

**UČNI NAČRT PREDMETA / COURSE SYLLABUS**

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| <b>Predmet:</b>      | Razvoj strežniških spletnih aplikacij       |
| <b>Course title:</b> | Development of server side web applications |

| Študijski program in stopnja<br>Study programme and level             | Študijska smer<br>Study field | Letnik<br>Academic year | Semester<br>Semester |
|-----------------------------------------------------------------------|-------------------------------|-------------------------|----------------------|
| Računalništvo in spletne tehnologije,<br>magistrski študijski program | -                             | Prvi                    | Drugi                |
| Computer Science and Web Technologies,<br>Master's Study Programme    | -                             | First                   | Second               |

**Vrsta predmeta / Course type**

Obvezni / Obligatory

**Univerzitetna koda predmeta / University course code:**

2-RST-MAG-RSSA-2026-09-29

| Predavanja<br>Lectures | Seminar<br>Seminar | Vaje<br>Tutorial | Klinične vaje<br>work | Druge oblike študija | Samost. delo<br>Individ. work | ECTS |
|------------------------|--------------------|------------------|-----------------------|----------------------|-------------------------------|------|
| 30                     | -                  | 45               | -                     | -                    | 105                           | 6    |

**Nosilec predmeta / Lecturer:****Jeziki /  
Languages:****Predavanja /  
Lectures:**

Slovenski, angleški / Slovene, English

**Vaje / Tutorial:**

Slovenski, angleški / Slovene, English

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

Pogoj za vključitev v delo je predznanje iz spletnega programiranja.  
Pogoj za pristop k izpitu je priprava in zagovor seminarske naloge.

**Prerequisites:**

The precondition for this course is knowledge from web programming.  
To attend an exam students will have to prepare and present a seminar work.

**Vsebina:**

- Uvod v sodobne strežniške arhitekture in mikrosoritive.
- Povezovanje storitev: gRPC in definicija vmesnikov (Protocol Buffers).
- Asinhrono sporočanje in gručenje: uporaba vrst sporočil (RabbitMQ).

**Content (syllabus outline):**

- Introduction to modern server-side architectures and microservices.
- Inter-service communication: gRPC and interface definition (Protocol Buffers).
- Asynchronous messaging and queueing: message brokers (RabbitMQ).

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| <ul style="list-style-type: none"> <li>• Pridobivanje podatkov in prilagojeni poizvedbeni vmesniki: Facebook GraphQL.</li> <li>• Nizkonivojski omrežni protokoli: SSH in obdelava vtičnikov TCP.</li> <li>• Kontejnerizacija aplikacij in upravljanje vsebnikov brez korenskega dostopa (Podman).</li> <li>• Orkestracija mikrororitev v lahkih okoljih Kubernetes (K3s).</li> <li>• Iskanje napak, analiza odpovedi in varnostni pregledi v porazdeljenih sistemih.</li> <li>•</li> </ul> | <ul style="list-style-type: none"> <li>• Data fetching and flexible query interfaces: Facebook GraphQL.</li> <li>• Low-level network protocols: SSH-based TCP servers and custom socket processing.</li> <li>• Application containerization and rootless container management (Podman).</li> <li>• Microservice orchestration with lightweight Kubernetes (K3s).</li> <li>• Live debugging, failure-mode analysis, and security auditing in distributed systems.</li> <li>•</li> </ul> |
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### Temeljni literatura in viri / Readings:

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| <p>Literatura in viri se zaradi nenehnega razvoja posodablja v vsakem študijskem letu.</p> <ul style="list-style-type: none"> <li>• Walsh, D. (2023). Podman in action: Secure, Rootless Containers for Kubernetes, Microservices, and More. Simon and Schuster.</li> <li>• Porcello, E., &amp; Banks, A. (2018). Learning GraphQL. "O'Reilly Media, Inc.."</li> <li>• Bellemare, A. (2020). Building Event-Driven Microservices: Leveraging Organizational Data at Scale. O'Reilly Media.</li> <li>• Newman, S. (2021). Building Microservices: Designing Fine-Grained Systems (2nd ed.). O'Reilly Media.</li> <li>• Technical documentation of selected implementation services - online dynamic</li> </ul> |
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### Cilji in kompetence:

