

UČNI NAČRT PREDMETA / COURSE SYLLABUS (leto / year 2016/17)						
<b>Predmet:</b>		Programiranje 1				
<b>Course title:</b>		Programming 1				
<b>Študijski program in stopnja</b> Study programme and level		<b>Študijska smer</b> Study field		<b>Letnik</b> Academic year	<b>Semester</b> Semester	
Visokošolski strokovni študijski program Praktična matematika		ni smeri		1	prvi in drugi	
First cycle professional study programme Practical Mathematics		none		1	first and second	
<b>Vrsta predmeta / Course type</b>				obvezni / compulsory		
<b>Univerzitetna koda predmeta / University course code:</b>				M0446		
<b>Predavanja</b> Lectures	<b>Seminar</b> Seminar	<b>Vaje</b> Tutorial	<b>Klinične vaje</b> work	<b>Druge oblike študija</b>	<b>Samost. delo</b> Individ. work	<b>ECTS</b>
45	15	60			150	9
<b>Nosilec predmeta / Lecturer:</b>		prof. dr. Andrej Bauer, viš. pred. mag. Matija Lokar				
<b>Jeziki / Languages:</b>		<b>Predavanja / Lectures:</b>		slovenski / Slovene		
		<b>Vaje / Tutorial:</b>		slovenski / Slovene		
<b>Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:</b>				<b>Prerequisites:</b>		
Vpis v letnik študija.				Enrolment in the programme.		
<b>Vsebina:</b>				<b>Content (Syllabus outline):</b>		

<p>Osnove programskih jezikov:Proces od problema do programa za izvajanje na računalniku. Pojem algoritma.izpisovanje, branje podatkov preko tipkovnice, spremenljivke, osnovni in številski tipi, aritmetika, pogojni stavki, zankeOsnovne podatkovne strukture:tabele, sezname, nabore, nizi, slovarji, množice, datoteke</p> <p>Zgradba programa:podprogrami, funkcije, dokumentacija, uporaba programskih knjižnic</p> <p>Osnovni programerski postopki: rekurzija, bisekcija, iskanje najmanjšega elementa ... Vpogled v dogodkovno programiranje in programski jeziki na osnovi »logo kock«</p>	<p>The basics of programming languages From problem to the execution on the computer. The concept of the algorithm, console output, reading data via keyboard, variables, basic and the numeric types, the arithmetic, conditional statements, loops</p> <p>Basic data structures: tables, lists, sets, arrays, dictionaries, sets, files</p> <p>The structure of the program: subroutines, functions, documentation, software libraries</p> <p>Basic programming procedures: recursion, bisection, searching</p> <p>Event driven programming and »logo style« programming languages</p>
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#### **Temeljni literatura in viri / Readings:**

<p>Priročniki in učbeniki za programske jezike, ki jih študenti spoznajo.</p> <p>Spletne strani in tečaji (Coursera, Udacity, Edx ...) za učenje programskega jezika, izbor je vsakoletno osvežen na spletni strani predmeta.</p> <p>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 programskih jezikov in didaktike poučevanja le teh. Konkretni naslovi, ki bi jih navedli, bi bili v času izvajanja že zastareli.</p> <p>Manuals and textbooks for programming languages.</p> <p>Web sites and courses (Coursera, Udacity, Edx...), selection is annually refreshed on the Web site of the subject.</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 programming languages and the didactics of teaching. Specific resources listed would have been at the time of the implementation already obsolete.</p>
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**Cilji in kompetence:**

Cilj predmeta je spoznati osnove algoritmičnega razmišljanja in kodiranja v primerno izbranem programskem jeziku. Študenti bodo spoznali in usvojili osnovne tehnike programiranja. Enostavne konkretne naloge bodo sposobni rešiti s pomočjo računalniškega programa. Osnovne tehnike programiranja bodo nadgradili z modularnim pristopom in uporabo zahtevnejših tehnik razvoja programov. S pomočjo računalniškega programa bodo sposobni reševanja težjih sestavljenih nalog.

**Objectives and competences:**

The goal of the subject is to teach the basics of algorithmic thinking and coding in the chosen language.

