|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| UČNI NAČRT PREDMETA / COURSE SYLLABUS | | | | | | | | | | | | | | | | | | | | |
| **Ime predmeta:** | | UPRAVLJANJE Z EMBALAŽO V LOGISTIKI | | | | | | | | | | | | | | | | | | |
| **Course title:** | | LOGISTICS PACKAGING MANAGEMENT | | | | | | | | | | | | | | | | | | |
|  | | | | | |  | | | | | | | | | |  | |  | | |
| **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 1st degree | | | | | |  | | | | | | | | | | 3. | | 5. | | |
|  | | | | | | | | | | | | | | | | | | | | |
| **Vrsta predmeta (obvezni ali izbirni) /**  **Course type (compulsory or elective)** | | | | | | | | | | | | | | | IZBIRNI | | | | | |
| ELECTIVE | | | | | |
|  | | | | | | | | | | | | | | |  | | | | | |
| **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** |
| 21 e-P  24 a-P |  | | |  |  | |  | |  | | | | |  | | | 90 | |  | 6 |
| **a-V** | **e-V** | | **LV** | |  |
| 18 | 15 | | 12 | |  |
|  | | | | | | | | | | | | | | | | | | | | |
| **Nosilec predmeta / Course coordinator:** | | | | | | **TONE LERHER** | | | | | | | | | | | | | | |
|  | | | | | | | | | | | | | | | | | | | | |
| **Jeziki /Languages:** | | | **Predavanja / Lectures:** | | | | | | | SLOVENSKI/SLOVENE | | | | | | | | | | |
| **Vaje / Tutorial:** | | | | | | | SLOVENSKI/SLOVENE | | | | | | | | | | |
| **Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:** | | | | | | | | | | |  | **Prerequisites for enrolling in the course or for performing study obligations:** | | | | | | | | |
| Ni pogojev. | | | | | | | | | | |  | None. | | | | | | | | |
| Vsebina (kratek pregled učnega načrta): | | | | | | | | | |  | | **Content (syllabus outline):** | | | | | | | | |
| * Naloge embalaže in pakiranja * Ravni embalaže in njihova vloga v logistiki * Embalažni materiali in tehnike embaliranja * Ustrezna izbira embalaže * Načrtovanje pakirnih in logističnih enot * Označevanje embalaže in GS1 standardi * Odpadna in vračljiva embalaža ter ravnanje z njo * Uporaba 3D tiskanja na primeru embalaže | | | | | | | | | |  | | * Packaging and wrapping role * Levels of packaging and their role in logistics * Packaging materials and packaging techniques * Appropriate packaging selection * Planning of packaging and logistics units * Package labelling and GS1 standards * Waste and returnable packaging * Use of 3D printing on the packaging case | | | | | | | | |
| **Temeljni literatura in viri / Reading materials:** | | | | | | | | | | | | | | | | | | | | |
| Ambrož, G., et al. (2019). *Razvoj embalaže v krožnem gospodarstvu: priročnik*. Celje: Fit media. ISBN - 978-961-6283-59-5  Radonjič, G. (2008). *Embalaža in varstvo okolja: zahteve, smernice in podjetniške priložnosti*. Maribor: Založba Pivec, ISBN - 978-961-6494-63-2  Martini, M., Kovačič, B., Konda, Z. (2014). *Upravljanje globalnih preskrbovalnih verig: učbenik*. Ljubljana: GS1 Slovenija. ISBN - 978-961-93963-1-5  Pålsson, H. (2018). *Packaging logistics: understanding and managing the economic and environmental impacts of packaging in supply chains*. London; New York; New Delhi: Kogan Page. ISBN - 978-0-7494-8170-4  Yam, Kit L. et al. (2009). *The Wiley encyclopedia of packaging technology*. Hoboken: J. Wiley & Sons, cop 3rd ed. ISBN - 978-0-470-08704-6; 0-470-08704-8  Coles, R. (2003). *Food packaging technology*. Oxford, Blackwell, Boca Raton, CRC Press, ISBN: 1-84127-221-3. | | | | | | | | | | | | | | | | | | | | |
| **Cilji in kompetence:** | | | | | | | | | |  | | **Objectives and competences:** | | | | | | | | |
