

**UČNI NAČRT PREDMETA / SUBJECT SPECIFICATION**

Predmet:	INTEGRALNI LOGISTIČNI PRISTOP ZA TRANSPORTNO LOGISTIČNA VOZLIŠČA
Subject Title:	THE INTEGRAL LOGISTICS APPROACH OF TRANSPORT LOGISTICS NODES

Študijski program Study programme	Študijska smer Study field	Letnik Year	Semester Semester
LOGISTIKA SISTEMOV		2	3.
LOGISTICS OF SYSTEMS			

Vrsta predmeta / Course type:

Univerzitetna koda predmeta / University course code:

Predavanja Lectures	Seminar Seminar	Sem. vaje Tutorial	Lab. vaje Lab work	Teren. vaje Field work	Samost. delo Individ. work	ECTS
25					425	15

Nosilec predmeta / Lecturer:

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

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

Prerequisites:

Vsebina:

Predavanja:

1. Uvodno poglavje – Razvoj, pomen in določitev transportno logističnih vozlišč (TLV) na mednarodni in na nacionalni ravni ter njihova delitev. Razvoj in pomen sistemov notranjega transporta in skladiščenja v TLV.
2. Osnove planiranja TLV – makro planiranje s poudarkom na družbeno-ekonomskih, ekoloških in ostalih vplivih s ciljem racionalizacije in optimizacije logističnih parametrov. Uporaba metode mrežnega planiranja, metode razvrščanja po faktorjih, modeliranja in simulacije.
3. Notranji transport – problemi planiranja, ciljno planiranje, zagotovitev optimalnega toka materiala, analogija toka materiala kot sistema čakalne vrste, modeliranje in simulacije, upravljanje projektov.
4. Notranji transport – transportni sistemi za zvezni in taktno-delujoči transport, avtomatizacija transporta, izračun glavnih logističnih parametrov, povezava transporta s skladiščenjem.
6. Pomen skladiščenja v toku materiala – predstavitev glavnih skladiščnih funkcij, definicija zalogovne velikosti in pretočne zmogljivosti skladišča, predstavitev glavnih skladiščnih strategij, sistemov komisioniranja ter informacijske podpore skladiščnim procesom.
7. Oblikovanje TLV s poudarkom na notranjem transportu in skladiščih – predstavitev in uporaba sodobnih računalniško podprtih sistemov za mrežno planiranje TLV in modeliranje transportnih, skladiščnih

Content (Syllabus outline):

Lectures:

1. Introduction – Development, importance and determination of transport logistics nodes (TLN) on the international and national levels with their classification. The development and importance of the internal transport systems and warehousing in the TLN.
2. Basic concepts of planning TLN - macro planning view with the emphasis on the social-economic, ecological and other influences with the aim of rationalisation and optimisation of logistics parameters. The use of network planning method, factor-rating method, modelling and simulation technique.
3. Internal transport - planning problem, objective planning, the assurance of the optimal material flow, the analogy of the material flow as a queue system, modelling and simulation, managing the project.
4. Internal transport – transport systems for continuous and tactfully-working transport, automation of transport, calculation of the main logistics parameters, the connection of transport with warehouses.
6. The importance of warehouses in the material flow – the presentation of the main warehouse function, the definition of the warehouse volume and the throughput capacity, the presentation of the main storage strategies, order-picking systems and warehouse management systems.
7. The design of the TLN with the emphasis on the internal transport and warehousing – the introduction

ter proizvodnih sistemov z uporabo diskretnih numeričnih simulacij

and usage of the modern computer aided systems for network planning of TLN and modelling transport, warehousing and production systems with discrete numerical simulations.

Temeljna literatura in viri / Textbooks:

