



Univerza v Mariboru

Fakulteta za naravoslovje
in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	Didaktika računalništva 1
Course title:	DIDACTICS OF COMPUTER SCIENCE 1

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Enovit magistrski študijski program druge stopnje Predmetni učitelj	/	3 ali 4	5 ali 7
Five-year master's degree program Subject Teacher	/		

Vrsta predmeta / Course type

Obvezni / Obligatory

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
30	15	30			105	180/6

Nosilec predmeta / Lecturer:

dr. Igor Pesek

Jeziki /

Languages:

Predavanja /

Lectures:

slovenščina / Slovenian

Vaje / Tutorial:

slovenščina / Slovenian

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

Vsaka izmed naštetih obveznosti v načinih ocenjevanja mora biti opravljena s pozitivno oceno.

Pozitivni oceni pri portfoliu in vajah so pogoj za pristop k pisnemu izpitu.

Prerequisites:

Each of the mentioned commitments must be assessed with a passing grade.

Passing grade of the Portfolio and coursework are required for taking the written exam.

Vsebina:

- Načrt dela, cilji pouka računalništva, kompetence učiteljev računalništva v osnovni šoli;
- zgodovina računalništva in informatike in računalniškega izobraževanja.

Content (Syllabus outline):

- Learning and working plan, goals of computer science education, competences of computing science teacher in primary education;
- computer - informatics history and history of computing science education.

• didaktični elementi izvajanja pouka računalništva v osnovni šoli, teorije poučevanja in pouk računalništva v osnovni šoli; • učni načrt in učna gradiva za pouk računalništva v osnovni šoli • učne metode in oblike pouka računalništva v osnovni šoli • problemski pouk računalništva v osnovni šoli • priprava na pouk računalništva v osnovni šoli in evalvacija; • preverjanje in ocenjevanje znanja računalništva v osnovni šoli; • učni prostori za pouk računalništva v osnovni šoli in ergonomija; • učila in učni pripomočki za pouk računalništva v osnovni šoli ; • izobraževalna in IKT tehnologija pri pouku računalništva v osnovni šoli; • interesne dejavnosti računalništva in računalniška tekmovanja v osnovni šoli; • sodobni trendi in projekti poučevanja računalništva v osnovni šoli.	• didactic elements of computing science education in primary education, theories of teaching and computing science education in primary education; • computer science curriculum and educational resources for primary computing science education; • education methods and forms in primary computing science education; • problem solving in computing science teaching in primary schools; • lesson planning on computing science in primary education and evaluation; • checking and assessment of knowledge in primary computing science education and ergonomics; • didactic places for teaching computing science in primary education; • teaching aids and accessories for primary computing science education; • educational and ICT technology in primary computing science education; • extracurricular activities of computing and computer competitions in primary school; • contemporary trends and projects of primary computing science education.
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Temeljni literatura in viri / Readings:

- Blažič, M., Ivanuš Grmek, M., Kramar, M., Strmčnik, F. (2003). Didaktika. Visokošolski učbenik. Novo mesto: Visokošolsko središče, Inštitut za raziskovalno in razvojno delo.
- Gerlič. I. Sodobna informacijska tehnologija v izobraževanju. DZS, Ljubljana, 2000.
- Hazzan, O., Lapidot, T., Ragonis, N., Guide to Teaching Computer Science, Springer, 2011
- Modrow, E., & Strecker, K. (2016). Didaktik der Informatik (str. XI, 240). De Gruyter Oldenbourg.
- Hubwieser, P. (2007). Didaktik der Informatik: Grundlagen, Konzepte, Beispiele: mit 91 Abbildungen und 68 Tabellen (3., überarbeitete und erweiterte Aufl., str. XVII, 286). Springer.
- Kirschner, P. A., & Hendrick, C. (2020). How learning happens: seminal works in educational psychology and what they mean in practice (str. XVIII, 309). Routledge.
- O naravi učenja, Uporaba raziskav za navdih prakse, Pariz in Ljubljana, OECD in ZRSŠ, 2013
- B. Marentič Požarnik, *Psihologija učenja in pouka*, DZS, 2010.

Dodatna literatura

- Članki, ki odražajo zadnje raziskave na področju IKT za katere ima UM plačano naročnino (Web of Science; IEEEExplore) in so kadarkoli dostopne z IP naslovov UM ali prijavo preko knjižnice.

Cilji in kompetence:

- Razvoj kompetenc bodočih učiteljev za pripravo, izvedbo in analizo vseh oblik in metod poučevanja računalništva v osnovni šoli.
- poglobljeno teoretično in praktično znanje s področja uporabe IKT v izobraževanju in stroki,
- razviti sposobnosti študentov za samostojno in kreativno reševanje praktičnih problemov z uporabo IKT v izobraževanju in študiju.

Objectives and competences:

- development of competences of preservice teachers to prepare, execute and analyse different forms and methods of teaching in primary schools
- Deep theoretical and practical knowledge of using ICT in education and profession,
- deep knowledge of ICT standards and data distributions,,
- abilities to creatively solve problems in practice with ICT systems in education and study.

