Univerza v Mariboru

Fakulteta za naravoslovje
in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS	
Predmet:	**Didaktika osnovnošolske matematike**
Course title:	Didactics of Elementary School Mathematics

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	**/**	**3.**	**5.**
Five-year master's degree program Subject Teacher	**/**		

Vrsta predmeta / Course type	Obvezni / compulsory
Univerzitetna koda predmeta / University course code:	

Predavanja Lectures	Seminar Seminar	Sem. vaje Tutorial	Lab. vaje Laboratory work	Teren. vaje Field work	Samost. delo Individ. work	ECTS
45		**30**			**105**	**6**

Nosilec predmeta / Lecturer:	Alenka LIPOVEC

Jeziki / Languages:	**Predavanja / Lectures:**	SLOVENSKO / SLOVENE
	Vaje / Tutorial:	SLOVENSKO / SLOVENE

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	**Prerequisits:**
Ni pogojev.	There are no prerequisities.

Vsebina:	**Content (Syllabus outline):**
– Matematična pismenost, cilji pouka matematike. – Razumevanje temeljnih matematičnih pojmov in postopkov, tipi in taksonomija matematičnega znanja, reprezentacije matematičnih pojmov, ponazorila. – Razvojno usmerjeno, na učenca osredotočeno poučevanje, motivacija, vprašanja pri pouku matematike, poučevanje skozi reševanje problemov. – Didaktični elementi izvajanja pouka matematike (oblike in metode dela, didaktična načela, pisna priprava …) in didaktično načrtovanje (dolgoročno in kratkoročno). – Šolska zakonodaja, vodenje pedagoške dokumentacije v osnovni šoli.	– Mathematical literacy, goals of school mathematics. – Understanding of fundamental mathematical concepts and procedures, types and taxonomy of mathematical knowledge, representation of mathematical concepts, manipulatives. – Developmentally oriented, student centred teaching, motivation, questions in mathematics classrooms, problem based teaching. – Didactic elements of mathematics education (forms and methods of instruction, didactic principles, lesson planning model, educational references and resources …), and didactical planning (long- and short-range). – School legislation and pedagogical documentation in elementary school.

– Učni načrt za matematiko v osnovni šoli, , učbeniki in drugi viri, IKT. – Princip enakosti, diferenciacija v osnovni šoli, prilagoditve za učence s težavami in za matematično obetavne učence. – vrednotenje znanja v osnovni šoli, – izbrane vsebine osnovnošolske matematike od 6. do 9.razreda.	– Mathematics curriculum in elementary school, textbooks and other taching rsorces, ICT. – Equality principle, differentiation in elementary school, addaptations for struggling and promissing students. – Assessment in elementary school. – Selected topics of elementary school mathematics from 6th to 9th grade.

Temeljni literatura in viri / Readings:

Van de Walle, J. A., Karp, K. S.,Bay-Williams, J. M. (2015). *Elementary and middle school mathematics. Teaching Developmentally.* Boston [etc.] : Pearson.
Učni načrt za osnovno šolo, učbeniki, priročniki in druga učna gradiva za osnovno šolo.
Aktualni viri.

Cilji in kompetence:	**Objectives and competences:**
Namen predmeta je študente usposobiti za uporabo principov didaktike matematike, ki jih potrebujejo za uspešno poučevanje matematike v osnovni šoli. Študent/ka: – izkazuje suveren in kritičen odnos do šolske matematike, – uporablja logično zaporedje, ki modelira strategije reševanja problemov pri pouku matematike, – načrtuje razvoj matematičnega znanja pri pouku, – uporablja tehnologijo pri pouku matematike, – prepozna učne težave, ki so posledica večjezičnostji, multikulturnostji, prikrajšanosti, idr., – evalvira lastno poučevanje matematike. Prenosljive/ključne spretnosti in drugi atributi: - *Spretnosti komuniciranja:* ustna in pisna matematična komunikacija, ki sledi splošnim jezikovnim normam. - *Uporaba informacijske tehnologije:* uporaba programskih orodij in aplikacij pri pouku matematike - *Reševanje problemov:* sposobnost reševanja izobraževalno matematičnih problemov. - *Računska pismenost:* reševanje šolskih matematičnih problemov. – *Delo v skupini:* priprava in izvedba timskega pouka.	The course aims are to train students in the application of the principles of mathematics didactics, which they need for successful mathematics teaching in elementary school. Students: – demonstrate sovereign and critical attitude towards school mathematics, – apply a logical sequence of problem-solving strategies in classrooms, – plan to develop mathematical knowledge in classes, – use technology in school mathematics, – recognize the learning difficulties as a result of multilingualism, multiculturalism, deprivation, et al., – evaluate himself as a teacher of mathematics.- Transferable/Key Skills and other attributes: - *Communication skills:* oral and written mathematical communication that complies with general language norms. - *Use of information technology: the* use of software tools and applications in mathematics. - *Problem-solving:* ability to solve educational problems in school mathematics. - *Numeracy*: solving school mathematical problems. *Teamwork:* designing and carrying out collaborative lessons.

