

| UČNI NAČRT PREDMETA / COURSE SYLLABUS (leto / year 2017/18) | | | | | | |
|--|---------------------------|---|------------------------------|------------------------------------|--------------------------------------|-------------|
| Predmet: | | Matematika 1 | | | | |
| Course title: | | Mathematics 1 | | | | |
| Študijski program in stopnja Study programme and level | | Študijska smer Study field | | Letnik Academic year | Semester Semester | |
| Visokošolski strokovni študijski program Praktična matematika | | ni smeri | | 1 | prvi in drugi | |
| First cycle professional study programme Practical Mathematics | | none | | 1 | first and second | |
| Vrsta predmeta / Course type | | | | obvezni / compulsory | | |
| Univerzitetna koda predmeta / University course code: | | | | M0444 | | |
| Predavanja Lectures | Seminar Seminar | Vaje Tutorial | Klinične vaje work | Druge oblike študija | Samost. delo Individ. work | ECTS |
| 120 | | 120 | | | 270 | 17 |
| Nosilec predmeta / Lecturer: | | prof. dr. Miran Černe, prof. dr. Barbara Drinovec Drnovšek, prof. dr. Jaka Smrekar, prof. dr. Peter Šemrl | | | | |
| Jeziki / Languages: | | Predavanja / Lectures: slovenski / Slovene | | | | |
| | | Vaje / Tutorial: slovenski / Slovene | | | | |
| Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti: | | | | Prerequisites: | | |
| Vpis v letnik študija. | | | | Enrolment in the programme. | | |
| Vsebina: | | | | Content (Syllabus outline): | | |

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| Osnovni pojmi o množicah in preslikavah. | Basic concepts of sets and mappings. |
| Osnove izjavnega računa: in, ali. | Fundamentals of mathematical logic: and, or. |
| Realna in kompleksna števila. | Real and complex numbers. |
| Številska zaporedja in vrste. | Number sequences and series. |
| Osnovno o realnih funkcijah. | Basic properties of real functions. |
| Pregled elementarnih funkcij. | Overview of elementary functions. |
| Odvajanje funkcij. Rollov in Lagrangeev izrek. | Differentiation of functions. Rolle's and Lagrange's theorem. |
| Višji odvodi. Uporaba odvoda. | Higher derivatives. Applications of the derivative. |
| Nedoločeni integral. | Indefinite integral. |
| Določeni integral. Lastnosti določenega integrala. Zveza med določenim in nedoločenim integralom. | Definite integral. Properties of the definite integral. The relationship between definite and indefinite integral. |
| Uporaba integrala. | Applications of the integral. |
| Posplošeni integral. | Improper integral. |
| Taylorjeva formula in vrsta. | Taylor formula and series. |
| Funkcijska zaporedja in vrste. | Sequences and series of functions. |

Temeljni literatura in viri / Readings:

- J. Globevnik, M. Brojan: Analiza 1, DMFA založništvo, Ljubljana, 2010.
- R. Jamnik: Matematika, DMFA založništvo, Ljubljana, 1994.
- I. Vidav: Višja matematika I, DZS, Ljubljana, 1981.
- M.H. Protter, C.B. Morrez: Intermediate Calculus, Springer-Verlag, New York, 1985.
- E. Krezsyig: Advanced Engineering Mathematics, Wiley, New York, 1988.
- P. Mizori-Oblak, Matematika za študente tehnike in naravoslovja, 1. del, Fakulteta za strojništvo, 2001.

A. Turnšek: Tehniška matematika, Fakulteta za strojništvo, Ljubljana, 2007.

Cilji in kompetence:

Študenti bodo spoznali in usvojili osnovne pojme iz: teorije množic in izjavnega računa, preslikav, številskih množic, zaporedij in vrst, realnih funkcij, diferencialnega in integralnega računa.

Zelo dobro bodo razumeli in znali uporabljati elementarne funkcije. Pridobili bodo osnovna znanja, ki so potrebna v matematični analizi.

Objectives and competences:

Students acquire the basic knowledge of set theory, mathematical logic, mappings, sets of numbers, sequences and series, real functions, differentiable calculus and integration.

They will have a very good understanding and the ability to use elementary functions. They will acquire the basic skills needed in the mathematical analysis.

Predvideni študijski rezultati:

Znanje in razumevanje:

Poznavanje in razumevanje osnovnih pojmov, potrebnih v matematični analizi. Uporaba pridobljenega znanja v drugih vejah matematike in v drugih znanostih.

Uporaba:

Obvladovanje osnov matematične analize je potrebno pri skoraj vseh vejah uporabne matematike. Matematična analiza je fundamentalna v skoraj vseh vejah uporabne matematike.

Refleksija:

Povezovanje teorije in računskih postopkov za reševanje najenostavnejših problemov v uporabni matematiki.

Prenosljive spretnosti – niso vezane le na en

Intended learning outcomes:

Knowledge and understanding:

Knowing and understanding the basic concepts needed in the mathematical analysis. Using the obtained knowledge in other fields of mathematics and other sciences.

