



Univerza v Mariboru

Fakulteta za naravoslovje
in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	Znanstveno-raziskovalno delo v fizikalnem izobraževanju z osnovami pedagoške statistike
Course title:	Scientific-research work in physics education with basics of pedagogical statistics

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	/	4,5	7,9
Five-year master's degree program Subject Teacher	/		

Vrsta predmeta / Course type

Izbirni / Optional

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
30		15			75	4

Nosilec predmeta / Lecturer:

Robert Repnik

Jeziki / Predavanja / Lectures: slovenski / slovene

Languages: Vaje / Tutorial: slovenski / slovene

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

Osnovna znanja iz didaktike fizike.

Prerequisites:

Basic knowledge of didactics of physics

Vsebina:**Predavanja:**

- Uvod.
- Razvoj raziskav v izobraževanju fizike
- Raziskovalne paradigme in socialna perspektiva
- Etična perspektiva raziskovanja
- Osnove raziskovalnega dela v poučevanju fizike
- Iskanje in obravnava literature
- Raziskovalne strategije: študije primera in pedagoški eksperimenti

Laboratorijske vaje:

- Kvalitativne, kvantitativne in kombinirane raziskovalne metode, raziskovalne strategije in statistika
- Planiranje, pridobivanje podatkov, analiza podatkov, ugotavljanje zaključkov, raziskovalno delo, poročila in publikacije
- Primeri in sodobni problemi pri uporabi raziskovalnih metod na področju izobraževanja fizike (vprašalniki, intervjuji, opazovanje, raziskovanje biografij,...)
- Nacionalni in mednarodni raziskovalni projekti

Content (Syllabus outline):**Lectures:**

- Introduction.
- The development of physics education research
- Research paradigms and social perspectives
- An ethical approach to research
- Getting started: beginning a research project in physics education
- Accessing and using literature
- Research strategies: case studies and pedagogical experiments

Seminar work:

- Qualitative, quantitative and mixed research approaches, research strategies, statistics
- Planning, process of data collection, data analysis, concluding, research work reports and publications
- Examples and new problems in using research methods in the field of physics education (questionnaires, interviews, observation, research of biographies...)
- National and international research projects

Temeljni literatura in viri / Readings:

- **BURTON, Diana, BARTLETT, Steve. Key issues for education researchers, Sage Publications Ltd., London UK, 2009**
- **FRAENKEL, Jack R., WALLEN, Norman E., HYUN, Hellen H.. How to design and evaluate Research in Education, McGraw-Hill Companies Inc., New York, USA, 2012**
- **NEWBY, Peter. Research Methods for Education, Pearson Education Ltd., Harlow, Essex, UK, 2010**
- **ČAGRAN, Branka. Univariatna in multivariatna analiza podatkov : zbirka primerov uporabe statističnih metod s SPSS. Maribor: Pedagoška fakulteta, 2004**
- **IVANUŠ-GRMEK, Milena, ČAGRAN, Branka, SADEK, Lidija. Eksperimentalna študija primera pri pouku spoznavanja okolja. 1. natis. Ljubljana: Pedagoški inštitut, 2009**

Cilji in kompetence:**Objectives and competences:**

Cilj predmeta je, da študenti spoznajo znanstveno-raziskovalno delo v fizikalnem izobraževanju, razumejo njegov pomen in cilje. Študenti poznajo in znajo uporabljati raziskovalne metode za lastno znanstveno-raziskovalno delo v fizikalnem izobraževanju.

The objective of this course is to acquaint students with scientific research in physics education and give them an understanding of the goals of the research. Students should learn how to use different research methods in their own research work in physics education.

Predvideni študijski rezultati:

Intended learning outcomes:

Znanje in razumevanje:

Po zaključku tega predmeta bo študent sposoben

- razumeti namen in cilje znanstveno-raziskovalnega dela v fizikalnem izobraževanju,
- organizirati in izvajati znanstvene raziskave v fizikalnem izobraževanju,
- aktivno razvijati področje znanstveno-raziskovalnega dela v fizikalnem izobraževanju.

