

	UČNI NAČRT PREDMETA/COURSE SYLLABUS
Predmet	Uporabna matematika
Course title	Applied Mathematics

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Poslovna informatika / I. stopnja	Poslovna informatika	I. letnik	I.
Business Informatics / I st Cycle	Business Informatics	I st year	I st

Vrsta predmeta/Course type

obvezni/obligatory

Univerzitetna koda predmeta/University course code

I_PI_I_UN2

Predavanja Lectures	Seminar Seminar	Sem. vaje Tutorial	Lab. vaje Laboratory work	Teren. vaje Field work	Samost. delo Individ. work	ECTS
30		60			85	7

Nosilec predmeta/Lecturer:

doc. dr. Srečko Devjak

Jeziki/
Languages:

Predavanja/Lectures:

slovenski/Slovenian

Vaje/Tutorial:

slovenski/Slovenian

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

Prerequisites:

<ul style="list-style-type: none"> Vpis v prvi letnik študijskega programa. Študent mora pred pristopom k izpitu pravočasno oddati vse domače naloge in biti ustrezno prisoten na vajah in predavanjih. 	<ul style="list-style-type: none"> The prerequisite for inclusion is enrolment in the first year of study. Students have to submit all their homework before the examination and be adequately present at tutorials and lectures.
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Vsebina:

Content (Syllabus outline):

Predavanja	Lectures
<p>I. Uvod:</p> <p>osnovni pojmi o množicah in operacije nad množicami (unija, presek, razlika, komplement množice, kartezični produkt), potenčna množica, realna in kompleksna števila;</p>	<p>I. Introduction:</p> <p>basic concepts of set theory and operations and main operations (union, intersection, difference, complement, Cartesian product), power set, real and complex numbers;</p>

<p>2. <i>Zaporedja in vrste</i>: definicija zaporedja, eksplicitna in rekurzivna zaporedja, geometrijski prikaz, lastnosti, konvergenca, limita, posebna zaporedja, definicija vrste, geometrijska vrste;</p> <p>3. <i>Realne funkcije</i>: pregled elementarnih funkcij, osnovne lastnosti, graf, kompozitum, inverzna funkcija, zveznost in limita;</p> <p>4. <i>Vektorji in matrike</i>: osnovni pojmi povezani z vektorji in matrikami, osnovne operacije z vektorji in matrikami, determinanta matrike, inverzna matrika, sistemi linearnih enačb in neenačb, Gaussova eliminacijska metoda, lastni vektorji in lastne vrednosti;</p> <p>5. <i>Kombinatorika</i>: osnovni pojmi in osnovna zakona kombinatorike, permutacije, variacije in kombinacije;</p> <p>6. <i>Verjetnostni račun</i>: poskusi, dogodki, operacije nad dogodki, statistična definicija verjetnosti dogodka, pogojna verjetnost, formula o popolni verjetnosti, Bayesova formula, zaporedja neodvisnih poskusov, diskretne slučajne spremenljivke, matematično upanje, varianca in standardni odklon diskretne slučajne spremenljivke, zvezne slučajne spremenljivke;</p> <p>7. <i>Gospodarski račun</i>: procentni in promilni račun, razmerja in sorazmerja, delitveni račun, zaokrožanje rezultatov.</p> <p>8. <i>Obrestni račun</i>: linearna in eksponentna rast, navadni in obrestno obrestni račun, dekurzivno in anticipativno obrestovanje, relativna in konformna obrestna mera, zvezno obrestovanje, načelo ekvivalence glavnice, končna in začetna vrednost denarnega toka, vloge, rente, kreditni posli, donosnost investicij, menice, obveznice, uporaba računalnika pri obrestnem računu.</p> <p>Vaje Vaje so avditorne. Namenjene so skupinskemu utrjevanju obravnavane snovi z računskimi primeri s pomočjo asistenta.</p>	<p>2. <i>Sequences and series</i>: definition of sequence, explicit and recursive sequences, geometrical representation, properties, convergence, limits, special sequences, definition of series, geometric series;</p> <p>3. <i>Real functions</i>: elementary functions, basic properties, graph, composite, inverse function, continuity and limits;</p> <p>4. <i>Vectors and matrices</i>: basic concepts associated with vectors and matrices, basic operations with vectors and matrices, determinant of a matrix, inverse matrices, systems of linear equations and inequalities, Gaussian elimination, eigenvectors and eigenvalues;</p> <p>5. <i>Combinatorics</i>: basic concepts and fundamental laws of combinatorics, permutations, variations and combinations;</p> <p>6. <i>Probability</i>: experiments, events, operations at the events, the statistical definition of probability of an event, conditional probability, formula of total probability, Bayes' formula, a sequence of independent trials, discrete random variables, expectation, variance and standard deviation of discrete random variable, continuous random variables;</p> <p>7. <i>The economic account</i>: percentage accounts, per thousand accounts, ratios and proportions, the distribution account, rounding off the results.</p> <p>8. <i>Interest account</i>: linear and exponential growth, common interest and the interest account, remuneration, conforming interest rates, relative interest rate, federal remuneration, the principle of equivalence principal, final and initial value of cash flow, deposits, rents, credit operations, return on investments, notes, bonds, the use of computer in interest account.</p> <p>Tutorials Tutorial time is intended for the classical blackboard approach. The students solve</p>
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<p>Domače naloge Predvideni sta dve ali štiri domače naloge. Osnovni namen je pripraviti študenta k sprotnemu študiju predmeta. Vsebine domačih nalog praviloma sledijo vsebinam obravnavanim na predavanjih in vajah.</p>	<p>computational problems with some help of the teaching assistant.</p> <p>Homework There are two or four homework assignments. The main purpose is to prepare the students for continuously working on the topics under consideration and help them to understand the ideas and concepts of the course.</p>
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Temeljna literatura in viri/Readings:

Temeljna literatura/Basic literature

- Usenik, J. (1998). *Matematične metode*. Novo mesto: Visoka šola za upravljanje in poslovanje.
- Povh, J, in drugi (2010). *Matematične metode v uporabi*, Društvo matematikov, fizikov in astronomov Slovenije, Ljubljana.
- Povh, J., Pustavrh, S. (2003). *Matematične metode: zbirka rešenih nalog*. Novo mesto: Visoka šola za upravljanje in poslovanje Novo mesto.
- Čibej, J. A. (2001). *Matematika za računovodje in finančnike*. Ljubljana: Zveza računovodij, finančnikov in revizorjev Slovenije.
- Ferbar Tratar, L., Kokol-Bukovšek, D. (2019). *Matematika za poslovne in ekonomske vede*. Ljubljana: Ekonomska fakulteta.
- Kokol-Bukovšek, D., Mojškerc, B. (2017). *Matematika za poslovne in ekonomske vede : naloge in izpitni primeri*. Ljubljana: Ekonomska fakulteta.

Priporočljiva literatura/Recommended literature

- Stewart, J. (2016). *Calculus: early transcendentals* (8th edition), Cengage Learning.
- D. Hwang, A. (2003). *Calculus for Mathematicians, Computer Scientists, and Physicists*. <http://www.freebookcentre.net/maths-books-download/Calculus-for-Mathematicians,-Computer-Scientists,-andPhysicists-An-Introduction-to-Abstract-Mathematics-%28pdf%29.html>.
- Strang, G. (2016). *Introduction to Linear Algebra, Fifth Edition*, Wellesley-Cambridge Press.
- S. Klavžar in P. Žigert (2002), *Izbrana poglavja uporabne matematike*, Pedagoška fakulteta, Maribor.
- Fošner, A. (2008). *Osnove poslovne matematike*. Koper: Fakulteta za management.

Cilji in kompetence:

Učna enota prispeva predvsem k razvoju naslednjih splošnih in specifičnih kompetenc:

- razvoj veščin kritičnega, analitičnega in sintetičnega razmišljanja,
- razumevanje in uporaba matematičnih pojmov in matematičnega načina razmišljanja,

Objectives and competences:

The learning unit mainly contributes to the development of the following general and specific competences:

- developing skills in critical, analytical and synthetic thinking,

<ul style="list-style-type: none"> • razumevanje pojma abstrakcije, • razumevanje matematičnih pojmov zaporedje, vrsta, konvergence, zveznosti, vektor, matrika, permutacije, variacije, kombinacije, poskusi dogodki, verjetnost dogodka, razmerja, sorazmerja ter obrestni račun, • sposobnost za reševanje konkretnih delovnih problemov na področju računalništva in informatike z uporabo matematičnih metod in postopkov. 	<ul style="list-style-type: none"> • understanding and using mathematical concepts and mathematical thinking, • understanding the concept of abstraction, • understanding the concepts of sequences, series, convergence, continuity, vectors, matrices, permutations, variations, combination, experiments, events, probability, ratios and proportions and interest account, • the ability to solve practical problems in the field of computer and information science with the use of mathematical methods and procedures.
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Predvideni študijski rezultati:

Študent/študentka:

- obvlada osnovne pojme in principe matematične analize, linearne algebre, teorije verjetnosti in obrestnega računa,
- razume zvezo med simboličnim, grafičnim in numeričnim opisom,
- bo sposoben uporabe metod linearne algebre, teorije verjetnosti in teorije obrestnega računa pri reševanju problemov, ki izvirajo v drugih področjih,
- bo sposoben uporabe abstrakcije linearne algebre, linearnih sistemov in teorije verjetnosti za modeliranje in reševanje konkretnih problemov.
- bo sposoben uporabljati matematični jezik za natančno opisovanje problemov iz realnega sveta.

Intended learning outcomes:

Students:

- master the basic concepts and principles of calculus, linear algebra, probability theory and interest account,
- understand the connection between the symbolic, graphic and numeric representations,
- are able to apply methods of linear algebra, probability theory and theory of interest account to solving problems arising in other fields,
- are able to use abstraction of linear algebra, linear systems and probability theory to model and solve specific problems.
- are able to use mathematical language to accurately describe problems from the real world.

Metode poučevanja in učenja:

- *predavanja* z aktivno udeležbo študentov – razlaga, diskusija, vprašanja, primeri, reševanje problemov,
- *vaje* z aktivno udeležbo študentov – študentje bodo na konkretnih problemih ponovili in utrdili pojme in metode, spoznane na predavanjih,

Learning and teaching methods:

- *lectures* with active student participation – explanation, discussion, questions, examples, problem solving,
- *tutorials* with active student participation – students will practise and revise the concepts and methods encountered at lectures,

<ul style="list-style-type: none"> • <i>kolokviji</i> – z njimi bodo študentje stimulirani, da sproti študirajo obravnavano snov. 	<ul style="list-style-type: none"> • <i>mid-term examinations</i> – will stimulate students to study the matter dealt with at lectures.
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Načini ocenjevanja:	Delež (v %) Weight (in %)	Assessment:
Načini: <ul style="list-style-type: none"> • izpit • sprotno delo: kvizi, domače naloge ali seminarska naloga. Ocenjevalna lestvica: ECTS.	80 % 20 %	Types: <ul style="list-style-type: none"> • exam • consecutive work: quizzes, homework or seminar paper. Grading scheme: ECTS.