

UČNI NAČRT PREDMETA / COURSE SYLLABUS (leto / year 2016/17)						
Predmet:		Računalniška orodja v matematiki				
Course title:		Computer tools in mathematics				
Študijski program in stopnja Study programme and level		Študijska smer Study field		Letnik Academic year	Semester Semester	
Visokošolski strokovni študijski program Praktična matematika		ni smeri		1	prvi	
First cycle professional study programme Practical Mathematics		none		1	first	
Vrsta predmeta / Course type				obvezni / compulsory		
Univerzitetna koda predmeta / University course code:				M0421		
Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
15		30			45	3
Nosilec predmeta / Lecturer:		prof. dr. Andrej Bauer, viš. pred. mag. Matija Lokar, prof. dr. Marko Petkovšek, prof. dr. Bor Plestenjak				
Jeziki / Languages:		Predavanja / Lectures:		slovenski / Slovene		
		Vaje / Tutorial:		slovenski / Slovene		
Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:				Prerequisites:		
Vpis v letnik študija.				Enrolment in the programme.		
Vsebina:				Content (Syllabus outline):		

<p>Programi za numerično in simbolno računanje, risanje grafov funkcij, reševanje matematičnih nalog iz analize in algebre z računalnikom. Orodja za simbolno računanje, preglednice, orodja za vizualizacijo. Orodja za računalniško podprto dinamično geometrijo.</p>	<p>Programs for numerical and symbolic calculations, drawing the graphs of functions, solving mathematical tasks from analysis and algebra with a computer. Computer algebra system, spreadsheets, tools for visualization. Computer aided dynamic geometry.</p>
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Temeljni literatura in viri / Readings:

<p>Priročniki in učbeniki za orodja, ki jih študenti spoznajo. Zapiski s predavanj, gradivo za vaje in ostalo gradivo v spletni učilnici predmeta.</p> <p>Zaradi hitrega razvoja informacijskih tehnologij se literatura in viri redno prilagajajo razvoju računalniških orodij uporabljenih pri matematiki. Konkretni naslovi, ki bi jih navedli, bi bili v času izvajanja že zastareli.</p> <p>Manuals and textbooks for tools used.</p> <p>Notes from lectures, tutorials and other resources in the online classroom.</p> <p>References and resources are refreshed regularly to address the development of computer tools used in mathematics. Specific resources listed would have been at the time of the implementation already obsolete.</p>

Cilji in kompetence:

<p>Študenti bodo spoznali in se naučili uporabljati računalniška orodja, s katerimi si bodo lahko pomagali pri različnih matematičnih postopkih. Usposobljeni bodo za poročanje o svojem delu.</p>
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Objectives and competences:

<p>Students will learn about and learned to use computer tools suitable in various mathematical procedures. They will learn how to report on their work.</p>
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Predvideni študijski rezultati:

<p>Znanje in razumevanje:</p> <p>Slušatelj je seznanjen z računalniškimi orodji in pristopi k njihovi uporabi pri matematičnih postopkih. Zna poročati o matematičnem problemu in njegovem reševanju.</p>

Intended learning outcomes:

<p>Knowledge and understanding:</p> <p>Student is familiar with computer tools and approaches to their usage in mathematical procedures. He is able to report on the process of solving a mathematical problem with computer tools.</p>

Uporaba:

Pridobljeno znanje služi za oporo pri študiju velikega dela predmetov.

Refleksija: Spoznavanje pomena računalniške podpore znanju matematike. Spoznavanje pomena poročanja o reševanju matematičnih problemov.

Prenosljive spretnosti – niso vezane le na en predmet:

Predmet se navezuje na vse matematične predmete in služi za spoznavanje orodij, uporabnih pri študiju teh predmetov.

Application:

The knowledge gained is used to support various subjects.

Reflection:

To learn about the importance of computer tools in learning and doing mathematics. To find about the importance of reporting on solving mathematical problems.

Transferable skills:

The subject refers to all mathematical subjects and serves for learning tools, useful in the study of these subjects.

Metode poučevanja in učenja:

predavanja, vaje, uporaba metod študija na daljavo, domače naloge, konzultacije

Learning and teaching methods:

Lectures, exercises, usage of distance learning techniques, home works, consultations

Delež (v %) /

Weight (in %)

Assessment:**Načini ocenjevanja:**

študenti dobijo eno oceno iz preverjanja domačih nalog in seminarske naloge iz matematičnega problema, obdelanega z rač. orodji

ocene: 1-5 (negativno), 6-10 (pozitivno) (po Statutu UL)

100%

Reference nosilca / Lecturer's references:

Andrej Bauer:

HAJDINJAK, Melita, BAUER, Andrej. Similarity-based relations in Datalog programs. International journal of uncertainty, fuzziness and knowledge-based systems, ISSN 0218-4885, Oct. 2012, vol. 20, no. 5, str. 673-700. [COBISS.SI-ID 9428308]

