

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Ime predmeta:	UPORABA OPTIMIZACIJSKIH METOD V LOGISTIKI
Course title:	APPLICATION OF OPTIMIZATION TECHNIQUES IN LOGISTICS

Študijski program in stopnja Study programme and cycle	Študijska smer Study option	Letnik Year of study	Semester Semester
GOSPODARSKA IN TEHNIŠKA LOGISTIKA 1. stopnja		2.	3.
PROFESSIONAL HIGHER EDUCATION STUDY PROGRAMME ECONOMIC AND TECHNICAL LOGISTICS 1 st degree		2.	3.

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

Univerzitetna koda predmeta / University course code:	VS
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Predavanja Lectures	Seminar Seminar	Vaje Tutorial			Klinične vaje Clinical training	Druge oblike študija Other forms of study	Samost. delo Individual work	ECTS
		a-V	e-V	LV				
30 e-P 30 a-P		6	12	12			150	8

Nosilec predmeta / Course coordinator:	TOMAŽ KRAMBERGER
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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):
<ul style="list-style-type: none"> Ponovitev osnov matričnega in procentnega računa. Razmerja, razdelilni račun, zmesi račun. Osnove obrestnega računa: navadni obrestni račun, obrestno obrestni račun, vloge in dvigi, posojila. Sistemi linearnih enačb in neenačb: Ponovitev reševanja sistemov linearnih enačb z več neznankami s pomočjo Gausove eliminacijske metode in matričnih enačb, reševanje sistemov linearnih neenačb z grafično 	<ul style="list-style-type: none"> Revision of basics of matrix and interest calculations. Basics of interest calculation types. Systems of linear equations and inequations: revision (solving linear equations using Gauss elimination method and matrix equations, solving linear inequations using the graph method. Convex sets, determining extreme points. Linear programming (problem formulation, solving problems using graphs, solving problems using LINGO and Microsoft Excel software).

<p>metodo.</p> <ul style="list-style-type: none"> • Konveksne množice, določanje ekstremnih točk. • Linearno programiranje (formulacija problema, reševanje na grafični način, reševanje s programskim paketom LINGO in Microsoft Excel). • Osnove DEA (Data Envelopment Analysis) analize (analitični in grafični način reševanja). 	<ul style="list-style-type: none"> • Basics of DEA (Data Envelopment Analysis) (using analytical and graphical methods).
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Temeljni literatura in viri / Reading materials:

<p>E-gradivo predmeta.</p> <p>Kramberger, T.: Kvantitativne metode v logistiki, Fakulteta za logistiko, Celje, 2019.</p> <p>Winston, W. L.: Operations Research; Applications and algorithms. Thomson Learning, Belmont, CA, 4th ed.</p> <p>Vadnal, A.: Linearno programiranje, Informator, Zagreb, 1977.</p> <p>Waters. D.: Quantitative Methods for Business, Addison Wesley, Essex, 1997, ISBN: 0-201-403978, COBISS.SI-ID: 9076454.</p> <p>Čižman, A.: Operacijske raziskave : teorija in uporaba v organizaciji, Kranj, Moderna organizacija, 2003, ISBN: 961-232-162-0, COBISS.SI-ID: 127813888.</p>
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Cilji in kompetence:

<p>Študenti:</p> <ul style="list-style-type: none"> • spoznajo osnove upravljanja logističnih sistemov s pomočjo kvantitativnih metod, • razumejo koncept operacijskih raziskav in so zmožni uporabiti znanja iz linearnega in celoštevilskega linearnega programiranja za namene reševanja in analize problemov v logističnih sistemih, • so zmožni ovrednotiti in interpretirati dobljene rešitve, • se naučijo na podlagi izbranega kriterija rešitev še izboljšati.

Objectives and competences:

<p>Students:</p> <ul style="list-style-type: none"> • get familiarized with the basics for managing logistics systems using quantitative methods, • understand the concept of operational research and are able to use linear and integer programming for solving and analysis of problems in logistics systems, • are able to evaluate and interpret the gained results, • learn how to improve results based on the chosen criteria.
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Predvideni študijski rezultati:

<p>Znanje in razumevanje:</p> <p>Študenti:</p> <ul style="list-style-type: none"> • spoznajo vrednost uporabe razmerij pri reševanju problemov; • usvojijo osnovne pojme obrestnega računa; • razumejo in znajo uporabiti obrestni račun v konkretnih primerih; • razumejo in znajo reševati sisteme linearnih neenačb na grafični način; • spoznajo in razumejo osnove linearnega programiranja; • znajo uporabiti linearno programiranje za reševanje osnovnih logističnih problemov; • razumejo osnove DEA analize; • znajo uporabiti programski paket LINGO in Microsoft Excel za reševanje linearnih programov. Na osnovi uporabe programskih
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Intended learning outcomes:

