Univerza v Mariboru

Fakulteta za naravoslovje in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS	
Predmet:	**Fizika tekočin**
Course title:	**Fluid Physics**

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		4	8

Vrsta predmeta / Course type: izbirni/elective

Univerzitetna koda predmeta / University course code:

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
45		15			90	5

Nosilec predmeta / Lecturer: Milan Ambrožič

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

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	**Prerequisits:**
Pogojev ni. Priporočljiva znanja so: znanje iz Mehanike in Matematične fizike.	None. Recommended knowledge: knowledge of Mechanics and Mathematical physics.

Vsebina:	**Content (Syllabus outline):**

Hidrostatika: osnovne enačbe. Plimovanje. Hidrodinamika: osnovne enačbe. Idealne tekočine: Eulerjeva enačba. Vrtinčnost. Bernoullijeve enačbe. Nestisljive tekočine. Dvodimenzionalni idealni tok. Teorija kril. Turbulenca.	Hydrostatics: basic equations. Tide oscillations. Hydrodynamics: basic equations. Ideal liquids: Euler equations. Vorticity Bernoulli equations. Uncompressible liquids. Two-dimensional ideal stream. Theory of wings. Turbulence.

Temeljni literatura in viri / Readings:

1. L. D. Landau, E. M. Lifshitz, Fluid Mechanics (Pergamon Press, Oxford, 1989).
2. I. G. Currie, Fundamental mechanics of fluids (McGraw Hill, New York, 1993).
3. D. J. Acheson, Elementary fluid dynamics (Oxford university press, Oxford, 1990).

Cilji in kompetence:	Objectives and competences:
Študenti usvojijo bolj poglobljeno znanje s področja fizike tekočin.	Students acquire deeper knowledge on fluid physics.

Predvideni študijski rezultati:	Intended learning outcomes:
Znanje in razumevanje: Študent zna uporabiti Navier-Stokesovo enačbo za reševanje problemov o pretakanju tekočin v različnih geometrijah. Študent zna kvalitativno oceniti približke pri gibanju tekočin za poenostavljeno obravnavo. Študent zna uporabiti obravnavane modele za različne praktične probleme in aplikacije. Študent dobi z analogijo med enačbami iz elastomehanike in hidrodinamike širši vpogled na fizikalne sisteme in probleme.	**Knowledge and understanding:** The student is able to use Navier-Stokes equation for solving problems in the area of the flow of fluids in various geometries. The student is able to make qualitative estimation of approximations in regard to the flow of fluids for simplified teratment. The student is able to use the treated models for different practical problems and applications. Using the analogy between the equations in the areas of elasto-mechanics and hydrodynamics, the student acquires a deeper insight into physical systems and problems.
Prenesljive/ključne spretnosti in drugi atributi: Razumevanje procesov v tehnologiji povezanih s fiziko tekočin.	**Transferable/Key Skills and other attributes:** Understanding of technological processes related to fluids.

Metode poučevanja in učenja:	Learning and teaching methods:

Metodika obsega: teoretičen uvod v problematiko in analitično ali numerično reševanje posameznih problemov. Domače računske vaje.	They are based on: theoretical introduction and analytic or numerical solving of specific problems. Home theoretical excercises.

Načini ocenjevanja:	Delež (v %) / Weight (in %)	**Assessment:**
Način (pisni izpit, ustno izpraševanje, naloge, projekt):		Type (examination, oral, coursework, project):
2 pisna kolokvija ali pisni izpit	**25**	2 written tests or written exam
ustni izpit	**50**	oral exam
krajša seminarska naloga	**25**	shorter seminar work

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]
tipologija 1.08 -> 1.01

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