



Univerza v Mariboru

Fakulteta za naravoslovje
in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	DIGITALNA STRATEGIJA ŠOLE
Course title:	SCHOOL DIGITAL STRATEGY

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Študijski program za izpopolnjevanje iz organizacije informacijskih dejavnosti v vzgoji in izobraževanju		1.	1.
Study programme for further education in organising information activities in education			1 st

Vrsta predmeta / Course type

Obvezni/compulsory

Univerzitetna koda predmeta / University course code:

KID2

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
10	4	13			183	7

Nosilec predmeta / Lecturer:

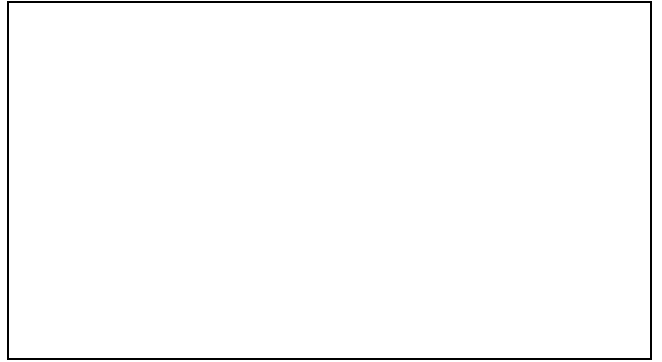
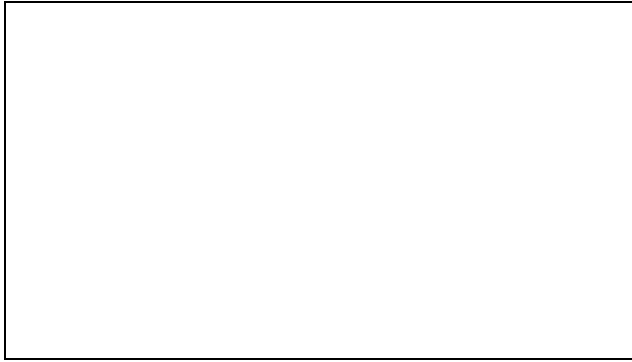
Boris Aberšek

**Jeziki /
Languages:**

**Predavanja /
Lectures:** slovenski/Slovenian
Vaje / Tutorial: slovenski/Slovenian

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

Prerequisites:



Vsebina:

- Digitalna družba, digitalizacija, e-šola, e-izobraževanje;
- Metode in koncepti izobraževanja odraslih, uvajanje sprememb v kolektiv, izobraževanje učiteljev;
- Projektni management in upravljanje s človeškimi viri;
- Vzpostavitev trajne učeče se skupnosti učiteljev na šoli, e-šrt;
- Načrtovanje razvoja digitalno kompetentne šole;
- Koncept samoevalvacije VIZ-a ter uporaba ustreznih orodij (Selfie, Mentep...);
- Digitalna strategija šole;
- Integracija razvitih estoritev Arnesa, ZRSŠ, CPI, RIC... na šoli;
- Integracija zunanjih didaktičnih e-storitev (padlet, kvizlet ipd.);
- Administrativna podpora pouku;
- Pomen inovativnih učnih okolij pri razvoju celotnega VIZ-a;

Content (Syllabus outline):

- Digital society, digitalisation, e-school, e-education;
- Methods and concepts of adult education, introducing change in the collective, teacher training;
- Project management and human resources management;
- Establishing a sustainable learning community of teachers at school, e-schools;
- Planning the development of a digitally competent school;
- The concept of self-evaluation of the VIZ and the use of relevant tools (Selfie, Mentep...);
- School Digital Strategy;
- Integration of the developed solutions of Arnes, ZRSŠ, CPI, RIC... in the school;
- Integration of external didactic e-services (Padlet, Quizlet, etc.);
- Administrative support for teaching;
- The importance of innovative learning environments in the development of the whole VIZ;

Temeljni literatura in viri / Readings:**Obvezna:**

1. European Commission. (2021). Digital education action plan 2021–2027: Resetting education and training for the digital age.
https://education.ec.europa.eu/sites/default/files/document-library-docs/deap-communication-sept2020_en.pdf
2. Flogie, A., & Aberšek, B. (2019). The impact of innovative ICT education and AI on the pedagogical paradigm. Cambridge Scholars Publishing.
3. European Commission. (2017). European framework for the digital competence of educators: DigCompEdu. Publications Office of the European Union.
<https://publications.jrc.ec.europa.eu/repository/handle/JRC107466>

Dodatna:

4. Bates, T. (2019). Teaching in a digital age: Guidelines for designing teaching and learning. BCcampus. <https://opentextbc.ca/teachinginadigitalage/>
5. Bregar, L., Zgajster, M., & Radovan, M. (2020). E-izobraževanje za digitalno družbo. Andragoški center Slovenije.
6. Marzano, R. J. (2003). What works in schools: Translating research into action. ASCD.
7. OECD. (2021). OECD digital education outlook 2021: Pushing the frontiers with artificial intelligence, blockchain and robots. OECD Publishing.
<https://www.oecd.org/education/digital-education-outlook/>

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

Študentje bodo razvili splošne kompetence:

- Zmožnost sodelovanja, medosebne, socialne spretnosti;
- Zmožnost kritičnega razmišljanja;
- Odprtost za alternativne poglede in rešitve;
- Podjetnostna kompetenca - prevzemanje pobud in iskanje novih priložnosti;
- Zmožnost biti kritičen in samokritičen;
- Odprtost za nenehen poklicni razvoj in vseživljenjsko učenje
- poznavanje in razumevanje socialnih sistemov (še posebej procesov v vzgoji in izobraževanju)
- Oblikovanje ocene potreb posameznika oz. skupine ob upoštevanju okoljskih dejavnikov
- organizacijske sposobnosti za pedagoško vodenje skupine

Študentje bodo razvili predmetno-specifične kompetence:

- Celovito pristopanje k evidentiranju problemov digitalizacije šole in njihovem reševanju;
- Zmožnost organiziranja in načrtovanja (lastnega dela in dela drugih) v okviru strokovne učeče se skupnosti;
- Vodenje in motivacija odraslih;
- Sposobnost za načrtovanje in izvajanje strokovnih delavnic;
- zmožnost priprave digitalne strategije VIZ-a.

Students will develop general competences:

- Collaborative, interpersonal, social skills;
- Critical thinking skills;
- Openness to alternative views and solutions;
- Entrepreneurial competence - taking initiatives and seeking new opportunities;
- Ability to be critical and self-critical;
- Openness to continuous professional development and lifelong learning
- Knowledge and understanding of social systems (especially processes in education)
- Appreciating the needs assessment of an individual or group taking into account environmental factors
- organisational skills for pedagogical group management

Students will develop subject-specific competences:

- Taking a holistic approach to recording and solving the problems of school digitisation;
- Ability to organise and plan (own and others' work) within a professional learning community;
- Leadership and motivation of adults;
- Ability to plan and deliver professional workshops;
- Ability to develop a digital strategy for the educational institution.

Predvideni študijski rezultati:

Po uspešno končanem predmetu bo študent pridobil znanje in razumevanje o:

- vplivu razvoja tehnologije na družbo in šolo;
- posledicah digitalizacije na razvoj družbe ter organizacijo in izvedbo učno-vzgojnega procesa;
- načrtovanju in vodenju projektov;
- upravljanju s človeškimi viri;
- motivaciji odraslih/zaposlenih za samoevalvacijo, uvajanje sprememb in sodelovanje v učeči se skupnosti;
- organizaciji in usmerjanju profesionalne učeče se skupnosti učiteljev.

Prav tako bo:

- preskusil razliko med samoevalvacijskimi orodji za merjenje digitalne zrelosti šole ter digitalnih kompetenc učitelja;

Intended learning outcomes:

Upon successful completion of the course, the student will have gained knowledge and understanding of:

- the impact of technological developments on society and schools;
- the implications of digitalisation on the development of society and the organisation and implementation of the teaching and learning process;
- project planning and management;
- human resources management;
- adult/staff motivation for self-evaluation, change and participation in a learning community;
- organising and guiding a professional learning community of teachers.

It will also:

- Test the difference between self-evaluation tools for measuring digital maturity of the school and digital competences of the teacher;

- poznal storitve, ki jih za potrebe izvajanja pedagoškega procesa zagotavljajo Arnes, ZRSŠ, CPI, RIC... in jih znal uporabljati; - zmožen analizirati ter kritično presoditi smiselnost umeščanja različnih plačljivih e-storitev v šolski prostor; - zmožen sodelovanja z vodstvom šole pri načrtovanju in udejanju vizije e-šole.	- be familiar with the services provided by Arnes, ZRSŠ, CPI, RIC, etc. for the needs of the pedagogical process. and know how to use them; - be able to analyse and critically assess the feasibility of integrating various paid e-services in the school environment; - Able to work with the school management in planning and implementing the vision of the e-school.
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Metode poučevanja in učenja:

Predavanja, sodelovalno delo v spletni učilnici, obrnjeno učenje, raziskovalno delo, projektno delo

Learning and teaching methods:

Lectures, collaborative work in an online classroom, flipped learning, research, project work

Delež (v %) /

Načini ocenjevanja:

Weight (in %)

Assessment:

Sodelovanje pri pedagoškem procesu	33%	In-class participation
Seminarska naloga	33%	Seminar paper
Ustni izpit	34%	Oral exam

Reference nosilca / Lecturer's references:

1. KORDIGEL ABERŠEK, Metka, ABERŠEK, Boris. (2020). <i>Society 5.0 and literacy 4.0 for the 21st century</i>. New York: Nova Science Publishers. 2. ABERŠEK, Boris, KRALJ, Samo, FLOGIE, Andrej. A hybrid AI-driven knowledge-based expert system for optimizing gear design : a case study for education. <i>Future internet</i>. 2026, vol. 18, iss. 1, [article no.] 25, 25 str., ilustr. ISSN 1999-5903. https://doi.org/10.3390/fi18010025, Digitalna knjižnica Univerze v Mariboru – DKUM, DOI: 10.3390/fi18010025, DOI: 20.500.12556/DKUM-96465. [COBISS.SI-ID 264450563], [SNIP, WoS, Scopus] 3. DEBELJAK, Krištof, KOCIJANČIČ, Slavko, ABERŠEK, Boris. (2021) Comparison of the efficiency of textual and iconic programming environments for teaching programmable logic controllers. <i>International journal of engineering education</i>. vol. 37, no. 2, str. 409-419. 4. FLOGIE, Andrej, ABERŠEK, Boris, PESEK, Igor. Education strategy for the net generation. <i>Information</i>. 2025, vol. 16, iss. 9, [article no.] 756, 15 str., ilustr. ISSN 2078-2489. https://doi.org/10.3390/info16090756, DOI: 10.3390/info16090756, DOI: 20.500.12556/DKUM-95221. [COBISS.SI-ID 248224003], [SNIP, WoS do 6. 11. 2025: št. citatov (TC): 1, čistih citatov (CI): 0, čistih citatov na avtorja (CIAu): 0.00, Scopus do 24. 1. 2026: št. citatov (TC): 2, čistih citatov (CI): 0, čistih citatov na avtorja (CIAu): 0.00] kategorija: 1B (Z); uvrstitev: Scopus, MBP (COMPENDEX, DOAJ, ESCI, INSPEC, METADEX, PUBMED); tip dela je verificiral OSICD točke: 13.33, št. avtorjev: 3



Univerza v Mariboru

Fakulteta za naravoslovje
in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	NAČRTOVANJE IN UPRAVLJANJE DIGITALNEGA IZOBRAŽEVANJA
Course title:	School digital education strategy

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Študijski program za izpopolnjevanje iz organizacije informacijskih dejavnosti v vzgoji in izobraževanju		1.	1.
Study programme for further education in organising information activities in education			1 th

Vrsta predmeta / Course type

Obvezni/elective

Univerzitetna koda predmeta / University course code:

KID1

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
10	4	13			213	8

Nosilec predmeta / Lecturer:

Andrej Flogie

**Jeziki /
Languages:**

**Predavanja /
Lectures:**

slovenski/Slovenian

Vaje / Tutorial:

slovenski/Slovenian

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

Prerequisites:

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Vsebina:

- Vpliv razvoja tehnologije na družbo;
- Kreiranje šolske politike razvoja na nivoju EK, posamezne DČ (pristopi, strateški dokumenti, priporočila, usmeritve);
- Vizija in razvoj digitalizacije izobraževanja na nivoju EK in MIZŠ (pristopi, strateški dokumenti, priporočila, usmeritve);
- Razvoj in digitalizacija šole (vizija šole, pristopi, usmeritve, priporočila);
- Vloga, pomen in delovanje šolskega razvojnega tima;
- Vloga in naloge računalnikarja organizatorja informacijskih dejavnosti;
- Paradigmatski temelji strateškega načrtovanja in upravljanja procesov;
- Upravljanje izobraževalnih procesov na šoli,
- Načrtovanje in implementacija razvoja digitalizacije šole;

Content (Syllabus outline):

- The impact of technological developments on society;
- Creating school development policy at EU, state level (approaches, strategy papers, recommendations, guidelines);
- Vision and development of digitisation of education at EU and MoE level (approaches, strategy papers, recommendations, orientations);
- School development and digitisation (school vision, approaches, orientations, recommendations);
- The role, importance and functioning of the school development team;
- The role and tasks of the IT organiser;
- Paradigmatic foundations of strategic planning and process management;
- Managing educational processes in schools,
- Planning and implementation of the development of the digitisation of the school;

Temeljni literatura in viri / Readings:

Obveza literatura

1. European Commission. (2021). *Digital education action plan 2021–2027: Resetting education and training for the digital age*.
https://education.ec.europa.eu/sites/default/files/document-library-docs/deap-communication-sept2020_en.pdf
2. European Commission. (2024). *DigComp 3.0: The digital competence framework for citizens*. Publications Office of the European Union.
<https://publications.jrc.ec.europa.eu/repository/handle/JRC144121>
3. European Commission. (2017). *European framework for the digital competence of educators: DigCompEdu*. Publications Office of the European Union.
<https://publications.jrc.ec.europa.eu/repository/handle/JRC107466>

Dodatna literatura

4. Bates, T. (2019). *Teaching in a digital age: Guidelines for designing teaching and learning*. BCcampus.
<https://opentextbc.ca/teachinginadigitalage/>
5. OECD. (2021). *OECD digital education outlook 2021: Pushing the frontiers with artificial intelligence, blockchain and robots*. OECD Publishing.
https://www.oecd.org/content/dam/oecd/en/publications/reports/2021/06/oecd-digital-education-outlook-2021_0f1487d9/589b283f-en.pdf
6. Rupnik Vec, T. (2006). *Vloga šolskega razvojnega tima v procesih uvajanja sprememb ter zagotavljanja kakovosti*. V: Zorman, M. (ur). Udejanjanje načel vseživljenjskega učenja v vrtcu, osnovni šoli in srednji šoli s pomočjo razvojnega načrtovanja. Gradivo za razvojno načrtovanje. Program Phare 2003 –vseživljenjsko učenje. Ljubljana: ZRSŠ, MŠŠ.

