

UČNI NAČRT PREDMETA / COURSE SYLLABUS						
<b>Predmet:</b>		Poučevanje matematike in fizike v angleškem jeziku				
<b>Course title:</b>		Teaching mathematics and physics in English				
<b>Študijski program in stopnja</b> Study programme and level		<b>Študijska smer</b> Study field		<b>Letnik</b> Academic year	<b>Semester</b> Semester	
Enoviti magistrski študijski program Pedagoška matematika		ni smeri		4 ali 5	prvi ali drugi	
Integrated Master's study programme Pedagogical Mathematics		none		4 or 5	first or second	
<b>Vrsta predmeta / Course type</b>				izbirni		
<b>Univerzitetna koda predmeta / University course code:</b>				M0591		
<b>Predavanja</b> Lectures	<b>Seminar</b> Seminar	<b>Vaje</b> Tutorial	<b>Klinične vaje</b> work	<b>Druge oblike študija</b>	<b>Samost. delo</b> Individ. work	<b>ECTS</b>
30		30			90	5
<b>Nosilec predmeta / Lecturer:</b>			Jaka Smrekar, prof. Alexander Keith Simpson, prof. Gorazd Planinšič			
<b>Jeziki / Languages:</b>		<b>Predavanja / Lectures:</b>	slovenski/Slovene			
		<b>Vaje / Tutorial:</b>	slovenski/Slovene			
<b>Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:</b>				<b>Prerequisites:</b>		
<b>Vsebina:</b>				<b>Content (Syllabus outline):</b>		
Pregled razlik in podobnosti med slovensko in angleško strokovno terminologijo (vključno s				Overview of the similarities and differences between Slovenian and English terminology		

<p>simboli, enotami, načini označevanja, zapisi enačb itd) v okviru naslednjih vsebin.</p> <p>MATEMATIKA: (1. del) logika in množice, števila in operacije, osnovna algebra, geometrija v ravnini in prostoru, vektorji, funkcije, stožnice; (2. del) Zaporedja in vrste, diferencialni in integralni račun, verjetnostni račun, statistika.</p> <p>FIZIKA: (1. del) Premo in krožno gibanje, sila in navor, Newtonovi zakoni in gravitacija, gibalna količina, delo in energija, zgradba snovi in temperatura, notranja energija in toplota, električni naboj in električno polje, električni tok, magnetno polje, indukcija; (2. del) nihanje, valovanje, svetloba, atom in atomsko jedro, astronomija</p> <p>Osnovno izražanje pri poučevanju: opisovanje, razlaganje, utemeljevanje</p> <p>Posebna besedila: učna priprava, pisni preizkus znanja, seminarsko delo, poročilo</p> <p>Razumevanje matematičnega in fizikalnega besedila: učbenik, poljudno matematično in fizikalno besedilo</p> <p>Tvorba strokovnega besedila: kombiniranje besed, simbolov in enačb, slovnica, organizacija besedila, stil</p>	<p>(including symbols, units, notation, equations etc) in the context of the following topics.</p> <p>MATHEMATICS: (Part 1) Logic and sets, numbers and arithmetic, rudimentary algebra, planar and spatial geometry, vectors, functions, conic sections; (Part 2) Sequences and series, differential and integral calculus, probability theory, statistics.</p> <p>PHYSICS: (Part 1) Linear and circular motion, force and torque, Newton's laws and gravitation, momentum, work and energy, the structure of matter, temperature, internal energy, electric charge and electric fields, electric currents, magnetic fields, magnetic induction; (Part 2) Oscillations, waves, light, atoms and atomic nuclei, astronomy</p> <p>Basic teaching vernacular : Descriptions, explanations, reasoning</p> <p>Teaching-specific writing: lesson plans, written examinations, seminar papers, reports</p> <p>Comprehension of mathematics and physics texts: textbooks, popular mathematics and physics text</p> <p>Writing professional text: combining words, symbols and equations, grammar, structuring text, style</p>
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### Temeljni literatura in viri / Readings:

Gary Martin, Focus in High School Mathematics: Reasoning and Sense Making. NCTM, 2009.

Gary Robert Muschla, Teaching the Common Core Math Standards with Hands-On Activities, Grades 9-12. Jossey-Bass, 2015.

Douglas C. Giancoli, Physics: Principles with Applications (7th Edition). Pearson, 2016.

Eugenia Etkina, Gorazd Planinšič, Alan Van Heuvelen, College physics : explore and apply. Pearson, 2018.

### Cilji in kompetence:

Študenti se seznanijo z angleškimi izrazi za matematične in fizikalne pojme iz srednješolskih učnih načrtov. Spoznajo pomembne vidike poučevanja matematike in fizike v angleškem jeziku, obravnavajo posebne vrste angleških besedil, ki so bistvena za učitelje matematike in fizike, in se naučijo tvoriti matematično oziroma fizikalno besedilo v angleškem jeziku.

### Objectives and competences:

Students will gain familiarity with the English terms for the concepts from mathematics and physics covered in the high school curriculum. They will learn important approaches to teaching mathematics and physics in English, they will study the principal modes of expression required to teach mathematics and physics in English, and they will learn how to compose mathematics and physics texts in English.

### Predvideni študijski rezultati:

Znanje in razumevanje:  
Poznavanje angleških matematičnih in fizikalnih izrazov za poučevanje na srednješolskem nivoju. Izdelava priprav in pisnih preizkusov znanja za poučevanje matematike in fizike v angleščini. Razumevanje in tvorba angleškega matematičnega oziroma fizikalnega besedila.

