

**UČNI NAČRT PREDMETA / SUBJECT SPECIFICATION**

Predmet:	UPRAVLJANJE LOGISTIČNIH SISTEMOV
Subject Title:	CONTROL OF LOGISTICS SYSTEMS

Študijski program Study programme	Študijska smer Study field	Letnik Year	Semester Semester
LOGISTIKA SISTEMOV		1	1.
LOGISTICS OF SYSTEMS			

Vrsta predmeta / Course type: Obvezni / Core subject

Univerzitetna koda predmeta / University course code: DR

Predavanja Lectures	Seminar Seminar	Sem. vaje Tutorial	Lab. vaje Lab work	Teren. vaje Field work	Samost. delo Individ. work	ECTS
15		10			335	12

Nosilec predmeta / Lecturer: ĐANI JURičIĆ, DEJAN DRAGAN

Jeziki / Languages: Predavanja/ Lecture: SLOVENSKI / SLOVENE  
 Vaje / Tutorial: SLOVENSKI / SLOVENE

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:  
Ni pogojev.

Prerequisites:  
None.

Vsebina:  
**OSNOVE VODENJA SISTEMOV:** Osnovni pojmi, modeli sistemov, deterministični in naključni sistemi, vodenje kot problem odločanja, optimalno vodenje na podlagi modela.  
**MODELIRANJE IN SIMULACIJA LOGISTIČNIH SISTEMOV:** Osnove modeliranja diskretnih procesov, simulacijski jeziki, uvod v Scilab, simulacija diskretnih procesov, simulacija naključnih logističnih procesov, Monte Carlo simulacija.  
**METODE ZA UPRAVLJANJE Z LOGISTIČNIMI SISTEMI:** Optimizacija transportnih in logističnih sistemov, razvrščanje opravil v logistiki, hevristični postopki razvrščanja, napovedovanje časovnih vrst, postopki modeliranja in vodenja distribucijskih mrež.  
**PRIMERI UPRAVLJANJA LOGISTIČNIH SISTEMOV:** Razporejanje distribucijskih centrov, primeri razvrščanja v logističnih sistemih, upravljanje zalog, napovedovanje povpraševanja po zalogah, modeliranje transporta v distribucijskih mrežah.

Content (Syllabus outline):  
**BASICS OF CONTROL THEORY:** Ontology of system control, sytem models, deterministic and stochastic systems, control as decision making, optimal model-based control.  
**MODELING AND SIMULATION OF LOGISTIC SYSTEMS:** Basics of discrete systems modelling, simulation tools, introduction to Scilab, simulation of discrete systems, simulation of stochastic logistic processes, Monte carlo simulation.  
**METHODS FOR CONTROL OF LOGISTICS SYSTEMS:** Optimization of transportation and logistic systems, job scheduling in logistic systems, heuristic procedures, time-series forecasting, modeling and control of distribution networks.  
**EXAMPLES OF LOGISTICS SYSTEMS CONTROL:** Allocation of distribution centers, scheduling examples in logistic systems, inventory control, demand forecasting, modeling of transportation in distribution networks.

Temeljni literatura in viri / Textbooks:

Ahuja, R.K.: Network flows : Theory, algorithms, and applications, Prentice Hall, 1993.  
 Axsäter, S.: Inventory Control. Boston: Kluwer Academic, 2000.  
 Ghiani, G.: Introduction to Logistics Systems Planning and Control, John Wiley & Sons, 2004.  
 Gomez, C.: Engineering and Scientific Computing with Scilab, Springer, 2006.  
 Hillier, F.S.: Introduction to Operations Research, McGraw-Hill, 2001.  
 Law A.M.: Simulation Modelling and Analysis, McGraw-Hill Higher Education, 1999.  
 Ross S.M.: Introduction to Probability Models, Academic Press, 1997.

**Cilji:**

**Študenti:**

- spoznajo raziskovalno področje upravljanja logističnih sistemov in ga prepoznajo kot morebitno polje bodočega znanstvenega dela.
- pridobijo poglobljeno razumevanje modeliranja in simulacij logističnih sistemov in uporabe metod za njihovo upravljanje,
- se usposobijo učinkovito reševati zahtevnejše probleme na področju upravljanja logističnih sistemov,
- se usposobijo za samostojno znanstveno raziskovalno delo na tem področju,
- se usposobijo za predstavitev svojega raziskovalnega dela (članki, referati).

**Objectives:**

**Students:**

- are introduced to the research fields of logistics systems control, with possibility of adoption of the latter as the potential field of research interest in the future,
- are gained to the deep understanding of logistics systems modeling, simulation and control,
- are qualified for efficient solving of more complicated problems in the field of logistics systems control,
- are qualified for independent research and scientific work in this field,
- are qualified for introduction of their scientific work by the means of publishing (papers).

**Predvideni študijski rezultati:**

**Znanje in razumevanje:**

- Študent je ob koncu študija sposoben obvladati raziskovalne metode, postopke in procese na področju upravljanja logističnih sistemov.

**Prenesljive/ključne spretnosti in drugi atributi:**

- Sposobnost za samostojno znanstveno raziskovalno delo na področju upravljanja logističnih sistemov. Sposobnost učinkovitega reševanja zahtevnejših problemov na tem področju. Razumevanje uporabe raziskovalnih metod z zmožnostjo poglobljene analize problemov in sistemskega razmišljanja na tem področju. Zmožnost ustvarjalnega sodelovanja pri reševanju težjih problemov v logističnih okoljih.

**Intended learning outcomes:**

**Knowledge and Understanding:**

- Graduated student is able to deal with research methods, procedures and processes in the field of logistics systems control.

