Univerza v Mariboru

Fakulteta za naravoslovje in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS	
Predmet:	**Mehanika kontinuov**
Course title:	**Mechanics of Continuous Media**

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Enovit magistrski študijski program druge stopnje Predmetni učitelj	/	4	8
Five-year master's degree program Subject Teacher	/		

Vrsta predmeta / Course type	izbirni / elective
Univerzitetna koda predmeta / University course code:	

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Lab. vaje Laboratory work	Terenske vaje Field work	Samost. delo Individ. work	ECTS
45		15			90	5

Nosilec predmeta / Lecturer:	Mitja Slavinec

Jeziki / Languages:	**Predavanja / Lectures:**	slovensko / Slovene
	Vaje / Tutorial:	slovensko / Slovene

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	**Prerequisits:**
Predznanje na področjih mehanike, termodinamike in matematičnih metod v fiziki.	Preknowledge in the field of mechanics, thermodynamics and mathematical methods in physics.

Vsebina:	**Content (Syllabus outline):**
- Deformacije in napetosti v trdnih telesih	- deformations and strains in condensed matter
- Termodinamika deformacije	- thermodynamics of deformation
- Strižne deformacije	- shear deformations
- Statika nosilca, konzole, plošče in oboka	- statics of carriers, consoles, plates and arch
- Statika in napetosti v podprtih nosilcih in ploščah	- statics and strains in underpinned carriers and

- Statika in dinamika navpičnih nosilcev, homogeni in nehomogenih (protipotresna gradnja) - Napetosti v tlačnih posodah - Napetosti in obremenitve v oseh in gredeh - Gibalne enačbe za tekočine - Mehanika tekočin – valovanje na vodni površini - Sile in navori v tekočinah, obremenitve sten	plates - statics and dynamics of vertical carriers, homogenous and non-homogenous (earthquake safe building) - strains in pressure containers - strains in axes and shafts - equations for fluid motion - fluid mechanics – waves on water surface - forces and torques in fluids, strains in the walls

Temeljni literatura in viri / Readings:

- P. K. Kundu, Fluid mechanics, Academic Press, San Diego, 1990.
- L.D. Landau, E.M. Lifshitz, Fluid mechanics, Pergamon Press, New York, 1989.
- D.J. Acheson, Elementary fluid dynamics, Clarendon Press, Oxford, 1990.
- T. E. Faber, Fluid dynamics for physicists, Cambridge University Press, Cambridge 1997.
- L.D. Landau, E.M. Lifshitz, Theory of Elasticity, Pergamon Press, New York 1986.
- R.J. Atkin, An introduction to the theory of elasticity, Longman, London, 1980.
- Borštnik, R. Podgornik, M. Vencelj, Rešene naloge iz mehanike kontinuov, DMFA, Ljubljana, 2001.

Cilji in kompetence:	**Objectives and competences:**
Študentje ponovijo osnovna matematična orodja in principe ter razširijo uporabo na fizikalne probleme, povezane z deformacijami trdnin in tekočin. Tvorijo ustrezne matematične modele za fizikalne probleme, formulirajo ustrezne robne pogoje in fizikalno interpretirajo dobljene rezultate.	The students refresh their knowledge about several mathematical tools and expand their application to physical problems connected to deformations and fluids. They form appropriate mathematical models for physical problems, formulate boundary conditions and interpret the obtained solutions.
Predvideni študijski rezultati:	**Intended learning outcomes:**
Znanje in razumevanje: Kompleksno razumevanje fizikalnih zakonitosti in sposobnost le-te kvantitativno opisati, napovedati in izračunati rezultate. **Prenesljive/ključne spretnosti in drugi atributi:** Reševanje fizikalnih in tehničnih problemov z matematičnimi orodji in postopki.	**Knowledge and understanding:** Complex understanding of physical laws and ability to qualitatively describe them, predict and calculate results. **Transferable/Key Skills and other attributes:** Solution of physical and technical problems using the mathematical tools and methods.
Metode poučevanja in učenja:	**Learning and teaching methods:**

Postavitev problema, izbira potrebnih matematičnih orodij za reševanje, postavitev matematičnega modela, analitično in numerično reševanje. Interpretacija dobljenih rešitev.	Setting up of a physical problem, selection of appropriate mathematical tools, setting up a mathematical model, finding of an analytical or numerical solution. Interpretation of obtained solutions.

Načini ocenjevanja: Delež (v %) / Weight (in %) **Assessment:**

Način (pisni izpit, ustno izpraševanje, naloge, projekt)		Type (examination, oral, coursework, project):
Pisni izpit	**40**	Written exam
Ustni izpit	**40**	Oral exam
Seminarska naloga	**20**	Seminar paper

Reference nosilca / Lecturer's references:

AMBROŽIČ, Milan, KOSMAČ, Tomaž. Optimization of the bend strength of flat-layered alumina-zirconia composites. *J. Am. Ceram. Soc.*, vol. 90, 2007, str. 1545-1550. [COBISS.SI-ID 20741415]

AMBROŽIČ, Milan, KRALJ, Samo, VIRGA, Epifanio G. Defect-enhanced nematic surface order reconstruction. *Phys. rev., E Stat. nonlinear soft matter phys. (Print)*, 2007, vol. 75, no. 3, str. 031708-1-031708-9. [COBISS.SI-ID 20736807]

CVETKO, Matej, AMBROŽIČ, Milan, KRALJ, Samo. Competition between local disordering and global ordering fields in nematic liquid crystals. *Beilstein journal of organic chemistry*, 2010, vol. 6, no. 2, str. 1-14. http://dx.doi.org/10.3762/bjoc.6.2, doi: 10.3762/bjoc.6.2. [COBISS.SI-ID 17410312]

ZIDANŠEK, Aleksander, AMBROŽIČ, Milan, MILFELNER, Maja, BLINC, Robert, LIOR, Noam. Solar orbital power : sustainability analysis. *Energy (Oxford)*. [Print ed.], 2011, vol. 36, no. 4, str. 1986-1995. [COBISS.SI-ID 24602919]
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GORJAN, Lovro, AMBROŽIČ, Milan. Bend strength of alumina ceramics : a comparison of Weibull statistics with other statistics based on very large experimental data set. *J. Eur. Ceram. Soc.*. [Print ed.], 2012, vol. 32, no. 6, str. 1221-1227, doi: 10.1016/j.jeurceramsoc.2011.12.010. [COBISS.SI-ID 25578279]