Učni načrt Fizikalni eksperimenti 1 (Fizika 1. st.) po spremembah

Univerza v Mariboru

FAKULTETA ZA NARAVOSLOVJE IN MATEMATIKO
Koroška cesta 160
2000 Maribor, Slovenija
www.fnm.um.si

UČNI NAČRT PREDMETA / SUBJECT SPECIFICATION	
Predmet:	Fizikalni eksperimenti 1
Subject Title:	Physics experiments 1

Študijski program **Study programme**	**Študijska smer** **Study field**	**Letnik** **Year**	**Semester** **Semester**
Fizika Physics		1	**2**

Univerzitetna koda predmeta / University subject code:

Predavanja **Lectures**	**Seminar** **Seminar**	**Sem. vaje** **Tutorial**	**Lab. vaje** **Labor work**	**Teren. vaje** **Field work**	**Samost. delo** **Individ. work**	**ECTS**
			55		65	**4**

Nosilec predmeta / Lecturer: Andrej Dobovišek

Jeziki / **Languages:**	**Predavanja / Lecture:**	Slovenski/Slovene
	Vaje / Tutorial:	Slovenski/Slovene

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	**Prerequisits:**
Opravljene laboratorijske vaje iz osnovnih merjenj ali ekvivalentno. Potrebno je predznanje iz predmeta mehanika.	Done laboratory exercises on basic measurements or equivalent. Preknowledge of mechanics.

Vsebina:	**Content (Syllabus outline):**
Predavanja: teoretičen pregled vsebin laboratorijskih vaj. Študent opravi 15 laboratorijskih vaj s področja mehanike: kinematike, dinamike, hidrostatike in hidrodinamike. V projektni nalogi s področja mehanike študent obdela zahtevnejšo merilno tehniko in pripravi ali izdela zahtevnejši eksperiment in o njem poroča.	Lectures: theoretical overview of the experiments. Students perform 15 laboratory experiments from mechanics: kinematics, dynamics, hydrostatics, hidrodynamics. In scope of the project work each student studies an advanced measurement technique and builds an advanced experiment and reports on the project.

Temeljni literatura in viri / Textbooks:

1) Interna navodila za izvedbo vaj/ Guidelines for of the experiments
2) Sirkevič, Koškin: *Priročnik elementarne fizike*. Ljubljana: TZS, 1988.
3) D. Halliday, R. Resnick, J. Walker, Fundamentals of Physics, 5. izdaja, (John Wiley & Sons, Inc., New York, 1997)
4) J. Strnad, Fizika, 1. del, (DMFA, Ljubljana, 2002)

Cilji:	**Objectives:**
Študentje ponovijo in poglobijo znanje, pridobljeno na predavanjih iz mehanike, ki je neobhodno potrebno za uspešno izvedbo in razumevanje eksperimentalnih vaj. Pridobijo si primerne izkušnje in laboratorijske spretnosti, potrebne za samostojno delo pri demonstracijah in eksperimentalnih vajah. Navadijo se uporabljati ustrezno strokovno literaturo, svoje teoretično in računsko znanje in tudi druge informacijske vire. Usvojijo znanja, potrebna za pripravo kvantitativnega in kvalitativnega eksperimenta. Usposobijo se precizno in adekvatno poročati o svojih eksperimentalnih ugotovitvah.	Students refresh and extend their knowledge obtained from attending lectures of mechanics, especially topics that are essential for the successful and correct execution of laboratory work. Students also acquire experience and laboratory skills that is essential for an autonomous execution of demonstrative physics experiments related to above-outlined topics. Finally, they learn how to use their theoretical and practical knowledge, as well as information offered from secondary sources, to master problems that might occur during experimental work and report on their findings.

Predvideni študijski rezultati:	**Intended learning outcomes:**
Znanje in razumevanje: Razumevanje osnovnih procesov v naravi in sposobnost njihove demonstracije v primerno opremljenem laboratoriju. **Prenesljive/ključne spretnosti in drugi atributi:** Didaktični pristop pri obravnavi naravnih pojavov ter sposobnost prenesti znanje laiku; ali predlagati matematično ali fizikalno rešitev specifičnega problema, ter tako pripomoči k njegovi rešitvi in razvoju v raziskovalno orientiranem okolju.	**Knowledge and Understanding:** Understanding of basic processes in nature and the ability to demonstrate them in an appropriately equipped laboratory. **Transferable/Key Skills and other attributes:** A didactic approach to real-life phenomena and the ability to transfer this knowledge to a non-specialist; or to provide a detailed and accurate description of a particular problem and propose mathematically and physically motivated solutions, thus facilitating development in a research oriented environment.

