

UČNI NAČRT PREDMETA / COURSE SYLLABUS	
Predmet:	STOHAŠTIČNI PROCESI V LOGISTIKI
Course title:	STOCHASTIC PROCESSES IN LOGISTICS

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
LOGISTIKA SISTEMOV 2.stopnja		2.	3.
SYSTEM LOGISTICS 2.degree		2.	3.

Vrsta predmeta / Course type

OBVEZNI

Univerzitetna koda predmeta / University course code:

MAG 9

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje Laboratory work	Druge oblike študija Field work	Samost. delo Individ. work	ECTS
24 e-P 21 a-P		6 e-V 34 a-V			65	5

Nosilec predmeta / Lecturer:

ĐANI JURIČIĆ, DEJAN DRAGAN

Jeziki /

Predavanja / Lectures:

SLOVENSKI / SLOVENE

Languages:

Vaje / Tutorial:

SLOVENSKI / SLOVENE

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

Ni pogojev.

Prerequisites:

None

Vsebina:

Teorija verjetnosti: Diskretne naključne spremenljivke in porazdelitve, Zvezne naključne spremenljivke in porazdelitve, Številске statistične karakteristike, Multivariantne porazdelitve, Pogojne in mejne porazdelitve, Funkcija največjega verjetja.

Stohastični procesi: Markovski procesi in markovske verige, Poissonovi procesi, Rojstno-smrtni procesi. Aplikacije v logističnih sistemih.

Uvod v analitično teorijo množične strežbe: Enokanalni strežni sistemi, Večkanalni strežni sistemi, Razlaga reševanja praktičnih in hipotetičnih primerov na podlagi realiziranih diplom.

Optimalno upravljanje zalog pri stohastičnem povpraševanju: Newsboy enoperiodični model, Zvezni (Q,s) model za zvezno pregledovanje stanja zalog, Periodični model za periodično pregledovanje stanja zalog. Razlaga reševanja praktičnih primerov na podlagi realiziranih diplom.

Content (Syllabus outline):

Probability Theory : Discrete random variables and distributions , Continuous random variables and distributions, Statistical characteristics, Multivariate distributions, Conditional and marginal distributions, The maximum likelihood function.

Stochastic processes : Markov processes and Markov chains , Poisson processes , Birth-death processes . Applications in logistics systems.

Introduction to the analytic queuing theory: Single channel queuing systems , Multi channel queuing systems, Explanation of solving practical and hypothetical cases on the basis of worked diplomas .

Optimal inventory management for the case of stochastic demand: Newsboy one-period model, Continuous review model (Q, s), Periodic review model for periodically reviewing the status of inventory. Interpretation of practical applications on the basis of worked diplomas.

Teorija regresije in napovedovanja v operacijskih raziskavah in ekonometriji:

Poglobitev znanj iz področja regresijskih modelov in njihove uporabe v statistiki, pri napovedovanju, v operacijskih raziskavah in v ekonometriji.

Modeliranje in napovedovanje časovnih vrst v logistiki in ekonometriji:

Poglobitev znanj iz področja modeliranja in napovedovanja časovnih vrst, kot npr. uporaba dinamičnih modelov s porazdeljenimi zakasnitvami in Box-Jenkins modelov. Primeri iz operacijskih raziskav, oskrbnih verig in ekonometrije.

Statistične analize v pomorski in pristaniški logistiki ter prometu.

Reševanje problemov sledenja in navigacije s filtri.

Programska orodja: Scilab, Matlab in kloni.

The theory of regression and forecasting in operations research and econometrics:

Advanced knowledge in the field of regression models and their application in statistics and forecasting, operations research and econometrics.

Modeling and forecasting of time series in logistics and econometrics:

Advanced knowledge in the field of modeling and forecasting of time series, as for example the use of Distributed lag models and Box-Jenkins models. Examples from the Operations Research, Supply chains and Econometrics.

Statistical analysis in the maritime and port logistics, in the transport, and in the traffic.

Solving of the tracking and navigation problems by the means of filters.

Software tools : Scilab, Matlab and clones .

Temeljni literatura in viri / Readings:

DRAGAN, Dejan: Stohastični procesi v logistiki : visokošolski učbenik. Celje: Fakulteta za logistiko, 2013.

DRAGAN, Dejan: Upravljanje logističnih sistemov : visokošolski učbenik. Celje: Fakulteta za logistiko, 2009.

DRAGAN, Dejan: Statistika, analiza podatkov in statistični modeli, neobjavljen učbenik v pripravi, 2014.

