustainable packaging: the influence of packaging on

oblikovanje embalaže in krožno gospodarjenje. Seminar: raziskovalna seminarska naloga. Druge oblike študija: pregled literature in predstavitev novosti. Vaje: načrtovanje in izdelava embalaže z dodano vrednostjo.	environment, recycling, biodegradation, eco-design and circular economy. Seminar: research seminar work. Other forms of study: literature overview and presentation of novelties. Tutorial: design and manufacturing of packaging with added value.
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Temeljna literatura in viri/Readings:

- Debeaufort, F., Galić, K., Kurek, M., Benbettaieb, N., Ščetar, M. Packaging Materials and Processing for Foods, Pharmaceuticals and Cosmetics, London, Hoboken, ISTE and Wiley, 2021
 - Cerqueira, M.A., Lagaron, J.M., Castro, L.M.P., Vicente A.A. Nanomaterials for Food Packaging: Materials, Processing Technologies and Safety Issues, Amsterdam, Elsevier, 2018
 - Kerry, J., Butler, P. Smart packaging technologies for fast moving consumer goods. Chichester, Wiley, 2008
 - Han, H. J. Innovations in food packaging. London, Academic Press, 2014
- Literatura je dostopna v knjižnici NTF-Oddelka za tekstilstvo, grafiko in oblikovanje. Literature is available in the library NTF-Department of Textiles, Graphic Arts and Design.
- DODATNA LITERATURA**
- E-Revije in e-knjige iz podatkovnih zbirk univerze / e-journals and e-books from university databases

Cilji in kompetence:

Študenti spoznajo embalažo z dodano vrednostjo, napredno embalažo in trende pri razvoju embalaže ter nove smernice kot so trajnostni razvoj, krožno gospodarjenje in ekološko oblikovanje. Dobijo pregled zakonodaje, predpisov, specifikacij, testnih metod za določene vrste embalaž.

Predmetnospecifične kompetence:

- poznavanje in razumevanje dejavnikov, ki podajo embalaži dodano vrednost,
- poznavanje in razumevanje posebnih zahtev za določene vrste embalaže,
- obvladovanje postopka načrtovanja pametne embalaže,
- obvladovanje postopka načrtovanja trajnostne embalaže,
- uporaba informacijsko-komunikacijske tehnologije pri načrtovanju napredne embalaže, posredovanju in obdelavi podatkov ter zasledovanju novosti,
- sposobnost umeščanja novih informacij in spoznanj v kontekstu razvoja novih izdelkov.

Objectives and competences:

Students get to know packaging with added value, advanced packaging and trends in packaging development, new directions such as sustainability, circular economy and eco-design. They get overview of the legislation, regulations, specifications, test methods for certain types of packaging.

Competences:

- knowledge and understanding of factors, which give packaging added value,
- knowledge and understanding of the specific requirements for certain types of packaging,
- managing of design process of smart packaging,
- managing of eco-design process of sustainable packaging,
- use of information-communication technology at packaging development, data evaluation and following innovations,
- ability to include new information and knowledge in the context of the development of new products.

Predvideni študijski rezultati:

Znanje in razumevanje:
 študent pozna različne vrste napredne embalaže, trende in novosti pri razvoju embalaže. Pozna in razume postopek načrtovanja pametne embalaže. Pozna pomen trajnostnega razvoja na področju embalaže in razume postopek ekološkega oblikovanja embalaže. Pozna predpise in zahteve za določene vrste embalaže. Teoretična podlaga mu pomaga prenesti znanje v delovni proces pri izdelavi napredne embalaže in izdelavi trajnostne embalaže.

Intended learning outcomes:

Knowledge and understanding:
 student knows various types of advanced packaging, trends and news at packaging development. Knows and understands the design process of smart packaging. Knows the meaning of sustainability in the field of packaging and understands the process of eco-design of packaging. Knows the regulations and requirements for a particular type of packaging. Theoretical basis helps him to implement the knowledge into the working process at advance packaging manufacturing and manufacturing of sustainable packaging.

Metode poučevanja in učenja:

- Klasična in interaktivna predavanja, poučevanje z uporabo IKT tehnologije,
 - projektno delo, diskusije, interpretacije, skupinsko delo,
 - samostojno analitično pisno delo s predstavitvijo in individualno delo pri vajah.
 Vse oblike (predavanja/seminar/vaje) se lahko izvajajo v živo v učilnicah ali preko spleta (online) v spletnih učilnicah, z uporabo specifičnih orodij ter ustrezne programske opreme.

