

UČNI NAČRT PREDMETA / COURSE SYLLABUS							
Predmet:		Življenjski cikel razvoja programske opreme					
Course title:		Software Development Life Cycle					
Študijski program in stopnja Study programme and level		Študijska smer Study field			Letnik Academic year		Semester Semester
Informacijske znanosti, doktorski študijski program tretje stopnje		Računalniške znanosti			Drugi		Tretji ali četrti
Information Sciences, third cycle Doctoral Study Programme		Computer sciences			Second		Third or fourth
Vrsta predmeta / Course type					Izbirni/Elective		
Univerzitetna koda predmeta / University course code:					1-IZ-DR-RZ-IP-ZCRPO-2024-04-24		
Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work		ECTS
30	-	-	-	-	270		10
Nosilec predmeta / Lecturer:		Prof. dr. Srdjan Škrbić					
Jeziki / Languages:		Predavanja / Lectures: Slovenski / Slovenian, Angleški / English					
		Vaje / Tutorial:					
Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:				Prerequisites:			
/				/			
Vsebina:				Content (Syllabus outline):			
<ul style="list-style-type: none"> Pregled ključnih elementov življenjskega cikla razvoja programske opreme s poudarkom na arhitekturah programske opreme in raziskovanju različnih vrst testiranja in validacije programske opreme: <ul style="list-style-type: none"> izvedljivost; specifikacija; arhitektura in oblikovanje; razvoj; testiranje in validacija; razvoj in vzdrževanje. Raziskovanje različnih možnosti za življenjski cikel spletnih in mobilnih aplikacij v sodobnih programskih 				<ul style="list-style-type: none"> An overview of key elements of a software development life cycle, with a focus on software architectures and exploration of various types of software testing and validation: <ul style="list-style-type: none"> feasibility; specification; architecture and design; development; testing and validation; evolution and maintenance. An exploration of various options for life cycle of web and mobile applications in modern software methodologies and processes focusing on usage of 			

<p>metodologijah in procesih s poudarkom na uporabi sodobnih orodij za upravljanje življenjskega cikla:</p> <ul style="list-style-type: none"> • procesi procesne programske opreme in model slapa - faze in iteracije, statična struktura procesa in delovni tokovi; • agilni programski procesi - Scrum in Kanban metodologije s poudarkom na popolnem poznavanju programskega procesa Scrum. 	<p>up to date life cycle management tools:</p> <ul style="list-style-type: none"> • procedural software processes and Waterfall model - phases and iterations, static process structure and workflows; • agile software processes - Scrum and Kanban methodologies with an emphasis on complete knowledge of the Scrum software process.
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Temeljni literatura in viri / Readings:

<ul style="list-style-type: none"> • Merkow, M. (2023). <i>Secure, Resilient, and Agile Software Development</i>. Auerbach Publications. • Richards, M. (2022). <i>Software Architecture Patterns</i>, 2nd Edition. O'Reilly. • Jones, C. (2021). <i>Software Development Patterns and Antipatterns</i>. Auerbach Publications. • Mal, S. (2021). <i>Software Development Lifecycle</i>. Notion Press. • Bass, L., Clements, P., & Kazman, R. (2021). <i>Software Architecture in Practice</i>, 4th edition. Addison-Wesley. • Kniberg, H. (2015). <i>Scrum and XP from the Trenches</i>, 2nd edition. Lulu.com. • Jeffries, R. (2015). <i>The Nature of Software Development</i>. Pragmatic Bookshelf. • Sutherland, J. (2019). <i>Scrum: The Art of Doing Twice the Work in Half the Time</i>, London : Random House Business.
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Cilji in kompetence:

<p><i>Učna enota prispeva k razvoju naslednjih splošnih in predmetno-specifičnih kompetenc:</i></p> <p><i>Splošne kompetence:</i></p> <ul style="list-style-type: none"> • Sposobnost obvladanja standardnih metod, postopkov in procesov raziskovalnega dela na znanstvenem področju študija. • Sposobnost samostojnega raziskovalno-razvojnega dela in vodenje raziskovalne skupine. • Prizadevanje za kakovost znanstveno-raziskovalnega dela skozi avtonomnost, (samo)kritičnost, (samo)refleksivnost in (samo)evalviranje. <p><i>Predmetno-specifične kompetence:</i></p> <ul style="list-style-type: none"> • Sposobnost uporabe različnih vrst modelov/arhitektur, ki se uporabljajo

Objectives and competences:

<p><i>The instructional unit contributes to the development of the following general and subject-specific competences:</i></p> <p><i>General competences:</i></p> <ul style="list-style-type: none"> • Ability to master standard methods, procedures and processes of research work in the scientific field of study. • Ability for independent research-development work and leadership of a research group. • Striving for quality in scientific research through autonomy, (self-)criticism, (self)reflexivity and (self-)evaluation. <p><i>Subject-specific competences:</i></p> <ul style="list-style-type: none"> • Ability to apply the different types of application models/architectures used to develop mobile software. • Applications through critical analysis. • Ability to choose the components and structure of mobile development

za razvoj mobilnih aplikacij skozi pristop kritične analize.

