

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Ime predmeta: PLANIRANJE IN VODENJE LOGISTIČNEGA SISTEMA
Course title: PLANNING AND MANAGEMENT OF LOGISTICS SYSTEMS

Študijski program in stopnja Study programme and cycle	Študijska smer Study option	Letnik Year of study	Semester Semester
LOGISTIKA SISTEMOV 1. stopnja		3.	5.
SYSTEM LOGISTICS 1 st degree		3.	5.

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

IZBIRNI
ELECTIVE

Univerzitetna koda predmeta / University course code:

UN

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje Clinical training	Druge oblike študija Other forms of study	Samost. delo Individual work	ECTS
15 e-P 30 a-P		24 e-V 21 a-V			90	6

Nosilec predmeta / Course coordinator:

BRIGITA GAJŠEK

Jeziki /Languages:

Predavanja / Lectures: SLOVENSKI/SLOVENE
Vaje / Tutorial: SLOVENSKI/SLOVENE

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

Ni pogojev.

Prerequisites for enrolling in the course or for performing study obligations:

No special conditions.

Vsebina (kratek pregled učnega načrta):

Predavanja:

1. Povezava med načrtovanjem izdelkov in sistemom proizvodnje in montaže
2. Postopki in sistematika načrtovanja logistike proizvodnega in montažnega sistema (postavitve problema, grobo načrtovanje, fino načrtovanje, realizacija, preskusni zagon).
3. Osnovni principi logističnega sistema proizvodnje in montaže in vpliv transportnega sistema (oblike postavitve montažnega sistema brez avtomatiziranega toka izdelkov, delno in popolno avtomatizirani logistični sistemi v proizvodnji in montaži s transportnim in skladiščnim sistemom).

Content (syllabus outline):

Lectures:

1. Linking between product design and assembly
2. Procedures and systematics on design of logistics for production and assembly systems (determination of problem, rough planning, fine planning, realisation, start-up procedures).
3. Basic principles of logistics system in production and assembly and influence of manner of transportation and material handling system (Assembly, production and montage logistics systems without automatically material flow, partly- and completely automatic assembly systems with transportation and warehouse systems).

<p>4. Primeri oskrbe montažnih linij in delovnih postaj (ročna montaža, delno avtomatizirana in popolno avtomatizirana montažna mesta).</p> <p>5. Načrtovanje logističnega sistema v proizvodnji in montaži z upoštevanjem vitkosti določitev vmesnih skladišč, določitev materialnega toka, določitev informacijskih tokov).</p> <p>6. Vmesna skladišča (linijsko vm. skladišče, obtočno vm. skladišče, posebni primeri skladiščenja).</p> <p>7. Varnostne zahteve (ergonomija) in vzdrževanje.</p> <p><u>Strokovna naloga:</u> Strokovna naloga aplikativno dopolnjujejo vsebino predavanj s praktičnim reševanjem problemov določanja logističnih sistemov v proizvodnih in montažnih sistemih.</p>	<p>4. Examples of supply for montage and assembly lines and workstations (manual assembly, partly an full automatic assembly points).</p> <p>5. Design of logistics system in production and assembly by use of Lean— determination of buffers, determination of material and information flow).</p> <p>6. Buffers (on transportation line buffers, circulation-tipe buffers, special cases of warehousing).</p> <p>7. Safety demands (ergonomics) and maintainance.</p> <p><u>Professional work:</u> Professional work supplements lectures with practical solutions to the problems of determining logistics systems in production and assembly systems.</p>
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Temeljna literatura in viri / Reading materials:

<ul style="list-style-type: none"> • E-gradivo predmeta. • Nyhuis, P., Wiendahl, H.P. (2009). Fundamentals of Production Logistics - Theory, Tools and Applications. Springer. • Meyer, A. (2015). Milk Run Design - Definitions, Concepts and Solution Approaches. Institut für Fördertechnik und Logistiksysteme am Karlsruher Institut für Technologie (KIT) • Baudin, M. (2002). Lean Assembly: The Nuts and Bolts of Making Assembly Operations Flow. Productivity Press.
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Cilji in kompetence:

