

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Ime predmeta:	INTEGRACIJE LOGISTIČNIH INFORMACIJSKIH SISTEMOV
Course title:	LOGISTICS INFORMATION SYSTEMS INTEGRATIONS

Študijski program in stopnja Study programme and cycle	Študijska smer Study option	Letnik Year of study	Semester Semester
LOGISTIKA SISTEMOV 2. stopnja		2.	3.
SYSTEM LOGISTICS 2 nd degree		2.	3.

Vrsta predmeta (obvezni ali izbirni) / Course type (compulsory or elective)	IZBIRNI
	ELECTIVE

Univerzitetna koda predmeta / University course code:	MAG
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Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje Clinical training	Druge oblike študija Other forms of study	Samost. delo Individual work	ECTS
20 a-P 20 e-P		20 a-V 20 e-V			100	6

Nosilec predmeta / Course coordinator:	ROMAN GUMZEJ
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Jeziki /Languages:	Predavanja / Lectures:	SLOVENSKI / SLOVENE
	Vaje / Tutorial:	SLOVENSKI / SLOVENE

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	Prerequisites for enrolling in the course or for performing study obligations:
Ni posebnih pogojev.	None in particular.

Vsebina (kratek pregled učnega načrta):	Content (syllabus outline):
1. Logistični informacijski sistemi (horizontalna in vertikalna integracija, ANSI/ISA-95 klasifikacija). 2. Integracija krmilnih sistemov podjetja (celoviti upravljavski informacijski sistemi (ERP), sistemi za vodenje proizvodnje (MES), procesno krmilni sistemi (PCS)). 3. Optimizacija poteka dela, upravljanja kakovosti in upravljanja sredstev (razvrščanje in razporejanje delovnih aktivnosti, analiza izvedljivosti in kakovosti razvrstitev). 4. Integracije pametnih tovarn, skladišč, transportov, domov in mest (digitalni dvojčki, prekrivne mreže in njihovo povezovanje, IoT sklad protokolov, razširjena resničnost).	1. Logistics information systems (horizontal and vertical integration, ANSI/ISA-95 classification). 2. Enterprise control system integration (enterprise resource planning systems (ERP), manufacturing execution systems (MES), process control systems (PCS)). 3. Workflow, quality management, and asset management optimization (workflow activities scheduling and dispatching, schedule feasibility and quality analysis). 4. Smart factory, warehouse, transport, home, and city integrations (digital twins, overlay networks and their interconnections, IoT protocol stack, extended reality).

Temeljni literatura in viri / Reading materials:

Anderson, G. W. (2003). SAP Planning Best Practices in Implementation. Sams.
Domoticz. (2020). Domoticz | Control at Your fingertips. Vir: <https://domoticz.com/>.
Fiware. (2021). Fiware community | Smart Cities. Vir: <https://www.fiware.org/community/smart-cities/>.
Gajjar, M. (2020). Odoos 13 Best practices. Vir: <https://www.odoobooks.com/en/13.0/>.
Gumzej, R. (2013). Logistika in e-poslovanje, Celje: Fakulteta za logistiko. ISBN 978-961-6562-88-1. ISBN 978-961-6562-89-8.
OASC. (2020). Minimal Interoperability Mechanisms – MIMs. Vir: <https://oascities.org/minimal-interoperability-mechanisms/>.
RF Wireless World. (2012). IoT Protocol Stack Layers | IoT Stack Layer 1 to Layer 7. Vir: <https://www.rfwireless-world.com/IoT/IoT-Protocol-Stack-layers.html>.

Cilji in kompetence:

Cilji predmeta so:

- razumevanje konceptov integracije krmilnih sistemov podjetja (ERP, MES in PCS),
- razumevanje konceptov integracij pametnih tovarn, skladišč, transportov, domov in mest,
- uporaba konceptov optimizacije poteka dela, upravljanja kakovosti in upravljanja sredstev,
- uporaba konceptov implementacije celovitih upravljavskih informacijskih sistemov.

Kompetence, ki jih študenti osvojijo:

- osvojijo koncepte integracij logističnih informacijskih sistemov (LIS): horizontalne (ERP in SCM sistemi) in vertikalne (ERP-MES-PCS sistemi) v skladu z ANSI/ISA-95 klasifikacijo,
- osvojijo koncepte integracij pametnih tovarn, skladišč, transportov, domov in mest,
- osvojijo metode implementacije ERP sistemov: veliki pok, fazni pristop, vzporedni pristop, procesni pristop, hibridni pristop, ASAP metodologija,
- osvojijo statične in dinamične, eksaktne in aproksimativne metode razvrščanja in razporejanja delovnih aktivnosti.

Objectives and competences:

Course objectives are:

- understanding the concepts of enterprise-control system integration (ERP, MES, and PCS),
- understanding the concepts of smart factory, warehouse, transport, home, and city integrations,
- workflow, quality management, and asset management optimization concepts utilization,
- enterprise resource planning systems implementation concepts utilization.

Competences acquired by students:

- master the concepts of logistics information systems (LIS) integrations: horizontal (ERP and SCM systems) and vertical (ERP-MES-PCS systems) according to the ANSI/ISA-95 classification,
- master the concepts of smart factory, warehouse, transport, home, and city integrations,
- master ERP system's implementation methods: big bang, phased approach, two-tire approach, process-based approach, hybrid approach, ASAP methodology,
- master static and dynamic, exact and approximative workflow activities scheduling and dispatching methods.