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| <p>Učna enota prispeva k razvoju naslednjih splošnih in predmetno-specifičnih kompetenc:</p> <p>Predmetno-specifične kompetence:</p> <ul style="list-style-type: none"> <li>• Sposobnost prepoznavanja priložnosti za inoviranje in zasnovo novih spletnih storitev in aplikacij.</li> <li>• Usposobljenost za skupinsko delo v vseh fazah razvoja in raziskovanja spletnih in mobilnih rešitev.</li> </ul> <p>Splošne kompetence:</p> <ul style="list-style-type: none"> <li>• Usposobljenost za načrtovanje in razvoj spletnih aplikacij na različnih platformah.</li> <li>• Sposobnost primerjave in izbire primernih orodij in ogrodij za razvoj spletnih aplikacij.</li> <li>• Poznavanje in sposobnost uporabe širokega nabora elementov</li> </ul> |
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### Objectives and competences:

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| <p>The instructional unit contributes to the development of the following general and subject-specific competencies:</p> <p>Subject-specific competencies:</p> <ul style="list-style-type: none"> <li>• Ability to recognize the opportunity to innovate and design new online services and applications.</li> <li>• Ability to work in team at all stages of development and research of online and mobile solutions.</li> </ul> <p>General competencies:</p> <ul style="list-style-type: none"> <li>• Ability to design and develop web applications on different platforms.</li> <li>• The ability of comparison and selection of appropriate tools and frameworks for developing server-side web applications.</li> </ul> |
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| <p>potrebnih za celovit razvoj spletnih aplikacij (baze podatkov, spletne storitve, strojna orodja).</p> <ul style="list-style-type: none"> <li>• Sposobnost interpretacije danega problema v obliki spletne aplikacije.</li> </ul> | <ul style="list-style-type: none"> <li>• Knowledge of and ability to use a wide range of components necessary for the full development of server-side web applications (databases, web services, machine tools).</li> <li>• The ability to interpret the given problem in the form of a server-side web application.</li> </ul> |
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#### **Predvideni študijski rezultati:**

Znanje in razumevanje:

- Razumevanje konceptov računalniških omrežij in arhitektur mikrostoritev  
ESCO skill:  
<http://data.europa.eu/esco/skill/f84a433f-34f1-4083-b0a3-24802623509c>
- Razumevanje principov orkestracije vsebnikov ter izvajanje varnostnih in kakovostnih revizij programske opreme (ESCO:  
<http://data.europa.eu/esco/skill/ae4f0cc6-e0b9-47f5-bdca-2fc2e6316dce>)

Prenosljive/ključne spretnosti in drugi atributi:

- Reševanje kompleksnih tehničnih problemov ter diagnostika in sistemsko odpravljanje napak v porazdeljenih okoljih (ESCO:  
<http://data.europa.eu/esco/skill/74442ac-c157-4350-8be0-ce454df4f5c5>).

#### **Intended learning outcomes:**

Knowledge and understanding:

- Understanding computer network concepts and microservices architectures ESCO skill:  
<http://data.europa.eu/esco/skill/f84a433f-34f1-4083-b0a3-24802623509c>
- Understanding container orchestration principles as well as conducting software security and quality audits (ESCO:  
<http://data.europa.eu/esco/skill/ae4f0cc6-e0b9-47f5-bdca-2fc2e6316dce>)

Transferable / Key skills and other attributes:

- Solving complex technical problems as well as diagnostics and system troubleshooting in distributed environments (ESCO:  
<http://data.europa.eu/esco/skill/74442ac-c157-4350-8be0-ce454df4f5c5>).
- Autonomous analysis, critical evaluation, and optimization of source code and AI-generated solutions (ESCO:  
<http://data.europa.eu/esco/skill/85f4>