Learning and teaching methods:

- Classic and interactive lectures, teaching using IKT technology,
 - project work in groups, discussions, interpretation, group work,
 - independent analytical written work with presentation and individual work at tutorials.
 All forms (lectures/seminar/tutorials) can be conducted live in classrooms or online in online classrooms, using specific tools and suitable software.

Načini ocenjevanja:**Delež/Weight****Assessment:**

Ustni ali pisni izpit ali izpitna naloga. Poteka lahko v predavalnici ali na daljavo.	40,00 %	Oral or written exam or exam assignment. Performed in classroom or on-line.
Seminar	20,00 %	Seminar
Druge oblike študija	10,00 %	Other forms of study
Vaje	30,00 %	Practical exercises

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
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Reference nosilca/Lecturer's references:

- ŽURBI, Tina, GREGOR-SVETEC, Diana. NFC tag awareness and its visual implementation on food packaging: case study in Slovenia. *Applied sciences*. October 2024, vol. 14, iss. 21, [article no.] 9933, str. 1-14.
- POGAČAR, Andreja, BOLANČA MIRKOVIĆ, Ivana, GREGOR-SVETEC, Diana. Print durability and recyclability of label paper equipped with printed RFID antenna. *Sustainability*. 2024, vol. 16, iss. 1, str. 1-16.
- ŽURBI, Tina, GREGOR-SVETEC, Diana. Use of QR code in dairy sector in Slovenia. *SAGE open*. April-June 2023, vol. 13, iss. 2, str. 1-16.
- GREGOR-SVETEC, Diana. Intelligent packaging. V: CERQUEIRA, Miguel Ângelo Parente Ribeiro (ur.), et al. *Nanomaterials for food packaging : materials, processing technologies and safety issues*. Amsterdam: Elsevier, 2018. Str. 203-247. Micro & nano technologies series..
- GREGOR-SVETEC, Diana, RAVNJAK, David. Različni sistemi aktivne in pametne embalaže za živila. V: VOLFAND, Jože (ur.), AMBROŽ, Goran. *Razvoj embalaže v krožnem gospodarstvu : priročnik*. Celje: Fit media, 2019. Str. 87-93, Zbirka Zelena Slovenija.
- GREGOR-SVETEC, Diana. Reciklabilnost papirne in kartonske embalaže ter postopki recikliranja. V: VOLFAND, Jože (ur.), AMBROŽ, Goran. *Razvoj embalaže v krožnem gospodarstvu : priročnik*. Celje: Fit media, 2019. Str. 144-150.

VIDEO

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Video
Course title:	Video
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Grafične in interaktivne komunikacije, prva stopnja, univerzitetni	Ni členitve (študijski program)	2. letnik, 3. letnik	2. semester	izbirni

Univerzitetna koda predmeta/University course code:	0554341
Koda učne enote na članici/UL Member course code:	10220

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	30	0	15	90	6

Nosilec predmeta/Lecturer:	Helena Gabrijelčič Tomc
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Vrsta predmeta/Course type:	Izbirni/Elective
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Jeziki/Languages:	Predavanja/Lectures:	Slovenščina
	Vaje/Tutorial:	Slovenščina

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

Pristop k predmetu:
Vpis v študij letnika. Osnovno znanje uporabe računalnika.
Pristop k izpitu:
K izpitu lahko pristopijo študenti/ke, ki imajo opravljen izpitni projekt, seminar in vaje ter izpolnjeno predpisano prisotnost pri vseh sklopih predmeta.
Prisotnost:
Pri predmetu se zahteva naslednja prisotnost: predavanja 80 %, seminar in druge oblike dela 90 %, vaje 100 %.

Prerequisites:

Course:
Enrolment in the study year. Basic knowledge of computer use.
Exam/Assessment:
Students who have completed the exam project, seminar and practical course and who have met the attendance requirements for all sections of the course can take the exam.
Presence:
Parts of the subject require the presence of: Lectures 80%, seminar and other forms of work 90 %, Practical Course 100 %.