| Cilji predmeta so:   * opredeliti naloge in osnovne značilnosti embalaže predstaviti vlogo embalaže v logistiki, * predstaviti tri ravni embalaže in opredeliti njihovo vlogo v logistiki, * predstaviti različne embalažne materiale, * predstaviti tehnike in tehnologije embaliranja in njihov vpliv na življenjski cikel artiklov, * opredeliti, kako pakirne enote sestaviti v logistične enote, * predstaviti označevanje embalaže, različne oznake in potrebne informacije, ki jih embalaža posameznih artiklov mora vsebovati, * predstaviti GS1 standarde, njihovo uporabo in obveznosti pri uporabi standarda, * predstaviti odpadno in vračljivo embalažo ter možnosti ravnanja z njo, * predstaviti koncept razbremenilne logistike, * predstaviti 3D modeliranje prototipa embalaže in uporabiti tiskalnike za 3D tisk.   Kompetence, ki jih študentje osvojijo:   * so sposobni izbrati primerno embalažo glede na njen namen uporabe in področje logistike, * poznajo različne vrste embalaže in znajo enote primarne embalaže ustrezno zavarovati tudi z embalažo na sekundarnem in terciarnem nivoju, * se zavedajo vpliva različnih embalažnih materialov in vrst embalaže na okolje, * so sposobni opremiti embalažo na vseh nivojih s potrebnimi informacijami, * se zavedajo pomena pravilnega ravnanja z odpadki in povratne logistike, * predstaviti uporabo 3D tiskanja na primeru prototipa embalaže. | | | | | | | | | |  | | The objectives of the course are:  • define the tasks and basic characteristics of packaging, present the role of packaging in logistics,  • present three levels of packaging and define their role in logistics,  • present various packaging materials,  • present packaging techniques and technologies and their impact on the lifecycle of products,  • define how to assemble packaging units into logistics units,  • present packaging labelling various labels, and necessary information that packaging of individual items must contain,  • presents GS1 standards, their usage, and obligations when using the standards,  • introduce waste and returnable packaging, as well as options for handling it,  • present the concept of reverse logistics,  • introduce 3D modelling of packaging prototypes and utilize 3D printers for 3D printing.  Competences that students acquire:  • are able to select the appropriate packaging for their intended use and logistics area,  • are familiar with the different types of packaging and know how to adequately secure primary packaging units with secondary and tertiary packaging,  • are aware of environmental impact of different packaging materials and types of packaging,  • are able to provide the necessary information on packaging at all levels,  • are aware of the importance of proper waste management and reverse logistics,  • present the use of 3D printing on the example of a packaging prototype. | | | | | | | | |
| **Predvideni študijski rezultati:** | | | | | | | | | | |  | **Intended learning outcomes:** | | | | | | | | |
| Študent je ob zaključku predmeta zmožen:   * izbrati ustrezno embalažo na vseh nivojih za konkretne primere artiklov glede na namen uporabe in procese v logistiki, * našteti in opisati embalažne materiale, razume vpliv materialov na življenjsko dobo artikla, * našteti in opisati tehnike in tehnologije embaliranja, * ustrezno načrtovati pakirne in logistične enote, * ustrezno opremiti embalažo z oznakami na različnih nivojih, * prepozna in opiše pomembnejše embalažne oznake, in pozna pomen GS1 standardov in uporabiti standarde GS1 pri označevanju različnih ravni embalaže, pozna obveznosti pri uporabi sistema GS1, * načrtovati ravnanje z odpadno in vračljivo embalažo, * načrtovati faze razbremenilne logistike za različne ravni embalaže, * uporabiti program za modeliranje za