Cilji in kompetence:**Študentje bodo razvili splošne kompetence:**

- Sintetično/analitično/ustvarjano mišljenje za reševanje problemov
- Fleksibilna uporaba znanja v praksi
- Zmožnost komuniciranja s strokovnjaki drugih področij
- zmožnost presoje vplivov sodobne IKT tehnologije na razvoj družbe, šole in posameznika;
- sposobnost razumevanja temeljnih konceptov strateškega načrtovanja, upravljanja znanja, organizacije izobraževanja in upravljanja s človeškimi viri;

Študentje bodo razvili predmetno-specifične kompetence:

- sposobnost razumevanja temeljnih pojmov in konceptov načrtovanja digitalizacije izobraževanja;
- sposobnost razumevanja pomena strateškega pristopa pri digitalizaciji izobraževanja;
- zmožnost timskega dela pri reševanju strokovnih problemov in načrtovanju digitalne strategije šole;
- prevzemanja odgovornosti za lastno delo ter zmožnost vodenja in upravljanja človeških virov v luči managementa organizacije;
- zmožnost kritične presoje uporabe in vpliva sodobne tehnologije na izobraževalni proces;
- zmožnost kritične samoevalvacije razvoja šole, na osnovi sinteze, samoevalvacije in sodobnih trendov v izobraževanju;

Objectives and competences:**Students will develop general competences:**

- Synthetic/analytical/creative thinking for problem solving
- Flexible application of knowledge in practice
- Ability to communicate with experts in other fields
- Ability to assess the impact of modern ICT technology on the development of society, schools and the individual;
- Ability to understand the basic concepts of strategic planning, knowledge management, educational organisation and human resource management;

Students will develop subject-specific competences:

- The ability to understand the basic concepts and concepts of planning for the digitalisation of education;
- the ability to understand the importance of a strategic approach in the digitisation of education;
- the ability to work as a team in solving professional problems and planning the digital strategy of the school;
- the ability to take responsibility for their own work and the ability to lead and manage human resources in the light of the management of the organisation;
- the ability to critically assess the use and impact of modern technology on the educational process;
- the ability to critically self-evaluate the development of the school, based on synthesis, self-evaluation and contemporary trends in education;

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

Po uspešno končanem predmetu bo študent pridobil znanje in razumevanje o:

- Temeljnih strateških dokumentih in pristopih digitalizacije izobraževanja;
- Osnovnih paradigmatskih pristopih uvajanja sprememb v izobraževanju;
- Vlogi in pomenu izobraževalnih strategij in priporočil na področju digitalizacije;
- Pomenu upravljanja znanja in kadra, pri zagotavljanju razvoja izobraževalnega sistema;
- Predvidenih strukturnih spremembah in reformah na področju digitalizacije izobraževanja v EU in Sloveniji;

Prav tako bo pridobil:

- Sposobnost analize in predvidevanja posledic pri digitalizaciji izobraževanja;
- Znanje in razumevanje o organizaciji, načrtovanju in uvajanju digitalizacije na nivoju šole;

Knowledge and understanding:

- Key policy documents and approaches for the digitalisation of education;
- Basic paradigmatic approaches to change in education;
- The role and importance of educational digitisation strategies and recommendations;
- The importance of knowledge and human resource management in ensuring the development of the education system;
- The envisaged structural changes and reforms in the field of digitisation of education in the EU and Slovenia;

It will also provide:

- The ability to analyse and anticipate the implications of the digitisation of education;
- Knowledge and understanding of the organisation, planning and implementation of digitisation at school level;

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Metode poučevanja in učenja:

Predavanja, sodelovalno delo v spletni učilnici, obrnjeno učenje, raziskovalno delo, projektno delo

Learning and teaching methods:

Lectures, collaborative work in an online classroom, flipped learning, research, project work

Delež (v %) /

Weight (in %)

Načini ocenjevanja:

Assessment:

Sodelovanje pri pedagoškem procesu
Seminarska naloga
Ustni izpit

33%
33%
34%

in-class participation
Seminar paper
Oral exam

Reference nosilca / Lecturer's references:

FLOGIE, Andrej, HARI, Daniel, SKRBINJEK, Vesna, BREJC, Mateja. Use and aspects of generative artificial intelligence in the educational system among leadership personnel. Education and information technologies. 2026, [35] str. ISSN 1360-2357. DOI: 10.1007/s10639-026-13986-2. [COBISS.SI-ID 275951363], [JCR, SNIP, WoS, Scopus]

1. PLAVEC, K., KERNEŽA, M., ABERŠEK, B., FLOGIE, A (2021). Management of evaluation and assessment processes in lower secondary schools in Slovenia. *International journal of management in education*. 2019, vol. 13, no. 3, str. 218-233. ISSN 1750-385X. [COBISS.SI-ID 24459528], [SNIP, Scopus do 27. 12. 2021: št. citatov (TC): 2, čistih citatov (CI): 2, čistih citatov na avtorja (CIAu): 0,50]
2. FLOGIE, Andrej, ABERŠEK, Boris, PESEK, Igor. *Education strategy for the net generation. Information*. 2025, vol. 16, iss. 9, [article no.] 756, 15 str., ilustr. ISSN 2078-2489. <https://doi.org/10.3390/info16090756>, Digitalna knjižnica Univerze v Mariboru – DKUM, DOI: 10.3390/info16090756, DOI: 20.500.12556/DKUM-95221. [COBISS.SI-ID 248224003], [SNIP, WoS do 6. 11. 2025:
3. FLOGIE, Andrej, HARI, Daniel, BRATINA, Matevž, KERNEŽA, Maja, ABERŠEK, Boris, ZEMLJAK, Dejan. *Integrating advanced technologies in education : empowering youth for a sustainable future through new literacies. Revija za elementarno izobraževanje*. 2025, letn. 18, št. 4, str. 415-432, tabele. ISSN 1855-4431. <https://journals.um.si/index.php/education/article/view/5189>, DOI: 10.18690/rei.5189, DOI: 20.500.12556/DKUM-96381. [COBISS.SI-ID 262715139], [Odprti dostop, SNIP, Scopus]



Univerza v Mariboru

Fakulteta za naravoslovje
in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	INOVATIVNA UČNA OKOLJA
Course title:	INNOVATIVE LEARNING ENVIRONMENTS

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Študijski program za izpopolnjevanje iz organizacije informacijskih dejavnosti v vzgoji in izobraževanju		1.	2.
STUDY PROGRAMME FOR FURTHER EDUCATION IN ORGANISING INFORMATION ACTIVITIES IN EDUCATION			2.

Vrsta predmeta / Course type

Obvezni/compulsory

Univerzitetna koda predmeta / University course code:

KID5

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
10	4	13			153	6

Nosilec predmeta / Lecturer:

Andrej Flogie

Jeziki /

Languages:

Predavanja /

Lectures:

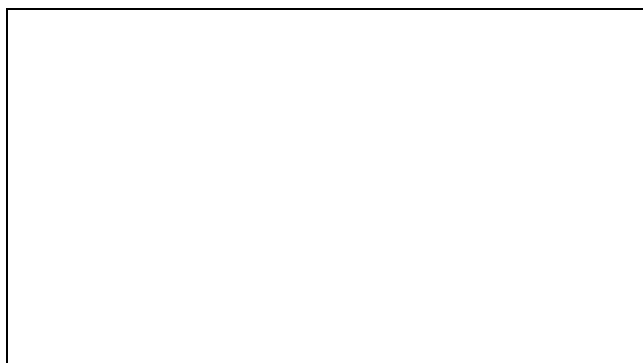
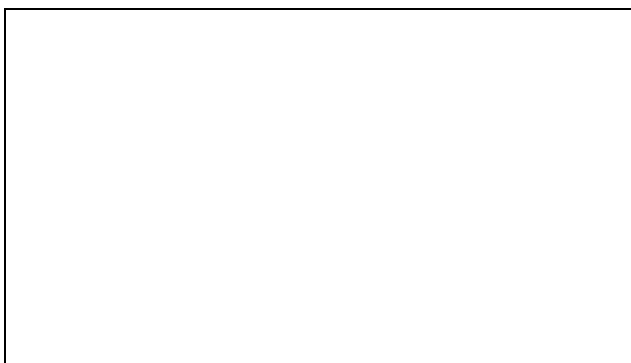
Vaje / Tutorial:

slovenski/Slovenian

slovenski/Slovenian

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

Prerequisites:

**Vsebina:**

- Inovativno učno okolje kot pedagoško-didaktični model;
- Inovativno učno okolje kot tehnološko podprt sistem poučevanja;
- Pedagoško kolo;
- Vrednotenje in izbira aplikacij in e-storitev;
- Načrtovanje inovativnega pouka;
- Kriteriji kakovosti načrtovanja izobraževalnega dela;
- Inovativne metode poučevanja podprte z IKT;
- Izbira in delo z e-storitvami, ki podpirajo:
 - a) sodelovalno delo učiteljev/učencev,
 - b) projektno delo učiteljev/učencev,
 - c) problemski pouk
 - d) obrnjeno učenje
 - e) preverjanje in ocenjevanje znanja podprto z digitalno tehnologijo.

Content (Syllabus outline):

- Innovative learning environments as a pedagogical-didactic model;
- Innovative learning environment as a technology-based teaching system;
- Pedagogical Wheel;
- Evaluation and selection of applications and e-services;
- Innovative Instructional Design;
- Quality criteria for educational planning;
- Innovative teaching methods supported by ICT;
- Selecting and working with e-services that support:
 - (a) collaborative work of teachers/students,
 - b) Teacher/student project work,
 - c) problem-based learning
 - d) flipped learning
 - e) assessment and evaluation supported by digital technology.

Temeljni literatura in viri / Readings:

Obvezna:

1. Flogie, A., & Aberšek, B. (2021). Artificial intelligence in education. In O. Lutsenko & G. Lutsenko (Eds.), Active learning – Theory and practice. IntechOpen.
<https://doi.org/10.5772/intechopen.96498>
 2. Aberšek, B., Flogie, A., & Šverc, M. (2015). Sodobno kognitivno izobraževanje in transdisciplinarni modeli učenja. Fakulteta za naravoslovje in matematiko, Univerza v Mariboru.
 3. Aberšek, B. (2018). Problem-based learning and proprioception. Cambridge Scholars Publishing.
- Dodatna:
4. Bates, T. (2019). Teaching in a digital age: Guidelines for designing teaching and learning. BCcampus. <https://opentextbc.ca/teachinginadigitalage>
 5. Redecker, C. (2017). European framework for the digital competence of educators: DigCompEdu. <https://publications.jrc.ec.europa.eu/repository/handle/JRC107466>
 6. Cencič, M. (2018). Izpostavljeni elementi inovativnih učnih okolij. Vodenje v vzgoji in izobraževanju, 16(2), 23–36.

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

Študentje bodo razvili splošne kompetence:

- Timsko delo in sodelovanje, medosebne kompetence
- Avtonomnost in prizadevanje za kakovost
- Zmožnost kritičnega razmišljanja
- Odprtost za alternativne poglede in rešitve
- Zmožnost biti kritičen in samokritičen
- Etično in trajnostno mišljenje
- Odprtost za nenehen poklicni razvoj in vseživljenjsko učenje
- Uporaba IKT v vzgoji in izobraževanju
- Razumevanje, uporaba in povezovanje kurikularnih teorij ter didaktičnega znanja na različnih predmetnih področjih

Študentje bodo razvili predmetno-specifične kompetence:

- Zmožnost izbire ustrezne didaktične e-storitve
- Presojanje kakovosti načrtovanja pouka za doseganje zastavljenih ciljev in razvijanja kompetenc
- Zmožnost načrtovanja in implementacije različnih didaktičnih pristopov
- Sposobnost za načrtovanje in izvajanje strokovnih delavnic

Students will develop general competences:

- Teamwork and cooperation, interpersonal competences
- Autonomy and commitment to quality
- Ability to think critically
- Openness to alternative views and solutions
- The ability to be critical and self-critical
- Ethical and sustainable thinking
- Openness to continuous professional development and lifelong learning
- Use of ICT in education
- Understanding, application and integration of curriculum theories and didactical knowledge in different subject areas

Students will develop subject-specific competences:

- The ability to select the appropriate didactic e-service
- Assessing the quality of lesson planning in order to achieve objectives and develop competences
- Ability to plan and implement different didactical approaches
- - Ability to plan and implement professional workshops

Predvideni študijski rezultati:**Po uspešno končanem predmetu bo študent pridobil znanje in razumevanje o:**

- odprtih in inovativnih učnih okoljih
- s tehnologijo podprtem poučevanju v okviru uvajanja inovativnih učnih okolij
- ciljni in smiselni uporabi didaktičnih e-storitev s pomočjo pedagoškega kolesa in SAMR modela
- kriterijih za presojanje primernosti didaktičnih e-storitev
- kriterijih kakovosti pri načrtovanju pedagoškega dela
- različnih didaktičnih pristopih, kot so sodelovalno delo, projektno delo, problemski pouk, obrnjeno učenje
- preverjanju, ocenjevanju in povratnih informacijah, podprtih z digitalno tehnologijo

ter bodo:

- zmožni presoje kakovosti načrtovanja pedagoškega dela
- zmožni podpreti učitelja pri izbiri in implementaciji didaktične e-storitve glede na načrtovane cilje, razvijanje kompetenc ter značilnosti učencev

Intended learning outcomes:**After successfully completing the course, the student will gain knowledge and understanding:**

- open and innovative learning environments
- technology-enhanced teaching in the context of the introduction of innovative learning environments
- targeted and meaningful use of didactic e-services using the pedagogical wheel and the SAMR model
- criteria for assessing the suitability of didactic e-services
- quality criteria for planning pedagogical work
- the different didactic environments, such as collaborative work, project work, problem-based learning, flipped learning
- checking, assessment and feedback supported by digital technology

and will:

- be able to assess the quality of pedagogical design
- be able to support the teacher in the selection and implementation of didactic e-services in relation to the planned

• zmožni podpreti učitelje, ne glede na predmetno področje, pri izbiri ustreznega didaktičnega pristopa ter mu pomagati pri načrtovanju ter s tehnologijo podprti izvedbi pouka	objectives, the development of competences and the characteristics of the learners • - be able to support teachers, regardless of subject area, in the selection of an appropriate didactic approach and to assist them in the planning and technology-assisted delivery of lessons
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Metode poučevanja in učenja:

Predavanja, sodelovalno učenje, obrnjeno učenje, raziskovalno učenje, projektno učenje

Learning and teaching methods:

Lectures, collaborative learning, flipped learning, inquiry learning, project-based learning

Načini ocenjevanja:

Delež (v %) /

Weight (in %)

Assessment:

	33% 33% 34%	In-class participation Seminar assignment Oral defence
Sodelovanje pri pedagoškem procesu Seminarska naloga Ustni izpit	33% 33% 34%	In-class participation Seminar paper Oral exam

Reference nosilca / Lecturer's references:

1. FIKSL, Majda, FLOGIE, Andrej, ABERŠEK, Boris. (2021). Innovative teaching/learning methods to improve science, technology and engineering classroom climate and interest. *Journal of Baltic science education*. 2017, vol. 16, no. 6, str. 1009-1019, tabele. ISSN 1648-3898. [COBISS.SI-ID [23666184](#)], [JCR, SNIP, WoS do 20. 9. 2021: št. citatov (TC): 9, čistih citatov (CI): 8, čistih citatov na avtorja (CIAu): 2,67, Scopus do 4. 9. 2021: št. citatov (TC): 12, čistih citatov (CI): 11, čistih citatov na avtorja (CIAu): 3,67].
2. FLOGIE, Andrej, ABERŠEK, Boris, PESEK, Igor. Education strategy for the net generation. Information. 2025, vol. 16, iss. 9, [article no.] 756, 15 str., ilustr. ISSN 2078-2489. <https://doi.org/10.3390/info16090756>, DOI: 10.3390/info16090756, DOI: 20.500.12556/DKUM-95221. [COBISS.SI-ID 248224003], [SNIP, WoS do 6. 11. 2025: št. citatov (TC): 1, čistih citatov (CI): 0, čistih citatov na avtorja (CIAu): 0.00, Scopus do 24. 1. 2026: št. citatov (TC): 2, čistih citatov (CI): 0, čistih citatov na avtorja (CIAu): 0.00] kategorija: 1B (Z);
3. GRUBELNIK, Vladimir, RIZMAN HERGA, Nataša, FLOGIE, Andrej, BRUMEN, Mihaela, MARHL, Marko, DINEVSKI, Dejan. Learning analytics : a case study on exploring social interaction and problem-solving strategies. *International journal of management, knowledge and learning*. [Spletna izd.]. 2025, vol.