Students will learn and acquire the basic programming techniques. They will be able to solve simple concrete tasks with the help of a computer program. The basic programming techniques will be upgraded with a modular approach and by using more complex techniques of program development.

**Predvideni študijski rezultati:**

Znanje in razumevanje: Študenti pridobijo znanje iz osnovnih programskih konstruktov (spremenljivke, stavki, zanke, podprogrami ...) in njihova učinkovita uporaba za reševanje manjših programerskih problemov.

Analiza problema, uporaba ustreznih programerskih prijemov,

Uporaba:

Sposobnost algoritmičnega pristopa k reševanju problemov. Reševanje matematičnih in drugih problemov z računalnikom, predvsem kadar je treba za rešitev problema sestaviti program. Sposobnost branja in pisanja dokumentacije.

Refleksija: Sposobnost programiranja omogoča uporabniku višji nivo nadzora nad računalnikom in mu omogoča reševanje problemov, ki jih z običajnimi aplikacijami ne more rešiti. Poznavanje osnov programiranja omogoča algoritmični pristop k reševanju poljubnih problemov. Študent spozna pomembnost uporabe knjižnic programov in ustreznosti dokumentacije programske kode.

Prenosljive spretnosti – niso vezane le na en

**Intended learning outcomes:**

Knowledge and understanding:

Students acquire knowledge of basic programming constructs (variables, statements, loops, subroutines...) and their effective use in solving small programming problems. Analysis of the problem, the use of appropriate programming approaches,

Application:

The ability of the algorithmic approach to problem solving. Solving mathematical and other problems with a computer, especially where it is necessary to draw up a program to solve the problem. The ability to read and to write documentation.

Reflection:

The ability of programming allows the user to have a higher level of control over the computer and allows him to solve problems, which using conventional applications can not be solved. Knowledge of the basics of programming allows the algorithmic approach to solving any problems. The student realizes the importance of the use of the programming libraries and

<p>predmet:</p> <p>Programerske sposobnosti študent uporabi pri ostalih računalniških in numeričnih predmetih, sam način pristopa k problemu pa tudi pri ostalih predmetih.</p>	<p>appropriate documentation of the code.</p> <p>Transferable skills:</p> <p>Programming skills student uses at other computing and numerical related subjects, also the approach to the problem is used in other subjects too.</p>
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**Metode poučevanja in učenja:**

<p>predavanja, vaje, uporaba metod študija na daljavo, domače naloge, konzultacije</p>
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**Learning and teaching methods:**

<p>Lectures, exercises, usage of distance learning techniques, home works, consultations</p>
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<b>Načini ocenjevanja:</b>	Delež (v %) / Weight (in %)	<b>Assessment:</b>
<p>Način (pisni izpit, ustno izpraševanje, naloge, sem. naloga):</p> <p>domače naloge (pogoj za pristop k pisnemu izpitu)</p> <p>izpit iz vaj (kolokviji ali pisni izpit)</p> <p>seminarska naloga</p> <p>ustni izpit – zagovor seminarske naloge</p> <p>Študentje dobijo dve oceni:</p> <p>eno iz izpita iz vaj ter domačih nalog,</p> <p>drugo iz seminarske naloge in ustnega izpita.</p> <p>Ocene: 1-5 (negativno), 6-10 (pozitivno) (po Statutu UL)</p>	<p>50%</p> <p>50%</p>	<p>Type (examination, oral, coursework, project):</p> <p>home works (requirement for taking the written exam)</p> <p>midterm exams instead of written exam, written exam</p> <p>oral exam – the presentation of term paper</p> <p>Students receive two grades: one from the written exam and home works and the other from the oral exam.</p> <p>Grading: 1-5 (fail), 6-10 (pass) (according to the Statute of UL)</p>

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**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:

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]

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]

KUDREVIČIUS, Evelina. Platforma SharePoint in oblikovanje glavne strani : diplomska naloga. Ljubljana: [E. Kudrevičius], 2008. 77 f., ilustr. [COBISS.SI-ID 15105625]

LOKAR, Matija. Prvenstvo študentskih ekip Univerze v Ljubljani v programiranju 2002. Ljubljana: [Fakulteta za matematiko in fiziko], 2002. 100 str., ilustr. [COBISS.SI-ID 12122457]