Metode poučevanja in učenja:	**Learning and teaching methods:**
Metodika obsega: teoretičen uvod v obravnavano snov ter samostojno izvedbo eksperimentov pod mentorstvom profesorja.	They are based on: theoretical introduction to specific topics and an autonomous execution of experiments under the supervision of the professor.

Načini ocenjevanja:	Delež (v %) / Weight (in %)	**Assessment:**
Ustno preverjanje pripravljenosti na vaje	**10%**	Oral assessment of readiness for the forthcoming experiment
Opravljene eksperimentalne vaje	**20%**	Done laboratory experiments
Izdelana poročila o vajah	**10%**	Done laboratory reports
Ustni zagovori vaj	**20%**	Oral avocation of the experiments
Pisni kolokvij	**20%**	Written test
Projektna naloga	**20%**	Project work

Reference nosilca / Lecturer's references:

1. DOBOVIŠEK, Andrej, FAJMUT, Aleš, BRUMEN, Milan. Strategy for NSAID administration to aspirin-intolerant asthmatics in combination with PGE [sub] 2 analogue: a theoretical approach. *Med. biol. eng. comput.*. [Print ed.], 2012, vol. 50, no. 1, str. 33-42, doi:10.1007/s11517-011-0844-x. [COBISS.SI-ID 18845192]

2. DOBOVIŠEK, Andrej, ŽUPANOVIĆ, Paško, BRUMEN, Milan, BONAČIĆ LOŠIĆ, Željana, KUIĆ, Domagoj, JURETIĆ, Davor. Enzyme kinetics and the maximum entropy production principle. *Biophysical chemistry*. [Print ed.], 2011, vol. 154, iss. 2/3, str. 49-55, doi: 10.1016/j.bpc.2010.12.009. [COBISS.SI-ID 18206984]

3. DOBOVIŠEK, Andrej, FAJMUT, Aleš, BRUMEN, Milan. Role of expression of prostaglandin synthases 1 and 2 and leukotriene C [sub] 4 synthase in aspirin-intolerant asthma: a theoretical study. *Journal of pharmacokinetics and pharmacodynamics*, 2011, vol. 38, no. 2, str. 261-278, doi: 10.1007/s10928-011-9192-6. [COBISS.SI-ID 18203144]

4. ŽUPANOVIĆ, Paško, KUIĆ, Domagoj, JURETIĆ, Davor, DOBOVIŠEK, Andrej. On the problem of formulating principles in nonequilibrium thermodynamics. *Entropy (Basel, Online)*, 2010, vol. 12, no. 4, str. 926-931. http://www.mdpi.com/1099-4300/12/4/926/pdf, doi: 10.3390/e12040926. [COBISS.SI-ID 17555976]

5. BRUMEN, Milan, FAJMUT, Aleš, DOBOVIŠEK, Andrej, ROUX, Etienne. Mathematical modelling of Ca[sup]2+ oscillations in airway smooth muscle cells. *Journal of biological physics*, 2005, 31, str. 515-524. [COBISS.SI-ID 14363656]

6. FAJMUT, Aleš, DOBOVIŠEK, Andrej, BRUMEN, Milan. Mathematical modeling of the relation between myosin phosphorylation and stress development in smooth muscles. *J. chem. inf. mod.*, 2005, [Vol.] 45, str. 1610-1615. [COBISS.SI-ID 14353672]

7. FAJMUT, Aleš, DOBOVIŠEK, Andrej, BRUMEN, Milan. Mathematical modelling in aspirin-induced asthma : theory and clinical applications. V: BISLIMI, Adelina H. (ur.), TOLKA, Lulezime C. (ur.). *Asthma : causes, complications and treatment*, (Pulmonary and respiratory diseases and disorders). New York: Nova Science Publishers, cop. 2012, str. 1-32. [COBISS.SI-ID 19556360]