Vsebina:

- Spoznavanje uporabe programskih orodij in tehnik za delo z večpredstavnimi digitalnimi vsebinami.
 - Spoznavanje uporabe programskih orodij in tehnik za delo z video vsebinami.
- Priprava in načrtovanje, zgodboris in priprava referenc z uporabo risarsko ilustratorske opreme

Content (Syllabus outline):

- Study of tools and techniques for manipulations with multimedia content.
 - Study of tools and techniques for creating video content.
- Preparation and planning, storyboarding and preparation of references using drawing and illustration equipment

• Razvojne, ustvarjalne in konceptualizacijske veščine ustvarjanja s sliko in zvokom. • Osnove filmske slovnice. • Filmska forma, principi forme, forma in vsebina. • Terminski in lokacijski plani predprodukcije, produkcije in postprodukcije večpredstavnih vsebin. • Narativnost in razvoj zgodbe, dramski trikotnik. • Postavitev na sceno, scenski in slikovni prostor. • Tipi planov in kadriranje. • Dinamika v kadru in tranzicije. • Osnove snemanja (rokovanja s kamero) • Snemanje v eksterieru in studiu • Uprizoritev časa in prostora na sceni, tranzicije ter montaža video vsebin. • Čas in prostor v kadru ter slikah v gibanju. Snemanje z zraka (priporočila, plan, kader), 360 stopinjsko snemanje za okolja razširjenih resničnosti. • Barvna korekcija in filtri, delo z delovno postajo za barvno korekcijo. • Teorija in praksa digitalnega sestavljanja. • Računalniška grafika ter vizualni efekti v video produkciji.	• Developmental, creative and conceptualizing skills of creating with image and sound. • Fundamentals of film grammar. • Film form, principles of form, form and content. • Term and location planning of preproduction, production and postproduction of multimedia content. • Narrative and story development, drama triangle. • Mise-en-scène, screen and scene space. • Type of shots and framing. • Frame and its dynamics • Shooting basics (camera handling) • Exterior and studio shooting • Staging of time and space, transitions and montage of video content • Time and space, editing and transitions. Shooting from the air (guidelines, cadre), 360 angle recording for environments for extended realities. • Color correction and filters, working with a workstation for color correction. • Theory and practice of digital compositing. • Computer graphic and visual elements in video production.
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Temeljna literatura in viri/Readings:

- Owens, J., Millerson, G. Video production Handbook, 7th ed. Routledge, 2023
- [Bordwell, D.](#), [Thompson, K.](#), [Smith, J.](#) Film Art: An Introduction, Mc Graw Hill, 2016
- Barnwell, J. Production Design for Screen: Visual Storytelling in Film and Television, Bloomsbury Academic, 2020
- Wright, S. Digital Compositing for Film and Video: Production Workflows and Techniques 4th Ed., Routledge, 2017

Dodatna literatura:

- Curbiss Cherrier M. Voice & Vision: A Creative Approach to Narrative Film and DV Production, 2011
- Frank, L. Real-Time Video Content for Virtual Production & Live Entertainment: A Learning Roadmap for an Evolving Practice 1st Ed., Focal Press, 2022

Cilji in kompetence:

Cilj je seznaniti študenta s tehnološko in vsebinsko pripravo, obdelavo in dodelavo večpredstavnih elementov za različne digitalne medije, s poudarkom na video vsebinah.

Predmetno-specifične kompetence:

- Oblikovanje delokroga od zamisli in načrtovanja do priprave in izbora ustreznih tehnik in orodij ter do realizacije končnega avdio-vizualnega produkta.
- Koordiniranje priprave produkcijskega načrta video vsebin in slik v gibanju.
- Obvladovanje postopkov izgradnje ustreznih video vsebin in slik v gibanju.
- Kritična presoja izbora in oblikovanja možnih elementov večpredstavne vsebine.
- Obvladovanje ustreznih postproduksijskih postopkov za zagotavljanje vizualne in tehnične korektnosti video vsebin in slik v gibanju.

Objectives and competences:

Basic goals of a course are the introduction of technological and content preparation, processing and postprocessing of multimedia elements of different digital media, with an emphasis on video content.

Subject-specific competences:

- Design of workflow from the basic idea and planning to the use of techniques and tools and realisation of final audio-visual product.
- Coordination of preparation for production plan of video contents and motion pictures.
- Knowledge of processes for building up a useful multimedia content.
- Critical evaluation of selection and design of video contents and motion pictures.
- Knowledge of postproduction processes.
- Understanding the importance of technologies and tools for ensuring visual and technical correctness of audio-visual product and motion pictures.