<ul style="list-style-type: none"> • Osvojitev osnovnih metod planiranja in vodenja logističnega sistema. • Seznanitev s vplivom oblikovanja izdelka na logistični sistem proizvodnje in montaže. • Osvojitev osnovne metodike pri planiranju in načrtovanju logistične podpore sistemov proizvodnje in montaže. • Spoznavanje načinov logistične podpore proizvodnji in montaži in ekonomska upravičenost avtomatizacije sistema • povezovati uporabo različnih inženirskih znanj za reševanje problemov planiranja materialnih tokov v sistemih montaže, • študenta izobraziti do nivoja, da se je sposoben soočiti s problemom reševanja novih idej načrtovanja, oblikovanja in optimiranja logističnih sistemov v proizvodnji in montaži.

Objectives and competences:

<ul style="list-style-type: none"> • Gaining knowledge of basic methods for planning and management of logistics systems. • Familiarization with the impact of product design on the logistics system of production and assembly. • To get aware of basic methods for planning and design of the logistics support to production and assembly systems. • Getting to know the methods of logistical support for production and assembly and the economic justification of automation of the system. • combined use of different engineering skills for solution of material flow planning problems in assembly systems, • to give students skills, that they can be involved in project work – solving new concepts of planning, design and optimization of the logistics systems in production and assembly.
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Predvideni študijski rezultati:

Intended learning outcomes:

Študentje bodo znali:

- načrtovati sistem materialne oskrbe proizvodnega/montažnega sistema,
- analizirati obstoječ sistem materialne oskrbe proizvodnega/montažnega sistema,
- znali izbrati ustrezno podporo materialnega toka v sistemih montaže glede zahtev po zmogljivosti,

Students will know:

- design material supply system for production/assembly system,
- analyze existing material supply system for production/assembly system,
- properly determine support for material flow due to demanded capacity,

Metode poučevanja in učenja:

Predavanja: pri predavanjih študent spozna teoretične vsebine predmeta. Del predavanj se izvaja na klasični način v predavalnici, del pa v obliki e-predavanj (e-predavanja se lahko izvajajo na videokonferenčni način ali s pomočjo posebej v ta namen didaktično pripravljenih e-gradiv v virtualnem elektronskem učnem okolju).

Vaje: pri vajah študent utrdi teoretično znanje in spozna aplikativne možnosti. Del vaj se izvaja na klasični način v predavalnici, del pa v obliki e-vaj (e-vaje se lahko izvajajo na videokonferenčni način ali s pomočjo posebej v ta namen didaktično pripravljenih e-gradiv v virtualnem elektronskem učnem okolju).

Learning and teaching methods:

Lectures: students understand the theoretical frameworks of the course. Part of the lecture course is in a classroom while the rest is in the form of e-learning (e-lectures may be given via video-conferencing or with the help of specially designed e-material in a virtual electronic learning environment).

Tutorials: Students enhance their theoretical knowledge and are able to apply it. Part of the seminar is in a classroom while the rest is in the form of e-learning (e-tutorials may be given via video-conferencing or with the help of specially designed e-material in a virtual electronic learning environment).

Načini ocenjevanja:	Delež (v %) / Share (in %)	Assessment methods:
Opravljenosti obveznosti e-predavanj in e-vaj so pogoj za pristop k izpitu.		Successful completion of e-lectures and e-tutorials is a prerequisite for entering the exam.
• Ocena iz e-vaj.	10%	• Grade from e-tutorials.
• Ocena iz e-predavanj.	10%	• Grade from e-lectures
• Pisni izpit.	40%	• Written exam.
• Strokovna naloga.	40%	• Professional work.