BAUER, Andrej, STONE, Christopher A. RZ: a tool for bringing constructive and computable mathematics closer to programming practice. Journal of logic and computation, ISSN 0955-792X, 2009, vol. 19, no. 1, str. 17-43. [COBISS.SI-ID 15325785]

LUKŠIČ, Primož, HORVAT, Boris, BAUER, Andrej, PISANSKI, Tomaž. Practical E-Learning for the Faculty of Mathematics and Physics at the University of Ljubljana. Interdisciplinary journal of knowledge & learning objects, ISSN 1552-2210, 2007, vol. 3, str. 73-83. [COBISS.SI-ID 14269529]

AWODEY, Steve, BAUER, Andrej. Propositions as [Types]. Journal of logic and computation, ISSN 0955-792X, 2004, vol. 14, no. 4, str. 447-471. [COBISS.SI-ID 13374809]

Matija Lokar:

LOKAR, Matija, KOKOL-VOLJČ, Vlasta. Projekt EdUatics - kako pomagati učiteljem matematike pri vpeljavi IKT v poučevanje = Project EdUatics - how to support math teachers to integrate technology within their classrooms. V: RAJKOVIČ, Vladislav (ur.), BERNIK, Mojca (ur.), URBANČIČ, Tanja (ur.). Vzgoja in izobraževanje v informacijski družbi : zbornik povzetkov referatov 15. mednarodne multikonference Informacijska družba - IS 2012, 12. oktober 2012 = Education in information society : book of abstracts of the 15th International Multiconference Information Society - IS 2012, 12th October 2012, Ljubljana, Slovenia. Kranj: Moderna organizacija, 2012, str. 58-59. [COBISS.SI-ID 16557657]

MARKOVIČ, Katja. Izdelava vodičev za uporabo programa GeoGebra : diplomska naloga. Ljubljana: [K. Markovič], 2011. 73 f., ilustr. [COBISS.SI-ID 16189529]

LOKAR, Matija. Designing tasks for CAS/DGS classrooms. V: TIME 2010, Technology and its Integration into Mathematics Education, July 6th-10th, 2010, Málaga, Spain. Proceedings of TIME 2010 : Technology and its Integration into Mathematics Education. Málaga: Universidad de Málaga, 2011, 17 str. [COBISS.SI-ID 15643993]

GAMS, Matjaž (glavni urednik, član uredniškega odbora). Računalniški slovarček. 3. razširjena izd. Ljubljana: Institut Jožef Stefan, Odsek za inteligentne sisteme, 2010. [COBISS.SI-ID 24181799]

LOKAR, Matija. Some issues on designing tasks for CAS classrooms. V: 6th Came symposium: structured abstracts : 16-17 July 2009, Megatrend University, Belgrade, Serbia. Beograd: Megatrend University, 2009, str. 15-16. [COBISS.SI-ID 15241817]

Marko Petkovšek:

PETKOVŠEK, Marko. Hypergeometric solutions of linear difference equations with polynomial coefficients. Journal of symbolic computation, ISSN 0747-7171, 1992, let. 14, str. 243-264. [COBISS.SI-ID 8044633]

PETKOVŠEK, Marko. A generalization of Gosper's algorithm. Discrete Mathematics, ISSN 0012-365X. [Print ed.], 1994, vol. 134, iss. 1-3, str. 125-131. [COBISS.SI-ID 8048217]

NEMES, István, PETKOVŠEK, Marko. RComp: a Mathematica package for computing with recursive sequences. *Journal of symbolic computation*, ISSN 0747-7171, 1995, let. 20, str. 745-753. [COBISS.SI-ID 6974809]

PETKOVŠEK, Marko, WILF, Herbert S., ZEILBERGER, Doron. A=B. Wellesley (Massachusetts): A. K. Peters, cop. 1996. VII, 212 str. ISBN 1-56881-063-6. [COBISS.SI-ID 4085337]

Bor Plestenjak:

PLESTENJAK, Bor, BAREL, Marc van, CAMP, Ellen van. A Cholesky LR algorithm for the positive definite symmetric diagonal-plus-semiseparable eigenproblem. V: CHING, Wai-Ki (ur.). *Second international conference on structured matrices : Hong Kong Baptist University, 08-11 June 2006*, (Linear algebra and its applications, ISSN 0024-3795, Vol. 428, Issues 2-3, 2008). New York: North Holland, 2008, vol. 428, iss. 2-3, str. 586-599. [COBISS.SI-ID 14475097]

PLESTENJAK, Bor. An algorithm for drawing planar graphs. *Software*, ISSN 0038-0644, 1999, let. 29, št. 11, str. 973-984. [COBISS.SI-ID 9066841]

PISANSKI, Tomaž, PLESTENJAK, Bor, GRAOVAC, Ante. NiceGraph program and its application in chemistry. *Croatica chemica acta*, ISSN 0011-1643, 1995, let. 68, št. 1, str. 283-292. [COBISS.SI-ID 8141401]