UČNI NAČRT PREDMETA / COURSE SYLLABUS (leto / year 2017/18)			
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):**

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.	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.

Temeljni literatura in viri / Readings:

Priročniki in učbeniki za orodja, ki jih študenti spoznajo.

Zapiski s predavanj, gradivo za vaje in ostalo gradivo v spletni učilnici predmeta.

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.

Manuals and textbooks for tools used.

Notes from lectures, tutorials and other resources in the online classroom.

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.

Cilji in kompetence:

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.

Objectives and competences:

Students will learn about and learned to use computer tools suitable in various mathematical procedures. They will learn how to report on their work.

Predvideni študijski rezultati:

| Znanje in razumevanje:

Slušatelj je seznanjen z računalniškimi orodji in pristopi k njihovi uporabi pri matematičnih postopkih. Zna poročati o matematičnem problemu in njegovem reševanju. |
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Intended learning outcomes:

| Knowledge and understanding:

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. |
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Uporaba:	Application:
Pridobljeno znanje služi za oporo pri študiju velikega dela predmetov.	The knowledge gained is used to support various subjects.
Refleksija: Spoznavanje pomena računalniške podpore znanju matematike. Spoznavanje pomena poročanja o reševanju matematičnih problemov.	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.
Prenosljive spretnosti – niso vezane le na en predmet:	Transferable skills:
Predmet se navezuje na vse matematične predmete in služi za spoznavanje orodij, uporabnih pri študiju teh predmetov.	The subject refers to all mathematical subjects and serves for learning tools, useful in the study of these subjects.

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

predavanja, vaje, uporaba metod študija na daljavo, domače naloge, konzultacije	Lectures, exercises, usage of distance learning techniques, home works, consultations

Načini ocenjevanja:	Delež (v %) / Weight (in %)	**Assessment:**
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 EdUmatics - kako pomagati učiteljem matematike pri vpeljavi IKT v poučevanje = Project EdUmatics - 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]