- Sposobnost izbire komponent in strukture mobilnih razvojnih ogrodij in znanje, kako in kdaj je potrebno uporabiti različne sestavne dele za razvoj delovnega sistema skozi pristop kritične analize in reševanja problemov.
- Zmožnost razvoja različnih zgoraj opisanih modelov s pomočjo programske opreme skozi pristop kritične analize in reševanja problemov.
- Razlikovanje zmogljivosti in omejitve različnih mobilnih računalniških naprav skozi pristop kritične analize.
- Zmožnost načrtovanja, izvajanja in razporeditve mobilnih aplikacij, ki uporabljajo ustrezno okolje za razvoj programske opreme skozi pristop reševanja problemov.

frameworks and knowing how and when to apply the different components to develop a working system through critical analysis and problem-solving.

- Ability to develop the various models described above using software through a critical analysis and problem-solving approach.
- Differentiation of the capabilities and limitations of a range of mobile computing devices through critical analysis.
- Ability to design, implement and deploy mobile applications using an appropriate software development environment through problem-solving.

Predvideni študijski rezultati:

Znanje in razumevanje:

Študent/študentka:

- identificira modele in faze življenjskega cikla razvoja;
- predvidi vse vidike življenjskega cikla sodobnih spletnih in mobilnih aplikacij;
- zna izbrati in priporočiti ustrezen proces za določen projekt razvoja spletne ali mobilne aplikacije ter analizirati in razvrstiti izbire;
- je sposoben kritično analizirati, oceniti in utemeljiti izbire glede arhitekture programske opreme, testiranja in celotnega življenjskega cikla razvoja;
- izkazuje razumevanje in sposobnost oblikovanja, izgradnje in načrtovanja vseh faz življenjskega cikla sodobne spletne ali mobilne aplikacije.

Intended learning outcomes:

Knowledge and understanding:

The student:

- identifies development life cycle models and phases;
- foresees all aspects of the life cycle of modern web and mobile applications;
- can choose and recommend appropriate process for a given web or mobile application development project and analyze and classify the choices;
- can critically analyze, evaluate and justify the choices regarding the software architecture, testing and whole development life cycle;
- demonstrates understanding and ability to design, build and plan all phases of a modern web or mobile application life cycle.

Metode poučevanja in učenja:

Learning and teaching methods:

- *Predavanja z aktivno udeležbo študentov (razlaga, diskusija, vprašanja, primeri, reševanje problemov);*
- *Seminarske vaje (refleksija izkušenj, projektno delo, timsko delo, metode kritičnega mišljenja, diskusija);*
- *Individualne in skupinske konzultacije (diskusija, dodatna razlaga, obravnava specifičnih vprašanj).*

- *Lectures with active student participation (explanation, discussion, questions, examples problem-solving);*
- *Seminars (reflection about experiences, project work, teamwork, method of critical thinking, discussion);*
- *Individual and group consultations (discussion, additional explanation, treatment of specific questions).*

Načini ocenjevanja:

Delež (v %) /
Weight (in %)

Assessment:

<p>Način (pisni izpit, ustno izpraševanje, naloge, projekt):</p> <ul style="list-style-type: none"> • projektna raziskovalna naloga 	<p>100</p>	<p>Type (examination, oral, coursework, project):</p> <ul style="list-style-type: none"> • project research paper
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Reference nosilca / Lecturer's references:

- Jović, M., Šubelj, L., Golob, T., Makarovič, M., Yasserli, T., Krstićev Boberić, D., Škrbić, S., & Levnajić, Z. (2023). Terrorist attacks sharpen the binary perception of "Us" vs. "Them". *Sci Rep* 13, 12451. <https://doi.org/10.1038/s41598-023-39035-3>
- Bravos, G., Cabrera, A. J., Correa, C., Danilovic, D., Evangelidou, N., Ezov, G., Gajica, Z., Jakovetic, D., Kallipolitis, L., Lukic, M., Mascolo, J.-E., Maserà D., Mazo, R., Mezei I., Miaoudakis, A. I., Milosevic, N., Oliff, W., Robin, J., Smyrlis, M., Sakellari, G., Stamatias, G., Stamenkovic, D., Skrbic, S., Souveyet, C., Vantolas, S., Vasiliadis, G., & Vukobratovic, D. (2022). Cybersecurity for Industrial Internet of Things: Architecture, Models and Lessons Learned. *IEEE Access* 10, 124747–124765.
- Fodor, L., Jakovetić, D., Boberić Krstićev, D. et al. A parallel ADMM-based convex clustering method. *EURASIP J. Adv. Signal Process.* 2022, 108 (2022). <https://doi.org/10.1186/s13634-022-00942-8>
- Fodor, L., Jakovetic, D., Krejic, N., Krklec Jerinkic, N., & Skrbic, S. (2021). Performance evaluation and analysis of distributed multi-agent optimization algorithms with sparsified directed communication. *EURASIP J. Adv. Signal Process.* 1, 25.
- Savic, M., Lukic, M., Danilovic, D., Bodroski, Z., Bajovic, D., Mezei, I., Vukobratovic, D., Skrbic, S., & Jakovetic, D. (2021). Deep Learning Anomaly Detection for Cellular IoT With Applications in Smart Logistics. *IEEE Access* 9, 59406–59419.
- Sae-Ueng, P., & Skrbic, S. (2020). Priority fuzzy database management system implementation based on extensions to the XQuery language. *J. Intell. Fuzzy Syst.* 38(4), 4107–4118.