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| <ul style="list-style-type: none"> <li>Samostojna analiza, kritično vrednotenje in optimizacija izvorne kode ter AI-generiranih rešitev (ESCO: <a href="http://data.europa.eu/esco/skill/85f46538-ae70-498a-bfbc-b8ddafe96c7d">http://data.europa.eu/esco/skill/85f46538-ae70-498a-bfbc-b8ddafe96c7d</a>)</li> <li>.</li> </ul> | <a href="http://data.europa.eu/esco/skill/85f46538-ae70-498a-bfbc-b8ddafe96c7d">6538-ae70-498a-bfbc-b8ddafe96c7d</a> ) |
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#### Metode poučevanja in učenja:

- predavanja z aktivno udeležbo študentov (razlaga, diskusija, vprašanja, primeri, reševanje problemov);
- laboratorijske vaje: študentje bodo spoznali nekaj najaktualnejših programskih orodij. Vaje bodo potekale v manjših skupinah, tako da bo imel vsak študent na razpolago en računalnik.

#### Learning and teaching methods:

- lectures with active students' participation (explanations, discussion, questions, examples, problem solving)
- tutorials (students will learn the very latest software tools. Exercises will be held in small groups so that each student will have a computer.)

| Načini ocenjevanja:                                                                                                                                             |                       | Delež (v %) /<br>Weight (in %) <b>Assessment:</b>                                                                                                                     |
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| <ul style="list-style-type: none"> <li>Samostojni praktični projekt in poročilo o reviziji</li> <li>Seminarski izpit v živo (Zagovor in diagnostika)</li> </ul> | <p>30%</p> <p>70%</p> | <ul style="list-style-type: none"> <li>Practical Project &amp; Code Audit Report</li> <li>Live oral and practical examination in the instructor's presence</li> </ul> |

#### Reference nosilca / Lecturer's references:

- BOŠKOSKI, Pavle. Towards digital transformation : implementation experience. V: RODIČ, Blaž (ur.). Book of Abstracts. Novo mesto: Faculty of Information Studies. 2017. <http://itis.fis.unm.si/>. [COBISS.SI-ID 30969895]
- BOŠKOSKI, Pavle, JURIČIČ, Đani, MUSIZZA, Bojan, ČERNE, Stanislav. Sistem za diagnostiko, prognostiko in podporo e-vzdrževanju industrijske opreme : tehnična izboljšava. Ljubljana: Institut Jožef Stefan, 2014. 21 str., ilustr. [COBISS.SI-ID 28376103]
- DEBENJAK, Andrej, BOŠKOSKI, Pavle, MUSIZZA, Bojan, KERN, Miha, BIČEK, Andrej. Informacijska arhitektura za proizvodno analitiko : primer Domel = Information architecture for production analytic : with application in Domel company. V: MUŠKINJA, Nenad (ur.), TOVORNIK, Boris (ur.). Zbornik desete konference Avtomatizacija v industriji in gospodarstvu, 6. in 7. april 2017, Maribor, Slovenija. Maribor: Društvo avtomatikov Slovenije. 2017, str. 38-43. [COBISS.SI-ID 30423079]

- DAMIJ, Nadja, BOŠKOSKI, Pavle, BOHANEČ, Marko, MILEVA BOSHKOŠKA, Biljana. Ranking of business process simulation software tools with DEX/QQ hierarchical decision model. PloS one, ISSN 1932-6203, 2016, vol. 11, no. 2, str. 1-16, doi: 10.1371/journal.pone.0148391. [COBISS.SI-ID 29294119],
- MILEVA BOSHKOŠKA, Biljana, BOHANEČ, Marko, BOŠKOSKI, Pavle, JURIČIĆ, Đani. Copula-based decision support system for quality ranking in the manufacturing of electronically commutated motors. Journal of intelligent manufacturing, ISSN 0956-5515, 2015, vol. 26, no. 2, str. 281-293, doi: 10.1007/s10845-013-0781-7. [COBISS.SI-ID 26734887]