Knowledge and understanding:

On completion of this course the student will be able to

- understand goals of scientific research in physics education,
- organise and conduct scientific research in physics education
- actively contribute to development of scientific research in the field of physics education

Prenesljive/ključne spretnosti in drugi atributi:

- Spretnosti komuniciranja: pisno izražanje pri pripravi poročila o raziskavi ter usvojene veščine javnega nastopanja ob predstavitvi raziskave.
- Uporaba informacijske tehnologije: uporaba računalnika in elektronskih informacijskih virov pri iskanju literature in relevantnih informacij.
- Reševanje problemov: organiziranje in izvedba raziskave v fizikalnem izobraževanju, časovno in vsebinsko načrtovanje raziskave, sposobnost razrešitve in interpretacije zastavljenega raziskovalnega problema.

Transferable/Key Skills and other attributes:

- Communication skills: writing skills when preparing report on research project and public performance skills when presenting the work
- Use of information technology: use of computer and on-line information sources when searching for literature and relevant information.
- Problem solving: organisation and conduct of research in physics education, time and content planning, ability to solve and interpret a chosen research problem.

Metode poučevanja in učenja:

Learning and teaching methods:

- Predavanja
- Seminarske vaje

- Lectures
- Seminar work

Delež (v %) /

Načini ocenjevanja:**Weight (in %)****Assessment:**

• pisno poročilo o raziskavi	50 %	• written examination
• nastop (predstavitev raziskave)	30 %	• oral examination
• ustni izpit	20 %	• completed coursework

Reference nosilca / Lecturer's references:

REPNIK, Robert, MATHELITSCH, Leopold, SVETEC, Milan, KRALJ, Samo. Physics of defects in nematic liquid crystals. *Eur. j. phys.*, 2003, 24, str. 481-491, ilustr. [COBISS.SI-ID [12755208](#)], [JCR, WoS do 21. 9. 2013: št. citatov (TC): 18, čistih citatov (CI): 15, normirano št. čistih citatov (NC): 26, Scopus do 21. 9. 2013: št. citatov (TC): 18, čistih citatov (CI): 12, normirano št. čistih citatov (NC): 20]

PLOJ VIRTič, Mateja, REPNIK, Robert. Improving quality of the educational process by raising teachers' communication skills. V: LAMANAUSKAS, Vincentas (ur.). *Philosophy of mind and cognitive modelling in education - 2012*, (Problems of education in the 21st century, vol. 46). Siauliai: Scientific Methodological Center Scientia Educologica, 2012, str. 109-115. [COBISS.SI-ID [19493128](#)]

GERLIČ, Ivan, REPNIK, Robert. Conceptual learning of physics in Slovenian primary schools. V: LAMANAUSKAS, Vincentas (ur.). *Challenges of science, mathematics and technology teacher education in Slovenia*, (Problems of education in the 21st century, vol. 14). Siauliai: Scientific Methodological Center Scientia Educologica, 2009, str. 65-69. [COBISS.SI-ID [17352968](#)]

RIBIČ, Alenka, REPNIK, Robert. Primerjava dveh metod poučevanja astronomskih vsebin v astronomskem krožku = Comparison of two methods of teaching astronomical content in astronomical club. V: DUH, Matjaž (ur.), AMBROŽIČ-DOLINŠEK, Jana. *Okoljsko izobraževanje za 21. stoletje : znanstvena monografija*. V Mariboru: Pedagoška fakulteta; Rakičan: RIS Dvorec, 2013, str. 228-241. [COBISS.SI-ID [19791112](#)]

REPNIK, Robert, KAUČIČ, Branko, KRAŠNA, Marjan. E-Learning in the modern curriculum development. V: GHISLANDI, Patrizia (ur.). *Elearning - theories, design, software and applications*. Rijeka: InTech, cop. 2012, str. 213-226, ilustr. <http://www.intechopen.com/books/elearning-theories-design-software-and-applications/e-learning-in-the-modern-curriculum-development>. [COBISS.SI-ID [19185928](#)]