

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Ime predmeta: NOTRANJA LOGISTIKA V PROIZVODNIH OKOLJIH
Course title: INTRA LOGISTICS IN PRODUCTION ENVIRONMENTS

Študijski program in stopnja Study programme and cycle	Študijska smer Study option	Letnik Year of study	Semester Semester
GOSPODARSKA IN TEHNIŠKA LOGISTIKA 1. stopnja		3.	5.
PROFESSIONAL HIGHER EDUCATION STUDY PROGRAMME ECONOMIC AND TECHNICAL LOGISTICS 1 st degree		3.	5.

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

OBVEZNI
COMPULSORY

Univerzitetna koda predmeta / University course code:

VS

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		15 e-V 30 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:

- Vpliv lastnosti proizvodnje na notranjo logistiko v proizvodnem okolju
- Osnovne postavitev proizvodnje, montaže, sestave in njihov vpliv na sistem oskrbe (material, orodja, odpadki, zaščitni material in skladiščenja.
- Rešitve in koncepti notranje logistike v proizvodnih sistemih
- Informacijski sistem notranje logistike v proizvodnih okoljih
- Zagotavljanje materialnega in informacijskega toka v proizvodnem okolju

Content (syllabus outline):

Lectures:

- Influence of production characteristics on internal logistics in production environments
- Basic layouts of production and assembly systems and their influence on material handling system (material, tools, waste, protection material and storage.
- Intralogistic solutions and concepts in production environments
- Information system for internal logistics in production environments
- Material and information flow execution in production environments

- 6. Vitkost in produktivnost
- 7. Ergonomija in skrb za zdravje zaposlenih

- 6. Lean and productivity
- 7. Ergonomy and wellbeing of employees

Temeljni literatura in viri / Reading materials:

- 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)
- Redford, A., Chal, J. (1994). Design for Assembly. London: Mcgraw-Hill Book Company.
- Baudin, M. (2002). Lean Assembly: The Nuts and Bolts of Making Assembly Operations Flow. Productivity Press.
- Gajšek, B. (2015). Vitka notranja logistika in osnove planiranja v proizvodnem podjetju: e-gradivo za predmet Metode in tehnike planiranja logističnih procesov. Celje: Faculty of logistics University of Maribor.

Cilji in kompetence:

Cilja predmeta so:

- pojasniti vpliv lastnosti proizvodnje na notranjo logistiko v proizvodnem okolju
- teoretično in praktično predstaviti različne izvedbe sistemov notranje logistike v proizvodnem okolju
- predstaviti kazalnike učinkovitosti notranje logistike v proizvodnem okolju
- predstaviti koncept vitkosti in njegovo uporabo pri izboljševanju notranje logistike v proizvodnem okolju
- predstaviti ergonomijo in njeno uporabo pri izboljševanju notranje logistike v proizvodnem okolju
- predstaviti določanje ekonomske upravičenosti uvajanja novosti v notranjo logistiko proizvodnega podjetja.

Kompetence, ki jih študentje osvojijo:

- voditi notranjo logistiko v manjšem podjetju ter uvajati manjše spremembe.

Objectives and competences:

The objectives of the course are:

- explain the impact of production characteristics on internal logistics in the production environment
- theoretically and practically present different implementations of internal logistics systems in the production environment
- present indicators of internal logistics efficiency in the production environment
- present the concept of lean and its use in improving internal logistics in the production environment
- present ergonomics and its use in improving internal logistics in the production environment
- determining the economic justification of introduction of novelties in the internal logistics of the production company.

Competences acquired by students:

- educate the student to the level that he/she is able to lead internal logistics in a small company and introduce minor changes.

Predvideni študijski rezultati:

Študentje bodo znali:

- poiskati podatke o proizvodnji na katerih bodo temeljili smoje operativne odločitve
- opisati materialni tok na layout-u proizvodnega okolja
- poiskati načine izvedbe notranje logistike glede na lastnosti proizvodnje in jih primerjati

Intended learning outcomes:

Students will:

- find data on production on which they will base operative decisions,
- describe material flow on production layout
- find design possibilities for internal logistics according to the characteristics of production and compare them

- izračunati znesek investicije in povračilo investicije za manjše novosti
- narediti preprosto ergonomsko oceno delovnega mesta
- izvesti 5S metodo
- načrtovati milk-run in kanban
- določiti način oskrbovanja proizvodnega delovnega mesta

- calculate the amount of investment and return on investment for small changes
- make a simple ergonomic assessment of the workplace
- perform the 5S method
- plan milk-run and kanban
- determine the method of supplying the production workplace

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:
Opravljene obveznosti e-predavanj in e-vaj so pogoj za pristop k izpitu.		Completion of e-lectures and e-tutorials is a prerequisite for entering the exam
• Ocena e-predavanj.	10%	• Grade from e-lectures.
• Ocena e-vaj.	10%	• Grade from e-tutorials.
• Pisni izpit.	40%	• Written examination.
• Strokovna naloga z zagovorom.	40%	• Professional work with defense.

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. KOSTANJŠEK, Grega, GAJŠEK, Brigita. The impact of workplace supply on productivity in functionally organized layouts. *Tehnički glasnik*, ISSN 1848-5588, 2017, vol. 11, no. 1/2, str. 35-44.
12. 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.