**Transferable/Key Skills and other attributes:**

- Capability of independent scientific and research work in the field of logistics systems control. Capability of efficient solving of more complicated problems in this field. Capability of dealing with research methods employment in this field, with the possibility of deep analysis and system reflection of the identified problems. Capability of creative collaboration in order to deal with solving of more difficult problems in logistics environments.

**Metode poučevanja in učenja:**

**Predavanja:** pri predavanjih študent spozna teoretične vsebine predmeta.

**Vaje:** pri vajah študent utrdi teoretično znanje in preko primerov pridobi razumevanje za reševanje zahtevnejših aplikativnih problemov .

**Learning and teaching methods:**

**Lectures:** Student is introduced to the theoretical part of the subject.

**Assignments:** Student is pointed to consolidate the theoretical part of the subject. Additionally, student is pointed to gain the understanding for the solving of more demanding application problems

Načini ocenjevanja:	Delež (v %) / Weight (in %)	Assessment:
Projekt (seminarska naloga)	70 %	Type (examination, oral, coursework, project):
Ustni izpit	30 %	Project (seminar work) Written part of exam Oral examination

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

1. DRAGAN, Dejan, KRAMBERGER, Tomaž, LISEC, Andrej, INTIHAR, Marko, PRAH, Klemen. Using GIS for the optimization of pupils transportation: The case of Laško municipality. *Logistics & sustainable transport*. [Tiskana izd.],

3. sept. 2011, vol. 2, no. 3, str. 35-51. <http://www.jlst.org/uploads/05%20dragan%20dejan%20etc.pdf>. [COBISS.SI-ID [512357437](#)]
2. DRAGAN, Dejan, KRAMBERGER, Tomaž, LIPIČNIK, Martin. Monte Carlo simulation-based approach to optimal bus stops allocation in the Municipality of Laško. *Promet (Zagreb)*, 2011, vol. 23, no. 4, str. 265-278. [COBISS.SI-ID [512342333](#)]
3. DRAGAN, Dejan. Fault detection of an industrial heat-exchanger : a model-based approach. *Stroj. vestn.*, jun. 2011, vol. 57, no. 6, str. 477-484, ilustr., doi: [10.5545/sv-jme.2010.128](https://doi.org/10.5545/sv-jme.2010.128). [COBISS.SI-ID [512232253](#)]
4. DRAGAN, Dejan, JURičIĆ, Đani, STRMČNIK, Stanko. Modelling for condition monitoring : application to a heat transfer process. *Process control qual.*, 2000, vol. 11, str. 419-431. [COBISS.SI-ID [15697191](#)]
5. BOŠKOSKI, Pavle, JURičIĆ, Đani. Fault detection of mechanical drives under variable operating conditions based on wavelet packet Rényi entropy signatures. *Mech. syst. signal process.*, [in press] 2012, 8 str., doi: [10.1016/j.ymsp.2012.04.016](https://doi.org/10.1016/j.ymsp.2012.04.016). [COBISS.SI-ID [25765159](#)]
6. BOŠKOSKI, Pavle, PETROVČIČ, Janko, MUSIZZA, Bojan, JURičIĆ, Đani. An end-quality assessment system for electronically commutated motors based 3 on evidential reasoning. *Expert syst. appl.*. [Print ed.], 2011, vol. 38, no. 11, str. 13816-13826, doi: [10.1016/j.eswa.2011.04.185](https://doi.org/10.1016/j.eswa.2011.04.185). [COBISS.SI-ID [24756775](#)]
7. GAŠPERIN, Matej, JURičIĆ, Đani, BOŠKOSKI, Pavle, VIŽINTIN, Jože. Model-based prognostics of gear health using stochastic non-linear dynamical models. *International journal of condition monitoring*, 2011, vol. 1, no. 2, str. 67-78. [COBISS.SI-ID [25338151](#)]
8. GAŠPERIN, Matej, JURičIĆ, Đani, BOŠKOSKI, Pavle, VIŽINTIN, Jože. Model-based prognostics of gear health using stochastic dynamical models. *Mech. syst. signal process.*, 2011, vol. 25, no. 2, str. 537-548, doi: [10.1016/j.ymsp.2010.07.003](https://doi.org/10.1016/j.ymsp.2010.07.003). [COBISS.SI-ID [23786791](#)]
9. BOŠKOSKI, Pavle, PETROVČIČ, Janko, MUSIZZA, Bojan, JURičIĆ, Đani. Detection of lubrication starved bearings in electrical motors by means of vibration analysis. *Tribol. int.*. [Print ed.], 2010, vol. 43, no. 9, str. 1683-1692, doi: [10.1016/j.triboint.2010.03.018](https://doi.org/10.1016/j.triboint.2010.03.018). [COBISS.SI-ID [23565607](#)]
10. GAŠPERIN, Matej, JURičIĆ, Đani. The uncertainty in burn prediction as a result of variable skin parameters : an experimental evaluation of burn-protective outfits. *Burns*. [Print ed.], 2009, vol.35, no. 7, str. 970-982, doi: [10.1016/j.burns.2008.12.018](https://doi.org/10.1016/j.burns.2008.12.018). [COBISS.SI-ID [22830119](#)]
11. GAŠPERIN, Matej, JURičIĆ, Đani, MUSIZZA, Bojan, MEKJAVIĆ, Igor B. A model-based approach to the evaluation of flame-protective garments. *ISA trans.*, 2008, vol. 47, no. 2, str. 198-210. [COBISS.SI-ID [21657127](#)]
12. BENKO, Uroš, JURičIĆ, Đani. Frequency analysis of noisy short-time stationary signals using filter-diagonalization. *Signal process.*. [Print ed.], 2008, vol. 88, no. 7, str. 1733-1746. [COBISS.SI-ID [21656871](#)]