• Uporaba ustreznih tehnologij, orodij in postopkov za zagotavljanje vizualne in tehnične ustreznosti avdio-video vsebin in slik v gibanju. • Spoznavanje osnovnih in naprednih prijemov dela z opremo za ustvarjanje avdio-vizualnih vsebin, vključno s specifikami snemanja in zraka, 360 produkcije. • Razumevanje sodobne merilne in predstavitvene opreme za video produkcijo in vizualizacijo končnih upodobitev. • Praktične spretnosti prenosa znanj ustvarjanja avdio-vizualnih vsebin na interdisciplinarna področja in na človeka in planet usmerjene tematske sklope.	• Understanding of basic and advanced techniques of working with equipment for creating audio-visual content, including the specifics of shooting from air and 360 production. • Understanding of modern measurement and presentation equipment for video production and visualization of final renderings. • Practical skills of transferring the knowledge of creating audio-visual content to interdisciplinary fields and human- and planet-oriented topics.
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Predvideni študijski rezultati:

Razumevanje teoretičnih osnov in spoznavanje osnovnih postopkov in zahtevnejših tehnik prenosa v prakso pri načrtovanju, pripravi, izdelavi in sestavljanju različnih elementov avdio-vizualnih medijev, s poudarkom na video vsebini. Sposobnost vključevanja veščin načrtovanja in izgradnje avdio-vizualnega medija v komunikacijske pristope z uporabo na interdisciplinarnih področjih in na človeka in planet osredotočenih tematikah.

Intended learning outcomes:

Understanding of theoretical basis and practical use of planning, preparing, production and compositing of different elements of audio-visual media, with an emphasis on video content. Ability to integrate audio-visual media design and construction skills into communication approaches using interdisciplinary fields and human- and planet-centred topics.

Metode poučevanja in učenja:

Predavanja, seminar (samostojno ali skupinsko projektno delo), računalniške vaje in vodeno individualno delo. Sklopi predmeta se izvajajo v računalniških in drugih fakultetnih učilnicah/predavalnicah in/ali preko spleta (online) s pomočjo primerne in ustrezne programske opreme, ki omogoča delo.

Learning and teaching methods:

Lectures, seminar (individual or group project work), computer exercises and guided individual work. Course assemblies are conducted in computer and other faculty classrooms/lecture rooms and/or online with the help of suitable and appropriate software that enables work.

Načini ocenjevanja:

Delež/Weight

Assessment:

Izpit teoretskih znanj in postopkov dela in ocena projektnega dela. Pogoji za pristop k zagovoru projektnega dela so opravljene računalniške vaje in pozitivno ocenjeno teoretično znanje	70,00 %	Exam of theoretical knowledge and evaluation of project work Prerequisites to the final presentation of project are completed computer tutorials and positive grade of theoretical knowledge of work procedure.
Ocena iz računalniških vaj	30,00 %	Completed computer tutorials
Ocena od 6 - 10 je pozitivna		Rating: positive – marks 6-10

Ocenjevalna lestvica:

5 - 10, pri čemer velja, da je pozitivna ocena od 6 - 10

Grading system:

5 - 10, a student passes the exam if he is graded from 6 to 10

Reference nosilca/Lecturer's references:

- VRHOVNIK, Blaž, KLOBUČAR, Špela, HROVAT, Petra, LESKOVAR, Zalka, ŠTIP, Martin, BRAKIČ, Danej, PEROVNIK, Lucija, ROŽIČ, Boštjan, NOVAK, Matevž, UČAKAR, Andrej, ŽVAB ROŽIČ, Petra, GABRIJELČIČ TOMC, Helena. "Stories of Montanistika" in the world of virtual reality. Athens Journal of Tourism. 2020, vol. 7, iss. 4, str. 259-278.

- KOMPARE, Rok, GABRIJELČIČ TOMC, Helena. Analysis of Movie genre Experiencing when changing post-production stylistic elements of the media. *Journal of print and media technology research*. 2019, vol. 8, no. 1, str. 57-69.
- KNIFIC KOŠIR, Aja, GABRIJELČIČ TOMC, Helena. Visual effects and their importance in the field of visual media creation. *JGED : Journal of Graphic Engineering and Design*. 2022, vol. 13, no. 2, str. 5-13
- PLOT, Mojca, ROŠKAR, Saška, GABRIJELČIČ TOMC, Helena. Evaluation of the impact of an awareness-based animation on students' knowledge about mental illness. 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. 659-666
- MALAČIČ, Veronika, CAFNIK, Marko, GABRIJELČIČ TOMC, Helena. Opis delokroga za produkcijo 360-stopinjskega glasbenega videospota = Description of a framework for the production of a 360 degree music video. V: ŽEMVA, Andrej (ur.), TROST, Andrej (ur.). *Zbornik devetindvajsete mednarodne Elektrotehniške in računalniške konference ERK 2020 = Proceedings of the Twenty-ninth International Electrotechnical and Computer Science Conference ERK 2020*. ERK 2020, Portorož, Slovenija, 21.-22. september 2020. Ljubljana: Slovenska sekcija IEEE: = Slovenian Section IEEE, 2020. str. 107-110