14, str. 79-87, ilustr. ISSN 2232-5697. <https://doi.org/10.53615/2232-5697.14.79-87>, DOI: 10.53615/2232-5697.14.79-87, DOI: 20.500.12556/DKUM-93826. [COBISS.SI-ID 236656131]

4. A. Flogie in M. Vičič Krabonja. Integracija generativne umetne inteligence v pouk: od digitalnih kompetenc do pedagoških modelov. V: Generativna umetna inteligenca v izobraževanju: preobrazba učenja v digitalni dobi, Založba Univerze, 2026, str. 39–66.



Univerza v Mariboru

Fakulteta za naravoslovje
in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	Socialni roboti in družbena omrežja v izobraževanju
Course title:	Social Robots and Social Media in Education

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Študijski program za izpopolnjevanje iz organizacije informacijskih dejavnosti v vzgoji in izobraževanju	/	1	2
Study programme for further education in organising information activities in education	/		

Vrsta predmeta / Course type

Izbirni / Elective

Univerzitetna koda predmeta / University course code:

Predavanja Lectures	Seminar Seminar	Sem. vaje Tutorial	Lab. vaje Laboratory work	Teren. vaje Field work	Samost. delo Individ. work	ECTS
10	4	10			156	6

Nosilec predmeta / Lecturer:

Andrej Flogie

Jeziki /

Languages:

Predavanja /

Lectures:

Vaje / Tutorial:

SLOVENSKO/SLOVENE

SLOVENSKO/SLOVENE

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

Prerequisites:

Vsebina:

- Razvoj digitalne družbe in vloga socialnih tehnologij v izobraževanju
- Osnovni koncepti socialnih robotov: definicija, značilnosti in vrste
- Pregled uporabe socialnih robotov v izobraževanju in drugih družbenih kontekstih

Content (Syllabus outline):

- Development of the digital society and the role of social technologies in education
- Basic concepts of social robots: definition, characteristics, and types
- Overview of the use of social robots in education and other social contexts

• Interakcija človek–robot in njen vpliv na učenje ter socialne procese • Pedagoške vloge socialnih robotov (učni pomočnik, tutor, motivator, socialni mediator) • Vpliv socialnih robotov na motivacijo, angažiranost in socialni razvoj učencev • Načrtovanje učnih aktivnosti z vključevanjem socialnih robotov • Socialna omrežja kot učni ekosistemi in okolja neformalnega učenja • Delovanje algoritmov in njihova vloga pri oblikovanju informacijskega prostora • Vpliv družbenih omrežij na kognitivne procese, pozornost in učno vedenje • Kritična presoja informacij, dezinformacije in medijska pismenost v digitalnem okolju • Digitalna identiteta, zasebnost in etični vidiki uporabe socialnih tehnologij • Vloga učitelja pri razvoju kritične digitalne pismenosti in odgovorne rabe tehnologij • Primeri dobrih praks uporabe socialnih robotov in družbenih omrežij v izobraževanju • Prihodnji trendi: sobivanje človeka, robotov in algoritmov v izobraževalnih procesih	• Human–robot interaction and its impact on learning and social processes • Pedagogical roles of social robots (teaching assistant, tutor, motivator, social mediator) • The impact of social robots on student motivation, engagement, and social development • Designing learning activities with the integration of social robots • Social media as learning ecosystems and environments for informal learning • Functioning of algorithms and their role in shaping the information environment • The impact of social media on cognitive processes, attention, and learning behavior • Critical evaluation of information, misinformation, and media literacy in digital environments • Digital identity, privacy, and ethical aspects of social technologies • The role of teachers in developing critical digital literacy and responsible use of technology • Examples of good practices in the use of social robots and social media in education • Future trends: coexistence of humans, robots, and algorithms in educational processes
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Temeljni literatura in viri / Readings:

1. Belpaeme, T., Kennedy, J., Ramachandran, A., Scassellati, B., & Tanaka, F. (2018). Social robots for education: A review. Science Robotics. https://www.researchgate.net/publication/327046544_Social_robots_for_education_A_review 2. Bartneck, C., Belpaeme, T., Eyssel, F., Kanda, T., Keijsers, M., & Šabanović, S. (2016). Human-robot interaction: An introduction. Cambridge University Press. 3. Boyd, D. (2014). It's complicated: The social lives of networked teens. Yale University Press. 4. European Commission. (2024). DigComp 3.0: The digital competence framework for citizens. https://publications.jrc.ec.europa.eu/repository/handle/JRC144121 5. Flogie, A., Aberšek, B., Kordigel Aberšek, M., Sík Lányi, C., & Pesek, I. (2020). Development and evaluation of intelligent serious games for children with learning difficulties: Observational study. JMIR Serious Games, 8(2). 6. Bates, T. (2019). Teaching in a digital age: Guidelines for designing teaching and learning. BCcampus. https://opentextbc.ca/teachinginadigitalage/
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Cilji in kompetence:

• razumevanje in kritično vrednotenje vloge socialnih robotov in družbenih omrežij v sodobnem izobraževanju • primerjava različnih tipov socialnih robotov in njihovih pedagoških potencialov v različnih učnih kontekstih

Objectives and competences:

• understand and critically evaluate the role of social robots and social media in contemporary education • compare different types of social robots and their pedagogical potential in various learning contexts
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• razumevanje in analiza delovanja algoritmov ter vrednotenje njihovega vpliva na dostop do informacij in učne procese • analiza in vrednotenje vpliva socialnih tehnologij na učenje, motivacijo, pozornost in socialne odnose učencev • razvoj sposobnosti kritične presoje in vrednotenja digitalnih vsebin, vključno z dezinformacijami in manipulativnimi praksami • primerjava različnih pristopov uporabe socialnih robotov in družbenih omrežij v izobraževanju • razumevanje in vrednotenje etičnih, družbenih in zasebnostnih vidikov uporabe socialnih tehnologij • razvoj kompetenc za odgovorno odločanje pri uporabi družbenih omrežij in socialnih robotov v učnem procesu • načrtovanje, izvajanje in kritično vrednotenje učnih aktivnosti z vključevanjem socialnih robotov in družbenih omrežij • izbor, primerjava in smiselna uporaba sodobnih digitalnih orodij in platform za podporo učenju • razvoj sposobnosti refleksije in vrednotenja lastne pedagoške prakse v kontekstu digitalnih tehnologij • prepoznavanje, analiza in vrednotenje priložnosti ter omejitev uporabe socialnih tehnologij v različnih učnih okoljih • spodbujanje razvoja digitalne, medijske in umetno-inteligenčne pismenosti ter kritičnega odnosa do tehnologije • oblikovanje vključujočih, varnih in pedagoško utemeljenih digitalnih učnih okolij	• understand and analyze the functioning of algorithms, and evaluate their impact on access to information and learning processes • analyze and evaluate the impact of social technologies on learning, motivation, attention, and students' social relationships • develop the ability to critically assess and evaluate digital content, including misinformation and manipulative practices • compare different approaches to the use of social robots and social media in education • understand and evaluate ethical, social, and privacy-related aspects of using social technologies • develop competences for responsible decision-making when using social media and social robots in educational contexts • design, implement, and critically evaluate learning activities that integrate social robots and social media • select, compare, and meaningfully use modern digital tools and platforms to support teaching and learning • develop the ability to reflect on and evaluate one's own teaching practice in the context of digital technologies • identify, analyze, and evaluate opportunities and limitations of using social technologies in different learning environments • foster digital, media, and AI literacy, and develop a critical perspective on technology use • design inclusive, safe, and pedagogically grounded digital learning environments
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Predvideni študijski rezultati:

Po zaključku tega predmeta bo študent sposoben: • analizirati in kritično ovrednotiti vlogo socialnih robotov in družbenih omrežij v sodobnem izobraževanju • razložiti in primerjati različne tipe socialnih robotov ter presoditi njihovo uporabnost v pedagoških kontekstih • analizirati delovanje algoritmov na družbenih omrežjih in ovrednotiti njihov vpliv na dostop do informacij ter učenje

Intended learning outcomes:

Upon completion of this course, the student will be able to: • analyze and critically evaluate the role of social robots and social media in contemporary education • explain and compare different types of social robots and assess their applicability in educational contexts • analyze the functioning of algorithms in social media and evaluate their impact on access to information and learning
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• presoditi vpliv socialnih tehnologij na motivacijo, pozornost, učno vedenje in socialne odnose učencev • kritično vrednotiti digitalne vsebine, prepoznati dezinformacije in manipulativne prakse ter razvijati medijsko pismenost • ovrednotiti etične, družbene in zasebnostne vidike uporabe socialnih robotov in družbenih omrežij v izobraževanju • načrtovati, utemeljiti in izvesti učne aktivnosti z vključevanjem socialnih robotov in družbenih omrežij • izbrati in smiselno uporabiti ustrezna digitalna orodja in platforme glede na učne cilje • primerjati različne pristope uporabe socialnih tehnologij in ovrednotiti njihovo učinkovitost pri doseganju učnih izidov • reflektirati in kritično ovrednotiti lastno pedagoško prakso v kontekstu digitalnih in socialnih tehnologij • prepoznati in analizirati priložnosti ter omejitve uporabe socialnih tehnologij v različnih učnih okoljih • oblikovati vključujoče, varno in pedagoško utemeljeno digitalno učno okolje • spodbujati razvoj digitalne, medijske in umetno-inteligenčne pismenosti pri učencih	• assess the impact of social technologies on motivation, attention, learning behavior, and students' social relationships • critically evaluate digital content, identify misinformation and manipulative practices, and promote media literacy • evaluate ethical, social, and privacy-related aspects of using social robots and social media in education • design, justify, and implement learning activities that integrate social robots and social media • select and meaningfully use appropriate digital tools and platforms according to learning objectives • compare different approaches to the use of social technologies and evaluate their effectiveness in achieving learning outcomes • reflect on and critically evaluate their own teaching practice in the context of digital and social technologies • identify and analyze opportunities and limitations of using social technologies in different learning environments • design inclusive, safe, and pedagogically grounded digital learning environments • promote digital, media, and AI literacy among students
Metode poučevanja in učenja:	Learning and teaching methods:
• Predavanja • Seminarske vaje • Individualno delo Poučevanje in učenje potekata z didaktično uporabo informacijsko-komunikacijske tehnologije.	• Lectures • Seminar work • Individual work Teaching and learning is done with didactical use of ICT.

Načini ocenjevanja:

Delež (v %) /

Assessment:

Weight (in %)

Sodelovanje pri pedagoškem procesu	33	In-class participation
Seminarska naloga	33	Seminar paper
Ustni izpit	34	Oral exam

Reference nosilca / Lecturer's references:

1. FLOGIE, Andrej, ŠKROBAR, Jakob, ZEMLJAK, Dejan. Attitudes of engineering and technology teachers towards the use of humanoid robots in education. International journal of management, knowledge and learning. [Spletna izd.]. 2025, vol. 14, str. 277-284. ISSN 2232-5697.
2. HARI, Daniel, SKRBINJEK, Vesna, FLOGIE, Andrej. Enhancing student motivation and engagement through the use of a Slovenian-speaking social robot AlphaMini. Education sciences. 2025, vol. 15, iss. 9, [article no.] 1222, 18 str. ISSN 2227-7102.
3. FLOGIE, Andrej, ABERŠEK, Boris, PESEK, Igor. Education strategy for the net generation. Information. 2025, vol. 16, iss. 9, [article no.] 756, 15 str., ilustr. ISSN 2078-2489.
4. FLOGIE, Andrej, HARI, Daniel, BRATINA, Matevž, KERNEŽA, Maja, ABERŠEK, Boris, ZEMLJAK, Dejan. Integrating advanced technologies in education : empowering youth for a sustainable future through new literacies. Revija za elementarno izobraževanje. 2025, letn. 18, št. 4, str. 415-432, tabele. ISSN 1855-4431.
5. TODOROVIĆ, Tadej, FLOGIE, Andrej, HARI, Daniel. Generative AI in pragmatics : assessing the accuracy of automated speech act classification in Pinter's The birthday party. ELOPE : English language overseas perspectives and enquiries. [Tiskana izd.]. 2025, vol. 22, no. 1, str. 19-34. ISSN 1581-8918.
6. ABERŠEK, Boris, KRALJ, Samo, FLOGIE, Andrej. A hybrid AI-driven knowledge-based expert system for optimizing gear design : a case study for education. Future internet. 2026, vol. 18, iss. 1, [article no.] 25, 25 str., ilustr. ISSN 1999-5903.



