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
Fizika, 1. stopnja		**3**	**6**
Physics, 1st cycle			

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			120	6

Nosilec predmeta / Lecturer: Mitja Slavinec

Jeziki / Languages:	Predavanja / Lectures:	slovensko / Slovenian
	Vaje / Tutorial:	slovensko / Slovenian

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	**Prerequisits:**
Pogojev ni. Priporočljivo predznanje na področjih mehanike, termodinamike in matematičnih metod v fiziki.	None. Recommended preknowledge in the field of mechanics, thermodynamics and mathematical methods in physics.

Vsebina:	**Content (Syllabus outline):**
- Deformacije in napetosti v trdnih telesih - Strižne deformacije - Statika nosilca, konzole, plošče in oboka - Statika in napetosti v podprtih nosilcih in ploščah - Napetosti v tlačnih posodah - Gibalne enačbe za tekočine	- deformations and strains in condensed matter - shear deformations - statics of carriers, consoles, plates and arch - statics and strains in underpinned carriers and plates - strains in pressure containers - equations for fluid motion

- Mehanika tekočin – valovanje na vodni površini	- fluid mechanics – waves on water surface

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:**
Študent usvoji kompleksno razumevanje fizikalnih zakonitosti in sposobnost le-te kvantitativno opisati, napovedati in izračunati rezultate.	Student gains complex understanding of physical laws and ability to qualitatively describe them, predict and calculate results.

Predviden študijski rezultati:	**Intended learning outcomes:**
Znanje in razumevanje: Po uspešno zaključeni učni enoti je študent zmožen: • uporabiti teoretično znanje za obravnavo deformacij v trdnih telesih in statike, • uporabiti enačbe za gibanje tekočin pri obravnavi pojavov v tekočinah, • uporabiti matematična orodja in metode za reševanje fizikalnih problemov povezanih z deformacijami trdnin in tekočin, • tvoriti ustrezne matematične modele za reševanje problemov pri izbranih primerih s področja gibanja tekočin, deformacij trdnin in statike, • oblikovati ustrezne robne pogoje matematičnih modelov, • vrednotiti in interpretirati dobljene rezultate in aplikacija v realne sisteme.	On completion of this course student will be able to: • use theoretical knowledge to study phenomena of deformations of solids and statics, • use equation for fluid movement to research mechanics of continuous media, • use mathematical tools and methods to solve problems in the field of deformation of solids and fluids. • form appropriate mathematical models to solve problems in the field of fluid movement, deformation of solids and statics, • formulate boundary conditions for mathematical models, • evaluate and interpret obtained solutions and apply them to realistic systems.

Prenesljive/ključne spretnosti in drugi atributi:	Transferable/Key Skills and other attributes:
Reševanje fizikalnih in tehničnih problemov z matematičnimi orodji in postopki.	Solution of physical and technical problems using the mathematical tools and methods.

Metode poučevanja in učenja:	Learning and teaching methods:
Predavanja (razlaga, razgovor, demonstracija) in eksperimentalna predavanja	Lectures (explanation, discussion, demonstration) and experimental lectures
Problemski pouk (postavitev problema, izbira potrebnih matematičnih orodij za reševanje, postavitev matematičnega modela, analitično in numerično reševanje, interpretacija dobljenih rešitev)	Problem based learning (setting up physical problem, selection of appropriate mathematical tools, setting up a mathematical model, finding of an analytical or numerical solution, interpretation of obtained solutions)
Seminarske vaje (metoda dela s tekstom, metoda pisnih in grafičnih del, uporaba programskih orodij)	Seminar work (work with text, work with graphic elements, use of computer tools)
Projektno delo	Project work
Poučevanje in učenje potekata z didaktično uporabo informacijsko-komunikacijske tehnologije.	Teaching and learning are done through the didactic use of ICT.

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
Samostojna naloga in predstavitev	20	Individual work and oral presentation
Vsaka izmed naštetih obveznosti mora biti opravljena s pozitivno oceno.		Each of the mentioned commitments must be assessed with a passing grade.
Pozitivna ocena iz pisnega izpita in pozitivna ocena seminarske naloga sta pogoja za pristop k ustnemu izpitu.		Positive grade of written exam and positive grade of seminar work are prerequisite for access to the oral exam.

Reference nosilca / Lecturer's references:

WANG, Zhen, ROSTAMI, Zahra, JAFARI, Sajad, ALSAADI, Fawaz E., SLAVINEC, Mitja, PERC, Matjaž. Suppression of spiral wave turbulence by means of periodic plane waves in two-layer excitable media. *Chaos, solitons and fractals*. [Print ed.]. 2019, vol. 128, str. 229-233. DOI: 10.1016/j.chaos.2019.07.045. [COBISS.SI-ID 24725000]

SHAFIEI, Mohadeseh, PARASTESH, Fatemeh, JALILI, Mahdi, JAFARI, Sajad, PERC, Matjaž, SLAVINEC, Mitja. Effects of partial time delays on synchronization patterns in Izhikevich neuronal networks. *The European physical journal. B, Condensed matter physics*. 2019, iss. 2, art. no. 36, str. 1-7. ISSN 1434-6028. DOI: 10.1140/epjb/e2018-90638-x. [COBISS.SI-ID 24460040]

WEI, Zhouchao, ZHU, Bin, YANG, Jing, PERC, Matjaž, SLAVINEC, Mitja. Bifurcation analysis of two disc dynamos with viscous friction and multiple time delays. *Applied mathematics and computation*, ISSN 0096-3003. [Print ed.], 2019, vol. 347, str. 265-281, doi: 10.1016/j.amc.2018.10.090. [COBISS.SI-ID 24361480]

FISTER, Iztok, IGLESIAS, Andres, GÁLVEZ, Akemi, DEL SER, Javier, OSABA, Eneko, FISTER, Iztok, PERC, Matjaž, SLAVINEC, Mitja. Novelty search for global optimization. *Applied mathematics and computation*, ISSN 0096-3003. [Print ed.], 2019, vol. 347, str. 865-881, doi: 10.1016/j.amc.2018.11.052. [COBISS.SI-ID 24211976]