Univerza v Mariboru

Fakulteta za naravoslovje in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS	
Predmet:	**Analitična mehanika**
Course title:	**Analytical Mechanics**

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 in Mechanics and Mathematical physics.

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

Pregled osnovnih zakonov mehanike. Lagrangejeve enačbe. Centralne sile in problem dveh teles. Kinematika togega telesa. Nihanje. Hamiltonove enačbe. Zanimivi eksotični problemi.	Survey of the basic principles in mechanics. Lagrange equations. Central forces and 2-body problem. Rigid body kinematics. Vibrations. Hamilton equations. Interesting exotic problems.

Temeljni literatura in viri / Readings:

- L. D. Landau, E. M. Lifshitz, Mechanics, Vol. 1 of Course in Theoretical Physics (Pergamon Press, Oxford, 1976).
- H. Goldstein, C. Poole, J. Safko, Classical Mechanics, (Addison Wesley, Reading, 2002).
- G. M. Calkin, Lagrangian and Hamiltonian Mechanics (World Scientific, Singapore, 1998).

Cilji in kompetence:	**Objectives and competences:**
Študenti pridobijo bolj poglobljeno znanje s področja klasične in analitične mehanike.	Students acquire deeper knowledge from classical and analytical mechanics.

Predvideni študijski rezultati:	**Intended learning outcomes:**
Znanje in razumevanje: Študent zna pretvori problem iz mehanike v kompleksnejši geometriji v formalizem z Lagrangianom ali Hamiltonianom in ga tudi uspešno rešiti: analitično ali numerično. Študent je uspešen pri generaliziranju osnovnih pojmov, kot sta koordinata in gibalna količina. Študent zna v didaktičnem smislu bolje ponazoriti rotacijo teles v prostoru; podobno velja za nihanje. Študent bolj sistematično poveže med seboj osnovne fizikalne količine, opredeljene pri mehaniki. Študent razume povezave med več različnimi vejami fizike.	**Knowledge and understanding:** The student is able to transform the problem in the mechanics with more complex geometry into the formalism using Lagrangian or Hamiltonian, and is also able to solve it either in analytical or numerical way. The student is succesful in generalization of basic concepts, such as coordinate and linear momentum. The has a didactic skill to illuminate the rotation of bodies in space; similarly holds for oscillation. The student is more systematic in relating the basic physics quantities, defined within mechanics. The student understands relations between some different areas of physics.
Prenesljive/ključne spretnosti in drugi atributi: Rešitev problemov z matematičnimi orodji in celosten pristop k reševanju problemov.	**Transferable/Key Skills and other attributes:** Solving of problems with mathematical tools and gained global approach on solving a problem.

Metode poučevanja in učenja:	**Learning and teaching methods:**
Predavanja Teoretične računske vaje Domače računske vaje	Lectures Theoretical excercises 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 or 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