- Arnold Dieter. *Materialflusslehre-Grundlagen der Fördertechnik, Transport und Logistik*. Karlsruhe, 1995.
- Banks J., Carson S. J. *Discrete-Event System Simulations*. Georgia Institute of technology, 1984.
- Bartholdi J. J. *Warehouse and distribution science*. School of Industrial and System Engineering, Georgia Institute of Technology, Atlanta, (2005).
- Bogataj Marija *Zastoji s čakajočimi vrstami in riziko odpovedi celic aktivnosti v logističnih verigah*, FPF, Ljubljana, 2000.
- Brooks Automation. *AutoMod-User manual V 10.0*. Utah, 2006.
- Čerič Vladko. *Simulacijsko modeliranje*, Univerza v Zagrebu, Zagreb, 1993.
- Gudehus T. *Principles of order picking: Operations in Distribution and Warehousing Systems*, Essen, Germany, 1973.
- Hesse. *Atlas der modernen Handhabungstechnik*, Hoppensted, 1991.
- Pfohl H.C. *Logistiksysteme: betriebswirtschaftliche Grundlagen*, Springer Verlag, Berlin 2004.
- Krampe H., Lucke H.J. *Grundlagen der Logistik: Theorie und Praxis logistischer System*Husverlag, München 2006.

Cilji:

- podati povezana znanja sistemov TLV, notranjega transporta in skladiščnih sistemov,
- razviti sposobnosti študentov za samostojno znanstveno-raziskovalno in kreativno reševanje problemov planiranja in oblikovanja TLV in integralnega transporta s skladiščenjem,
- pridobivanje znanja za pristop in projektno realizacijo kompleksnih inženirskih problemov na področju TLV, notranjega transporta ter skladiščnih sistemov.

Objectives:

- to provide integrated knowledge of the TLN, internal transport and warehouse systems.
- to further develop student's capabilities of independent scientific-research and creative solutions of planning and designing TLN and integral transport with warehousing,
- course gives knowledge about complex project analysis and project realization for problems in the field of TLN, internal transport and warehousing systems.

Predvideni študijski rezultati:

Znanje in razumevanje:

- kombinirana uporaba različnih osnovnih znanj za reševanje inženirskih problemov,
- znati znanstveno in raziskovalno predvideti in uporabiti najnovejše metode, tehnike in aplikacije pri planiranju in oblikovanju TLV in inteligentnih transportnih ter skladiščnih sistemov,
- povezovanje konceptov TLV in transportno-skladiščnega sistema v smislu integralnega pristopa.

Prenesljive/ključne spretnosti in drugi atributi:

- povezovati uporabo različnih inženirskih znanj za reševanje problemov planiranja TLV in integralnega transporta na omejenih območjih,
- študenta izobraziti do nivoja, da se je sposoben soočiti s problemom reševanja novih idej (npr. planiranja, načrtovanja in optimizacije).

Intended learning outcomes:

Knowledge and Understanding:

- combined use of different fundamental skills for solution of engineering problems,
- knowledge of proper scientific and researching anticipation and applied know-how techniques, methods and applications of planning and designing TLN and intelligent transport and warehousing systems,
- connection of TLN and the concept of transport and warehousing systems, into the integral approach.

Transferable/Key Skills and other attributes:

- combined use of different engineering skills for solution of planning TLN and integral transport in the restricted (limited) areas,
- to give students skills, that they can be involved in project work – solving new concepts (like planning, designing, optimization).

Metode poučevanja in učenja:

Learning and teaching methods:

- frontalna predavanja,
- konzultacije,
- izdelava projektne naloge – seminar.

- frontal lectures,
- home-works,
- consultations,
- seminar (project) work.

Načini ocenjevanja:	Delež (v %) / Weight (in %)	Assessment:
<ul style="list-style-type: none"> <li>• opravljena seminarska naloga,</li> <li>• praktični in teoretični del izpita v obliki pisnega ali ustnega zagovora.</li> </ul>	50% 50%	Type (examination, oral, coursework, project): <ul style="list-style-type: none"> <li>• completed seminar (project) work,</li> <li>• written or oral examination of practical and theoretical applications</li> </ul>

Reference nosilca / Lecturer's references:

1. REIBENSCHUH, Marko, ODER, Grega, ČUŠ, Franc, POTRČ, Iztok. Modelling and analysis of thermal and stress loads in train disc brakes - braking from 250 km/h to standstill. *Stroj. vestn.*, 2009, vol. 55, no. 7/8, str. 494-502, ilustr. [http://www.sv-jme.eu/scripts/download.php?file=/data/upload/2009/SV-7-8-09/8\\_Odar\\_zl\\_p494\\_502.pdf](http://www.sv-jme.eu/scripts/download.php?file=/data/upload/2009/SV-7-8-09/8_Odar_zl_p494_502.pdf).
2. HREN, Gorazd, POTRČ, Iztok, AVSEC, Jurij. Integrated web-based framework for product mechanism simulation. *Advanced engineering*, 2010, year 4, no. 1, str. 25-36, ilustr.
3. LERHER, Tone, POTRČ, Iztok, ŠRAML, Matjaž, TOLLAZZI, Tomaž. Travel time models for automated warehouses with aisle transferring storage and retrieval machine. *Eur. J. oper. res.*. [Print ed.], Sep. 2010, vol. 205, iss. 3, str. 571-583, doi: [10.1016/j.ejor.2010.01.025](https://doi.org/10.1016/j.ejor.2010.01.025).
4. LERHER, Tone, ŠRAML, Matjaž, POTRČ, Iztok, TOLLAZZI, Tomaž. Travel time models for double-deep automated storage and retrieval systems. *Int. J. Prod. Res.*, June 2010, vol. 48, no. 11, str. 3151-3172, doi: [10.1080/00207540902796008](https://doi.org/10.1080/00207540902796008).
5. LERHER, Tone, ŠRAML, Matjaž, POTRČ, Iztok. Simulation analysis of mini-load multi-shuttle automated storage and retrieval systems. *Int. j. adv. manuf. technol.*, Published online: 14 September 2010, doi: [10.1007/s00170-010-2916-8](https://doi.org/10.1007/s00170-010-2916-8).
6. ŠAMEC, Blaž, POTRČ, Iztok, ŠRAML, Matjaž. Low cycle fatigue of nodular cast iron used for railway brake discs. *Eng fail. anal.*. [Print ed.], Available online 18 April 2011., doi: [10.1016/j.engfailanal.2011.04.002](https://doi.org/10.1016/j.engfailanal.2011.04.002).
7. PEVEC, Miha, POTRČ, Iztok, BOMBEEK, Gorazd, VRANEŠEVIĆ, Darko. Prediction of the cooling factors of a vehicle brake disc and its influence on the results of a thermal numerical simulation. *Int. j. automot. technol. (Seoul. Print)*, 2012, vol. 13, no. 5, str. 725-733, doi: [10.1007/s12239-012-0071-y](https://doi.org/10.1007/s12239-012-0071-y). [COBISS.SI-ID [16294678](https://www.cobiss.si/urn:nbn:si:coibis:16294678)]
8. PEVEC, Miha, VRANEŠEVIĆ, Darko, ODER, Grega, POTRČ, Iztok, ŠRAML, Matjaž. Modifying the brake drum geometry to avoid self-excited vibrations and noise. *J. Vibroeng. (Vilnius)*, June 2012, vol. 14, iss. 2, str. 751-758. <http://www.jve.lt/Vibro/JVE-2012-14-2/JVE-2012-14-2-802-Pevce.pdf.pdf>. [COBISS.SI-ID [16081430](https://www.cobiss.si/urn:nbn:si:coibis:16081430)]
9. PEVEC, Miha, POTRČ, Iztok, ODER, Grega, VRANEŠEVIĆ, Darko, ŠRAML, Matjaž. Optimizing the rear brake's thermal performance using numerical methods. *Advanced engineering*, 2011, year 5, no 1, str. 57-68, ilustr. [COBISS.SI-ID [15408406](https://www.cobiss.si/urn:nbn:si:coibis:15408406)]
10. ŠRAML, Matjaž, KRAMBERGER, Janez, POTRČ, Iztok, TOLLAZZI, Tomaž. Design and simulation of the conveying transport using CAD tools. *Gép*, 2005/11-12, évf. 56, kötet 2, str. 149-152. [COBISS.SI-ID [10046742](https://www.cobiss.si/urn:nbn:si:coibis:10046742)]
11. LERHER, Tone, ŠRAML, Matjaž, KRAMBERGER, Janez, POTRČ, Iztok, BOROVIŠEK, Matej, ZMAZEK, Blaž. Analytical travel time models for multi aisle automated storage and retrieval systems. *Int. j. adv. manuf. technol.*, Available online 11. November 2005, [17] f. [HTTP://dx.doi.org/10.1007/s00170-005-0061-6](http://dx.doi.org/10.1007/s00170-005-0061-6). [COBISS.SI-ID [10012950](https://www.cobiss.si/urn:nbn:si:coibis:10012950)]