Predvideni študijski rezultati:

Študent bo po zaključku predmeta zmožen:

- implementacije ERP rešitev,
- optimizacije poteka dela, upravljanja kakovosti in upravljanja sredstev,
- sodelovanja pri integracijah pametnih sistemov in rešitev.

Intended learning outcomes:

Upon completion of the course the student will be capable of:

- ERP solutions implementation,
- workflow, quality management, and asset management optimization,
- cooperation in smart systems and solutions integrations.

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

<p>Predavanja: pri predavanjih študenti spoznajo teoretične osnove predmeta. Predavanja potekajo v živo v predavalnici pa tudi v obliki e-predavanj na videokonferenčni način ter preko namenskih e-učilnic v e-učnem okolju.</p> <p>Vaje: pri vajah študenti utrdijo teoretično znanje in se ga naučijo uporabiti. Vaje potekajo v živo v predavalnici pa tudi v obliki e-vaj na videokonferenčni način ter preko namenskih e-učilnic v e-učnem okolju.</p>	<p>Lectures: during lectures students are familiarised with the theoretical fundamentals of the course. Lectures take place live in the classroom as well as in the form of e-lectures via videoconferencing and dedicated e-classrooms in the e-learning environment.</p> <p>Tutorials: during tutorials students consolidate their theoretical knowledge and learn to apply it. The tutorials are held live in the classroom as well as in the form of e-tutorials via videoconferencing and dedicated e-classrooms in the e-learning environment.</p>
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	Delež (v %) / Share (in %)	Assessment methods:
Načini ocenjevanja:		
Način (pisni izpit, ustno izpraševanje, naloge, projekt): <ul style="list-style-type: none"> • projekt • ustni izpit 	50% 50%	Method (written or oral exam, coursework, project): <ul style="list-style-type: none"> • project • oral exam

Reference nosilca / Course coordinator's references:

1. GUMZEJ, Roman. Intelligent logistics systems for smart cities and communities, (Lecture notes in intelligent transportation and infrastructure). Cham: Springer, cop. 2021. XVII, 204 str., ilustr. ISBN 978-3-030-81202-7. ISBN 978-3-030-81203-4. <https://doi.org/10.1007/978-3-030-81203-4>, doi: 10.1007/978-3-030-81203-4. [COBISS.SI-ID 81555203] kategorija: 2A (Z, A", A', A1/2); tip dela še ni verificiran točke: 160, št. avtorjev: 1.
2. Junying Niu, Yuhong Song, Roman Gumzej, "A cloud-based intelligent management system for electronic components", V: Developments of artificial intelligence technologies in computation and robotics : proceedings of the 14th International FLINS Conference (FLINS 2020), Cologne, Germany, 18-21 August 2020, Zhong Li (ur.), New Jersey [etc.]: World Scientific, cop. 2020, str. 1213-1220, ilustr., World scientific proceedings series on computer engineering and information science, vol. 12, ISBN 978-981-122-334-1, ISBN 978-981-122-333-4, ISBN 978-981-122-332-7, https://doi.org/10.1142/9789811223334_0145, DOI: 10.1142/9789811223334_0145. [COBISS.SI-ID 40994819].
3. Roman Gumzej, Maytayanin Komkhao, Sunantha Sodsee, "Design of an intelligent, safe and secure transport unit for the physical internet", V: Recent advances in information and communication technology 2020 : proceedings of the 16th International Conference on Computing and Information Technology (IC2IT 2020), Phayung Meesad (ur.), Cham: Springer, cop. 2020, str. 60-69, ilustr., Advances in intelligent systems and computing, vol. 1149, ISBN 978-3-030-44043-5, ISBN 978-3-030-44044-2, ISSN 2194-5365, https://doi.org/10.1007/978-3-030-44044-2_7, DOI: 10.1007/978-3-030-44044-2_7. [COBISS.SI-ID 16559875].
4. GUMZEJ, Roman, RAKOVSKA, Miroslava. Simulation modeling and analysis for sustainable supply chains. V: GRZYBOWSKA, Katarzyna (ur.), AWASTHI, Anjali (ur.), SAWHNEY, Rapinder (ur.). Sustainable logistics and production in industry 4.0 : new opportunities and challenges, (Ecoproduction, ISSN 2193-4614). [S. l.]: Springer Nature. cop. 2020, str. 145-160, ilustr. https://doi.org/10.1007/978-3-030-33369-0_9, doi: 10.1007/978-3-030-33369-0_9. [COBISS.SI-ID 513050429] kategorija: 3B (Z, A1/2); tip dela je verificiral OSICD točke: 20, št. avtorjev: 2.
5. GUMZEJ, Roman. Engineering safe and secure cyber-physical systems : the specification PEARL approach, (Studies in computational intelligence, vol. 632). [S. l.]: Springer, cop. 2016. XIII, 128 str., ilustr. ISBN 978-3-319-28903-8. <http://www.springer.com/us/book/9783319289038>. [COBISS.SI-ID 512752957] kategorija: 2A (Z, A", A', A1/2); tip dela je verificiral OSICD točke: 160, št. avtorjev: 1, http://fl.uni-mb.si/knjiznica/wp-content/uploads/2013/12/Gumzej_Logistika-in-e-poslovanje.pdf. [COBISS.SI-ID 270214912].

