Univerza v Mariboru

Fakulteta za naravoslovje in matematiko

| UČNI NAČRT PREDMETA / COURSE SYLLABUS | |
|---|---|
| **Predmet:** | Didaktika matematike |
| **Course title:** | Didactics of mathematics |

| Študijski program in stopnja<br>Study programme and level | Študijska smer<br>Study field | Letnik<br>Academic year | Semester<br>Semester |
|---|---|---|---|
| **Matematika, 3. stopnja** | | **1. ali 2.** | **1. ali 2. ali 4.** |
| **Mathematics, 3rd Degree** | | **1st or 2nd** | **1st or 2nd or 4th** |

**Vrsta predmeta / Course type** obvezni ali izbirni/obligatory or elective

**Univerzitetna koda predmeta / University course code:**

| Predavanja<br>Lectures | Seminar<br>Seminar | Vaje<br>Tutorial | Klinične vaje<br>work | Druge oblike študija | Samost. delo<br>Individ. work | ECTS |
|---|---|---|---|---|---|---|
| **60** | | | | | **240** | **10** |

**Nosilec predmeta / Lecturer:** Alenka Lipovec

| **Jeziki / Languages:** | |
|---|---|
| **Predavanja / Lectures:** | Slovenski / Slovene |
| **Vaje / Tutorial:** | Slovenski / Slovene |

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

Znanje osnovnih pojmov iz didaktike matematike.

**Prerequisits:**

Basic knowledge of fundamental notions in didactics of mathematics.

**Vsebina:**

**Content (Syllabus outline):**

| | |
|---|---|
| Didaktika matematike kot znanstvena disciplina.<br><br>Koncepti sodobne didaktike matematike.<br><br>Pedagoško raziskovanje in metodologija. Analiza sodobnih raziskav s področja didaktike matematike.<br><br>Teorije učenja. Učenje matematike. Učno okolje.<br><br>Znanstvene paradigme in sodobne teorije.<br><br>Sodobne teorije reševanja problemov. Metodologije raziskovanja sposobnosti reševanja problemov.<br><br>Izobraževanje učiteljev. Prepričanja in odnos do matematike. Profesionalna rast učitelja.<br><br>Odprti problemi. Prioritete v mednarodnih raziskavah pouka matematike.<br><br>Nekatere izmed teh tem so obdelane podrobneje, druge pa le na osnovni ravni. Pri izboru se upoštevajo interesi in raziskovalne usmeritve študentov. | Didactics of mathematics as a scientific discipline.<br><br>Concepts in modern didactics of mathematics.<br><br>Research design and methodology. Analysis of contemporary research in didactics of mathematics,<br><br>Learning theories. Learning mathematics. Learning environment.<br><br>Scientific paradigms and modern theories.<br><br>Contemporary problem solving theories. Research design for exploring problem solving abilities.<br><br>Teacher training. Attitudes toward and beliefs about mathematics. Teachers' professional development.<br><br>Open problems. Priorities in international didactics of mathematics research.<br><br>Some of these topics are treated in greater detail and the others only at a basic level. The selection depends on students' interests and their research orientation. |

**Temeljni literatura in viri / Readings:**


Handbook of International Research in Didactics of Mathematics. LEA, 2002
P. Clakson, N. Presmeg (Ur.), Critical Issues in Mathematics Education. Springer, 2008.
D. De Bock, W. Van Dooren, D. Janssens, L. Verschaffel, The Illusion of Linearity. Springer, 2007.
J. Mason, Fundamental Constructs in Mathematical Education. Rutledge, 2004.
F.-L. Lin, T.J. Cooney, (Ur.), Making Sense of Mathematics Teacher Education. Kluwer Academic Publishers, 2001.
A. Orton, Learning Mathematics: Issues, Theory and Classroom Practice, Third Edition. Continuum, 2004.