Univerza v Mariboru

Fakulteta za naravoslovje
in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	Upravljanje znanja
Course title:	Knowledge management

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Študijski program za izpopolnjevanje iz organizacije informacijskih dejavnosti v vzgoji in izobraževanju		1.	1.
Study programme for further education in organising information activities in education			1 st

Vrsta predmeta / Course type

Obvezni/compulsory

Univerzitetna koda predmeta / University course code:

KID4

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
10	4	13			183	7

Nosilec predmeta / Lecturer:

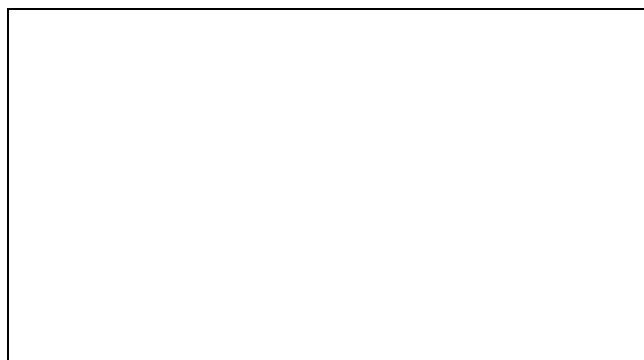
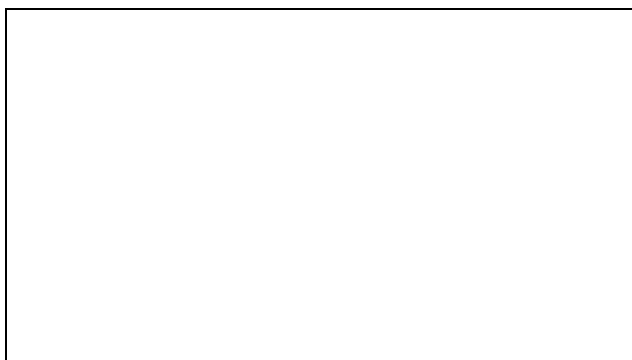
Florjančič Viktorija

**Jeziki /
Languages:**

**Predavanja /
Lectures:** slovenski/Slovenian
Vaje / Tutorial: slovenski/Slovenian

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

Prerequisites:

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

1. Vpliv digitalizacije na paradigmatike in filozofske temelje poučevanja;
 - Evropski referenčni okvir kompetenc;
 - Digitalne kompetence;
 - Okvir digitalnih kompetenc za državljane;
 - Digitalne kompetence za učitelje;
 - Razvijanje in preverjanje digitalnih kompetenc učiteljev in učencev;
 - Učenec v središču;
 - Digitalna Bloomova taksonomija;
 - Vloga ROID-a pri razvoju digitalnih kompetenc učiteljev in učencev;

- The impact of digitalisation on the paradigmatic and philosophical foundations of teaching;
- The European Reference Framework of Competences;
- Digital competences;
- Digital Competences Framework for Citizens;
- Digital Competences for Teachers;
- Developing and testing digital competences for teachers and students;
- The learner at the centre;
- Bloom's Digital Taxonomy;
- The role of ROID in the development of digital competences of teachers and learners;

Temeljni literatura in viri / Readings:**Obvezna:**

1. Flogie, A., & Aberšek, B. (2019). The impact of innovative ICT education and AI on the pedagogical paradigm. Cambridge Scholars Publishing.
2. European Commission. (2021). Digital education action plan 2021–2027: Resetting education and training for the digital age. https://education.ec.europa.eu/sites/default/files/document-library-docs/deap-communication-sept2020_en.pdf
3. Bates, T. (2019). Teaching in a digital age: Guidelines for designing teaching and learning. BCcampus. <https://opentextbc.ca/teachinginadigitalage>

Dodatna:

4. OECD. (2021). OECD digital education outlook 2021: Pushing the frontiers with artificial intelligence, blockchain and robots. <https://www.oecd.org/education/digital-education-outlook>
5. Redecker, C. (2017). European framework for the digital competence of educators: DigCompEdu. <https://publications.jrc.ec.europa.eu/repository/handle/JRC107466>

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

Študentje bodo razvili splošne kompetence:

- Ustvarjalnost in vrednotenje idej
- Načrtovanje in organiziranje
- Timsko delo in sodelovanje, zmožnost kritičnega dialoga
- Etično in trajnostno mišljenje
- Zmožnost biti kritičen in samokritičen
- Odprtost za nenehen poklicni razvoj in vseživljenjsko učenje
- Interdisciplinarno povezovanje vsebin

Študentje bodo razvili predmetno-specifične kompetence:

- Interpretacija rezultatov različnih orodij za samorefleksijo učiteljev
- Zmožnost organiziranja in načrtovanja (lastnega dela in dela drugih) v okviru strokovne učeče se skupnosti
- Sposobnost za načrtovanje in izvajanje strokovnih delavnic za razvijanje digitalnih kompetenc učiteljev
- Podpora učiteljem pri načrtovanju in implementaciji učnih situacij s ciljem razvijanja digitalnih kompetenc učiteljev

Students will develop general competences:

- Creativity and evaluation of ideas
- Planning and organising
- Teamwork and collaboration, ability to engage in critical dialogue
- Ethical and sustainable thinking
- Ability to be critical and self-critical
- Openness to continuous professional development and lifelong learning
- Interdisciplinary integration of content

Students will develop subject-specific competences:

- Interpreting the results of different teacher self-reflection tools
- Ability to organise and plan (own and others' work) within a professional learning community
- Ability to plan and implement professional workshops to develop teachers' digital competences
- Support for teachers in planning and implementing learning situations with the aim of developing teachers' digital competences

Predvideni študijski rezultati:**Po uspešno končanem predmetu bo študent pridobil znanje in razumevanje o:**

- Vzgojnih in izobraževalnih konceptih, njihovih filozofskih temeljih
- vplivu digitalizacije na poučevanje
- pomenu razvijanja kompetenc za aktivno udejstvovanje posameznika v poklicnem, osebnem in javnem življenju
- različnih kompetenčnih okvirjih ter njihovem vplivu na učenje in poučevanje (Evropski referenčni okvir kompetenc) DigComp2.1, DigCompEdu)
- razlikah med okvirjem digitalnih kompetenc za državljanje ter učitelje
- vlogi ROIDA pri razvijanju digitalnih kompetenc učiteljev in učencev
- na učenca osredinjenem pouku ter vlogi aktivnih oblik poučevanja pri razvijanju kompetenc učencev

ter bo:

- zmožen podpreti vodstvo šole in učiteljski zbor pri načrtovanju in usklajevanju razvijanja digitalnih kompetenc učiteljev in učencev

Intended learning outcomes:**After successfully completing the course, the student will gain knowledge and understanding:**

- Educational and educational concepts, their philosophical foundations
- the impact of digitisation on teaching
- the importance of developing competences for active participation in professional, personal and public life
- the different competences frameworks and their impact on learning and teaching (European Reference Framework for Competences) DigComp2.1, DigCompEdu)
- the differences between the DigTal competences framework for the state and for teachers
- the role of ROID in developing teachers' and learners' digital competences
- learner-centred teaching and the role of active learning in developing learners' competences

and will:

- be able to support the school management and the teaching staff in planning and

• zmožen svetovati učiteljem pri razvijanju njihovih digitalnih kompetenc na osnovi izvedene samorefleksije ter analize njihovih potreb in potreb VIZ • usposobljen podpreti učitelje pri načrtovanju pouka z uporabo digitalne Bloomove taksonomije	coordinating the development of teachers' and students' digital competences. • be able to advise teachers on the development of their digital competences on the basis of self-reflection and analysis of their needs and the needs of the VIZ • be able to support teachers in planning lessons using Bloom's digital taxonomy
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Metode poučevanja in učenja:

Predavanja, sodelovalno delo v spletni učilnici, obrnjeno učenje, raziskovalno delo, projektno delo

Learning and teaching methods:

Lectures, collaborative work in an online classroom, flipped learning, research, project work

Načini ocenjevanja:

Sodelovanje pri pedagoškem procesu
Seminarska naloga
Ustni izpit

Delež (v %) /

Weight (in %) **Assessment:**

Assessment:

In-class participation
Seminar paper
Oral exam

Reference nosilca / Lecturer's references:

1. FLORJANČIČ, Viktorija, WIECHETEK, Łukasz. Using Moodle and MS Teams in higher education : a comparative study. International journal of innovation and learning. 2022, vol. 31, no. 2, str. 264-286, ilustr. ISSN 1741-8089. <https://www.inderscience.com/info/inarticle.php?jcode=ijil&year=2022&vol=31&issue=2>, <https://www.inderscience.com/info/inarticle.php?artid=120650>, DOI: 10.1504/IJIL.2022.120650. [COBISS.SI-ID 95801091]
2. FLORJANČIČ, Viktorija. The challenges of distance assessment in higher education – a case study. International journal of learning technology. 2022, vol. 17, no. 1, str. 77-93, ilustr. ISSN 1477-8386. <https://www.inderscience.com/info/inarticle.php?artid=123685>, DOI: 10.1504/IJLT.2022.123685. [COBISS.SI-ID 114035459]
3. FLORJANČIČ, Viktorija. The lockdown impact on student's successfulness. V: UDEN, Lorna (ur.), LIBERONA, Dario (ur.). Learning Technology for Education Challenges : 10th International Workshop, LTEC 2022, Hagen, Germany, July 11-14, 2022 : proceedings. Cham: Springer, 2022. Str. 192-203. Communications in Computer and Information Science, 1595. ISBN 978-3-031-08890-2, ISBN 978-3-031-08889-6. ISSN 1865-0937. https://link.springer.com/chapter/10.1007/978-3-031-08890-2_15, DOI: 10.1007/978-3-031-08890-2_15. [COBISS.SI-ID 118733827]



Univerza v Mariboru

Fakulteta za naravoslovje
in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	KIBERNETSKA IN OMREŽNA VARNOST
Course title:	Cyber and network security

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Študijski program za izpopolnjevanje iz organizacije informacijskih dejavnosti v vzgoji in izobraževanju		1.	2.
STUDY PROGRAMME FOR FURTHER EDUCATION IN ORGANISING INFORMATION ACTIVITIES IN EDUCATION			2.

Vrsta predmeta / Course type

Obvezni/compulsory

Univerzitetna koda predmeta / University course code:

KID8

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
10	4	13			153	6

Nosilec predmeta / Lecturer:

Marko Hölbl, Muhamed Turkanovič

**Jeziki /
Languages:**

**Predavanja /
Lectures:**

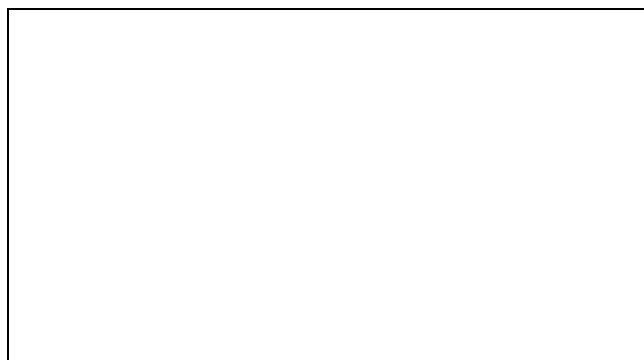
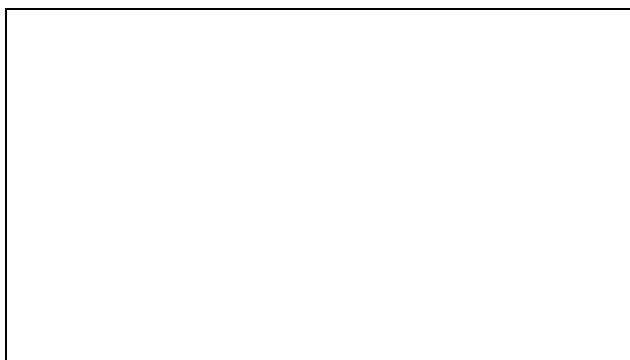
slovenski/Slovenian

Vaje / Tutorial:

slovenski/Slovenian

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

Prerequisites:

**Vsebina:**

- Osnove informacijske varnosti v IKT
- Vloga kriptografije pri informacijski varnosti: tehnologije, gradniki in pristopi zaščite.
- Infrastruktura javnih ključev: modeli zaupanja; koncepti, gradniki in pojmi; digitalno potrdila in elektronski podpisi.
- Škodljiva programska koda in prevare na internetu.
- Mrežna varnost: napadi in grožnje; postopki zaščite; varnostni protokoli in drugi pristopi ter tehnologije za zaščito komunikacij.
- Varnost na spletu: model spletne varnosti; varnost spletnih aplikacij.
- Varne arhitekture: varnost operacijskih sistemov, ogrodij in drugih arhitekturnih komponent.
- Načrtovanje varnostnih zahtev in ukrepov ter uporabniški vidiki varnost: zasebnost; standardi; varnostne politike; analiza informacijskih tveganj.
- Upravljanje z zasebnostjo in osebnimi podatki v sodobnih informacijskih sistemih (vloga GDPR).

Content (Syllabus outline):

- Cryptography basics: the role of cryptography in information security, technologies, building-blocks and approaches of protection.
- The public key infrastructure: trust models, concepts, building-blocks, digital certificates and digital signatures.
- Malware and internet scams.
- Network security: risks and attacks, security protocols, other means of protection.
- Web security: web security model, web applications.
- Secure architectures: security of operating systems, frameworks and other architectural components.
- Planning of security requirements and measures, and user aspects of security: privacy; standards; security policies; analysis of security risks.
- Management of privacy and personal data in modern information systems (role of GDPR).

Temeljni literatura in viri / Readings:

- Easttom, Chuck. (2021). *Computer Security Fundamentals* (4th ed.). Pearson IT Certification.
- Rains, T. (2020). *Cybersecurity Threats, Malware Trends, and Strategies: Learn to mitigate exploits, malware, phishing, and other social engineering attacks*. Packt Publishing.
- Stallings, W., Brown, L. (2018). *Computer Security - Principles and Practice*. 4th Edition, Pearson, Boston.
- Mead, N., & Woody, C. (2017). *Cyber Security Engineering: A Practical Approach for Systems and Software Assurance*. Addison Wesley.
- W. Stallings (2017). *Cryptography and Network Security: Principles and Practice*, 7th Edition, Pearson, Boston.
- Prislan, Kaja, Lobnikar, Branko (2016). Varnost v kibernetnem prostoru - poročilo s konference RISK 2016. [Varstvoslovje \(Spletna izd.\)](#), letnik 18, številka 1, str. 112-121. URN:NBN:SI:DOC-2HG2XXVS from <http://www.dlib.si>.
- Uršič, Črt, Mihelič, Anže, Vrhovec, Simon (2020). Uporaba nevronske mreže v kibernetni varnosti. [Varstvoslovje \(Spletna izd.\)](#), letnik 22, številka 2, str. 197-210. URN:NBN:SI:DOC-9X5XX9T9 from <http://www.dlib.si>.

Cilji in kompetence:**Študentje bodo razvili predmetno-specifične kompetence:**

razumevanje pojmov kibernetске varnosti ter varovanja informacijskih sistemov in komunikacij. Prav tako bodo zmožni prepoznavati probleme ter vpeljati mehanizme varovanja na izbranem informacijskem sistemu ali storitvi.

Objectives and competences:

The objective of this course is for students to be able to understand the concepts of cybersecurity and methods for protecting information systems and communications. Additionally, they will be able to identify problems, and deploy security mechanisms on selected information systems or services.