DRAGAN, Dejan: Predstavitev optimalnih strategij za upravljanje zalog pri stohastičnem povpraševanju : interno dodatno gradivo, 2009.

Hsu H.: Schaum's Outline of Probability, Random Variables, and Random Processes, McGraw-Hill, 1997.

Papoulis A.: Probability, Random Variables and Stochastic Processes with Errata Sheet, McGraw-Hill Science/Engineering/Math, 4th edition, 2001.

Ross S.M.: Introduction to Probability Models, Academic Press, 1997.

Nelson, R.: Probability, stochastic processes, and queueing Theory, Springer, 1995.

Brown, R. G., Introduction to Random Signals and Applied Kalman Filtering with Matlab Exercises and Solutions, Wiley, 3rd Edition, 1996.

Kutner, M.: Applied Linear Regression Models, McGraw-Hill, 4th ed., 2004.

Box G., Jenkins, G.M.: Time Series Analysis: Forecasting and Control, Wiley, 4th ed., 2008.

Winston W.L.: Operations Research: Applications and Algorithms, Cengage Learning, 4th ed., 2003.

Waters D., inventory Control and Management, Wiley, 2nd ed., 2003.

Bowerman B.L.: Forecasting, Time Series, and Regression, Cengage Learning, 4th edition, 2004.

Cilji in kompetence:

Cilj tega predmeta je:

- nadgraditi pojme teorije stohastičnih procesov,
- naučiti se ocenjevati statistične pokazatelje stohastičnih procesov,
- pridobiti sposobnost interpretacije nedoločenih pojavov,
- usposobiti se za uporabo teoretičnega znanja pri obravnavi zahtevnejših stohastičnih procesov v logistiki.

Objectives and competences:

This course will help students:

- to upgrade the issues in the theory of stochastic processes,
- to gain a deeper understanding of estimation of statistical indicators in stochastic processes,
- to gain the ability to interpret uncertain events,
- to gain the ability to apply theoretical knowledge for the purpose of solving of more complicated stochastic problems in logistics,

Predvideni študijski rezultati:

Intended learning outcomes:

Znanje in razumevanje:

- nadgraditi razumevanje postopkov in orodij za analizo in uporabo stohastičnih modelov,
- spoznati raziskovalno področje stohastičnih procesov in ga prepoznati kot morebitno polje bodočega znanstvenega dela,
- pridobiti poglobljeno razumevanje iz teorije stohastičnih procesov ter uporabe stohastičnih modelov,
- se usposobiti za samostojno znanstveno raziskovalno delo na tem področju,
- se usposobiti za predstavitev svojega raziskovalnega dela (članki, referati),
- spoznati uporabne vsebine in se naučiti systemskega razmišljanja, kako pristopiti k reševanju realnih problemov.
- pridobiti razumevanje teoretičnih ozadij, nujno potrebnih za interpretacijo dobljenih rezultatov računalniških orodij in ocenitev kakovosti razvitih stohastičnih in statističnih modelov.

Prenesljive/ključne spretnosti in drugi atributi:

- Zmožnost sodelovanja pri reševanju zahtevnejših problemov stohastične narave v logističnih okoljih. Obvladovanje znanstvenih podlag in praktičnih spretnosti za nadaljnji študij in delo v logističnih in nelogističnih podjetjih.

Knowledge and Understanding:

- to enhance the understanding of procedures and tools for the construction of stochastic models,
- to get familiar with scientific field of stochastic processes and recognize it as a possible field of future scientific work,
- to get the ability to co-operate in solving more complicated stochastic problems in logistics,
- to qualify for independent research and scientific work in this field,
- to qualify for presentation of scientific work by the means of publishing (papers),
- to get familiar with useful contents and to gain the possibility of systematical thinking about solving of real problems,
- to gain the understanding of theoretical background, necessary for the interpretation of achieved results given by computer software and to verify the quality of developed stochastic and statistical models.

Transferable/Key Skills and other attributes:

- The ability to co-operate in solving more complicated stochastic problems in logistics. Understanding scientific and practical competences for further studies and work in logistical and non-logistical companies.

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-predavanj (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)
- Seminars: 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-seminars 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:
• Opravljen seminar • Pisni izpit • Ustni izpit	30 40 30	• Coursework • Written examination • Oral examination

Reference nosilca / Lecturer's references:

Opomba:

Navedene sestavine so obvezna sestavina učnega načrta predmeta kot ga določajo Merila za akreditacijo visokošolskih zavodov in študijskih programov v 7. členu (Ur. l. RS, št. 101/2004).