Univerza v Mariboru

Fakulteta za naravoslovje in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS	
Predmet:	**Korelacijski projekti**
Course title:	**Correlative projects**

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
FIZIKA		**1**. ali 2.	**2. ali 3.**
PHYSICS		1. or 2.	**2. or 3.**

Vrsta predmeta / Course type

Izbirni iz nabora Fizikalno - didaktični predmeti za modul Izobraževalne fizike 2, 3

Univerzitetna koda predmeta / University course code:

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Lab. vaje Laboratory work	Mentorstvo Mentorship	Samost. delo Individ. work	ECTS
7	**3**				**290**	**10**

Nosilec predmeta / Lecturer: **Aleš Fajmut**

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

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

Ni posebnih zahtev.

Prerequisits:

None.

Vsebina:

Predavanja:

Sodobni pogled na fiziko in naravoslovne znanosti ter sodobni trendi v poučevanju fizike.

Content (Syllabus outline):

Lectures:

Modern view on the Physics and Natural sciences and new trends in Physics education.

Sodobne interdisciplinarne vede, njihovo področje delovanja in vloga fizike v njih. Zakaj, kako, kdaj in kje vpletati: - nekonvencionalne vsebine - interdisciplinarne vsebine - vsebine s področja aktualnih raziskav v fiziki - vsebine s področja tehnike, medicine in zdravstva, naravoslovja, astronomije, aplikativne fizike v formalno in neformalno poučevanje fizike na vseh nivojih izobraževanja. Izzivi in nevarnosti. Metodologija vključevanja sodobnih fizikalnih vsebin v poučevanje fizike. Analiziranje in vrednotenje uporabe korelacijskih projektov za pouk fizike. Seminar: Konkretni primeri izvedbe korelacijskih projektov in njih predstavitev.	Modern interdisciplinary sciences, their field of interest and the role of physics in them. Why, how, when and where to apply: - unconventional topics - interdisciplinary topics - topics from the fields of up-to-date research in physics - topics from the fields of technology, medicine and health sciences, science, astronomy, applicative physics in formal and informal curriculum of Physics at all levels of education. Chalanges and threats. Methodology of application of modern topics in Physics eduaction. Analysis and evaluation of the correlative projects in Phyiscs education Seminar: Case study of correlative projects and their presentation.

Temeljni literatura in viri / Readings:

1) E. Boeker, R. van Grondelle, Environmental physics, 2. ed., John Wiley & Sons, Inc., New York, 2000 2. P. R. Bergethon: The Physical Basis of Biochemistry. The Foundations of Molecular Biophysics, Springer, New York 1998
2) G. B: Benedek, F. M. H. Villars: Physics with Illustrative Examples from Medicine and Biology: Mechanics, Statistical Physics, Electricity and Magnetism, Springer, New York 2000
3) D. C. Giancoli, Physics 4th ed., Prentice Hall, New Jersey, 1995
4) P. P. Urone: Physics with health science applications. John Wiley, New York 1986
5) P. Davidovits: Physics in Biology and Medicine (2. izdaja). Academic Press, San Diego 2001
6) Revije: Physics Teacher, Physics Education, Technology&Learning, Computers&Education, Educational Technilogy in slovenske fizikalne, računalniške ter didaktične revije.

Cilji in kompetence:	**Objectives and competences:**
Študent/ka: - pridobi dodatno znanje in poglobi obstoječe znanje o korelacijskih projektih izobraževalne fizike za izboljšanje kakovosti učenja in poučevanja fizike v osnovnih in srednjih šolah ter na univerzi.	A student: - Gains additional knowledge and deepens the existing one about correlative projects in physics education for improvement of physics teaching and physics education quality in primary and secondary schools and universities.

- se usposobi za samostojno razvojno-raziskovalno delo na področju inovativnih projektov.	- Is qualified for advanced independent development and research work on the field of correlative projects.

Predvideni študijski rezultati:	**Intended learning outcomes:**
Znanje in razumevanje: • Poglobljeno poznavanje in razumevanje didaktike fizike. • Poglobljeno znanje in razumevanje raziskovanja fizikalno-didaktičnih procesov • Poglobljeno poznavanje modernih fizikalnih in interdisciplinarnih vsebin ter področij aktualnega raziskovanja Prenesljive/ključne spretnosti in drugi atributi: • Sposobnost kritične uporabe znanstvenih in strokovnih spoznanj s področja didaktike fizike. • Sposobnost samostojnega raziskovanja v didaktiki fizike. • Samostojnost v razvijanju novih znanj, rešitev in idej za vpletanje interdisciplinarnih in sodobnih vsebin v poučevanje fizike.	Knowledge and understanding: • Deeper knowledge and understanding of the didactics of physics. • Deeper knowledge and understanding of research processes in didactics of physics. • Deeper knowledge of modern topics from Physics and interdisciplinary sciences and up-to-date research Transferable/Key Skills and other attributes: • The ability of critical use and application of scientific and professional findings from the field of didactics of physics. • The ability of independent research in didactics of physics. • Self-independence in developing novel knowledge, solutions and ideas for application of interdisciplinary and modern topics in Physics Education.

Metode poučevanja in učenja:	**Learning and teaching methods:**
predavanja obravnava študijskih primerov z diskusijo, projektno delo multimedijska predstavitev	interactive lectures case studies discussion, project work, multimedia presentation

Načini ocenjevanja:	Delež (v %) / Weight (in %)	**Assessment:**
Način (pisni izpit, ustno izpraševanje, naloge, projekt)		Type (examination, oral, coursework, project):
• Projektna naloga • Ustni izpit	**50%** **50%**	• Project • Oral examination

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. *Medical & biological engineering & computing*, ISSN 0140-0118. [Print ed.], 2012, vol. 50, no. 1, str. 33-42, doi: 10.1007/s11517-011-0844-x. [COBISS.SI-ID 18845192]

2. 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*, ISSN 1567-567X, 2011, vol. 38, no. 2, str. 261-278, doi: 10.1007/s10928-011-9192-6. [COBISS.SI-ID 18203144]

3. FAJMUT, Aleš, BRUMEN, Milan. MLC-kinase/phosphatase control of Ca[sup]2+ signal transduction in airway smooth muscles. *Journal of theoretical biology*, ISSN 0022-5193, 2008, vol. 252, no. 3, str. 474-481. http://dx.doi.org/10.1016/j.jtbi.2007.10.005, doi: 10.1016/j.jtbi.2007.10.005. [COBISS.SI-ID 15856392]

4. FAJMUT, Aleš, BRUMEN, Milan, SCHUSTER, Stefan. Mathematical modelling of the interactions between Ca[sup]2+, calmodulin and myosin light chain kinase. *FEBS letters*, ISSN 0014-5793. [Print ed.], 2005, 579, str. 4361-4366. [COBISS.SI-ID 14189576]

5. FAJMUT, Aleš, JAGODIČ, Marko, BRUMEN, Milan. Mathematical modeling of the myosin light chain kinase activation. *Journal of chemical information and modeling*, ISSN 1549-9596. [Print ed.], 2005, [Vol.] 45, str. 1605-1609. [COBISS.SI-ID 14354184]