Application:

Mastering the basic concepts of mathematical analysis is needed in almost all fields of applied mathematics. Mathematical analysis is fundamental in almost all branches of applied mathematics.

Reflection:

Combining theory and computational procedures to solve the simplest problems in applied mathematics.

Transferable skills:

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| <p>predmet:</p> <p>Sposobnost korektne formulacije problema, izbire ustrezne metode, samostojnost pri reševanju problemov, sposobnost analize dobljenih rezultatov.</p> | <p>The ability of a correct formulation of a problem, selecting the appropriate method, solving problems independently, the ability to analyze the results obtained.</p> |
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Metode poučevanja in učenja:

Predavanja, vaje, domače naloge, konzultacije, dodatne ure učenja ob pomoči asistentov in demonstratorjev, tutorstvo, spletna učilnica (klepetalnica, forumi, ipd.)

Learning and teaching methods:

Lectures, exercises, homeworks, consultations, extra hours of studying with the help of teaching assistants and tutors, virtual classroom (chatrooms, forums, etc.)

| | Delež (v %) / Weight (in %) | |
|---|--------------------------------|--|
| Načini ocenjevanja: | | Assessment: |
| <p>Način (pisni izpit, ustno izpraševanje, naloge, projekt):</p> <p>pisni izpit iz vaj ali 4 kolokviji namesto pisnega izpita iz vaj,</p> <p>izpit iz teorije</p> <p>domače naloge (opcija)</p> <p>Ocene: 1-5 (negativno), 6-10 (pozitivno) (po Statutu UL)</p> | <p>50%</p> <p>50%</p> | <p>Type (examination, oral, coursework, project):</p> <p>written exam or 4 midterm exams instead of the written exam,</p> <p>oral exam or theoretical test,</p> <p>homework (optional).</p> <p>Grading: 1-5 (fail), 6-10 (pass) (according to the Statute of UL)</p> |

Reference nosilca / Lecturer's references:

Miran Černe:

ČERNE, Miran, ZAJEC, Matej. Boundary differential relations for holomorphic functions on the disc. Proceedings of the American Mathematical Society, ISSN 0002-9939, 2011, vol. 139, no. 2, str. 473-484. [COBISS.SI-ID 15710553]

ČERNE, Miran, FLORES, Manuel. Generalized Ahlfors functions. Transactions of the American Mathematical Society, ISSN 0002-9947, 2007, vol. 359, no. 2, str. 671-686. [COBISS.SI-ID 14227801]

ČERNE, Miran, FLORES, Manuel. Quasilinear $\overline{\partial}$ -equation on bordered Riemann

surfaces. *Mathematische Annalen*, ISSN 0025-5831, 2006, vol. 335, no. 2, str. 379-403. [COBISS.SI-ID 13970777]

Barbara Drinovec Drnovšek:

DRINOVEC-DRNOVŠEK, Barbara, FORSTNERIČ, Franc. Holomorphic curves in complex spaces. *Duke mathematical journal*, ISSN 0012-7094, 2007, vol. 139, no. 2, str. 203-254. [COBISS.SI-ID 14351705]

DRINOVEC-DRNOVŠEK, Barbara, FORSTNERIČ, Franc. The Poletsky-Rosay theorem on singular complex spaces. *Indiana University mathematics journal*, ISSN 0022-2518, 2012, vol. 61, no. 4, str. 1407-1423. [COBISS.SI-ID 16679257]

DRINOVEC-DRNOVŠEK, Barbara, FORSTNERIČ, Franc. Disc functionals and Siciak-Zaharyuta extremal functions on singular varieties. V: *Proceedings of Conference on Several Complex Variables on the occasion of Professor Józef Siciak's 80th birthday : July 4-8, 2011, Kraków, Poland*, (Annales Polonici Mathematici, ISSN 0066-2216, Vol. 106). Warsaw: Institute of Mathematics, Polish Academy of Sciences, 2012, str. 171-191. [COBISS.SI-ID 16436057]

Jaka Smrekar:

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]

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. 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]

Peter Šemrl:

ŠEMRL, Peter. Comparability preserving maps on Hilbert space effect algebras. *Communications in Mathematical Physics*, ISSN 0010-3616, 2012, vol. 313, iss. 2, str. 375-384. [COBISS.SI-ID 16568409]

ŠEMRL, Peter. Symmetries on bounded observables: a unified approach based on adjacency preserving maps. *Integral equations and operator theory*, ISSN 0378-620X, 2012, vol. 72, iss. 1, str. 7-66. [COBISS.SI-ID 16568665]

MOLNÁR, Lajos, ŠEMRL, Peter. Transformations of the unitary group on a Hilbert space. *Journal of mathematical analysis and applications*, ISSN 0022-247X. [Print ed.], 2012, vol. 388, iss. 2, str. 1205-1217. [COBISS.SI-ID 16568153]

