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 Semester
Izobraževalna matematika – dvopredmetni, 1. stopnja		**1.**	**1.**
Educational mathematics – Double- major, 1st degree		**1.**	**1.**

Vrsta predmeta / Course type   Obvezni / Obligatory

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**			**105**	**6**

Nosilec predmeta / Lecturer: Iztok Banič

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

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	**Prerequisits:**
Jih ni.	There are none.

Vsebina:	**Content (Syllabus outline):**
• 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.	• 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:

Študent obvlada osnove vektorskega in matičnega računa.

Objectives and competences:

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

Predvideni študijski rezultati:

Znanje in razumevanje:

- Poznavanje matričnega računa in njegove uporabe na različnih področjih.
- Razumevanje geometrijskih vektorjev in osnovnih primerov njihove uporabe.

Prenesljive/ključne spretnosti in drugi atributi:
- Pridobljena znanja so podlaga za večino predmetov v nadaljevanju študija.

Intended learning outcomes:

Knowledge and Understanding:

- To know matrix computations and be able to apply them in various fields.
- The understanding of geometric vectors and main examples of their application.

Transferable/Key Skills and other attributes:
- The obtained knowledge is a basis for most of the later subjects.

Metode poučevanja in učenja:

- Predavanja
- Seminarske vaje
- Domače naloge
- Individualno delo

Learning and teaching methods:

- Lectures
- Tutorial
- Homework
- Individual work

Načini ocenjevanja:

Assessment:

Način (pisni izpit, ustno izpraševanje, naloge, projekt)		Type (examination, oral, coursework, project):
Izpit:		Exam:
Pisni izpit – problemi	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.
Pisni izpit – problemi se lahko nadomesti z enim testom (sprotne obveznosti).		Written exam – problems can be repalced with one mid-term test.

Reference nosilca / Lecturer's references:		

1. BANIČ, Iztok, ČREPNJAK, Matevž, MERHAR, Matej, MILUTINOVIĆ, Uroš, SOVIČ, Tina. Ważewski's universal dendrite as an inverse limit with one set-valued bonding function. *Preprint series*, 2012, vol. 50, št. 1169, str. 1-33. http://www.imfm.si/preprinti/PDF/01169.pdf. [COBISS.SI-ID 16194137]

2. BANIČ, Iztok, ČREPNJAK, Matevž, MERHAR, Matej, MILUTINOVIĆ, Uroš. Paths through inverse limits. *Topol. appl.*. [Print ed.], 2011, vol. 158, iss. 9, str. 1099-1112. http://dx.doi.org/10.1016/j.topol.2011.03.001. [COBISS.SI-ID 18474504]

3. BANIČ, Iztok, ŽEROVNIK, Janez. Wide diameter of Cartesian graph bundles. *Discrete math.*. [Print ed.], str. 1697-1701. http://dx.doi.org/10.1016/j.disc.2009.11.024, doi: 10.1016/j.disc.2009.11.024. [COBISS.SI-ID 17543176]
tipologija 1.08 -> 1.01

4. BANIČ, Iztok, ČREPNJAK, 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]

5. BANIČ, Iztok, ERVEŠ, Rija, ŽEROVNIK, Janez. Edge, vertex and mixed fault diameters. *Adv. appl. math.*, 2009, vol. 43, iss. 3, str. 231-238. http://dx.doi.org/10.1016/j.aam.2009.01.005, doi: 10.1016/j.aam.2009.01.005. [COBISS.SI-ID 13396502]