Univerza v Mariboru

Fakulteta za naravoslovje in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS	
Predmet:	**Didaktika srednješolske matematike**
Course title:	Didactics of Secondary 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	**/**	**4.**	**7.**
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**			**75**	**5**

Nosilec predmeta / Lecturer:	David GAJSER

Jeziki /	**Predavanja / Lectures:**	slovensko / slovene
Languages:	**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):**

- Slovenski srednješolski izobraževalni sistem.	- Slovenian secondary school system
- Učni načrti za matematiko v srednjih šolah.	- Mathematics curricula in secondary schools.
- Izbrane vsebine srednješolske matematike. Učne priprave.	- Selected contents of secondary school mathematics Unit planning.
- Motivacija pri pouku matematike v srednjih šolah.	- Mathematical motivations in secondary schools.
- Učna gradiva v srednjih šolah (učbeniki, priročniki, didaktični materiali, knjige, internet in e-učna gradiva …).	- Educational resources in secondary schools (textbooks, handbooks, books, didactic materials, internet and e-learning materials …).
- Netradicionalne metode poučevanja pri matematiki (problemsko učenje, preiskovalno učenje, obrnjena učilnica …)	- Non-traditional teaching methods for mathematics classroom (problem based learning, inquiry based learning, flipped classroom …)
- Matematično modeliranje v srednjih šolah	- Mathematical modelling in secondary schools
- Uporaba tehnologije pri pouku matematike.	- Using technology in mathematics classroom
- Individualizacija pri pouku matematike v srednji šoli.	- Individualisation in mathematics instruction in secondary schools.
- Učenci z učnimi težavami v srednji šoli.	- Children with learning difficulties in secondary school.
- Preverjanje in ocenjevanje znanja v srednjih šolah: oblike, sestava preizkusov, vrednotenje. Splošna in poklicna matura v Sloveniji.	- Assessment in secondary schools: forms, exam composition, and grading. Leaving examinations (finishing secondary schools) in Slovenia.
- Šolska zakonodaja, vodenje pedagoške dokumentacije v srednji šoli, doba pripravništva.	- School legislation and pedagogical documentation in secondary schools, teaching probation.
- Pedagoško delo v razredu v srednji šoli: komunikacija, odnosi, vzgoja, razredništvo, reševanje konfliktov.	- Pedagogical class management in secondary school: communication, relations, education, class teacher work, conflict solving.
- Razvijanje in implementacija učnih enot, ki obravnavajo vlogo matematike pri reševanju globalnih izzivov, kot so podnebne spremembe, trajnostna uporaba naravnih virov in energetska učinkovitost.	- Developing and implementing teaching units that address the role of mathematics in solving global challenges, such as climate change, sustainable use of natural resources, and energy efficiency.
- Demonstracija uporabe matematičnih modelov in statističnih metod za analizo in interpretacijo podatkov na primerih, povezanih s cilji trajnostnega razvoja.	- Developing and implementing teaching units that address the role of mathematics in solving global challenges, such as climate change, sustainable use of natural resources, and energy efficiency.

Temeljni literatura in viri / Readings:

A. S. Posamentier [et al.], *Teaching Secondary Mathematics: Techniques and Enrichment Units. 8th Edition*, Pearson Prentice Hall, 2009.

Učni načrti za srednje šole.

Učbeniki, priročniki in druga učna gradiva za srednje šole.

Reviji *Matematika v šoli* in *Presek.* Pedagoška strokovna in znanstvena periodika.

Spletni portal E-torba: https://etorba.sio.si/.

Cilji in kompetence:

Študente usposobiti za uporabo temeljnih spoznanj didaktike matematike, ki jih potrebujejo za uspešno poučevanje matematike v srednji šoli.

Objectives and competences:

To qualify and train students for application of fundamental findings in didactics of mathematics needed for efficient teaching of mathematics at secondary school.

Predvideni študijski rezultati:

Znanje in razumevanje:

Po zaključku tega predmeta bo študent sposoben:

- povezovati in pri pouku uporabljati temeljna in sodobna načela didaktike matematike,
- izkazovati suveren in kritičen odnos do šolske matematike,
- uporabljati logično zaporedje, ki modelira pouk matematike v srednji šoli,
- osmišljeno in učinkovito uporabljati tehnologije pri pouku,
- reflektirati in samoevalvirati učinkovitost lastnega poučevanja 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.

Intended learning outcomes:

Knowledge and Understanding:

On completion of this course the student will be able to:

- connect and apply fundamental and contemporary mathematical education principles in school settings,
- demonstrate sovereign and critical attitude towards school mathematics,
- apply logical sequence of teaching in secondary school mathematical classrooms,
- use technology in classrooms in meaningful and efficient way,
- reflect and self-evaluate himself as a teacher of mathematics.

Transferable/Key Skills and other attributes:

- *Communication skills:* oral and written mathematical communication that comply with general language norms.
- *Use of information technology:* use of software tools and applications in mathematics.
- *Problem solving:* ability to solve educational problems in school mathematics.
- *Numeracy*: solving school mathematical problems.

Metode poučevanja in učenja:

Learning and teaching methods:

• Predavanje, • razgovor in diskusija, • demonstracija, • metoda pisnih in grafičnih del, • reševanje problemov in preiskovanje, • delo z viri. • Uporaba IKT • Delavnica za uporabo in oceno digitalnih orodij Poučevanje in učenje potekata z didaktično uporabo informacijsko-komunikacijske tehnologije.	• Lecture, • conversation and discussion, • demonstration, • method of written and graphic products, • problem solving and investigation, • work with resources. • use of ICT • Workshop on the application and evaluation of digital tools 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): <u>Sprotno ocenjevanje:</u> - pisni test, - mikronastop pred kolegi študenti, - portfolij. Vsaka izmed naštetih obveznosti mora biti opravljena s pozitivno oceno.	 50 % 10 % 40 %	Type (examination, oral, coursework, project): <u>Ongoing assessment:</u> - written test, - one pedagogical appearance in front of the colleagues, - portfolio. Each of the listed obligations must have positive grade.

Reference nosilca / Lecturer's references:

GAJSER, David et al. Exploring technology access and support for secondary mathematics teachers in Slovenia and Turkey. V: Challenges and transformation of education for 21st century schools. Cambridge Scholars Publishing, 2024. Str. 269-292.

GAJSER, David. Verifying whether one-tape Turing machines run in linear time. *Journal of computer and system sciences*, ISSN 0022-0000, Feb. 2020, vol. 107, str. 93-107.

GAJSER, David. MaRS 2019. *Obzornik za matematiko in fiziko*, ISSN 0473-7466, 2019, letn. 66, št. 2, str. 64-66.