Uporaba:

Doba internacionalizacije in globalizacije je prinesla potrebo po širjenju kompetenc

### Intended learning outcomes:

Knowledge and understanding:  
Knowledge of the English language expressions required by high school teachers in mathematics and physics. The design of lesson plans and written examinations for teaching mathematics and physics in English. The comprehension and composition of mathematics and physics texts in English.

Application:

The era of internationalisation and globalisation has brought about the need for the expansion

učiteljev na področje izražanja in možnosti aktivnega profesionalnega udejstvovanja v angleškem jeziku. Po eni strani želimo učitelje usposobiti za poučevanje matematike in fizike na mednarodnih oddelkih in mednarodnih šolah, po drugi strani pa jim želimo omogočiti sodelovanje v programih izmenjav ter na mednarodnih strokovnih srečanjih učiteljev in spremljanje sodobnih mednarodnih trendov v izobraževanju.

**Refleksija:**

Povezovanje matematičnega ter fizikalnega poučevanja s poučevanjem v tujem jeziku.

Prenosljive spretnosti (niso vezane le na en predmet):

Ustna in pisna komunikacija v angleškem jeziku.

of teachers' competences to include the ability to express oneself and to professionally engage in English. On the one hand, we aim to train our students for teaching mathematics and physics at international schools. On the other hand, we would like to enable them to participate in exchange programs and international teachers' meetings, and also to provide them with a basis for keeping in touch with international trends in education.

**Reflection:**

Integrating the teaching of mathematics and physics with that of teaching in a foreign language.

**Transferable skills:**

Oral and written communication in English.

**Metode poučevanja in učenja:**

predavanja, diskusije, seminar, domače naloge, konzultacije

**Learning and teaching methods:**

Lectures, group discussions, seminars, homework, consultations

Delež (v %) /

**Načini ocenjevanja:**

Weight (in %)

**Assessment:**

<p>Način (pisni izpit, ustno izpraševanje, naloge, projekt): - izdelava in predstavitev seminarskega dela (pogoj za pristop k pisnemu izpitu)</p>	<p>50% 50%</p>	<p>Type (examination, oral, coursework, project): - seminar project (paper and</p>
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<p>- pisni izpit</p> <p>Ocene: 5 (negativno), 6-10 (pozitivno) (po Statutu UL)</p>		<p>presentation); required for admission to written exam</p> <p>- written exam</p> <p>Grading: 5 (fail), 6-10 (pass) (according to the Statutes of UL)</p>
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#### Reference nosilca / Lecturer's references:

Gorazd Planinšič:

- ETKINA, Eugenia, PLANINŠIČ, Gorazd. Defining and developing critical thinking through devising and testing multiple explanations of the same phenomenon. *The Physics teacher*, ISSN 0031-921X, 2015, vol. 53, no. 7, str. 432-437,

ilustr. <http://scitation.aip.org/content/aapt/journal/tpt/53/7/10.1119/1.4931014>. [COBISS.SI-ID 2898276] [COBISS.SI-ID 2898276]

- JELIČIĆ, Katarina, PLANINIĆ, Maja, PLANINŠIČ, Gorazd. Analyzing high school students' reasoning about electromagnetic induction. *Physical review, Physics education research*, ISSN 2469-9896, 2017, vol. 13, iss. 1, str. 010112-1-010112-18, ilustr., doi: 10.1103/PhysRevPhysEducRes.13.010112. [COBISS.SI-ID 3067236] [COBISS.SI-ID 3067236]

- ETKINA, Eugenia, PLANINŠIČ, Gorazd, VAN HEUVELEN, Alan. *College physics : explore and apply*. New York: Pearson, [2018]. XVIII, 981, [42] str., ilustr. ISBN 0-134-60182-3. ISBN 978- 0-134-60182-3. ISBN 0-134-68330-7. ISBN 978-0-134-68330-0. [COBISS.SI-ID 3165796] [COBISS.SI-ID 3165796]

Alexander Keith Simpson:

- SIMPSON, Alex. Measure, randomness and sublocales. *Annals of pure and applied Logic*, ISSN 0168-0072. [Print ed.], 2012, vol. 163, iss. 11, str. 1642-1659. [COBISS.SI-ID 17091161]

- J. Brotherston and A. Simpson. Sequent Calculi for Induction and Infinite Descent. *Journal of Logic and Computation*, 21(6), pp. 1177-1216, 2011. <https://doi.org/10.1093/logcom/exq052> [COBISS.SI-ID 17091929]

- M. Mio and A. Simpson. Lukasiewicz mu-calculus. *Fundamenta Informaticae*, 150(3- 4), pp. 317-346, 2017. <https://doi.org/10.3233/FI-2017-1472> [COBISS.SI-ID 18320729]

Jaka Smrekar:

- SMREKAR, Jaka. Periodic homotopy and conjugacy idempotents. *Proceedings of the American Mathematical Society*, ISSN 0002-9939, 2007, vol. 135, no. 12, str. 4045-4055 [COBISS.SI-ID

14382681]

- SMREKAR, Jaka, YAMASHITA, Atsushi. Function spaces of CW homotopy type are Hilbert manifolds. Proceedings of the American Mathematical Society, ISSN 0002-9939, 2009, vol. 137, no. 2, str. 751-759 [COBISS.SI-ID 14965849]
- SMREKAR, Jaka. Homotopy type of mapping spaces and existence of geometric exponents. Forum mathematicum, ISSN 0933-7741, 2010, vol. 22, no. 3, str. 433-456 [COBISS.SI-ID 15638105]
- Nosilec University of Cambridge Certificate of Proficiency in English, University of Cambridge, June 1994. [brez vpisa v COBISS]