VODENJE KAKOVOSTI

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Vodenje kakovosti
Course title:	Quality management
Članica nosilka/UL Member:	UL NTF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Grafične in interaktivne komunikacije, prva stopnja, univerzitetni	Ni členitve (študijski program)	3. letnik	2. semester	izbirni

Univerzitetna koda predmeta/University course code:	0089474
Koda učne enote na članici/UL Member course code:	10278

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:	Klemen Možina
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Vrsta predmeta/Course type:	Izbirni/Elective
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Jeziki/Languages:	Predavanja/Lectures:	Angleščina, Slovenščina
	Vaje/Tutorial:	Angleščina, Slovenščina

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

Vpis v letnik študija in izbira predmeta.
Pogoj za opravljanje izpita sta pozitivno opravljena seminar in predstavitev seminarja o poljubno izbrani temi s področja kakovosti.

Prerequisites:

Enrolment into study year and selecting the course.
A prerequisite for access to the exam are positively evaluated seminar paper and its presentation on a topic from the field of Quality chosen by students.

Vsebina:

Osnovni pojmi in definicije. Pomen vodenja kakovosti z vidika svetovne konkurenčnosti. Značilnosti sistemov vodenja kakovosti za mala in velika podjetja. Zgodovinski pregled sistemov vodenja kakovosti od pregledovanja do celovitega vodenja kakovosti. Najpomembnejši teoretiki na področju vodenja kakovosti (Juran, Deming, Garvin, Crosby, Conti, Ishikava, Taguchi in drugi). Razvoj standardov za vodenje kakovosti. Struktura standardov skupine ISO 9000. Pregled zahtev standarda ISO 9001:2015. Presojanje in certificiranje sistemov kakovosti po standardu ISO 9001. Pregled osnovnih metod in tehnik na področju vodenja kakovosti (osnovne tehnike statistične analize, statistična procesna

Content (Syllabus outline):

Basic terms and definitions. Meaning of quality management from the viewpoint of world competition. Characteristics of quality management systems for small and large companies. Historical overview of quality management systems from inspections to total quality management. Important scientists in the field of quality management (Juran, Deming, Garvin, Crosby, Conti, Ishikava, Taguchi and others). Development of quality management standardisation. Structure of ISO 9000 standardisation. Overview of ISO 9001:2015 standard requirements. Certification of quality systems according to ISO 9001. Overview of basic methods and techniques in the field of quality management (basic techniques of statistical analysis,

kontrola, načrtovanje in analiza eksperimentov, tehnike, ki se uporabljajo v procesu stalnih izboljšav kakovosti). Ekonomika kakovosti. Celovito vodenje kakovosti. Samoocenjevanje in nagrade za kakovost. Pomen vrednotenja kakovosti za prehod v ogljično nevtralno družbo.	statistical process control, design of experiments, techniques for constant quality improvements. Economics of quality. Total quality management. Self-evaluation and awards for quality. The importance of quality evaluation for the transition to a carbon neutral society.
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Temeljna literatura in viri/Readings:

- EVANS, J. R. Total Quality : Management, Organization, and Strategy. Mason, OH : Thomson/South-Western, 2003.
- 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 9001:2000 : a Practical Guide. Hampshire : Gower, 2000.
- SLUGA, F. , DEMŠAR, A. Zagotavljanje kakovosti : študijsko gradivo. Ljubljana : NTF, 2014.

Cilji in kompetence:

Temeljni cilj je opredelitev sodobnega pojmovanja kakovosti in sistemov vodenja kakovosti v kontekstu svetovne konkurenčnosti in značilnosti orodij za vodenje kakovosti vključno s standardi za sisteme vodenja kakovosti, njihovega presojanja in certificiranja.