<p>Knowledge and understanding:</p> <p>Students:</p> <ul style="list-style-type: none"> • learn about the value of relations when solving problems; • learn the basics of interest calculations; • understand and know how to apply the interest calculation to practical cases; • understand and know how to solve systems of linear inequations using graphs; • learn and understand the basics of linear programming; • are able to use linear programming to solve basic logistics problems; • understands the basics of DEA (Data Envelopment Analysis);
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<p>orodij so študenti sposobni analizirati in ovrednotiti dobljene rezultate.</p> <p>Prenesljive/ključne spretnosti in drugi atributi:</p> <p>Študenti se usposobijo za uporabo teoretičnega znanja v praktičnih primerih, predvsem pri procesih, ki so jih spoznali pri predmetih Osnove logistike, Osnove logističnih procesov in trajnostnih oskrbovalnih verig, Osnove ekonomike v logistiki v prvem letniku.</p>	<ul style="list-style-type: none"> know to use LINGO and Microsoft Excel software to solve linear programs. Using different software's' students are able to analyze. <p>Transferable/Key Skills and other attributes:</p> <p>Students learn to apply theoretical knowledge to practical situations, especially processes from the following subjects: Basics of logistics, Basics of logistics processes and sustainable supply chains, Fundamentals of Economics in logistics from year 1.</p>
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Metode poučevanja in učenja:

<p>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).</p> <p>Vaje: pri vajah študent utrdi teoretično znanje in spozna aplikativne možnosti. Del vaj se izvaja na klasični način v predavalnici, del v okviru laboratorijskih vaj, 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).</p>

Learning and teaching methods:

<p>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).</p> <p>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).</p>

Načini ocenjevanja:	Delež (v %) / Share (in %)	Assessment methods:
Pisni izpit.	80%	Written examination.
E- predavanja in e-vaje.	20%	E-lectures and e-courses.

Reference nosilca / Course coordinator's references:

<ol style="list-style-type: none"> KRAMBERGER, Tomaž, MONIOS, Jason, ŠTRUBELJ, Gregor, RUPNIK, Bojan. Using dry ports for port co-opetition : the case of Adriatic ports. <i>International journal of shipping and transport logistics</i>, ISSN 1756-6525. [Online ed.], 2018, vol. 10, iss. 1, str. 18-44, ilustr. http://www.inderscience.com/info/inarticle.php?artid=88319, doi: 10.1504/IJSTL.2018.10008533. [COBISS.SI-ID 512889661]. BUTTON, Kenneth John, KRAMBERGER, Tomaž, GROBIN, Klemen, ROSI, Bojan. A note on the effects of the number of low-cost airlines on small tourist airports' efficiencies. <i>Journal of Air Transport Management</i>, ISSN 1873-2089. [Online ed.], 2018, vol. 72, str. 92-97. https://www.sciencedirect.com/science/article/pii/S096969971730114X, doi: 10.1016/j.jairtraman.2017.12.003. [COBISS.SI-ID 512892733]. BUTTON, Kenneth John, KRAMBERGER, Tomaž, VIZINGER, Tea, INTIHAR, Marko. Economic implications for Adriatic seaport regions of further opening of the Northern Sea Route. <i>Maritime economics & logistics</i>, ISSN 1479-294X. [Spletna izd.], Mar. 2017, vol. 19, iss. 1, str. 52-67, ilustr. http://www.palgrave-journals.com/mel/journal/vaop/ncurrent/abs/mel201525a.html, doi: 10.1057/mel.2015.25. [COBISS.SI-ID 512702781].
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4. INTIHAR, Marko, KRAMBERGER, Tomaž, DRAGAN, Dejan. Container throughput forecasting using dynamic factor analysis and ARIMAX model. *Promet*, ISSN 0353-5320. [Print ed.], 2017, vol. 29, no. 5, str. 529-542, ilustr. [COBISS.SI-ID [512879421](#)].
5. KRAMBERGER, Tomaž, RUPNIK, Bojan, ŠTRUBELJ, Gregor, PRAH, Klemen. Port hinterland modelling based on port choice. *Promet*, ISSN 0353-5320. [Print ed.], 2015, vol. 27, no. 3, str. 195-203, ilustr. <http://www.fpz.unizg.hr/traffic/index.php/PROMTT/article/view/1611>, doi: [10.7307/ptt.v27i3.1611](https://doi.org/10.7307/ptt.v27i3.1611). [COBISS.SI-ID [512689725](#)].