Reference nosilca / Course coordinator's references:

1. GAJŠEK, Brigita, ŠINKO, Simona, KRAMBERGER, Tomaž, BUTLEWSKI, Marcin, ÖZCEYLAN, Eren, ĐUKIĆ, Goran. Towards productive and ergonomic order picking : multi-objective modeling approach. Applied sciences, ISSN 2076-3417, 2021, vol. 11, iss. 9, str. 1-27.
2. GAJŠEK, Brigita, STRADOVNIK, Saša, HACE, Aleš. Sustainable move towards flexible, robotic, human-involving workplace. Sustainability, ISSN 2071-1050, 2020, [Vol.] 12, [iss.] 16, str. 1-16.
3. KOVAČIČ, Miha, ĐUKIĆ, Goran, GAJŠEK, Brigita, STOPAR, Klemen. CAD based electric transporter path planning and production storage optimization using genetic algorithm - industrial case study. Tehnički glasnik, ISSN 1846-6168, 2020, [Vol.] 14, [iss.] 2, str. 174-179.
4. BUTLEWSKI, Marcin, DAHLKE, Grzegorz, DRZEWIECKA-DAHLKE, Milena, HANKIEWICZ, Krzysztof, GÓRNY, Adam, GAJŠEK, Brigita. Use of the methodology of network thinking for a fatigue criteria investigation based on the example of mining companies. Tehnički vjesnik : znanstveno-stručni časopis tehničkih fakulteta Sveučilišta u Osijeku, ISSN 1330-3651, 2020, god.=Vol. 27, br.=no. 4, str. 1037-1043.

5. GAJŠEK, Brigita, ĐUKIĆ, Goran, BUTLEWSKI, Marcin, OPETUK, Tihomir, CAJNER, Hrvoje, MLAKER KAČ, Sonja. The impact of the applied technology on health and productivity in manual "picker-to-part" systems. *Work : a journal of prevention, assessment & rehabilitation*, ISSN 1051-9815, 2020, vol. 65, no. 3, 525-536.
6. VREČKO, Igor, KOVAČ, Jure, RUPNIK, Bojan, GAJŠEK, Brigita. Using queuing simulation model in production process innovations. *International journal of simulation modelling*, ISSN 1726-4529, Mar. 2019, vol. 18, no. 1, str. 47-58.
7. GAJŠEK, Brigita, MAROLT, Jakob, RUPNIK, Bojan, LERHER, Tone, STERNAD, Marjan. Using maturity model and discrete-event simulation for industry 4.0 implementation. *International journal of simulation modelling*, ISSN 1726-4529, Sept. 2019, vol. 18, no. 3, str. 488-499.
8. VUJICA-HERZOG, Nataša, BUCHMEISTER, Borut, BEHARIĆ, Amer, GAJŠEK, Brigita. Visual and optometric issues with smart glasses in Industry 4.0 working environment. *Advances in production engineering & management*, ISSN 1854-6250, Dec. 2018, vol. 13, no. 4, str. 417-428.
9. LABUS, Nina, GAJŠEK, Brigita. Use of ergonomic principles in manual order picking systems. *Logistics & sustainable transport*, ISSN 2232-4968. [Spletna izd.], February 2018, vol. 9, no. 1, str. 11-22.
10. GAJŠEK, Brigita, VUJICA-HERZOG, Nataša, BUTLEWSKI, Marcin, ĐUKIĆ, Goran. Research opportunity : incorporation of human factors in order picking system models. *Zeszyty Naukowe Politechniki Poznańskiej : Organizacja i Zarządzanie*, ISSN 0239-9415. [Print ed.], 2017, no. 72, str. 45-61.
11. GAJŠEK, Brigita, ŠIMENC, Mitja, LERHER, Tone, POTRČ, Iztok. On the technology roadmapping based development of the new order-picking technology RF kinetic. *Advanced engineering*, ISSN 1846-5900, 2009, year 3, no. 2, str. 167-173.