Predvideni študijski rezultati:**Po zaključku tega predmeta bo študent sposoben:**

- identificirati in razumeti varnostna tveganja v informacijskih sistemih,
- razložiti osnove principe delovanja zaščitnih mehanizmov,
- vpeljati ustrezne protiukrepe.

Prenosljive/ključne spretnosti in drugi atributi:

- *Spretnosti komuniciranja:* pisanje strokovnega poročila o opravljenem projektu, ustni zagovor laboratorijskih vaj, pisno izražanje pri pisnem izpitu.
- *Uporaba informacijske tehnologije:* iskanje informacij na internetu, uporaba programskih rešitev za zaščito informacijskih sistemov.
- *Reševanje problemov:* reševanje specifičnega problema s pomočjo programske rešitve in načrtovanje ter vpeljava varnostne rešitve.

Intended learning outcomes:**On completion of this course the student will be able to:**

- recognize and understand security risks in information systems,
- explain principles of the operation of protection mechanisms,
- deploy appropriate protection measures.

Transferable/Key skills and other attributes:

- *Communication skills:* writing a professional report of the performed project, oral lab work defense, manner of expression at the written examination.
- *Use of information technology:* search for information on the Internet, use of software solutions for protecting information systems.
- *Problem solving:* solve a specific problem with the use of security mechanisms and design and deploy a security solution.

Metode poučevanja in učenja:

Predavanja, sodelovalno učenje, obrnjeno učenje, raziskovalno učenje, projektno učenje

Learning and teaching methods:

Lectures, collaborative learning, flipped learning, inquiry learning, project-based learning

Delež (v %) /

Načini ocenjevanja:

Weight (in %) /

Assessment:

Sodelovanje pri pedagoškem procesu	33%	In-class participation
Seminarska naloga	33%	Seminar paper
Ustni izpit	34%	Oral exam

Reference nosilca / Lecturer's references:

Reference nosilca / Lecturer's references:

1. KOMPARA, Marko, NEMEC ZLATOLAS, Lili, TURKANOVIC, Muhamed, HÖLBL, Marko. Importance of cybersecurity competencies in higher education and for employers. Applied sciences. 2026, vol. 16, iss. 7, [article no.] 3260, 23 str., ilustr. ISSN 2076-3417. <https://dk.um.si/IzpisGradiva.php?id=97657>. [COBISS.SI-ID 273535747], [Odprti dostop, JCR, SNIP]
2. KOMPARA, Marko, HÖLBL, Marko. Vzpostavitev šifrnih ključev v post-kvantni kriptografiji. Uporabna informatika. 2025, letn. 33, št. 2, str. 55-78. ISSN 2630-435X. <https://dk.um.si/IzpisGradiva.php?id=95583>, <https://uporabna-informatika.si/ui/article/view/248/215>, DOI: 10.31449/upinf.248. [COBISS.SI-ID 246672387]
3. TURKANOVIC, Muhamed, KERŠIČ, Vid, HORVAT, Alen, BERON, Dominik, ČUČKO, Špela. From model to mechanism : enforcing delegated authority in ssi with language-based security. Mathematics. 2025, vol. 13, iss. 18, [article no.] 2971, 33 str. ISSN 2227-7390. <https://dk.um.si/IzpisGradiva.php?id=95629>, DOI: 10.3390/math13182971. [COBISS.SI-ID 249372675]
4. HÖLBL, Marko, KEŽMAH, Boštjan, KOMPARA, Marko. (2021). Data protection heterogeneity in the European Union. Applied sciences, ISSN 2076-3417, Nov.-2 2021, vol. 11, iss. 22, str. 1-9. <https://www.mdpi.com/2076-3417/11/22/10912>, doi: 10.3390/app112210912. [COBISS.SI-ID 85541123].
5. KOMPARA, Marko, NEMEC ZLATOLAS, Lili, TURKANOVIC, Muhamed, HÖLBL, Marko. Importance of cybersecurity competencies in higher education and for employers. Applied sciences. 2026, vol. 16, iss. 7, [article no.] 3260, 23 str., ilustr. ISSN 2076-3417. Digitalna knjižnica Univerze v Mariboru – DKUM. [COBISS.SI-ID 273535747], [Odprti dostop, JCR, SNIP]



Univerza v Mariboru

Fakulteta za naravoslovje
in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	TEHNOLOGIJE NAVIDEZNE IN OBOGATENE RESNIČNOSTI V IZOBRAŽEVANJU
Course title:	VIRTUAL AND AUGMENTED REALITY TECHNOLOGIES IN EDUCATION

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Študijski program za izpopolnjevanje iz organizacije informacijskih dejavnosti v vzgoji in izobraževanju		1.	2.
Study programme for further education in organising information activities in education			2.

Vrsta predmeta / Course type

izbirni/elective

Univerzitetna koda predmeta / University course code:

KID9

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
10	4	10			156	6

Nosilec predmeta / Lecturer:

Simon Kolmanič

Jeziki /

Languages:

Predavanja /

Lectures:

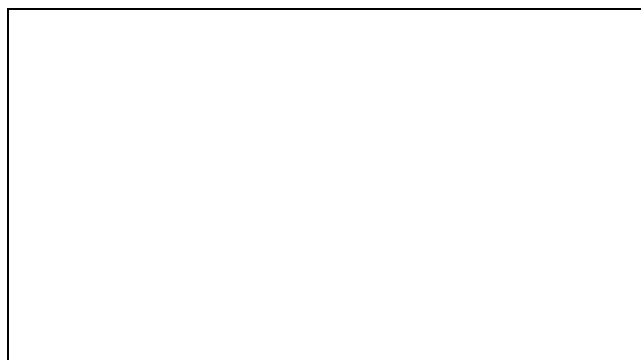
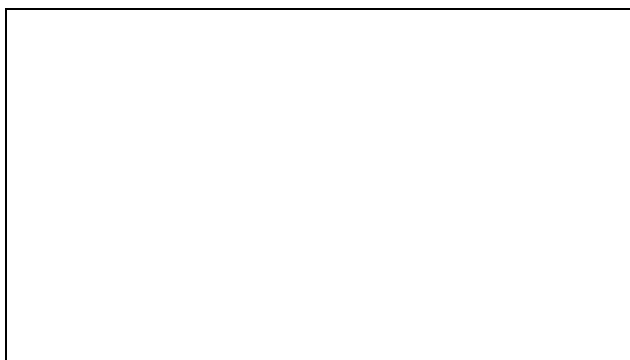
slovenski/Slovenian

Vaje / Tutorial:

slovenski/Slovenian

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

Prerequisites:



Vsebina:

- Uvod: pregled razvoja navidezne in obogatene resničnosti in temeljnih konceptov delovanja.
- Pregled naprav za navidezno in obogateno resničnost: naglavni zasloni (HTC, Oculus, CardBox), HoloLens, pametni telefoni.
- Sistem SLAM: spoznavanje koncepta sprotne lokalizacije in mapiranja.
- Osnove interakcije človek računalnik.
- Osnove gradnje virtualnih 3D svetov: geometrijsko modeliranje, teksture, animacija, fotogrametrija.
- Platforme za navidezno in obogateno resničnost: seznanitev s platformami SteamVR, ARKit, ARCore, MRTK.
- Osnove konceptov računalniško podprtega poučevanja.
- Priprave digitalnih učnih vsebin: spoznavanje konceptov resnih iger, metod pripovedovanja, uporaba interaktivnost za zagotavljanje pozornosti učenca.

Orodja za razvoj izobraževalnih vsebin, temelječih na navidezni in obogateni resničnosti: Slušatelji bodo spoznali sodobna razvojna orodja, skupaj s primeri dobrih praks.

Content (Syllabus outline):

- Introduction: a brief history of virtual and augmented reality and basic operation concepts.
- Overview of virtual and augmented reality hardware: Head mounted displays (HTC, Oculus, CardBox), HoloLens, smart phones.
- SLAM system: introduction to concept of simultaneous localization and mapping.
- Basics of Human computer interaction.
- Basics of building 3D virtual worlds: Geometric modelling, texturing, animation, photogrammetry.
- Virtual and augmented reality platforms: introduction to SteamVR, ARKit, ARCore, and MRTK platforms.
- Introduction to the concepts of computer aided teaching.
- Preparation of digital learning contents: learning about the concepts of serious games, storytelling methods, employment of interactivity to maintain the student attention.

Tools for the development of virtual and augmented reality educational content: Participants will learn about modern development tools together with examples of good practice.

Temeljni literatura in viri / Readings:

- Pangilinan, Erin, Steve Lukas, and Vasanth Mohan. *Creating augmented and virtual realities: theory and practice for next-generation spatial computing*. " O'Reilly Media, Inc.", 2019.
- Schmalstieg, Dieter, and Tobias Hollerer. *Augmented reality: principles and practice*. Addison-Wesley Professional, 2016.
- Jerald, Jason. *The VR book: Human-centered design for virtual reality*. Morgan & Claypool, 2015.
- Bucher, John. *Storytelling for virtual reality: Methods and principles for crafting immersive narratives*. Routledge, 2017.
- KOLMANIČ, Simon, MARKSEL, Maršenka, MONGUS, Domen, ŽALIK, Borut. Tehnologije navidezne in obogatene resničnosti, kot orodje za predstavitev novih idej in produktov na sejnih : primer Mahepa. Uporabna informatika. [Tiskana izd.]. 2020, letn. 28, št. 2, str. 85-93.

Cilji in kompetence:

Objectives and competences:

Cilj predmeta je učitelje naučiti konceptov obogatene in navidezne resničnosti in njihove uporabe v procesu izobraževanja. Učitelji bodo pridobili osnovna znanja gradnje navideznih svetov in razvoja učnih aplikacij, temelječih na navidezni in obogateni resničnosti.

The aim of the course is to teach the participants the concepts of augmented and virtual reality and their use in the educational process. Participants will gain basic knowledge of building virtual worlds and developing learning applications based on virtual and augmented reality.

Predvideni študijski rezultati:

Znanje in razumevanje:

Po zaključku tega predmeta bo učitelj sposoben:

- Razumeti koncepte navidezne in obogatene resničnosti in njihovo uporabo v procesu izobraževanja.
- Izdelati učinkovite učne scenarije in preproste navidezne svetove.
- Načrtovati in izdelati preprostejše učne aplikacije.

Prenosljive/ključne spretnosti in drugi atributi:

- *Spretnosti komuniciranja:* pisno izražanje pri pripravi scenarijev in učnih gradiv.
- *Uporaba informacijske tehnologije:* uporaba animacijskih paketov za gradnjo navideznih svetov in objektov, uporaba orodij za gradnjo učnih aplikacij.

Reševanje problemov: načrtovanje in implementacija preprostih mobilnih aplikacij.

Intended learning outcomes:

Knowledge and understanding:

On completion of this course the participant will be able to:

- Understand the concepts of virtual and augmented reality and their application in the educational process.
- Develop effective learning scenarios and simple virtual worlds.
- Design and build plain learning applications.

Transferable/Key skills and other attributes:

- Communication skills: written expression in the preparation of scenarios and learning materials.
- Use of information technology: use of animation packages to build virtual worlds and objects, use of development tools to build learning applications.

Problem solving: design and implementation of simple mobile applications.

Metode poučevanja in učenja:

Predavanja, sodelovalno učenje, obrnjeno učenje, raziskovalno učenje, projektno učenje

Learning and teaching methods:

Lectures, collaborative learning, flipped learning, inquiry learning, project-based learning

Načini ocenjevanja:

Sodelovanje pri pedagoškem procesu
Seminarska naloga
Ustni izpit

Delež (v %) /

Weight (in %) /

Assessment:

In-class participation
Seminar paper
Oral exam

33%
33%
34%

Reference nosilca / Lecturer's references:

- KOLMANIČ, Simon, STRNAD, Damjan, KOHEK, Štefan, BENES, Bedrich, HIRST, Peter, ŽALIK, Borut. (2021). An algorithm for automatic dormant tree pruning. *Applied soft computing*. [Print ed.]. Feb. 2021, vol. 99, str. 1-11.
- LIU, Shuang, AO, Zhizhuo, CHEN, Peng, KOLMANIČ, Simon. CollRec: pre-trained language models and knowledge graphs collaborate to enhance conversational recommendation system. *IEEE access*. 2024, vol. 12, str. 104663 - 104675, ilustr. ISSN 2169-3536. DOI: [10.1109/ACCESS.2024.3434720](https://doi.org/10.1109/ACCESS.2024.3434720). [COBISS.SI-ID [219646211](https://cobiss.si/id/219646211)],
- LIU, Shuang, AO, Zhizhuo, CHEN, Peng, KOLMANIČ, Simon. CollRec: pre-trained language models and knowledge graphs collaborate to enhance conversational recommendation system. *IEEE access*. 2024, vol. 12, str. 104663 - 104675, ilustr. ISSN 2169-3536. DOI: 10.1109/ACCESS.2024.3434720. [COBISS.SI-ID 219646211], [JCR, SNIP, WoS do 20. 3. 2026: št. citatov (TC): 2, čistih citatov (CI): 2, čistih citatov na avtorja (CIAu): 0.50, Scopus
- KOHEK, Štefan, ŽALIK, Borut, STRNAD, Damjan, KOLMANIČ, Simon, LUKAČ, Niko. Simulation-driven 3D forest growth forecasting based on airborne topographic LiDAR data and shading. *International journal of applied earth observation and geoinformation* : the journal is the successor of the former ITC Journal and has been published by Elsevier since 2002. July 2022, vol. 111, 13 str. ISSN 1569-8432. DOI: 10.1016/j.jag.2022.102844. [COBISS.SI-ID 110735107], [JCR, SNIP, WoS do 19. 5. 2026: št. citatov (TC): 10, čistih citatov (CI): 7, čistih citatov na avtorja (CIAu): 1.40, Scopus



Univerza v Mariboru

Fakulteta za naravoslovje
in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	DIGITALNE TEHNOLOGIJE
Course title:	Digital technologies

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Študijski program za izpopolnjevanje iz organizacije informacijskih dejavnosti v vzgoji in izobraževanju		1.	1.
STUDY PROGRAMME FOR FURTHER EDUCATION IN ORGANISING INFORMATION ACTIVITIES IN EDUCATION			1 st

Vrsta predmeta / Course type

Obvezni/compulsory

Univerzitetna koda predmeta / University course code:

KID7

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
10	4	13			153	6

Nosilec predmeta / Lecturer:

Marjan Krašna

**Jeziki /
Languages:**

**Predavanja /
Lectures:**

slovenski/Slovenian

Vaje / Tutorial:

slovenski/Slovenian

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

Prerequisites:

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Vsebina:

- Trendi razvoja računalniške infrastrukture, omrežij in opreme;
- Šolska omrežna in računalniška infrastruktura
- Načrtovanje šolskega lokalnega omrežja;
- Osnovne značilnosti razvoja lokalne omrežne in računalniške infrastrukture;
- Zagotavljanje dostopnosti in sodelovanje z Arnesom na nivoju mrežne infrastrukture;
- Zagotavljanje nemotenega delovanja šolskega omrežja;
- Enotno upravljanje in nadzor strojne opreme na šoli ter sistemi oddaljene pomoči;
- Upravljanje in zagotavljanje IP telefonija šole;
- Upravljanje in zagotavljanje šolskega video nadzora;
- Upravljanje in zagotavljanje tiskalniških storitev;
- Trajnostno načrtovanje šolske računalniške opreme;
- mrežne shrambe datotek in video vsebin, dostop in varovanje
- delovno mesto za poučevanje na daljavo in hibridno poučevanje

Content (Syllabus outline):

- Trends in computing infrastructure, networks and equipment;
- School network and computer infrastructure
- School local area network planning;
- Basic characteristics of local network and computer infrastructure development;
- Ensuring accessibility and cooperation with Arnes at network infrastructure level;
- Ensuring the smooth operation of the school network;
- Unified management and control of school hardware and remote assistance systems;
- Managing and providing IP telephony to the school;
- Management and provision of school video surveillance;
- Management and provision of printing services;
- Sustainable design of school computer equipment;
- Network file and video storage, access and security
- Distance and Hybrid Teaching post

Temeljni literatura in viri / Readings:

Obvezna:

1. Krašna, M. (2015). *Izobraževanje v digitalnem svetu*. Zora.
2. Easttom, C. (2016). *Computer security fundamentals*. Pearson.