Predvideni študijski rezultati:

- načrtovati različne učne oblike in metode pouka računalništva v osnovni šoli;
- analizirati učno uro
- demonstrirati poznavanje teoretičnih izhodišč poučevanja osnovnošolskega računalništva;
- ovrednotiti učne načrte in obstoječa učna gradiva za pouk računalništva v osnovnih šolah;
- obravnavati pomembne didaktične in računalniške razvojne koncepte osnovnošolskega računalništva;
- organizirati izvedbo pouka računalništva na osnovni šoli
- uporabiti sodobne in ustrezne oblike ocenjevanja dela in napredka učencev pri pouku računalništva
- analizirati osnovnošolsko zakonodajo
- demonstrirati različne možnosti uporabe IKT pri pouku računalništva v osnovni šoli.
- povezati računalništvo z drugimi predmeti v osnovni šoli

Intended learning outcomes:

- to plan different learning forms and methods of Computer science teaching
- analyze teaching hour
- demonstrate the knowledge of theories of computing science teaching and learning in primary schools;
- evaluate curriculum and materials for CS education;
- consider important didactical and CS concepts in primary schools;
- organize CS classroom in primary school
- apply contemporary and adequate type of assessment in CS education;
- analyze school legislation for primary education;
- demonstrate possibilities of use of ICT in computing science education in primary education.
- connect CS with other subject in primary school education.

Metode poučevanja in učenja:

Predavanje, razgovor in diskusija, demonstracija, metoda pisnih in grafičnih del, uporaba IKT, reševanje problemskih nalog in preiskovanje, ustvarjanje avtentičnih učnih situacij (mikro pouk), oblike dela (individualno delo, skupinsko

Learning and teaching methods:

Lecture, conversation and discussion, demonstration, method of written and graphic products, usage of ICT, problem solving and investigation, creation of authentic learning situations (micro teaching), learning forms (individual work, teamwork, group learning (cooperative

delo - kooperativno učenje, timsko delo, delo v dvojicah, frontalno delo), delo z viri.	learning, work in pair, frontal instruction), work with sources.
Poučevanje in učenje potekata z didaktično uporabo informacijsko-komunikacijske tehnologije.	Teaching and learning is done with didactical use of ICT.

Načini ocenjevanja:

Delež (v %) /
Weight (in %)

Assessment:

Znanje: pisni izpit.	50 %,	Knowledge: written exam.
Izdelki: Portfolio	50 %	Outputs: Portfolio

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. FLOGIE, Andrej, ABERŠEK, Boris, KORDIGEL ABERŠEK, Metka, SÍK LÁNYI, Cecília, PESEK, Igor. Development and evaluation of intelligent serious games for children with learning difficulties : observational study. *JMIR serious games : Elektronski vir*. 2020, vol. 8, no. 2, str. 1-16, ilustr. ISSN 2291-9279. DOI: 10.2196/13190. [COBISS.SI-ID 13487363]
4. TOMIĆ, Maja Katarina, ABERŠEK, Boris, PESEK, Igor. GeoGebra as a spatial skills training tool among science, technology engineering and mathematics students. *Computer applications in engineering education*. [Online ed.]. 2019, vol. 27, iss. 6, str. 1506-1517. ISSN 1099-0542. DOI: 10.1002/cae.22165. [COBISS.SI-ID 24744712]
3. WEIGEND, Michael, VANÍČEK, Jiří, PLUHÁR, Zsuzsa, PESEK, Igor. Computational thinking education through creative unplugged activities. *Olympiads in informatics*. 2019, vol. 13, str. 171-192. ISSN 1822-7732. DOI: 10.15388/oi.2019.11. [COBISS.SI-ID 24747016]
4. FLOGIE, Andrej, ABERŠEK, Boris, PESEK, Igor. The impact of innovative learning environments on social competences of youth. *Research in learning technology*. 2019, vol. 27, str. 1-14. ISSN 2156-7069. DOI: 10.25304/rlt.v27.2214. [COBISS.SI-ID 24743944]
5. ŠORGO, Andrej, DOJER, Brina, GOLOB, Nika, REPNIK, Robert, REPOLUSK, Samo, PESEK, Igor, PLOJ VRTIČ, Mateja, ŠPERNJAK, Andreja, ŠPUR, Natalija. Opinions about STEM content and classroom experiences as predictors of upper secondary school students' career aspirations to become researchers or teachers. *Journal of research in science teaching*. Dec. 2018, vol. 55, iss. 10, str. 1448-1468, ilustr. ISSN 0022-4308. DOI: 10.1002/tea.21462. [COBISS.SI-ID 23839240]
6. MUSIL, Bojan, GARTNER, Smiljana, PESEK, Igor, KRAŠNA, Marjan. ICT competences assessment through ICT escape room. V: SKALA, Karolj (ur.). *MIPRO 2019 : 42nd International Convention, May 20 -24, 2019, Opatija, Croatia : proceedings*. Rijeka: Croatian Society for Information and Communication Technology, Electronics and Microelectronics - MIPRO, 2019. Str. 730-734, ilustr. MIPRO ... (CD-ROM). ISSN 1847-3946.
7. REPNIK, Robert, ROBIČ, Dominik, PESEK, Igor. Physics learning in primary and secondary schools with computer games : an example - Angry birds. V: GRADINAROVA, Boyka (ur.). *E-learning :*

instructional design, organizational strategy and management. Rijeka: InTech, 2015. Str. 203-225, ilustr.
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