Predvideni študijski rezultati:	**Intended learning outcomes:**
Znanje in razumevanje: Po zaključku tega predmeta bo študent sposoben: – presojati primerne aktivnosti za razvijanje matematične pismenosti, – uporabljati temeljne pojme didaktike matematike (reprezentacije, tipi znanja, taksonomija) v realnih situacijah, – pojasniti zgradbo učnega načrta za matematiko, – kritično presojati učne vire pri pouku matematike, – identificirati aktivnosti za razvoj problemskih znanj, – uporabljati programska orodja pri pouku matematike, – ustvariti metodično sekvenco za matematične pojme, ki se razvijejo v osnovni šoli, – načrtovati vključevanje kognitivnega konflikta v metodične sekvence, – klasificirati pristope glede na teme in sklope v učnem načrtu, – izpostaviti temeljne ideje vsebinskih sklopov, – izdelati vrednotenja znanja za pouk matematike, – razviti in izvesti timski pouk matematike, – samoevalvirati učinkovitost poučevanja matematike.	Knowledge and Understanding: On completion of this course, the student will be able to: – evaluate appropriate activities for the development of mathematical literacy, – apply the basic concepts in didactics of mathematics (representations, types of knowledge, taxonomy) in real situations, – explain the structure of the math curriculum, – critically evaluate learning resources in math, – identify activities for developing problem-solving knowledge, – use software tools in mathematics education, – create a teaching sequence for mathematical concepts taught at the elementary level, – plan integration of cognitive conflicts into methodological processes – classify approaches according to the themes and content sections in the mathematics curriculum, – emphasise the basic ideas of the content sections, – design knowledge assessments for math, – develop and implement team instructions in mathematics classrooms. – self-evaluate the effectiveness of mathematics teaching.
Metode poučevanja in učenja:	**Learning and teaching methods:**
– visokošolska predavanja, – metoda razgovora, – metoda reševanja problemov, – sodelovalno učenje, – projektno delo. Poučevanje in učenje potekata z didaktično uporabo informacijsko-komunikacijske tehnologije.	– lectures, – Socratic method, – problem-solving, – cooperative learning, – project work. Teaching and learning are done through the didactic use of ICT

Načini ocenjevanja:	Delež (v %) / Weight (in %)	**Assessment:**
Način (pisni izpit, ustno izpraševanje, naloge, projekt): – pisni izpit, – mikronastop pred kolegi študenti, – portfolij. Vsaka izmed naštetih obveznosti mora biti opravljena s pozitivno oceno.	 50 % 10 % 40 %	Type (examination, oral, coursework, project): – written exam – microteaching, – portfolio. Each of the listed obligations must be assessed with a passing grade.

Reference nosilca / Lecturer's references:

SABO, Mateja, LIPOVEC, Alenka. What is and what is not mathematical modelling in primary school : opinions of Slovenian and Croatian primary school teachers = Što jest, a što nije matematičko modeliranje u razrednoj nastavi : mišljenja slovenskih i hrvatskih učitelja razredne nastave. *Hrvatski časopis za odgoj i obrazovanje :*

[CJE]. [Tiskana izd.]. 2022, vol. 24, no. 2, str. 539-568, tabele. ISSN 1848-5189. DOI: 10.15516/cje.v24i2.4451.

FERME, Jasmina, LIPOVEC, Alenka. Mathematics homework. V: NOVOTNÁ, Jarmila (ur.), MORAOVÁ, Hana (ur.). *Opportunities in learning and teaching elementary mathematics : proceedings*. International Symposium Elementary Mathematics Teaching, Prague, the Czech Republic, Charles University, Faculty of Education, August 18-22, 2019. Prague: Charles University, Faculty of Education, 2019. Str. 173-182. ISBN 978-80-7603-069-5.

LIPOVEC, Alenka, PODGORŠEK MESAREC, Manja. Prospective primary teachers' shift in locus of control and pedagogy focus. *Journal of mathematics teacher education*. 2021, vol. 24, iss. 4, str. 361–373. ISSN 1573-1820. https://link.springer.com/article/10.1007/s10857-020-09463-3, DOI: 10.1007/s10857-020-09463-3.