Dodatna:

3. OECD. (2021). *OECD digital education outlook 2021*. https://www.oecd.org/en/publications/oecd-digital-education-outlook-2021_589b283f-en.html
4. European Commission. (2021). *Digital education action plan 2021–2027*. https://education.ec.europa.eu/sites/default/files/document-library-docs/deap-communication-sept2020_en.pdf
5. Bates, T. (2019). *Teaching in a digital age: Guidelines for designing teaching and learning*. BCcampus. <https://opentextbc.ca/teachinginadigitalage/>

Cilji in kompetence:**Študentje bodo razvili splošne kompetence:**

- Skupinsko delo in sodelovanje, medosebne kompetence
- Odprtost za alternativne poglede in rešitve
- usposobljenost za samostojno razvijanje novega znanja in reševanje problemov s

Objectives and competences:**Students will develop general competences:**

- Teamwork and cooperation, interpersonal competences
- Openness to alternative views and solutions
- Competence to independently develop new knowledge and solve problems by testing

preizkušanjem in izboljševanjem znanih rešitev ter odkrivanjem novih, • Etično in trajnostno mišljenje Študentje bodo razvili predmetno-specifične kompetence: • trajnostno načrtovanje šolske računalniške opreme • zmožnost upravljanja in zagotavljanja nemotenega delovanja šolskega omrežja	and improving known solutions and discovering new ones, • Ethical and sustainable thinking Students will develop subject-specific competences: • Sustainable design of school computing equipment • - the ability to manage and ensure the smooth operation of the school network
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Predvideni študijski rezultati:

Po uspešno končanem predmetu bo študent pridobil znanje in razumevanje o:

- trendih razvoja računalniške infrastrukture, omrežij in opreme
- osnovnih značilnosti razvoja lokalne omrežne in računalniške infrastrukture
- zagotavljanju nemotenega delovanja šolskega omrežja
- enotnem upravljanju in nadzoru strojne opreme na šoli
- upravljanju in zagotavljanju IP telefonije VIZ
- upravljanju in zagotavljanju tiskalniških storitev
- Arnesovih storitvah pri zagotavljanju dostopnosti na nivoju mrežne infrastrukture

ter bodo:

- zmožni načrtovanja šolskega lokalnega omrežja
- poznali možnosti sodelovanja z Arnesom pri zagotavljanju dostopnosti na nivoju mrežne infrastrukture
- uporabljali sistem oddaljene pomoči za nemoteno delovanje opreme in omrežja na šoli
- sodelovali z vodstvom VIZ pri odločitvah glede upravljanja in zagotavljanja IP telefonije ter tiskalniških storitev
- zmožni svetovati vodstvu VIZ in sprejemati odločitve o nabavi strojne opreme VIZ

Intended learning outcomes:

After successfully completing the course, the student will gain knowledge and understanding:

- trends in the development of computer infrastructure, networks and equipment
- the basic characteristics of local network and computing infrastructure development
- ensuring the smooth operation of the school network
- unified management and control of hardware in the school
- the management and provision of IP telephony in the VIZ
- the management and provision of printing services
- Arnes services in the provision of accessibility at network infrastructure level

and will:

- be able to design the school's local area network
- know how to work with Arnes to provide accessibility at the network infrastructure level
- use the remote assistance system to ensure the smooth operation of the equipment and network in the school
- cooperate with the VIZ management in decisions regarding the management and provision of IP telephony and printing services
- be able to advise the management of the VIZ and make decisions on the purchase of VIZ hardware

Metode poučevanja in učenja:

Learning and teaching methods:

Predavanja, sodelovalno delo v spletni učilnici, obrnjeno učenje, raziskovalno delo, projektno delo	Lectures, collaborative work in an online classroom, flipped learning, research, project work
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Delež (v %) /

Načini ocenjevanja:

Weight (in %) **Assessment:**

Sodelovanje pri pedagoškem procesu	33%	In-class participation
Seminarska naloga	33%	Seminar paper
Ustni izpit	34%	Oral exam

Reference nosilca / Lecturer's references:

Reference nosilca / Lecturer's references:

1. LAPI, Mojca, KRAŠNA, Marjan. (2021). The distance learning implications on high school students. V: SKALA, Karolj (ur.). MIPRO 2021 : 44th International Convention, September 27 - October 1, 2021, Opatija, Croatia : proceedings. Rijeka: Croatian Society for Information and Communication Technology, Electronics and Microelectronics - MIPRO, cop. 2021. Str. 634-638. MIPRO ... ISSN 1847-3946. <https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=9597143>. [COBISS.SI-ID 86733315]
2. PESEK, Igor, KRAŠNA, Marjan, BRATINA, Tomaž. (2021). Students' transition from high school to university in COVID-19 constrained education. V: SKALA, Karolj (ur.). MIPRO 2021 : 44th International Convention, September 27 - October 1, 2021, Opatija, Croatia : proceedings. Rijeka: Croatian Society for Information and Communication Technology, Electronics and Microelectronics - MIPRO, cop. 2021. Str. 645-649, tabele. MIPRO ... ISSN 1847-3946. <https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=9596698>. [COBISS.SI-ID 86740483]
3. GARTNER, Smiljana, KRAŠNA, Marjan. Etika umetne inteligence v izobraževanju. Revija za elementarno izobraževanje. jun. 2023, letn. 16, št. 2, str. 221-235, ilustr. ISSN 1855-4431. <https://journals.um.si/index.php/education/article/view/2846/2211>, DOI: 10.18690/rei.16.2.2864, DOI: 20.500.12556/DKUM-88953. [COBISS.SI-ID 158599683], [SNIP]
4. GARTNER, Smiljana, KRAŠNA, Marjan. Artificial intelligence in education – ethical framework. V: 2023 12th Mediterranean Conference on Embedded Computing (MECO), 6-10 June 2023. 2023 12th Mediterranean Conference on Embedded Computing (MECO), 6-10 June 2023, Budva, Montenegro. [S. l.]: IEEE, cop. 2023. Str. 1-7, ilustr. ISBN 979-8-3503-2291-0. <https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=10155012>, DOI: 10.1109/MECO58584.2023.10155012. [COBISS.SI-ID 159825155], [Scopus do 24. 5. 2026: št. citatov (TC): 38, čistih citatov (CI): 37, čistih citatov na avtorja (CIAu): 18.50]



Univerza v Mariboru

Fakulteta za naravoslovje
in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	DIGITALNE STORITVE V IZOBRAŽEVANJU
Course title:	DIGITAL SERVICES IN EDUCATION

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Študijski program za izpopolnjevanje iz organizacije informacijskih dejavnosti v vzgoji in izobraževanju		1.	2.
STUDY PROGRAMME FOR FURTHER EDUCATION IN ORGANISING INFORMATION ACTIVITIES IN EDUCATION			2.

Vrsta predmeta / Course type

Obvezni/compulsory

Univerzitetna koda predmeta / University course code:

KID6

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
10	4	13			153	6

Nosilec predmeta / Lecturer:

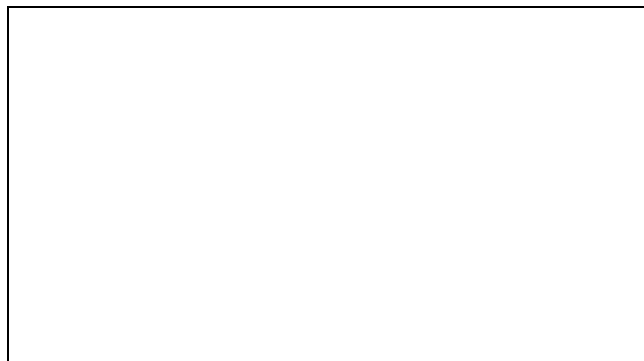
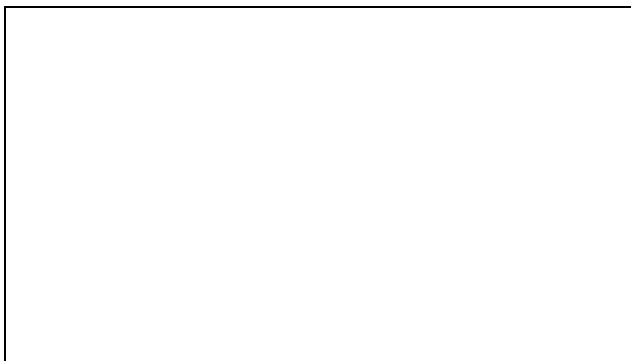
Igor Pesek

**Jeziki /
Languages:**

**Predavanja /
Lectures:** slovenski/Slovenian
Vaje / Tutorial: slovenski/Slovenian

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

Prerequisites:

**Vsebina:**

- Upravljanje identitet, varnost osebnih podatkov (GDPR) na nivoju VIZ-a;
- Distribucijski sistemi za izobraževalne vsebine;
- Šolsko izobraževalno omrežje in spletna varnost;
- Sistemi za upravljanje s spletnimi vsebinami (CMS sistemi);
- Sistemi za upravljanje z učnimi okolji (LMS);
- E-učne vsebine, vizija razvoja, usmeritve ter standardi v slovenskem izobraževalnem prostoru;
- Dostopne e-storitve za vzgojno izobraževalne zavode;
- Varnost šolskega omrežja ter upravljanje oddaljenega dostopa za učence in učitelje;
- Varnostna tveganja pri upravljanju z identitetami, programsko in strojno opremo ter protivirusna zaščita na nivoju VIZ-a.

Content (Syllabus outline):

- Identity management, personal data security (GDPR) at VIZ level;
- Distribution systems for educational content;
- School education network and online security;
- Web content management systems (CMS systems);
- Learning Management Systems (LMS);
- E-learning content, development vision, orientations and standards in the Slovenian educational space;
- Accessible e-services for educational institutions;
- School network security and remote access management for students and teachers;
- Security risks in identity, software and hardware management and antivirus protection at the VIZ level.

Temeljni literatura in viri / Readings:**Obvezna:**

1. Bates, T. (2019). Teaching in a digital age: Guidelines for designing teaching and learning. BCcampus. <https://opentextbc.ca/teachinginadigitalage/>
2. Bregar, L., Zgmajster, M., & Radovan, M. (2020). E-izobraževanje za digitalno družbo. Andragoški center Slovenije.

Dodatna:

3. European Commission. (2021). Digital education action plan 2021–2027: Resetting education and training for the digital age. https://education.ec.europa.eu/sites/default/files/document-library-docs/deap-communication-sept2020_en.pdf
4. European Union. (2016). General data protection regulation (GDPR). <https://eur-lex.europa.eu/eli/reg/2016/679/oj>

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

Študentje bodo razvili splošne kompetence:

- Zmožnost kritičnega razmišljanja
- Odprtost za alternativne poglede in rešitve
- Zmožnost biti kritičen in samokritičen
- Etično in trajnostno mišljenje
- usposobljenost za samostojno razvijanje novega znanja in reševanje problemov s preizkušanjem in izboljševanjem znanih rešitev te odkrivanjem novih
- Razumevanje in reševanje računalniških problemov na kvalitativnem in kvantitativnem nivoju

Študentje bodo razvili predmetno-specifične kompetence:

- načrtovanje in izvajanje kratkih usposabljanj za učitelje glede uporabe programske in strojne opreme in digitalne varnosti na VIZ
- Primerjava in izbira stroje in programske opreme za podporo poslovnih, organizacijskih in pedagoških procesov na VIZ
- Razumevanje in obvladovanje varnostnih tveganj pri upravljanju digitalnih identitet ter programske in strojne opreme na VIZ

Students will develop general competences:

- Critical thinking skills
- Openness to alternative views and solutions
- The ability to be critical and self-critical
- Ethical and sustainable thinking
- Competence to develop new knowledge and solve problems independently by testing and improving known solutions and discovering new ones.
- Understanding and solving computational problems at qualitative and quantitative levels

Students will develop subject-specific competences:

- Planning and delivering short training sessions for teachers on the use of software, hardware and digital security at VIZ.
- Comparison and selection of hardware and software to support business, organisational and pedagogical processes at VIZ
- - Understanding and managing security risks in managing digital identities and software and hardware in HEIs

Predvideni študijski rezultati:**Po uspešno končanem predmetu bo študent pridobil znanje in razumevanje o:**

- upravljanju identitet ter varnosti osebnih podatkov na nivoju VIZ
- distribucijskih sistemih za izobraževalne vsebine
- šolskem izobraževalnem omrežju in spletni varnosti
- sistemih za upravljanje s spletnimi vsebinami
- sistemih za upravljanje z učnimi okolju
- standardih in usmeritvah e-učnih vsebin v Slovenji
- e-storitvah za VIZ v Sloveniji varnostnih tveganj pri upravljanju z identitetami, programsko in strojno opremo ter protivirusna zaščita na nivoju VIZ-a

ter bodo:

- zmožni svetovati vodstvu VIZ in sprejemati odločitve o izbiri spletnega učnega okolja ter nabave programske opreme VIZ
- zmožni podpreti učitelje različnih predmetnih področij pri izbiri in uporabi e-učnih vsebin

Intended learning outcomes:**After successfully completing the course, the student will gain knowledge and understanding:**

- Identity management and personal data security at the VIZ level
- distribution systems for educational content
- school education network and online security
- online content management systems
- systems for managing learning environments
- standards and guidelines for e-learning content in Slovenia
- e-services for HEIs in Slovenia security risks in identity management, software and hardware, and antivirus protection at the HEI level

and will:

- be able to advise the management of the HEI and make decisions on the selection of the online learning environment and the purchase of software for the HEI
- be able to support teachers in different subject areas in the selection and use of e-learning content

• zmožni svetovati vodstvu šole in učiteljem o uporabi protivirusne zaščite, varovanju osebnih podatkov	• be able to advise school management and teachers on the use of anti-virus protection, protection of personal data
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Metode poučevanja in učenja:

