| UČNI NAČRT PREDMETA/COURSE SYLLABUS | |
|---|---|
| Predmet: | PLANIRANJE IN VODENJE LOGISTIČNEGA SISTEMA |
| Course title: | PLANNING AND MANAGEMENT OF LOGISTICS SYSTEMS |

| Študijski program in stopnja<br>Study programme and level | Študijska smer<br>Study field | Letnik<br>Academic year | Semester<br>Semester |
|---|---|---|---|
| LOGISTIKA SISTEMOV 1. stopnja | | 3. | 5. |
| SYSTEM LOGISTICS 1st degree | | 3. | 5. |

| | |
|---|---|
| Vrsta predmeta / Course type | IZBIRNI |
| Univerzitetna koda predmeta / University course code: | UN |

| Predavanja<br>Lectures | Seminar<br>Seminar | vaje<br>Tutorial | Laboratory work | Druge oblike študija<br>Field work | Samost. delo<br>Individ. work | ECTS |
|---|---|---|---|---|---|---|
| e-P 15<br>a-P 30 | | e-V 24<br>a-V 21 | | | 90 | 6 |

| | |
|---|---|
| Nosilec predmeta / Lecturer: | IZTOK POTRČ |
| Jeziki / Languages: Predavanja / Lectures: | SLOVENSKI / SLOVENE |
| Vaje / Tutorial: | SLOVENSKI / SLOVENE |

| Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti: | Prerequisits: |
|---|---|
| Ni pogojev. | No special conditions. |

| Vsebina: | Content (Syllabus outline): |
|---|---|
| Predavanja:<br>Povezava med načrtovanjem izdelkov in sistemom sestave (oblikovanje za montažo, tolerance, primeri oblikovanja).<br>Postopki in sistematika načrtovanja montažnega sistema (postavitev problema, grobo načrtovanje, fino načrtovanje, realizacija, preskusni zagon).<br>Osnovni principi sistema sestave in vpliv transportnega sistema (oblike postavitve montažnega sistema brez avtomatiziranega toka izdelkov, delno in popolno avtomatizirani sistemi sestave s transportnim in skladiščnim sistemom).<br>Primeri montažnih linij in nivo delovnih postaj (ročna montaža, delno avtomatizirana in popolno avtomatizirana montažna mesta).<br>Načrtovanje sistema sestave (določitev časa takta, določitev števila delovnih mest, določitev vmesnih skladišč, določitev materialnega toka, določitev informacijskih tokov).<br>Elementi transportnega sistema (gnani in negnani transporterji, elementi za prevzem in preusmeritev).<br>Informacijski tokovi in nosilci informacij (Črtna koda, RFID, Pick by light/voice …).<br>Vmesna skladišča (linijsko vm. skladišče, obtočno vm. skladišče, posebni primeri skladiščenja). | Lectures:<br>Linking between design and assembly (design for assembly, tolerances, design cases).<br>Procedures and systematics on design of assembly systems (determination of problem, rough planning, fine planning, realisation, start-up procedures).<br>Basic principles of assembly and montage systems and influence of manner of transportation an material handling system (Assembly and montage systems without automatically material flow, partly- and completely automatic assembly systems with transportation and warehouse systems).<br>Montage and assembly lines and level of technological points (manual assembly, partly an full automatic assembly points).<br>Design of assembly systems (determination of assembly rhythm, determination of number of working places, determination of buffers, determination of material and information flow).<br>Elements of transportation and material handling system (powered and free conveyors, switch points, manipulation machines).<br>Information flow and information carriers (bar-code, RFID, Pick by light, Pick by voice, …).<br>Buffers (on transportation line buffers, circulation-tipe |

| | |
|---|---|
| Varnostne zahteve in primeri montažnih celic.<br><br>Seminar:<br>Seminar aplikativno dopolnjujejo vsebino predavanj s praktičnim reševanjem problemov določanja montažnih sistemov in sistemov sestave. | buffers, special cases of warehousing).<br>Safety demands and cases of assembly cells.<br><br>Seminar:<br>Seminar (project) work supplement lectures with practical solutions design problems by assembly systems. |

