



Univerza v Mariboru

Fakulteta za naravoslovje
in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	Uporabna fizika
Course title:	Applied Physics

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		5	9
Five-year master's degree program Subject Teacher			

Vrsta predmeta / Course type

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
15				45	60	4

Nosilec predmeta / Lecturer:

Jeziki / Languages:	Predavanja / Lectures:	<input type="text" value="Slovenski/Slovene"/>
	Vaje / Tutorial:	<input type="text" value="Slovenski/Slovene"/>

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

Prerequisites:

Vsebina:

Na predavanjih bodo predstavljene aktualne vsebine iz fizike in primeri uporabe fizike v praksi. Predstavljene bodo možnosti uporabe fizike v najrazličnejših področjih gospodarstva in vsakdanjega življenja. Študenti bodo dobili pregled nad osnovnimi fizikalnimi principi in tehnološkimi izvedbami različnih aparatov in merilnih tehnik ter možnosti njihovega nadaljnega razvoja. V okviru terenskih vaj bodo organizirani ogledi in strokovne ekscurzije po Sloveniji in v tujini. Študenti

Content (Syllabus outline):

In theoretical part will be presented topical themes of physics and examples of use of physics in practice. There will be presented possibilities of application of physics in different fields of economy and everyday living.

There will be presented basic overview of physical Principle and technologic applications of different equipment, measurement techniques and possibility of their future development. In part of the field work will be organised visits and expert excursions in Slovenia or abroad. Students will visit companies,

bodo obiskali podjetja, inštitute, bolnišnice, observatorije, laboratorije in druge inštitucije, kjer se bodo seznanili z vsebinami in tehnološkimi procesi uporabne fizike, kot npr. laserska tehnika, NMR, radiologija in podobno.

institutes, hospitals, observatories, laboratories and other institutions, where will be introduced with applied physics and technological process corresponding with applied physics, like for example, laser technique, NMR, radiology etc..

Temeljni literatura in viri / Readings:

- 1) Obravnavane teme se bodo vsako leto spreminjale, zato bodo aktualni temeljni viri osredovani na predavanjih. Nekatera gradiva bodo sproti objavljena tudi na spletnih straneh Oddelka za fiziko <http://www.fizika.uni-mb.si/> The topics will be different each year. The relevant textbooks will thus be given at the lectures. Some of the teaching material will also be published on the website of the Department of Physics <http://www.fizika.uni-mb.si/>
- 2) D. Ewen, R. Nelson, N. Schurter, E. Gundersen, Applied Physics, Prentice Hall, 2005.
- 3) A. Beiser, A. Beiser, Schaum's Outline of Applied Physics, McGraw-Hill Companies, 2004.
- 4) G. S. Romine, Applied Physics: Concepts into Practice, Prentice-Hall, Inc, 2001.
- 5) N. C. Harris; E. M. Hemmerling, Introductory applied physics, McGraw-Hill, 1972.

Cilji in kompetence:

Študentje osvojijo praktična znanja in izkušnje, potrebna za kompleksnejše razumevanje fizikalnih pojavov, procesov in reševanje fizikalnih problemov na različnih delovnih področjih in v aplikacijah. Osvojijo sposobnost prenašati teoretično fizikalno znanje v uspešne fizikalne aplikacije.

Objectives and competences:

Students achieve practical knowledge and experiences that are necessary for complex understanding of physical phenomena, processes and solving physical problems in different fields of activities and in applications. Students conquest ability to transfer theoretical physical knowledge into physical applications.

Predvideni študijski rezultati:

Intended learning outcomes:

Znanje in razumevanje:

Osvojiti praktična znanja in izkušnje na različnih delovnih področjih in v aplikacijah, kjer je mogoče znanje fizike koristno uporabiti.

Knowledge and understanding:

Achievement of practical knowledge and experiences in different fields of activities and in applications, where is possibility for advantageous use of physics knowledge.

Prenesljive/ključne spretnosti in drugi atributi:

Predlagati matematično ali fizikalno rešitev specifičnega fizikalnega problema ter tako

Transferable/Key Skills and other attributes:

To propose mathematically and physically motivated solutions of physical problem, thus facilitating development in a physical application.

pri pomoči k njegovi rešitvi in razvoju v določeni aplikaciji.

Metode poučevanja in učenja:

Learning and teaching methods:

Metodika obsega: teoretična predavanja, terensko delo ter spoznavanje aplikativne uporabe fizikalnih znanj.

They are based on: theoretical lectures, fieldwork and recognition of applicative use of physical knowledge.

Načini ocenjevanja:

Delež (v %) /

Assessment:

Weight (in %)

Način (pisni izpit, ustno izpraševanje, naloge, projekt)		Type (examination, oral, coursework, project):
Ustni izpit	50	Oral exam
Seminarska naloga	50	Seminar work

Reference nosilca / Lecturer's references:

SLAVINEC, Mitja, CRAWFORD, G. D., KRALJ, Samo, ŽUMER, Slobodan. Determination of the nematic alignment and anchoring strength at the curved nematic-air interface. *J. appl. phys.*, 1997, vol. 81, str. 2153-2156. [COBISS.SI-ID 5769736]

SLAVINEC, Mitja, KRALJ, Samo. Annihilation of nematic point defects within a cylindrical tube = Anihilacija nematičnih točkovnih defektov v cilindrični kapilari. *Znan. rev. (Maribor)*, 1997, letn. 9, št. 1, str. 19-25, ilustr. [COBISS.SI-ID 77702144]

SLAVINEC, Mitja, KRALJ, Samo, ŽUMER, Slobodan. Formation of edge dislocations in the surface constrained smectic a film. *Mol. cryst. liq. cryst. sci. technol., A Mol. cryst. liq. cryst.*, 2000, vol. 351, str. 153-160, ilustr. [COBISS.SI-ID 10579464]

SLAVINEC, Mitja, KRALJ, Samo, ŽUMER, Slobodan, SLUCKIN, T. J. Surface depinning of smectic-A edge dislocations. *Phys. rev., E Stat. phys. plasmas fluids relat.*, 2001, 63, str. 031705-1-031705-6. [COBISS.SI-ID 1277796]

SVETEC, Milan, SLAVINEC, Mitja. Structural transition of nematic liquid crystal in cylindrical capillary as a result of the annihilation of two point defects. *J. chem. phys.*, 2008, vol. 128, no. 8, str. 084704-1-084704-6, ilustr. <http://link.aip.org/link/?JCPSA6/128/084704/1>, <http://dx.doi.org/10.1063/1.2839301>. [COBISS.SI-ID 15899400]