

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	OSNOVE MEHATRONIKE V LOGISTIKI
Course title:	FUNDAMENTALS OF MECHATRONICS IN LOGISTICS

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
GOSPODARSKA IN TEHNIŠKA LOGISTIKA 1.stopnja		1.	2.
PROFESSIONAL HIGHER EDUCATION STUDY PROGRAMME ECONOMIC AND TECHNICAL LOGISTICS 1. degree			

Vrsta predmeta / Course type: OBVEZNI

Univerzitetna koda predmeta / University course code: VIS

Predavanja Lectures	Seminar Seminar	vaje Tutorial	Klinične vaje Laboratory work	Druge oblike študija Field work	Samost. delo Individ. work	ECTS
30 e-P 30 a-P		15 e-V 15 a-V			90	6

Nosilec predmeta / Lecturer: TONE LERHER

Jeziki / Predavanja / Lectures: SLOVENSKI / SLOVENE
 Languages: Vaje / Tutorial: SLOVENSKI / SLOVENE

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

Prerequisites:

Ni pogojev

None

Vsebina:

Content (Syllabus outline):

Modeli sil, aktivne (brena) in pasivne (reakcijske) sile, moment dvojice sil, redukcija sil. Težišča teles. Trenje na ravni podlagi in na kolutih. Verižnice. Napetosti in deformacije, Hookov zakon. Opisovanje in delitev gibanj. Hitrost in pospešek. Kinematika sistema delcev. D'Alembertov princip. Delo, energija in moč pri premočrtnem gibanju in rotaciji. Izrek o gibanju masnega središča, gibalni in vrtilni količini. Trk teles. Dinamika teles spremenljive mase. Bernoullijeva enačba in vrste izgub. Laminarno in turbulentno pretakanje. Gibanje v odprtih strugah. Čas iztekanja kapljev in pri spremenljivi gladini. Reakcija iztekajočega curka.

Električna napetost in električni potencial. Kondenzator,

Force models, active (load) and passive (reaction) forces, momentum of a force couple, force reduction. Centres of gravity of bodies. Friction on flat surface and discs. Chainrings. Stresses and deformations, Hook's Law. Description and categorisation of motions. Velocity and acceleration. Kinematics of a system of particles. D'Alembert's Principle. Work, energy and power for linear movement and rotation. Theorem on motion of mass centre, motion and rotation quantity. Collision of bodies. Dynamics of bodies with changeable mass. Bernoulli equation and loss types. Laminar and turbulent flow. Motion in open riverbeds. Time of liquid outflow if liquid level is changing. Reaction of outflowing jet.

kapacitivnost. Ohmov zakon, ohmska upornost. Kirchoffova zakona, Joulov zakon. Magnetno polje premega tokovodnika. Magnetno polje dolge ravne tuljave. Magnetilna krivulja in histerezna zanka. Sila na tokovodnik v magnetnem polju. Induktivnost tuljave. Faradayev zakon elektromagnetne indukcije. Izmenični tokokrogi. Enofazni in polifazni sistemi. Električne meritve. Električni stroji in transformatorji. Varnostni predpisi in izvedba električnih inštalacij. Polprevodniške diode, poljski in bipolarni tranzistorji. Integrirana elektronska vezja. Družine logičnih vezij. Mikroprocesorji in programirana logična vezja. Senzorji in aktuatorji.

Electric tension and electrical potentials. Condenser, capacity. Ohm's Law, ohm resistance. Kirchhoff's Laws, Joule's Law. Magnetic field of a linear conductor. Magnetic field of a long straight coil. Magnetic curve and hysteresis loop. Force on a conductor in a magnetic field. Coil inductivity. Faraday's Law of electromagnetic induction. Alternating current circuits. Single- and multi-phase systems. Electrical measurements. Electrical engines and transformers. Safety regulations and electrical installation completion. Semiconductor diodes, field and bipolar transistors. Integrated electronic circuits. Families of logical circuits. Microprocessors and programmed logical circuits. Sensors and actuators.

Temeljna literatura in viri / Readings:

M.Oblak: Mehanika v logistiki. Zbrano gradivo, Univerza v Mariboru, Fakulteta za logistiko, 2007.
R. Pušenjak: Elektrotehnika za strojnike, Univerza v Mariboru, Tehniška fakulteta. (Ponatis 2003)

Cilji in kompetence:

Cilj predmeta je seznaniti študente s temeljnimi znanji s področja statike, trdnosti, kinematike, dinamike, hidromehanike in osnov elektrotehnike z elektroniko. Prav tako je predmet namenjen pridobitvi praktičnih izkušenj na področju mehanike, merilne tehnike in delovanja električnih naprav ter elektronskih vezij.

Objectives and competences:

The goal of this course is to acquire basic knowledge from the field of statistics, rigidity, kinematics, dynamics, hydromechanics and basis of electrotechnics with electronic. Another goal is to acquire practical experience in the field of mechanics, measuring techniques and functioning of electrical gadgets and electronic circuits.

Predvideni študijski rezultati:

Po opravljenem izpitu iz tega predmeta bo študent sposoben pridobljeno znanje uporabiti pri reševanju enostavnih mehanskih in elektrotehniških problemov stroke v logistiki.

Intended learning outcomes:

Upon passing the exam, students will be able to use the acquired knowledge for solving simple mechanical and electrotechnical professional problems in logistics.

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-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).

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-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:
<ul style="list-style-type: none"> ▪ Pisni izpit ▪ Ustni izpit 	<ul style="list-style-type: none"> ▪ 50 % ▪ 50 % 	<ul style="list-style-type: none"> ▪ Written examination ▪ Oral examination

Reference nosilca / Lecturer's references:

1. AVSEC, Jurij, OBLAK, Maks. Calculation of the thermal conductivity of nanofluids containing nanoparticles and carbon nanotubes. *High temp. High press.*, 2003/2007, issue 6, vols. 35/36, str. 611-620. <http://dx.doi.org/10.1068/htjr142>.
2. GUBELJAK, Nenad, VOJVODIČ-TUMA, Jelena, ŠUŠTARŠIČ, Borivoj, PREDAN, Jožef, OBLAK, Maks. Assessment of the load-bearing capacity of a primary pipeline. *Eng. fract. mech.*. [Print ed.], Apr. 2007, vol. 74, iss. 6, str. 995-1005. <http://dx.doi.org/10.1016/j.engfracmech.2006.08.013>.
3. AVSEC, Jurij, OBLAK, Maks. The calculation of thermal conductivity, viscosity and thermodynamic properties for nanofluids on the basis of statistical nanomechanics. *Int. j. heat mass transfer*. [Print ed.], Oct. 2007, vol. 50, iss. 21/22, str. 4331-4341. <http://dx.doi.org/10.1016/j.ijheatmasstransfer.2007.01.064>.
4. AVSEC, Jurij, OBLAK, Maks. Thermal vibrational analysis for simply supported beam and clamped beam. *J. Sound Vib.*, Dec. 2007, vol. 308, iss. 3/5, str. 514-525. <http://dx.doi.org/10.1016/j.jsv.2007.04.002>.
5. KEGL, Marko, BRANK, Boštjan, HARL, Boštjan, OBLAK, Maks. Efficient handling of stability problems in shell optimization by asymmetric "worst case" shape imperfection. *Int. j. numer. methods eng.*, 26 February 2008, vol. 73, iss. 9, str. 1197-1216. <http://dx.doi.org/10.1002/nme.2113>