



Univerza v Mariboru

Fakulteta za naravoslovje
in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet: Osnove linearne algebre in vektorske analize
Course title: Basic linear algebra and vector analysis

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Fizika, 1. stopnja		1.	1.
Physics, 1 st degree		1.	1.

Vrsta predmeta / Course type

Univerzitetna koda predmeta / University course code:

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
60		45			135	8

Nosilec predmeta / Lecturer:

Iztok BANIČ

Jeziki /

Languages:

Predavanja / SLOVENSKO/SLOVENE

Lectures:

Vaje / Tutorial: SLOVENSKO/SLOVENE

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

Priporočeno je predznanje maturitetnega kurza matematike.

Prerequisites:

Matura-level knowledge of mathematics is recommended.

Vsebina:

Content (Syllabus outline):

Analična 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.
Gradient, divergenca, rotor.

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, 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.

Prenosljive/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:

Learning and teaching methods:

Predavanja Teoretične vaje	Lectures Theoretical exercises
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Delež (v %) /

Weight (in %)

Načini ocenjevanja:

Assessment:

<p>Način (pisni izpit, ustno izpraševanje, naloge, projekt)</p> <p><u>Izpit:</u></p> <p>Pisni izpit – problemi</p> <p>Ustni izpit – teorija</p> <p>Vsaka izmed naštetih obveznosti mora biti opravljena s pozitivno oceno.</p> <p>Opravljen pisni izpit – problemi je pogoj za pristop k ustnemu izpitu – teorija.</p> <p>Pisni izpit – problemi se lahko nadomesti z dvema delnima testoma (sprotne obveznosti).</p>	<p>50%</p> <p>50%</p>	<p>Type (examination, oral, coursework, project):</p> <p><u>Exam:</u></p> <p>Written exam – problems</p> <p>Oral exam – theory</p> <p>Each of the mentioned assessments must be assessed with a passing grade.</p> <p>Passing grade of written exam – problems is required to take the oral exam – theory.</p> <p>Written exam – problems can be replaced with two mid-term tests.</p>
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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. [COBISS.SI-ID 17543176] tipologija 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]

