



Univerza v Mariboru

Fakulteta za naravoslovje
in matematiko

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
Enovit magistrski študijski program druge stopnje Predmetni učitelj	/	1.	1.
Five-year master's degree program Subject Teacher	/		

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			75	5

Nosilec predmeta / Lecturer:

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

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

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 equations.
- 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:

Študent obvlada osnove vektorskega in matričnega računa.

Objectives and competences:

The students get familiar with the basic concepts of vector and matrix algebra.

Predvideni študijski rezultati:

Znanje in razumevanje:
<ul style="list-style-type: none"> • Poznavanje matričnega računa in njegove uporabe na različnih področjih. • Razumevanje geometrijskih vektorjev in osnovnih primerov njihove uporabe.
Prenesljive/ključne spretnosti in drugi atributi:
<ul style="list-style-type: none"> • Pridobljena znanja so podlaga za večino predmetov v nadaljevanju študija.

Intended learning outcomes:

Knowledge and Understanding:
<p>To know matrix computations and be able to apply them in various fields.</p> <ul style="list-style-type: none"> • To know matrix computations and be able to apply them in various fields. <p>The understanding of geometric vectors and main examples of their application.</p>
Transferable/Key Skills and other attributes:
<ul style="list-style-type: none"> • The obtained knowledge is a basis for most of the later subjects.

Metode poučevanja in učenja:

<ul style="list-style-type: none"> • Predavanja • Seminarske vaje • Individualno delo
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Learning and teaching methods:

<ul style="list-style-type: none"> • Lectures • Tutorial • Individual work

Delež (v %) /

Načini ocenjevanja:

Weight (in %)

Assessment:

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

Reference nosilca / Lecturer's references:

1. BANIČ, Iztok, ČREPNIJAK, Matevž, MERHAR, Matej, MILUTINOVIĆ, Uroš. Limits of inverse limits. *Topol. appl.* [Print ed.], 2010, vol. 157, iss. 2, str. 439-450. <http://dx.doi.org/10.1016/j.topol.2009.10.002>. [COBISS.SI-ID 15310169]
2. BANIČ, Iztok, ŽEROVNIK, Janez. The fault-diameter of Cartesian products. *Adv. appl. math.*, 2008, vol. 40, iss. 1, str. 98-106. <http://dx.doi.org/10.1016/j.aam.2007.04.005>. [COBISS.SI-ID 12049430]

3. BANIČ, Iztok. Continua with kernels. *Houst. j. math.*, 2008, vol. 34, no. 1, str. 145-163. [http://math.uh.edu/~hjm/restricted/pdf34\(1\)/08banic.pdf](http://math.uh.edu/~hjm/restricted/pdf34(1)/08banic.pdf). [COBISS.SI-ID 12049686]
 4. BANIČ, Iztok. Inverse limits as limits with respect to the Hausdorff metric. *Bull. Aust. Math. Soc.*, 2007, vol. 75, str. 17-22. [COBISS.SI-ID 11306262]
 5. BANIČ, Iztok, ŽEROVNIK, Janez. Edge fault-diameter of Cartesian product of graphs. *Lect. notes comput. sci.*, 2007, vol. 4474, str. 234-245. [COBISS.SI-ID 11394838]
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