| **Cilji in kompetence:** | **Objectives and competences:** |
|---|---|
| • Doseči poglobljeno razumevanje teoretskih in metodoloških konceptov s področja didaktike matematike<br>• Razviti sposobnost samostojnega razvijanja novega znanja s področja didaktike matematike<br>• Razviti sposobnost za samostojno reševanje najzahtevnejših problemov iz didaktike matematike<br>• Razviti sposobnost izboljševanja znanih in odkrivanja novih rezultatov s področja didaktike matematike<br>• Zmožnost razvijanja kritične refleksije na področju didaktike matematike<br>• Razviti zmožnost vodenja najzahtevnejših znanstvenoraziskovalnih projektov s širšega področja didaktike matematike. | • To achieve a deeper understanding of theoretical and methodological concepts of didactics of mathematics<br>• To develop the ability to independently develop new knowledge in the field of didactics of mathematics<br>• To develop the ability for solving the most challenging problems in didactics of mathematics<br>• To develop the ability of improving known results as well as obtaining new results in didactics of mathematics<br>• Ability to develop critical reflection in didactics of mathematics<br>• To develop the ability to lead the most challenging scientific research projects in the wider field of didactics of mathematics |

| **Predvideni študijski rezultati:** | **Intended learning outcomes:** |
|---|---|
| Znanje in razumevanje:<br>• poznavanje osnovnih področij didaktike matematike;<br>• razumevanje osnovnih pojmov didaktike matematike.<br><br>Prenesljive/ključne spretnosti in drugi atributi:<br>• podlaga za raziskovalno delo na področju didaktike matematike;<br>• spretnosti komuniciranja; uporaba informacijske tehnologije; delo v skupini. | Knowledge and understanding:<br>• knowledge of basic topics in didactics of mathematics;<br>• understanding fundamental concepts of didactics of mathematics.<br><br><u>Transferable/Key Skills and other attributes:</u><br>• a basis for research in didactics of mathematics; communication skills; use of information technology; team work. |

| **Metode poučevanja in učenja:** | **Learning and teaching methods:** |
|---|---|
| predavanja;<br>priprava seminarja;<br>konzultacije;<br>samostojni študij. | lectures;<br>seminar work;<br>consultations;<br>self-study. |

| **Načini ocenjevanja:** | Delež (v %) / Weight (in %) | **Assessment:** |
|---|---|---|
| Način (pisni izpit, ustno izpraševanje, naloge, projekt)<br>seminarsko predavanje;<br>pisni izdelek;<br>ustni izpit. | <br><br><br>**20 %**<br>**30 %**<br>**50 %** | Type (examination, oral, coursework, project):<br>seminar talk;<br>written work;<br>oral examination. |

**Reference nosilca / Lecturer's references:**


**1.** BEZGOVŠEK VODUŠEK, Helena, LIPOVEC, Alenka. The square as a figural concept = O quadrado como conceito figural. *Bolema*, ISSN 1980-4415, 2014, vol. 28, no. 48, str. 430
**2.** LIPOVEC, Alenka, PODGORŠEK, Manja, ANTOLIN, Darja. Točka kontrole in osredotočenost študentov razrednega pouka. *Pedagoška obzorja*, ISSN 0353-1392, 2013, letn. 28, [št.] 3/4, str. 157-170.
**3.** ANTOLIN, Darja, LIPOVEC, Alenka. Postavljanje podpore v okviru vključevanja staršev matematikov v matematično izobraževanje njihovih otrok = Scaffolding as part of parental involvement of mathematicians in their children's mathematics education.*Revija za elementarno izobraževanje*, ISSN 1855-4431, apr. 2013, letn. 6, št. 1, str. 43-56.
**4.** LIPOVEC, Alenka, ANTOLIN, Darja. Slovenian pre-service teachers' prototype biography. *Teaching in higher education*, ISSN 1356-2517. [Print ed.], 2013, str. 1-11.
**5.** NUDL, Andreja, BREZOČNIK, Dejan, LIPOVEC, Alenka, ANTOLIN, Darja. Struktura zastopanosti matematičnih dejavnosti v slovenskih vrtcih = The structure of mathematical activities in Slovenian kindergartens. *Matematika v šoli*, ISSN 1318-010X, 2012, letn. 18, št. 1/2, str. 5-14.