Temeljni literatura in viri / Readings:

- E-gradivo predmeta.
- 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.
- Konold, P., Reger, H. (1997). Angewandte Montagetechnik. Vieweg Verlag.
- Kopač, J., Noe, D. (1989). Strega in montaža. Ljubljana: Fakulteta za strojništvo, Univerza v Ljubljani.
- Pfohl, H.C. (2009). Logistiksysteme. Springer Verlag.
- Potrč, I. (1999). Transportni sistemi (zbrano gradivo). Fakulteta za strojništvo, Univerza v Mariboru.
- Scheer A.W. (1996). Business Process Engineering – Reference models for industrial enterprises. Berlin: Springer-Verlag.
- Davis, R. (2001). Business Process Modeling with Aris. London: Springer.
- Gajšek, B. (2015). Vitka notranja logistika in osnove planiranja v proizvodnem podjetju: e-gradivo. Celje: Fakulteta za logistiko, Univerza v Mariboru.

| Cilji in kompetence: | Objectives and competences: |
|---|---|
| • Osvojitev osnovnih metod planiranja in vodenja logističnega sistema.<br>• Projektna zasnova in modifikacija izdelka (naprave ali konstrukcije) v povezavi z montažnimi, funkcijskimi, proizvodnimi, tržnimi in ekološkimi zahtevami.<br>• Osvojitev osnovne metodike pri planiranju in načrtovanju sistema sestave.<br>• Spoznavanje načinov sestave in ekonomska upravičenost avtomatizacije sistema sestave. | • Gaining knowledge of basic methods for planning and management of logistics systems.<br>• Design plan and modification of product (device or construction) due to assembly, functional, technological, market and ecological requirements.<br>• To get aware of basic methods for planning and design of the assembly systems.<br>• Insight into design manners and economic authorization of automatisation by assembly systems. |

| Predvideni študijski rezultati: | Intended learning outcomes: |
|---|---|
| Znanje in razumevanje:<br>• poznavanje specialnega področja planiranja in vodenja logističnega sistema,<br>• poznavanje specialnega področja sistemov sestave,<br>• znati izbrati ustrezno podporo materialnega toka v sistemih sestave glede zahtev po zmogljivosti,<br>• povezovanje konceptov logističnega transportnega sistema v smislu integralnega transporta.<br><br>Prenesljive/ključne spretnosti in drugi atributi:<br>• povezovati uporabo različnih inženirskih znanj za reševanje problemov integralnega transporta pri sistemih sestave,<br>• študenta izobraziti do nivoja, da se je sposoben soočiti s problemom reševanja novih idej načrtovanja, oblikovanja in optimiranja sistemov sestave. | Knowledge and understanding:<br>• special knowledge of planning and management of logistics systems,<br>• special knowledge of all kinds of the assembly systems,<br>• knowledge of proper determination of proper support for material flow due to demanded capacity,<br>• connection of transport-logistics systems concepts, into the integral transport.<br><br>Transferable/Key skills and other attributes:<br>• combined use of different engineering skills for solution of integral transport by the assembly systems,<br>• to give students skills, that they can be involved in project work – solving new concepts of planning, design and optimization of the assembly systems. |

| Metode poučevanja in učenja: | Learning and teaching methods: |
|---|---|
| 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).<br><br>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). | 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).<br><br>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 %) / Weight (in %) | Assessment: |
|---|---|---|
| <u>Način (pisni izpit, ustno izpraševanje, naloge, projekt):</u> | | <u>Type (examination, oral, coursework, project):</u> |
| • Opravljene 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. |
| • Pisni izpit. | 30% | • Written exam. |
| • Seminarska naloga. | 20% | • Seminar work. |
| • Ustni izpit. | 50% | • Oral exam. |

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.
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.
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.
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.
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.
7. 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.
8. 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