



Univerza v Mariboru



Univerza v Mariboru

*Fakulteta za naravoslovje in  
matematiko*

### UČNI NAČRT PREDMETA / COURSE SYLLABUS

|                      |                                              |
|----------------------|----------------------------------------------|
| <b>Predmet:</b>      | Osnove linearne algebre in vektorske analize |
| <b>Course title:</b> | Basic linear algebra and vector analysis     |

| Študijski program in stopnja<br>Study programme and level | Študijska smer<br>Study field | Letnik<br>Academic year | Semester<br>Semester |
|-----------------------------------------------------------|-------------------------------|-------------------------|----------------------|
| Fizika                                                    |                               | 1.                      | 1.                   |
| Physics                                                   |                               | 1.                      | 1.                   |

**Vrsta predmeta / Course type**

**Univerzitetna koda predmeta / University course code:**

| Predavanja<br>Lectures | Seminar<br>Seminar | Sem. vaje<br>Tutorial | Lab. vaje<br>Laboratory work | Teren. vaje<br>Field work | Samost. delo<br>Individ. work | ECTS |
|------------------------|--------------------|-----------------------|------------------------------|---------------------------|-------------------------------|------|
| 60                     |                    | 45                    |                              |                           | 135                           | 8    |

**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:**

Priporočeno je predznanje maturitetnega kurza matematike.

**Vsebina:**

Analitična geometrija trirazsežnega evklidskega prostora.  
Vektorji, skalarni in vektorski produkt, norma.  
Matrike, determinante, rang in lastne vrednosti matrik.  
Linearni operatorji in povezava operatorjev z matrikami.  
Funkcije več spremenljivk, parcialni odvodi, ekstremi.

**Prerequisites:**

Matura-level knowledge of mathematics is recommended.

**Content (Syllabus outline):**

Analytical geometry of the three-dimensional Euclidean space.  
Vectors, the dot and cross products, the norm.  
Matrices, determinants, rank and eigenvalues of matrices.  
Linear operators and relations between operators and matrices.  
Functions of several variables, partial derivatives, maxima and minima.

Gradient, divergenca, rotor.

Gradient, divergence and curl.

**Temeljni literatura in viri / Readings:**

1. Vidav: Višja matematika I, II, III. Ljubljana, DZS, 1974
2. J. Grasselli: Linearna algebra. Linearno programiranje. Ljubljana, DMFA Slovenije, 1994
3. M. R. Spiegel: Schaum's Outline of Theory and Problems of Vector Analysis and an Introduction to Tensor Analysis, New York, McGraw-Hill, 1959
4. S. Lipschutz: 3000 Solved Problems in Linear Algebra. New York: McGraw-Hill, 1988

**Cilji in kompetence:**

Študentje usvojijo osnovne pojme in metode linearne algebre, ki jih potrebujejo pri nadaljnjem študiju fizike.

**Objectives and competences:**

Students acquire basic knowledge of linear algebra and vector analysis, essential for studying physics.

**Predvideni študijski rezultati:**

Znanje in razumevanje.  
Znanje osnov linearne algebre in vektorske analize in praktična uporaba v fiziki.

Prenesljive/ključne spretnosti in drugi atributi:  
Pridobljeno matematično orodje je osnova za študij fizike.

**Intended learning outcomes:**

Knowledge and understanding.  
Knowledge of algebra and vector analysis and their application.

Transferable/Key Skills and other attributes:  
Knowledge of mathematical tools that is essential for all the subjects on physics

**Metode poučevanja in učenja:**

Predavanja  
Teoretične vaje

**Learning and teaching methods:**

Lectures  
Theoretical exercises

**Načini ocenjevanja:**

Način (pisni izpit, ustno izpraševanje, naloge, projekt)  
Pisni test – praktični del  
Izpit (ustni) – teoretični del

Vsaka izmed naštetih obveznosti mora biti opravljena s pozitivno oceno.

Pozitivna ocena pri pisnem testu je pogoj za pristop k izpitu.

Delež (v %) /  
Weight (in %)  
50%  
50%

Type (examination, oral, coursework, project):  
Written test – practical part  
Exam (oral) – theoretical part

Each of the mentioned commitments must be assessed with a passing grade.

Passing grade of the written test is required for taking the exam.

**Reference nosilca / Lecturer's references:**

1. BANIČ, Iztok, ČREPNIJAK, Matevž, MERHAR, Matej, MILUTINOVIĆ, Uroš. Towards the complete classification of generalized tent maps inverse limits. *Topol. appl.* [Print ed.], 2013, vol. 160, iss. 1, str. 63-73. <http://dx.doi.org/10.1016/j.topol.2012.09.017>. [COBISS.SI-ID 16485977]

2. BANIČ, Iztok, ČREPNIJAK, 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](#)]

3. BANIČ, Iztok, ČREPNIJAK, 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](#)]

4. 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](https://doi.org/10.1016/j.disc.2009.11.024). [COBISS.SI-ID [17543176](#)]  
topologija 1.08 -> 1.01

5. 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](#)]