

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	FIZIKA I
Course Title:	PHYSICS I

Študijski program in stopnja Study Programme and Level	Študijska smer Study Field	Letnik Academic Year	Semester Semester
UŠP Tehniška varnost, 1. stopnja	/	1.	1.
USP Technical Safety, 1 st Cycle	/	1 st	1 st

Vrsta predmeta / Course Type

obvezni / Mandatory

Univerzitetna koda predmeta / University Course Code:

IN102

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
45	/	30 SV	/	/	75	5

Nosilec predmeta / Lecturer:

izr. prof. dr. Miha Ravnik / Dr. Miha Ravnik, Associate Professor

Jeziki / Languages:

Predavanja / Lectures: Slovenski / Slovenian

Vaje / Tutorial: Slovenski / Slovenian

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

Študent oz. kandidat mora imeti predmet opredeljen kot študijsko obveznost.

Prerequisites:

The course has to be assigned to the student.

Vsebina:

Kinematika: premo enakomerno in pospešeno gibanje točkastega telesa, gibanje v prostoru.

Dinamika: sila in masa. Newtonovi zakoni, izrek o gibanju težišča, izrek o gibalni količini, sila curka, izrek o kinetični energiji, delo, potencialna energija, prožnost, prožnostna energija, vrtenje togega telesa okoli nepremične osi, navor, Newtonov zakon pri vrtenju, izrek o vrtilni količini.

Mehanika tekočin: hidrostatika, hidrostatični tlak, vzgon, delo tlaka, hidrodinamika, opis toka tekočin, Bernoullijeva enačba.

Nihanje in valovanje: amplituda, frekvenca in nihajni čas, sinusno nihanje, vsiljeno nihanje, sklopljeno nihanje, spekter nihanja, longitudinalno in transverzalno valovanje, valovna dolžina, hitrost valovanja, interferenca,

Content (Syllabus Outline):

Kinematics: uniform and accelerated motion of a particle, motion in space

Dynamics: Force and mass; Chord force; Newton's laws; the theorem on the system of particles and velocity of the centre of mass; kinetic energy theorem; work; potential energy; elasticity; rotation of a rigid body around a fixed axis; torque; Newton's law on rotation; theorem on conservation of angular momentum.

Fluid mechanics: hydrostatics, hydrostatic pressure; buoyancy; hydrodynamics; description of fluid flow; Bernoulli's equation.

Oscillation and wave motions: amplitude, frequency and oscillation intervals; harmonic oscillation; oscillation of molecules, forced oscillation; oscillation of coupled oscillators;

stoječe valovanje, lastna nihanja, osnove akustike.

Toplota: definicija temperature, temperaturno raztezanje teles, idealni plin, enačba stanja, fazne spremembe, notranja energija, toplota, energijski zakon, kalorimetrija, notranja energija idealnega plina, različne spremembe idealnega plina, prevajanje toplote.

oscillation spectrum; longitudinal and transversal waves, radiant flux, radiant flux density, wave length; the speed of a travelling wave, interference, standing waves; motion spectrum; fundamentals of acoustics.

Heat: Definition of temperature, thermal expansion of bodies, ideal gas, enab status, phase changes, internal energy, heat, energy law, calorimetry, internal energy of an ideal gas, various modifications of the ideal gas heat conduction

Temeljni literatura in viri / Readings:

- I. Serša, Fizika za študente tehniške varnosti, FKKT, 2009, 129 strani (90%)
- J. Strnad, Fizika: I. del, DZS 1997, 1998, 281 str., (60%),
- R. Kladnik: Visokošolska fizika I, DZS, Ljubljana, 1989. 285 str., (60%)

Cilji in kompetence:

Pri predmetu Fizika I študenti pridobijo razumevanje osnovnih fizikalnih pojmov in fizikalnih količin, spoznajo osnovne zakone narave, ter se ob reševanju problemov navadijo osnov analitičnega mišljenja.

Objectives and Competences:

During the physics course students obtain the understanding of basic physical concepts and quantities, they obtain the understanding of the basic laws of nature and through problem solving acquire the basics principles of analytical thinking.

Predvideni študijski rezultati:

Znanje in razumevanje

Ob reševanju problemov se navadijo osnov analitičnega mišljenja.

Intended Learning Outcomes:

Knowledge and Comprehension

Students obtain the understanding of the basic laws of nature and through problem solving acquire the basics principles of analytical thinking.

Uporaba

Pridobljeno znanje fizikalnih osnov bo študentu omogočilo kritično ovrednotiti različne posege za zagotavljanje tehnične in požarne varnosti.

Application

The acquired knowledge of physics will enable the student to critically evaluate the different approaches to establish technical and fire safety.

Refleksija

Razmislek o urejenosti sistemov v naravi.

Analysis

In-depth analysis of system behaviour in nature.

Prenosljive spretnosti

Sposobnost samostojnega spremljanja novih spoznanj in literature na področju tehnične in požarne varnosti. Razumevanje fizikalnih meritev in sposobnost njihovega ovrednotenja. Kritičen odnos do standardov kakovosti in varnosti na področju varstva pri delu.

Skill-transference Ability

The ability to autonomously follow the latest advances and literature in the field of technical and fire safety. Understanding of physical measurements and the ability of their critical evaluation.

Metode poučevanja in učenja:

Predavanja Vaje

Learning and Teaching Methods:

Lectures Problem solving

Delež (v %) /

Načini ocenjevanja:

Weight (in %)

Assessment:

Izpit pisni in ustni. Ocene: 6-10 pozitivno. Vaje: Opravljen kolokvij.
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Written and oral exam. Grades: 6-10 Problem solving: written tests
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Reference nosilca / Lecturer's References:

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| <ol style="list-style-type: none"> 1. J.C. Everts and M. Ravnik, Ionically charged topological defects in nematic fluids, Phys. Rev. X 11, 011054 (2021) 2. S. Copar, J. Aplinc, Z. Kos, S. Zumer and M. Ravnik, Topology of Three-Dimensional Active Nematic Turbulence Confined to Droplets, Phys. Rev. X 9, 031051 (2019) 3. M. Ravnik, G. P. Alexander, J. M. Yeomans, and S. Žumer, Three-dimensional colloidal crystals in liquid crystalline blue phases, Proc. Natl. Acad. Sci. USA 108, 5188 (2011) |
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