



Univerza v Mariboru

Fakulteta za naravoslovje  
in matematiko

**UČNI NAČRT PREDMETA / COURSE SYLLABUS**

**Predmet:** Fizikalni eksperimenti 1  
**Course title:** Physics experiments 1

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	/	1	2
Five-year master's degree program Subject Teacher	/		

**Vrsta predmeta / Course type**

Obvezni/Obligatory

**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
			40		50	3

**Nosilec predmeta / Lecturer:**

Dobovišek Andrej

**Jeziki /**

**Predavanja / Lectures:**

slovenski/Slovene

**Languages:**

**Vaje / Tutorial:**

slovenski/Slovene

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

**Prerequisites:**

Opravljenе 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: kinematika, dinamika, hidrostatične in hidrodinamike.

V projektni nalogi s področja mehanike študent obdeli 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, hydrodynamics.

In scope of the project work each student studies an advanced measurement technique and builds an advanced experiment and reports on the project.

### Temeljna literatura in viri / Readings:

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 in kompetence:

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.

#### Objectives and competences:

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 aboveoutlined 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:

##### 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

#### Intended learning outcomes:

##### 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

problema, ter tako pripomoči k njegovi rešitvi in razvoju v raziskovalno orientiranem okolju.

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 %) /

**Assessment:**

Weight (in %)

Način (pisni izpit, ustno izpraševanje, naloge, projekt)		Type (examination, oral, coursework, project):
Ustno preverjanje pripravljenosti na vaje	<b>10%</b>	Oral assessment of readiness for the forthcoming experiment
Opravljene eksperimentalne vaje		Done laboratory experiments
Izdelana poročila o vajah	<b>20%</b>	Done laboratory reports
Ustni zagovori vaj	<b>10%</b>	Oral avocation of the experiments
Pisni kolokvij	<b>20%</b>	Written test
Projektna naloga	<b>20%</b>	Project work
	<b>20%</b>	

**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+</sup> oscillations in airway smooth muscle cells. Journal of biological physics, 2005, 31, str. 515-524. [COBISS.SI-ID 14363656]