



Univerza v Mariboru

Fakulteta za naravoslovje
in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	Elementarne funkcije
Course title:	Elementary functions

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Matematika		1.	1.
Mathematics		1.	1.

Vrsta predmeta / Course type

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
30		45			135	7

Nosilec predmeta / Lecturer:

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

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

Prerequisites:

Vsebina:

Pojem funkcije, domene, kodomene, slike, grafa funkcije. Surjektivnost, injektivnost, bijektivnost. Kompozitum funkcij. Inverzna funkcija. Realna števila. Koordinatni sistem.

Realne funkcije. Osnovni primeri. Potence. Koreni. Korenjenje potenc. Absolutna vrednost. Trikotniška neenakost. Razlike in vsote potenc, binomski koeficienti, binomski izrek. Polinomi. Hornerjeva shema. Racionalne ničle polinomov s celoštevilskimi koeficienti. Racionalne funkcije.

Content (Syllabus outline):

The concept of a function. The domain, codomain, range, graph of a function. Surjectivity, injectivity, bijectivity. The composition, the inverse function. The real numbers. Coordinate system.

Real functions. Basic examples. Powers. Roots. Roots of powers. The absolute value. The triangle inequality. The differences and sums of powers, the binomial theorem. Polynomials. Horner's scheme. Rational zeros of polynomials with integer-valued coefficients. Rational functions.

Limite funkcij. Definicije in osnovni primeri. Zveznost. Definicija odvoda funkcije in njegove osnovne lastnosti.

Lastnosti funkcij: monotonost (naraščanje, padanje), konveksnost, konkavnost, ekstremi, lokalni ekstremi, sodost, lihost, periodičnost.

Kotne funkcije in njihove osnovne lastnosti. Adicijski izreki in sorodne formule. Moivreova formula. Funkcije arcsin, arccos, arctan, arccot.

Eksponentne funkcije. Logaritemske funkcije.

Limits of functions. Definitions and basic examples. Continuity. Definition of derivative and its basic properties.

Function properties: monotonicity (increasing, decreasing), convexity, extrema, local extrema, even and odd functions, periodicity.

Trigonometric functions and their basic properties. Addition and related formulas. De Moivre's formula. Functions arcsin, arccos, arctan, arccot.

Exponential functions, logarithmic functions.

Temeljni literatura in viri / Readings:

I.Vidav: Višja matematika I, Ljubljana, DZS, 1974.

J.Marsden, A.Weinstein: Calculus 1,2, New York (etc.), Springer-Verlag, 1985.

R.C. Wrede: Schaum's outline of calculus, New York (etc.), McGraw-Hill, 2010.

Cilji in kompetence:

Obvladati osnovne realne funkcije realne spremenljivke, njihove grafe in njihove lastnosti.

Objectives and competences:

Students learn how to handle the basic functions of one real variable, their graphs and properties.

Predvideni študijski rezultati:

Znanje in razumevanje:

- Uporaba osnovnih funkcij realne spremenljivke.
- Risanje njihovih grafov v koordinatnem sistemu in njihova interpretacija.

Prenesljive/ključne spretnosti in drugi atributi:

- Pridobljena znanja so osnova za vse druge matematične predmete.

Intended learning outcomes:

Knowledge and Understanding:

- Be able to use the basic functions of one real variable.
- Be able to draw their graphs in the coordinate system and to interpret the graphs.

Transferable/Key Skills and other attributes:

- The obtained knowledge forms a foundation for all the other mathematical courses.

Metode poučevanja in učenja:

Predavanja
Teoretične vaje
Domače naloge

Learning and teaching methods:

Lectures
Theoretical exercises
Homework assignments

Načini ocenjevanja:**Assessment:**

Način (pisni izpit, ustno izpraševanje, naloge, projekt)	Delež (v %) / Weight (in %)	Type (examination, oral, coursework, project):
<u>Sprotno preverjanje:</u> Pisni testi (3 do 4 pisni testi na semester)	20%	<u>Mid-term testing:</u> Written tests (from 3 to 4 written tests during the semester)
Pisni izpit	80%	Written exam
Reference nosilca / Lecturer's references:		

1. BOKAL, Drago, BREŠAR, Boštjan, JEREŠIĆ, Janja. A generalization of Hungarian method and Hall's theorem with applications in wireless sensor networks. *Discrete appl. math.*. [Print ed.], 2012, vol. 160, iss. 4-5, str. 460-470. <http://dx.doi.org/10.1016/j.dam.2011.11.007>. [COBISS.SI-ID 16191577]
2. BREŠAR, Boštjan, CHALOPIN, Jérémie, CHEPOI, Victor, GOLOGRANC, Tanja, OSAJDA, Damian. Bucolic complexes. *Preprint series*, 2012, vol. 50, št. 1171, str. 1-24. <http://www.imfm.si/preprinti/PDF/01171.pdf>. [COBISS.SI-ID 16207961]
3. BALAKRISHNAN, Kannan, BREŠAR, Boštjan, CHANGAT, Manoj, KLAUVŽAR, Sandi, PETERIN, Iztok, SUBHAMATHI, Ajitha R. Almost self-centered median and chordal graphs. *Taiwan. j. math.*, 2012, vol. 16, no. 5, str. 1911-1922. <http://journal.taiwanmathsoc.org.tw/index.php/TJM/article/view/2393/1403>. [COBISS.SI-ID 16376409]
4. BREŠAR, Boštjan, KARDOŠ, František, KATRENIČ, Ján, SEMANIŠIN, Gabriel. Minimum k-path vertex cover. *Discrete appl. math.*. [Print ed.], 2011, vol. 159, iss. 12, str. 1189-1195. <http://dx.doi.org/10.1016/j.dam.2011.04.008>. [COBISS.SI-ID 15929689]
5. BREŠAR, Boštjan, KRANER ŠUMENJAK, Tadeja, TEPEH, Aleksandra. The geodetic number of the lexicographic product of graphs. *Discrete math.*. [Print ed.], 2011, vol. 311, iss. 16, str. 1693-1698. <http://dx.doi.org/10.1016/j.disc.2011.04.004>. [COBISS.SI-ID 15929945]