pripravo 3D modela prototipa embalaže, * uporabiti 3D tiskalnik za namen ustvarjanja prototipa embalaže. | | | | | | | | | | |  | Upon completion of the course, the student is able to:  • select appropriate packaging at all levels for specific items based on their intended use and logistics processes,  • list and describe packaging materials, understanding the impact of materials on the lifespan of the product,  • list and describe packaging techniques and technologies,  • adequately plan packaging and logistics units,  • properly equip packaging labels at different levels,  • recognize and describe important packaging labels, understand the significance of GS1 standards, and utilize GS1 standards in labelling various levels of packaging; understand the obligations when using the GS1 system,  • plan waste and returnable packaging management,  • plan reverse logistics phases for different levels of packaging,  • utilize modelling software to prepare a 3D model of packaging prototype,  • use a 3D printer for creating a prototype of packaging. | | | | | | | | |
| **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).  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).  Laboratorijske vaje: pri laboratorijskih vajah študentje izvedejo praktične vaje na namenski opremi v laboratoriju. | | | | | | | | | | |  | 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-conference or with the help of specially designed e-material in a virtual electronic learning environment).  Laboratory exercises: During laboratory sessions, students perform practical tasks using specialized equipment in the laboratory. | | | | | | | | |
| **Načini ocenjevanja:** | | | | | | | | Delež (v %) /  Share (in %) | | | | | **Assessment methods:** | | | | | | | |
| * Sprotne naloge * Pisni izpit * Seminarska naloga | | | | | | | | 20 %  60 %  20 % | | | | | * Coursework * Written examination * Seminar paper | | | | | | | |

|  |
| --- |
| **Reference nosilca / Course coordinator's references:** |
| 1. HERCOG, Darko, BENCAK, Primož, VINCETIČ, Uroš, LERHER, Tone. Product assembly assistance system  based on pick-to-light and computer vision technology. *Sensors*. 2022, vol. 22, iss. 24, 24 str. ISSN 1424-  8220. https://dk.um.si/IzpisGradiva.php?id=84840, DOI: 10.3390/s22249769. [COBISS.SI-ID 133762819].  2. LERHER, Tone, BENCAK, Primož. Advanced technologies in logistics engineering : automated storage systems with shuttles integrated with hoisted carriage. Tehnički glasnik. 2022, vol. 16, no. 3, str. 336-342, ilustr. ISSN 1846-6168. https://hrcak.srce.hr/file/404717, DOI: 10.31803/tg-20220509104609. [COBISS.SI-ID 117014787]  3. ĐUKIĆ, Goran, OPETUK, Tihomir, GAJŠEK, Brigita, LERHER, Tone. Single-tray VLM vs dual-tray VLM : quantitative throughput comparison. Tehnički glasnik. 2021, vol. 15, no. 4, str. 498-503, ilustr. ISSN 1846-6168. https://doi.org/10.31803/tg-20210824184058, DOI: 10.31803/tg-20210824184058. [COBISS.SI-ID 84600323]  4. MAROLT, Jakob, RUPNIK, Bojan, LERHER, Tone. Stack shuffling optimization of steel bars by using genetic algorithms. V: CLAUSEN, Uwe (ur.), LANGKAU, Sven (ur.), KREUZ, Felix (ur.). Advances in production, logistics and traffic : proceedings of the 4th Interdisciplinary Conference on Production Logistics and Traffic 2019. Cham: Springer, cop. 2019. Str. 20-31, ilustr. Lecture notes in logistics, 2194-8917. ISBN 978-3-030-13534-8. [COBISS.SI-ID 512981565]  5. LERHER, Tone. Pridobljen mednarodni strokovni certifikat organizacije GS1 Ljubljana "Razume standarde GS1". Certifikat je bil pridobljen 15. junija 2021 (št. potrdila: 00266) s strani organizacije GS1 Ljubljana. |