UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	Matrični račun
Course title:	Matrix Algebra

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	/	1.	1.
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
30		45			75	**5**

Nosilec predmeta / Lecturer: Iztok BANIČ

Jeziki /	**Predavanja / Lectures:**	slovenski / Slovenian
Languages:	**Vaje / Tutorial:**	slovenski / Slovenian

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

Pogojev ni.	None.

Vsebina:

- Vektorji v ravnini in prostoru, linearne kombinacije, kolinearnost in koplanarnost.
- Baza in dimenzija prostora. Koordinate vektorja, zamenjava baze.
- Matrike. Seštevanje matrik in množenje s skalarji.
- Transponirana matrika. Rang matrike.
- Množenje matrik, inverzna matrika.
- Determinanta kvadratne matrike in njene značilne lastnosti.
- Determinanta produkta matrik.
- Linearna enačba. Sistemi linearnih enačb in njihov matrični zapis.
- Gaussova eliminacijska metoda.
- Množici rešitev homogenega in nehomogenega sistema linearnih enačb.
- Premice in ravnine v prostoru, koordinatni zapis in medsebojna lega.

Content (Syllabus outline):

- Vectors on the plane and in the space, linear combinations, colinearity and coplanarity.
- The basis and the dimension of a space. Coordinates of a vector, the change of basis.
- Matrices. Matrix addition and scalar multiplication.
- The transpose matrix. Rank of a matrix.
- Matrix multiplication, the inverse matrix.
- Determinant of a square matrix, characteristic properties.
- The determinant of a product.
- Linear equation. Systems of linear equations and their matrix form.
- The Gauss elimination method.
- The sets of solutions of a homogeneous and a non-homogeneous system of linear exuations.
- Lines and planes in the space, their equations and interrelations.

Temeljni literatura in viri / Readings:

J. Grasselli. Linearna algebra, DMFA založništvo. Ljubljana, 1994 (tudi kot ustrezno poglavje v knjigi I. Vidav: Višja matematika III, 1981)

F. E. Hohn. Elementary Matrix Algebra. Collier-Macmillan, London 1973

L. P. Eisenhart. Coordinate Geometry. Dover Publications, 2005

M. Kolar, B. Zgrablič. Več kot nobena, a manj kot tisoč in ena rešena naloga iz linearne algebre, PeF Lj, Ljubljana, 1996

Cilji in kompetence:

Cilj in kompetence tega predmeta so, da študentje usvojijo osnovne pojme in metode vektorskega in matričnega računa, in jih uporabljajo pri nadaljnjem študiju matematike.

Objectives and competences:

The objectives and competences of this course are for students to acquire basic knowledge of vector and matrix algebra, and to apply it in the study of mathematics.

Predvideni študijski rezultati:	Intended learning outcomes:
Znanje in razumevanje: Po zaključku tega predmeta bo študent sposoben • razumeti osnovne pojme vektorskega in matričnega računa. • razložiti in uporabljati osnovne izreke vektorskega in matričnega računa. • za reševanje problemov uporabiti vektorski in matrični račun. Prenosljive/ključne spretnosti in drugi atributi: • Spretnosti komuniciranja: ustni zagovor izpita, pisno izražanje pri pisnem izpitu. • Uporaba informacijske tehnologije: uporaba računala ali računalniških aplikacij pri reševanju problemov. • Reševanje problemov: reševanje problemov s pomočjo metod iz vektorskega in matričnega računa.	Knowledge and understanding: On completion of this course the student will be able to • understand basic concepts of vector and matrix algebra. • explain and use basic theorems from vector and matrix algebra, • apply vector and matrix algebra for problem solving. Transferable/Key skills and other attributes: • Communication skills: oral exam, manner of expression at written examination. • Use of information technology: use of a calculator or computer applications for problem solving. • Problem solving: problem solving using methods from vector and matrix algebra.

Metode poučevanja in učenja:

	Learning and teaching methods:
• Predavanja • Seminarske vaje • Individualno delo	• Lectures • Tutorial • Individual work

Delež (v %) /

Načini ocenjevanja: Weight (in %) **Assessment:**

Načini ocenjevanja	Weight (in %)	Assessment
Pisni izpit – problem Ustni izpit – teorija Vsaka izmed naštetih obveznosti mora biti opravljena s pozitivno oceno. Opravljen pisni izpit – problemi je pogoj za pristop k ustnemu izpitu – teorija.	50% 50%	Written exam – problems Oral exam – theory Each of the mentioned assessments must be assessed with a passing grade. Passing grade of written exam – problems is required to take the oral exam – theory.

Reference nosilca / Lecturer's references:

1. BANIČ, Iztok, ČREPNJAK, Matevž, MERHAR, Matej, MILUTINOVIĆ, Uroš, SOVIČ, Tina. The closed subset theorem for inverse limits with upper semicontinuous bonding functions. Bulletin of the Malaysian Mathematical Society, ISSN 0126-6705, 2019, vol. 42, iss. 3, str. 835-846, doi: 10.1007/s40840-017-0517-5.

2. BANIČ, Iztok, GOODWIN, Simon, LOCKYER, Michael. Extending bonding functions in generalized inverse sequences. Topology and its Applications, ISSN 0166-8641. [Print ed.], March 2019, vol. 254, str. 85-100. https://doi.org/10.1016/j.topol.2018.12.004, doi: 10.1016/j.topol.2018.12.004.

3. BANIČ, Iztok, ČREPNJAK, Matevž. Inverse component cropping sequences and connected inverse limits over intervals. Glasnik matematički. Serija 3, ISSN 0017-095X, 2018, vol. 53, no. 2, str. 371-384. https://web.math.pmf.unizg.hr/glasnik/53.2/53(2)-09.pdf, doi: 10.3336/gm.53.2.09.

4. BANIČ, Iztok, ČREPNJAK, Matevž. Markov pairs, quasi Markov functions and inverse limits. Houston journal of mathematics, ISSN 0362-1588, 2018, vol. 44, no. 2, str. 695-707. https://www.math.uh.edu/~hjm/restricted/pdf44(2)/16banic.pdf.

5. BANIČ, Iztok, ČREPNJAK, Matevž, MERHAR, Matej, MILUTINOVIĆ, Uroš. The (weak) full projection property for inverse limits with upper semicontinuous bonding functions. Mediterranean journal of mathematics, ISSN 1660-5446, Aug. 2018, vol. 15, iss. 4, str. 1-21, doi: 10.1007/s00009-018-1209-6.