Kompetence: sposobnost razumevanja sodobnih konceptov sistemov vodenja kakovosti in pojmovanja kakovosti, razvijanje zavesti o pomenu kakovosti v kontekstu svetovne konkurenčnosti, spoznavanje razvoja sistemov vodenja kakovosti in njihova kritična analiza, sposobnost kritične analize orodij za vodenje kakovosti, vključno s standardi za sisteme vodenja kakovosti, sposobnost uporabe metod in orodij za postopke stalnih izboljšav, ki vodijo v trajnostno naravnane delovne procese, sposobnost izbire in uporabe temeljnih statističnih metod pri analizi podatkov, sposobnost uporabe metod samoocenjevanja in razumevanje njihovega pomena za doseganje poslovne odličnosti, sposobnost dela v skupini na področju kakovosti.

Objectives and competences:

Objectives: definition of modern understanding of quality management systems in the frame of world competition and characteristics of tools for quality management, including standardisation for quality management, assessment and certification.

Competences: ability to understand modern concepts of quality and quality management systems, development of awareness of the meaning of quality in the frame of world competition, learning about the development of quality management systems and their critical evaluation, ability of critical analysis of tools for quality management including standardisation for the quality management systems, ability to use methods and tools for constant improvement, which lead to sustainable work processes, ability to choose and use basic statistical methods at data analysis, ability to use methods for self-evaluation and understanding of their meaning for development of business excellence and ability to work in a team in the field of quality.

Predvideni študijski rezultati:

Znanje in razumevanje: Pozna sodobni pomen kakovosti in sistemov vodenja kakovosti in jih zna kritično analizirati. Pozna osnovna orodja, ki se uporabljajo na področju vodenja in v procesu stalnih izboljšav kakovosti. Pozna in razume pomen standardov za sisteme vodenja kakovosti. Razume različne koncepte vodenja kakovosti. Pozna in razume osnovne metode statistične analize. Razume pomen kontrolnih kart kot orodja za odkrivanje neskladnosti v procesih. Razume metode samoocenjevanja in nagrade za poslovno odličnost.

Intended learning outcomes:

Knowledge and understanding of: 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; basic statistical methods for data analysis; control charts as a tool for discovering discrepancies in processes; self-evaluation and awards for business excellency.

Metode poučevanja in učenja:

Predavanja in seminarsko delo, ki potekajo v živo in/ali on-line.

Learning and teaching methods:

Lectures and seminar work which are carried out live and/or on-line.

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

- SARJANOVIĆ, Anja, MOŽINA, Klemen, GREGOR-SVETEC, Diana. Print quality of coated paper from invasive alien plant Goldenrod. *Coatings*. 2023, vol. 13, iss. 10, str. 1–11, ilustr. ISSN 2079-6412, DOI: [10.3390/coatings13101754](https://doi.org/10.3390/coatings13101754), [COBISS.SI-ID [167947267](#)].
- BRESKVAR, Kaja, AHTIK, Jure, MOŽINA, Klemen. Cracking phenomena of coatings on label papers. *Cellulose chemistry and technology*. 2021, vol. 55, no. 3–4, str. 289–297, ISSN 0576-9787, DOI: [cellulosechemtechnol.ro/firstonline.php](https://doi.org/10.3390/coatings13101754), [COBISS.SI-ID [59536643](#)].
- MOŽINA, Klemen. Sistem kakovosti v izobraževalnem procesu. *Grafičar: revija slovenskih grafičarjev*. 2020, [št.] 5, str. 22–23, ISSN 1318-4377, [COBISS.SI-ID [33097219](#)].
- MOŽINA, Klemen. Vodenje kakovosti v izobraževalnem procesu = Quality management in education. *Papir: revija Društva inženirjev in tehnikov papirništva*. 2020, letn. 48, št. 24, str. 28, ISSN 0350-6614, [COBISS.SI-ID [40284675](#)].
- MOŽINA, Klemen. Iz zelenega v modro = From green to blue. *Papir: revija Društva inženirjev in tehnikov papirništva*. 2023, letn. 50, št. 29, str. 1–2, ISSN 0350-6614, [COBISS.SI-ID [162160643](#)].
- MOŽINA, Klemen (intervjuvanec). Papir ustreza načelom trajnostnega razvoja. *Delo*. [Tiskana izd.]. 22. jul. 2019, leto 61, št. 166, str. 10, ISSN 0350-7521, [COBISS.SI-ID [3619696](#)].
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