Predavanja, sodelovalno učenje, obrnjeno učenje, raziskovalno učenje, projektno učenje

Learning and teaching methods:

Lectures, collaborative learning, flipped learning, inquiry learning, project-based learning

Načini ocenjevanja:

Delež (v %) /

Weight (in %) /

Assessment:

Sodelovanje pri pedagoškem procesu	33%	In-class participation
Seminarska naloga	33%	Seminar paper
Ustni izpit	34%	Oral exam

Reference nosilca / Lecturer's references:

Reference nosilca / Lecturer's references:

1. PESEK, Igor, KRAŠNA, Marjan, BRATINA, Tomaž. (2021) Students' transition from high school to university in COVID-19 constrained education. Opatija: V: SKALA, Karolj MIPRO.
2. ABERŠEK, Boris, FLOGIE, Andrej, PESEK, Igor. AI and cognitive modelling for education. Cham: Springer, cop. 2023. XII, 229 str., ilustr., tabele, graf. prikazi. ISBN 978-3-031-35330-7. <https://doi.org/10.1007/978-3-031-35331-4>, DOI: 10.1007/978-3-031-35331-4. [COBISS.SI-ID 162099971]
3. MARČINKOVIČ, Bogomir, ABERŠEK, Boris, PESEK, Igor. (2021) The satisfaction of primary school teachers with the introduction and use of MS Teams in distance education. Opatija: V: SKALA, Karolj MIPRO
4. FLOGIE, Andrej, ABERŠEK, Boris, PESEK, Igor. Education strategy for the net generation. Information. 2025, vol. 16, iss. 9, [article no.] 756, 15 str., ilustr. ISSN 2078-2489. <https://doi.org/10.3390/info16090756>, DOI: 10.3390/info16090756, DOI: 20.500.12556/DKUM-95221. [COBISS.SI-ID 248224003]



Univerza v Mariboru

Fakulteta za naravoslovje
in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	E-IZOBRAŽEVANJE
Course title:	E-LEARNING

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Študijski program za izpopolnjevanje iz organizacije informacijskih dejavnosti v vzgoji in izobraževanju		1.	1.
Study programme for further education in organising information activities in education			1 st

Vrsta predmeta / Course type

Obvezni/compulsory

Univerzitetna koda predmeta / University course code:

KID3

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
10	4	13			213	8

Nosilec predmeta / Lecturer:

Igor Pesek

Jeziki /

Languages:

Predavanja /

Lectures:

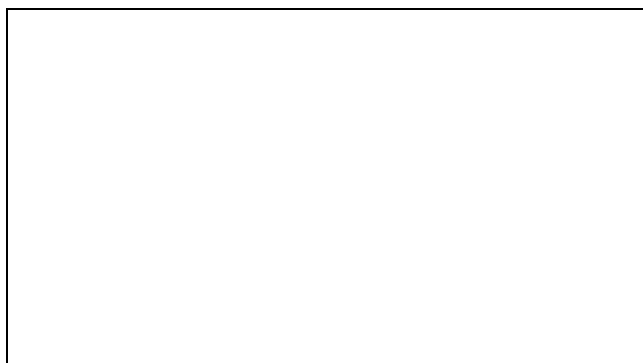
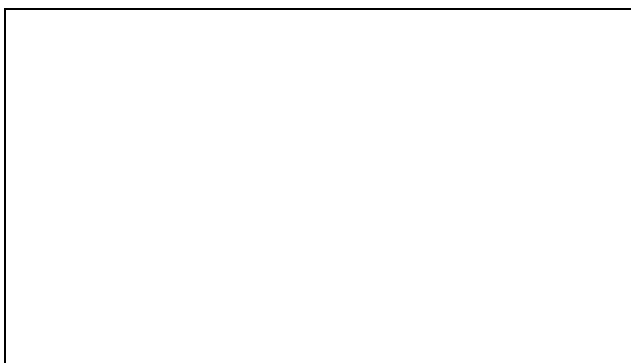
Vaje / Tutorial:

slovenski/Slovenian

slovenski/Slovenian

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

Prerequisites:

**Vsebina:**

- Teoretični in razvojni vidiki e-izobraževanja (opredelitev, klasifikacija, značilnosti);
- Organizacijski vidiki in načrtovanje e-izobraževanja;
- Pedagoški vidiki načrtovanja e-izobraževanja;
- Pedagoška podpora e-izobraževanju;
- Umetna inteligenca v izobraževanju;
- Navidezna in nadgrajena resničnost v izobraževanju.
- Učne analitike;
- Odprto izobraževanje in prosto dostopni izobraževalni viri;
- Avtorske pravice v e-okolju;

Implementacijske oblike e-izobraževanja na šoli:

- Mobilno učenje;
- Učenje na daljavo;
- Odprto izobraževanje;

Content (Syllabus outline):

- Theoretical and developmental aspects of e-learning (definition, classification, characteristics);
- Organisational aspects and planning of e-learning;
- Pedagogical aspects of e-learning design;
- Pedagogical support for e-learning;
- Artificial intelligence in education;
- Virtual and Augmented Reality in Education.
- Learning analytics;
- Open education and freely accessible educational resources;
- Copyright in the online environment;

Implementing e-learning in schools:

- Mobile learning;
- Distance learning;
- Open Education;

Temeljni literatura in viri / Readings:

Obvezna:

1. Bates, T. (2019). Teaching in a digital age: Guidelines for designing teaching and learning. BCcampus. <https://opentextbc.ca/teachinginadigitalage>
2. Neelen, M., & Kirschner, P. A. (2020). Evidence-informed learning design: Creating training to improve performance. Kogan Page.
3. Bregar, L., Zgajster, M., & Radovan, M. (2020). E-izobraževanje za digitalno družbo. Andragoški center Slovenije.

Dodatna:

4. European Commission. (2021). Digital education action plan 2021–2027: Resetting education and training for the digital age. https://education.ec.europa.eu/sites/default/files/document-library-docs/deap-communication-sept2020_en.pdf
 5. Siemens, G. (2005). Connectivism: A learning theory for the digital age. <https://www.elearnspace.org/Articles/connectivism.htm>
 6. OECD. (2021). OECD digital education outlook 2021: Pushing the frontiers with artificial intelligence, blockchain and robots. <https://www.oecd.org/education/digital-education-outlook>
- Redecker, C. (2017). European framework for the digital competence of educators: DigCompEdu. <https://publications.jrc.ec.europa.eu/repository/handle/JRC107466>

Cilji in kompetence:

Študentje bodo razvili splošne kompetence:

- Timsko delo in sodelovanje
- zmožnost kritične presoje, analize, ovrednotenja in sinteze novih kompleksnih idej,
- Medosebne, socialne spretnosti
- Odprtost za alternativne poglede in rešitve
- Etično in trajnostno mišljenje
- Zmožnost biti kritičen in samokritičen
- Odprtost za nenehen poklicni razvoj in vseživljenjsko učenje
- Interdisciplinarno povezovanje vsebin
- Uporaba IKT v izobraževanju

Študentje bodo razvili predmetno-specifične kom:

- Zmožnost implementacije različnih oblik e-izobraževanja v načrtovanje in izvedbo pouka
- Zmožnost organiziranja in načrtovanja (lastnega dela in dela drugih) v okviru strokovne učeče se skupnosti
- Vodenje in motivacija odraslih
- Sposobnost za načrtovanje in izvajanje strokovnih delavnic

Objectives and competences:

Students will develop general competences:

- Teamwork and collaboration
- The ability to critically assess, analyse, evaluate and synthesise new complex ideas,
- Interpersonal, social skills
- Openness to alternative views and solutions
- Ethical and sustainable thinking
- Ability to be critical and self-critical
- Openness to continuous professional development and lifelong learning
- Interdisciplinary integration of content
- Use of ICT in education

Students will develop subject-specific com:

- Ability to implement different forms of e-learning in the planning and delivery of lessons
- Ability to organise and plan (own and others' work) within a professional learning community
- Leadership and motivation of adults
- Ability to plan and deliver professional workshops

Predvideni študijski rezultati:

Po uspešno končanem predmetu bo študent pridobil znanje in razumevanje o

- teoretskih podlagah e-izobraževanja
- organizacijskih in pedagoških oblikah e-izobraževanja
- vlogi učne analitike pri organizaciji sodobnega učnega procesa
- trendih uvajanja umetne inteligence, navidezne in nadgrajene resničnosti v izobraževanju
- prednostih in slabostih uporabe odprtih in prosto-dostopnih virov v izobraževanju ter razliki med njima

ter bo:

- zmožen primerjati različne oblike e-izobraževanja ter izbrati ustrezno obliko v dani učni situaciji
- zmožen podpreti učitelje različnih strokovnih področij pri izbiri in implementaciji različnih oblik e-izobraževanja
- zmožen svetovanja o uporabi različno avtorsko zaščitene virov pri pedagoškem delu

Intended learning outcomes:

After successfully completing the course, the student will gain knowledge and understanding:

- the theoretical foundations of e-learning
- organisational and pedagogical forms of e-learning
- the role of learning analytics in the organisation of the modern learning process
- trends in the introduction of artificial intelligence, virtual and augmented reality in education
- the advantages and disadvantages of using open and freely-available resources in education and the difference between them

and will:

- be able to compare different forms of e-learning and choose the appropriate form in a given learning situation
- be able to support teachers from different subject areas in the selection and implementation of different forms of e-learning
- be able to advise on the use of different copyrighted resources in pedagogical work

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Metode poučevanja in učenja:

Predavanja, sodelovalno delo v spletni učilnici, obrnjeno učenje, raziskovalno delo, projektno delo

Learning and teaching methods:

Lectures, collaborative work in an online classroom, flipped learning, research, project work

Načini ocenjevanja:

Sodelovanje pri pedagoškem procesu
Seminarska naloga
Ustni izpit

Delež (v %) /

Weight (in %) **Assessment:**

33%
33%
34%

In-class participation
Seminar paper
Oral exam

Reference nosilca / Lecturer's references:

1. PESEK, Igor, KRAŠNA, Marjan, BRATINA, Tomaž. (2021). Students' transition from high school to university in COVID-19 constrained education. Opatija: V: SKALA, Karolj MIPRO.
2. FLOGIE, Andrej, ABERŠEK, Boris, PESEK, Igor. Education strategy for the net generation. Information. 2025, vol. 16, iss. 9, [article no.] 756, 15 str., ilustr. ISSN 2078-2489. <https://doi.org/10.3390/info16090756>, Digitalna knjižnica Univerze v Mariboru – DKUM, DOI: 10.3390/info16090756, DOI: 20.500.12556/DKUM-95221. [COBISS.SI-ID 248224003], [SNIP, WoS]
3. FLOGIE, Andrej, ABERŠEK, Boris, KORDIGEL ABERŠEK, Metka, SÍK LÁNYI, Cecília, PESEK, Igor. (2020) Development and evaluation of intelligent serious games for children with learning difficulties : observational study. JMIR serious games: vol. 8, no. 2, str. 1-16. PESEK, Igor. Rethinking education governance in the age of AI. Frontiers of digital education. 2026, vol. 3, iss. 1, [article no.] 11, 10 str., ilustr. ISSN 2097-3926. <https://doi.org/10.1007/s44366-026-0085-z>, DOI: 10.1007/s44366-026-0085-z, DOI: 20.500.12556/DKUM-97355. [COBISS.SI-ID 270084099];
4. MARČINKOVIČ, Bogomir, ABERŠEK, Boris, PESEK, Igor. (2021). The satisfaction of primary school teachers with the introduction and use of MS Teams in distance education. Opatija: V: SKALA, Karolj MIPRO



Univerza v Mariboru

Fakulteta za naravoslovje
in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet: INFORMACIJSKA PISMENOST
Course title: INFORMATION LITERACY

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Študijski program za izpopolnjevanje iz organizacije informacijskih dejavnosti v vzgoji in izobraževanju		1.	2.
Study programme for further education in organising information activities in education			2.

Vrsta predmeta / Course type

izbirni/elective

Univerzitetna koda predmeta / University course code: KID10

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
10	4	10			156	6

Nosilec predmeta / Lecturer: Igor Pesek

Jeziki / Languages: **Predavanja / Lectures:** slovenski/Slovenian

Vaje / Tutorial: slovenski/Slovenian

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

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Vsebina:

- opredelitev informacijske pismenosti
- informacijska družba
- informacijski in bibliografski sistemi

- informacijski viri
 - * oblike in vrste informacijskih virov
 - * iskanje po elektronskih virih, iskalne strategije
 - * iskanje po internetu
 - * podatkovne zbirke
 - * specializirane podatkovne zbirke
 - * odprta znanost

- vrednotenje informacij in informacijskih virov

- citiranje in upravljanje referenc
 - * različni načini citiranja
 - * orodja za upravljanje referenc

- znanstveno pisanje
 - * sistematični pregled literature in z dokazi podprte znanosti
 - * zgradba strokovnega/znanstvenega dela

- etična in pravična uporaba informacij
 - * plagiatstvo
 - * intelektualna lastnina (patenti, avtorske pravice...)
 - * licence

Content (Syllabus outline):

- information literacy definition
- information society
- information and bibliographic systems

- information sources
 - *forms and kinds of information sources
 - *searching in information sources, search strategies
 - *internet searching
 - *databases
 - *specialised databases
 - *open science

- evaluating information and information sources

- citing and reference management
 - *different citation styles
 - *reference management tools

- scientific writing
 - *systematic literature review and evidence based science
 - *outline of a professional/scientific work

- ethical and fair information use
 - *plagiarism
 - *intellectual property (patent, copyright...)

- *licences

Temeljni literatura in viri / Readings:**Obvezna:**

- Bothma T., Cosijn E., Fourie I., Penzhorn C., (2011). *Navigating Information Literacy*. Pearson Education.
- Bottomley, J., (2015). *Academic writing for international students of science*, Routledge, Abingdon.
- Lanning S. (2012). *Concise Guide to Information Literacy*, Libraries Unlimited.

Dodatna:

- Bailey, S., (2014). *Academic writing: a handbook for international students*, Routledge, London.
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- Richter, U. A. in Fügert, N. (2016). *Wissenschaftlich arbeiten und schreiben : wissenschaftliche Standards und Arbeitstechniken, wissenschaftlich formulieren, Textsorten*. Ernst Klett Sprachen, Stuttgart.
- Levitin D. J. (2016). *A Field Guide to Lies: Critical Thinking in the Information Age*, Dutton.

-Raziskovalni vodiči UKM za posamezna področja <http://libguides.ukm.um.si/?b=g&d=a>

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

Cilji predmeta so

- seznaniti se s teoretičnimi izhodišči informacijske pismenosti,
- raziskati obvladovanje informacijske pismenosti pri študiju,
- seznaniti študente s knjižnično zbirko ter z načini iskanja gradiva, ki se nahajajo tako v klasični kot tudi elektronski obliki,
- študenti bodo znali uporabljati iskalnike in različne iskalne strategije,
- pridobiti kritičnost pri izbiri virov,
- razlikovati med ključnimi besedami in predmetnimi oznakami ter spoznati klasifikacijske sisteme,
- seznaniti se z in uporabljati različne podatkovne zbirke,
- razumeti in prepoznati metode sistematičnega pregleda literature ter na dokazih temelječih znanosti in jih praktično uporabiti,
- seznaniti študente s faktorji vpliva pri objavljanju člankov v visokošolskem okolju,
- študente usposobiti za zakonito rabo intelektualne lastnine s poudarkom na etični rabi gradiva in pasteh plagiatorstva,
- seznaniti študente z zgradbo in obliko pisnih del ter tipologijo objavljenih del,
- spoznati in uporabljati različne načine citiranja, uporabljati različna orodja za učinkovito citiranje in upravljanje z referencami,
- spoznati koncept odprte znanosti ter alternativne metrike.

The objectives of this course are

- to inform students about the theoretical basis of information literacy,
- to explore information literacy proficiency in the study process,
- to inform students about library collections and ways of searching materials in print and electronic version,
- students will be able to use browsers and different search strategies,
- to become critical about source choice,
- to know the difference between keywords and subject headings and to get familiar with classification systems,
- to recognise and use different databases,
- to understand and recognise the methods of the systematic literature review and evidence based science and to use them in practice,
- to get familiar with impact factors in the academic article publishing,
- students will be aware of legal use of intellectual property with the emphasis on ethical use of the materials and plagiarism,
- to learn about the structure and form of written works and typology of published works,
- to learn about and use different citation styles,
- to use different citation tools for efficient citing and reference management,
- to get familiar with the concept of open science and altmetrics.

Predvideni študijski rezultati:

Znanje in razumevanje:

Po zaključku izbirnega predmeta naj bi študent/-ka bil/-a sposoben/-na:

- prepoznati in definirati svojo informacijsko potrebo
- uporabiti ter izvesti ustrezne iskalne strategije za doseg ustreznih virov in literature
- uporabljati IKT v smislu specializiranih podatkovnih zbirk, elektronskih virov
- med različnimi podatkovnimi zbirkami izbrati in vrednotiti prave za svoje strokovno področje
- med rezultati iskanja prepoznati, analizirati in kritično ovrednotiti ustrezne in uporabne vire in literaturo in jih med seboj primerjati
- uporabiti orodja za citiranje
- pripraviti terminološke seznane

Intended learning outcomes:

Knowledge and understanding:

On completion of this extracurricular activity the student should be able to:

- identify the information need
- use and perform suitable search strategies for getting relevant sources and literature
- use information communication technology in the sense of searching in databases and electronic resources
- among many databases choose and evaluate the most relevant databases for specific scientific field
- recognise, analyse and critically evaluate relevant and useful sources and materials and compare them
- use citation tools
- prepare terminological lists
- perform systematic literature review with meta-analysis

• samostojno izvesti sistematični pregled literature z metaanalizo • v izogib plagiatstvu vrednotiti in etično uporabiti ter pravilno citirati vire in literaturo • poznati in uporabljati pravice in dolžnosti intelektualne lastnine • spoznati in razumeti termine kot so odprta znanost, faktor vpliva, alternativna metrika • pridobljeno znanje uporabiti v pisnih izdelkih Prenesljive/ključne spretnosti in drugi atributi: uporaba znanj in konceptov informacijske pismenosti na drugih področjih študija in življenja	• avoid plagiarism by evaluating and ethically using as well as citing the used references correctly • understand and use the intellectual property rights and obligations • know and understand terms like open science, impact factor, altmetrics • use the gained knowledge in written papers Transferable/key competences and other attributes use of knowledge and concepts of information literacy in other fields of study and life
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Metode poučevanja in učenja:

Predavanja, sodelovalno učenje, obrnjeno učenje, raziskovalno učenje, projektno učenje,

Learning and teaching methods:

Lectures, collaborative learning, flipped learning, inquiry learning, project-based learning
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Načini ocenjevanja:

Sodelovanje pri pedagoškem procesu
Seminarska naloga
Ustni izpit

Delež (v %) /

Weight (in %)

Assessment:

In-class participation
Seminar paper
Oral exam

Reference nosilca / Lecturer's references:

1. PESEK, Igor, KRAŠNA, Marjan, BRATINA, Tomaž. (2021) Students' transition from high school to university in COVID-19 constrained education. Opatija: V: SKALA, Karolj MIPRO.
2. MARČINKOVIČ, Bogomir, ABERŠEK, Boris, PESEK, Igor. (2021) The satisfaction of primary school teachers with the introduction and use of MS Teams in distance education. Opatija: V: SKALA, Karolj MIPRO
3. PESEK, Igor. Rethinking education governance in the age of AI. <i>Frontiers of digital education</i> . 2026, vol. 3, iss. 1, [article no.] 11, 10 str., ilustr. ISSN 2097-3926. https://doi.org/10.1007/s44366-026-0085-z , DOI: 10.1007/s44366-026-0085-z , DOI: 20.500.12556/DKUM-97355 . [COBISS.SI-ID 270084099], [Odprti dostop]
4. FLOGIE, Andrej, ABERŠEK, Boris, PESEK, Igor. Education strategy for the net generation. <i>Information</i> . 2025, vol. 16, iss. 9, [article no.] 756, 15 str., ilustr. ISSN 2078-2489. https://doi.org/10.3390/info16090756 , DOI: 10.3390/info16090756 , DOI: 20.500.12556/DKUM-95221 . [COBISS.SI-ID 248224003],



Univerza v Mariboru

Fakulteta za naravoslovje
in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	Umetna inteligenca v izobraževanju
Course title:	Artificial intelligence in Education

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Študijski program za izpopolnjevanje iz organizacije informacijskih dejavnosti v vzgoji in izobraževanju	/	1	2
Study programme for further education in organising information activities in education	/		

Vrsta predmeta / Course type

Izbirni / Elective

Univerzitetna koda predmeta / University course code:

Predavanja Lectures	Seminar Seminar	Sem. vaje Tutorial	Lab. vaje Laboratory work	Teren. vaje Field work	Samost. delo Individ. work	ECTS
10	4	10			156	6

Nosilec predmeta / Lecturer:

Igor Pesek

Jeziki /

Languages:

Predavanja /

Lectures:

Vaje / Tutorial:

SLOVENSKO/SLOVENE

SLOVENSKO/SLOVENE

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

Prerequisites:

Vsebina:

- Zgodovinsko ozadje in trenutni trendi umetne inteligence v izobraževanju
- Osnovni koncepti umetne inteligence in strojnega učenja
- Osnovni koncepti podatkovne pismenosti

Content (Syllabus outline):

- Historical background and current trends in AI in Education
- Core Concepts of Data Literacy
- Core Concepts of AI and Machine Learning
- AI in Education Theory, Principles, and Literacy

• Teorija, načela in pismenost o umetni inteligenci v izobraževanju • Koncepti in temelji uporabe umetne inteligence pri poučevanju in učenju • Teoretski okviri in načela učenja, podprtega z umetno inteligenco • Učna okolja, orodja in digitalne vsebine, izboljšane z umetno inteligenco • Etika, pravičnost in odgovorna uporaba umetne inteligence v izobraževanju	• Concepts and foundations of AI in teaching and learning • Theoretical frameworks and principles of AI-supported learning • AI-enhanced teaching and learning environments, tools, and digital content • Ethics, equity, and responsible AI in education
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Temeljni literatura in viri / Readings:

Osnovna: • J. A. Bowen, C. E. Watson: Teaching with AI, Johns Hopkins University Press, 2024 • Prosim za dopolnitev: Cosgrove, J. and Cachia, R. DigComp 3.0: European Digital Competence Framework - Fifth Edition, Publications Office of the European Union, Luxembourg, 2025, dostopno na: https://data.europa.eu/doi/10.2760/0001149. • W. Holmes, M. Bialik, C. Fadel: Artificial Intelligence in Education, The Center for Curriculum Redesign, Boston, 2019, dostopna na https://curriculumredesign.org/our-work/artificial-intelligence-in-education/ Dodatna: • AI Literacy Framework, dostopno na https://ailiteracyframework.org/ • DigComp 2.2, dostopno na https://www.zrssi.si/wp-content/uploads/2023/08/DigComp-2-2-Okvir-digitalnih-kompetenc.pdf • DigCompEdu, dostopno na https://www.zrssi.si/pdf/digcompedu.pdf
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Cilji in kompetence:

• razvoj osnovnih konceptov podatkovne pismenosti in njihova uporaba v izobraževalnih kontekstih • osnovna seznanitev s koncepti umetne inteligence in strojnega učenja • razumevanje zgodovinskega razvoja in trenutnih trendov umetne inteligence v izobraževanju • analiza teoretskih okvirov in načel učenja, podprtega z umetno inteligenco • izbor in uporaba orodij umetne inteligence v različnih učnih in učnih kontekstih • uporaba in upravljanje platform ter intelligentnih učnih sistemov, ki temeljijo na umetni inteligenci • analiza izobraževalnih vsebin in digitalnih učnih gradiv, ustvarjenih z umetno inteligenco • primerjava različnih aplikacij umetne inteligence za prilagodljivo učenje in preverjanje znanja

Objectives and competences:

• develop core concepts of data literacy and apply them in educational contexts • basic introduction to artificial intelligence and machine learning concepts • understand historical development and current trends of AI in education • analyze theoretical frameworks and principles of AI-supported learning • select and apply AI tools in different teaching and learning contexts • use and manage AI-based platforms and intelligent tutoring systems • analyze AI-driven educational content and digital learning materials • compare different AI applications for adaptive learning and assessment • evaluate ethical, social, and equity implications of AI in education • recognize emerging AI technologies and predict their potential in education • develop digital and AI literacy as a competence for teaching and learning
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• vrednotenje etičnih, družbenih in pravičnostnih vidikov uporabe umetne inteligence v izobraževanju • prepoznavanje novih tehnologij umetne inteligence in napovedovanje njihovega potenciala v izobraževanju • razvoj digitalne in umetno-inteligenčne pismenosti kot kompetence za poučevanje in učenje	
Predvideni študijski rezultati:	Intended learning outcomes:
• Analizirati zgodovinski razvoj in trenutne trende umetne inteligence v izobraževanju ter kritično ovrednotiti njihov vpliv na poučevanje in učenje. • Razumeti in uporabiti osnovne koncepte podatkovne pismenosti, vključno z zbiranjem, interpretacijo in etično uporabo podatkov v izobraževalnih okoljih. • Razložiti in uporabiti temeljne koncepte umetne inteligence in strojnega učenja, vključno z njihovo relevantnostjo za izobraževalne kontekste. • Ovrednotiti teoretske okvire in načela učenja, podprtega z umetno inteligenco, ter presoditi njihove pedagoške prednosti in omejitve. • Izbrati in uporabiti ustrezna orodja, platforme ter inteligentne učne sisteme, ki temeljijo na umetni inteligenci, v različnih učnih in učnih okoljih. • Ustvariti in prilagoditi digitalna učna gradiva z uporabo tehnologij umetne inteligence ob upoštevanju pedagoških načel in raznolikosti učencev. • Kritično presojsati etične, družbene in pravičnostne vidike uporabe umetne inteligence v izobraževanju ter predlagati odgovorne prakse za njihovo uporabo. • Primerjati različne aplikacije umetne inteligence za prilagodljivo učenje, preverjanje znanja in ustvarjanje vsebin ter ovrednotiti njihovo učinkovitost pri podpori učnih izidov. • Razviti digitalne in umetno-inteligenčne kompetence, ki omogočajo kritično, reflektirano in inovativno vključevanje umetne inteligence v izobraževalne procese.	• Analyse the historical development and current trends of AI in education, and critically evaluate their impact on teaching and learning practices. • Understand and apply the core concepts of data literacy, including data collection, interpretation, and ethical use in educational settings. • Explain and apply the fundamental concepts of artificial intelligence and machine learning, including their relevance to educational contexts. • Evaluate theoretical frameworks and principles of AI-supported learning, and assess their pedagogical strengths and limitations. • Select and apply appropriate AI-based tools, platforms, and intelligent tutoring systems in diverse teaching and learning settings. • Create and adapt digital learning materials using AI-driven technologies, while considering pedagogical principles and learner diversity. • Critically assess ethical, social, and equity-related implications of AI applications in education, and propose responsible practices for their use. • Compare and contrast AI applications for adaptive learning, assessment, and content generation, and evaluate their effectiveness in supporting learning outcomes. • Develop digital and AI literacy competences that enable critical, reflective, and innovative integration of AI in educational processes.
Metode poučevanja in učenja:	Learning and teaching methods:

Predavanja, sodelovalno učenje, obrnjeno učenje, raziskovalno učenje, projektno učenje	Lectures, collaborative learning, flipped learning, inquiry learning, project-based learning
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Načini ocenjevanja:

Delež (v %) /

Assessment:

Weight (in %)

Sodelovanje pri pedagoškem procesu	33	In-class participation
Seminarska naloga	33	Seminar paper
Ustni izpit	34	Oral exam

Reference nosilca / Lecturer's references:

1. VEBER, Matej, PESEK, Igor, ABERŠEK, Boris. Assessment of supporting visual learning technologies in the immersive VET cyber-physical learning model. *Education sciences*. 2023, vol. 13, iss. 6, [article no.] 608, 19 str., ilustr. ISSN 2227-7102. <https://www.mdpi.com/2227-7102/13/6/608>, Digitalna knjižnica Univerze v Mariboru – DKUM, DOI: 10.3390/educsci13060608, DOI: 20.500.12556/DKUM-87405. [COBISS.SI-ID 155720451]
2. VEBER, Matej, PESEK, Igor, ABERŠEK, Boris. Implementation of the modern immersive learning model CPLM. *Applied sciences*. 2022, vol. 12, iss. 6, 17 str. ISSN 2076-3417. Digitalna knjižnica Univerze v Mariboru – DKUM, DOI: 10.3390/app12063090. [COBISS.SI-ID 102763523]
3. ABERŠEK, Boris, FLOGIE, Andrej, PESEK, Igor. AI and cognitive modelling for education. Cham: Springer, cop. 2023. XII, 229 str., ilustr., tabele, graf. prikazi. ISBN 978-3-031-35330-7. <https://doi.org/10.1007/978-3-031-35331-4>, DOI: 10.1007/978-3-031-35331-4. [COBISS.SI-ID 162099971]
4. FLOGIE, Andrej, ABERŠEK, Boris, PESEK, Igor. Education strategy for the net generation. *Information*. 2025, vol. 16, iss. 9, [article no.] 756, 15 str., ilustr. ISSN 2078-2489. <https://doi.org/10.3390/info16090756>, Digitalna knjižnica Univerze v Mariboru – DKUM, DOI: 10.3390/info16090756, DOI: 20.500.12556/DKUM-95221. [COBISS.SI-ID 248224003], [SNIP, WoS do 6. 11. 2025]