



Univerza v Mariboru

Fakulteta za naravoslovje
in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	Metrični prostori
Course title:	Metric spaces

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	/	3. ali/or 4.	6. ali /or 8.
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		15			45	3

Nosilec predmeta / Lecturer:

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

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

Prerequisites:

Vsebina:

- Metrični prostori. Primeri metrik. Primeri ravninskih metrik. Ekvivalentne metrike.
- Normirani prostori.
- Prostori s skalarnim produktom.
- Odprte in zaprte krogle. Odprte in zaprte množice.
- Notranjost, rob, zaprtje in zunanost množice.
- Podprostori metričnih prostorov. Produkti metričnih prostorov.
- Zaporedja v metričnih prostorih. Konvergenca in enakomerna konvergenca. Polnost.
- Zveznost in enakomerna zveznost.
- Kompaktnost in povezanost.

Content (Syllabus outline):

- Metric spaces. Examples of metrics. Examples of metrics in the plane. Equivalent metrics.
- Normed spaces.
- Spaces with scalar product.
- Open and closed balls. Open and closed sets.
- Interior, boundary, closure and exterior of a set.
- Subspaces of metric spaces. Product spaces.
- Sequences in metric spaces. Convergence and uniform convergence. Complete metric spaces.
- Continuous and uniformly continuous functions.
- Compact and connected spaces.

Temeljni literatura in viri / Readings:

J. Vrabec: *Metricni prostori*. Ljubljana: DMFA, 1993.

A. Suhodolc: *Metricni prostor, Hilbertov prostor, Fourierova analiza, Laplaceova transformacija*.

Matematični rokopisi 23, Ljubljana: DMFA, 1998.

V. Bryant: *Metric Spaces: Iteration and Application*. Cambridge: Cambridge University Press, 1985.

D. Benkovic: *Analiza II* (dodatna gradiva na spletu)

http://matematika-racunalnistvo.fnm.uni-mb.si/dodatna_gradiva/analiza_II.html

Cilji in kompetence:

Posplošiti rezultate v zvezi z odprtimi, zaprtimi intervali, s konvergenco realnih zaporedij in z zveznostjo realnih funkcij na metricne prostore.

Objectives and competences:

To generalize the results about closed intervals, convergent sequences in real line, and the continuity of real functions to metric spaces.

Predvideni študijski rezultati:**Intended learning outcomes:**

<p>Znanje in razumevanje:</p> <ul style="list-style-type: none"> • Študent obvlada osnovne koncepte v metričnih prostorih. Zaveda se pomena odprtih, zaprtih množic, kompaktnosti, polnosti in povezanosti metričnih prostorov. <p>Prenesljive/ključne spretnosti in drugi atributi:</p> <ul style="list-style-type: none"> • Prenos znanja obravnavanih metod na druga področja, predvsem skozi uporabo metrike in zveznih funkcij. 	<p>Knowledge and Understanding:</p> <p>To know metric spaces and be able to apply them in other fields. Be aware of the importance of open sets, closed sets, compactness, completeness and connectedness of metric spaces. The understanding of geometric vectors and main examples of their application.</p> <p>Transferable/Key Skills and other attributes:</p> <ul style="list-style-type: none"> • Knowledge transfer of treated methods into other fields, basically through the use of metric and continuous functions.
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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:

<p>Pisni izpit – problemi 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>50% 50%</p>	<p>Written exam – problems 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>
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Reference nosilca / Lecturer's references:

<p>1. BANIČ, Iztok, ČREPNIJAK, Matevž, MERHAR, Matej, MILUTINOVIĆ, Uroš. Limits of inverse limits. <i>Topol. appl.</i>. [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]</p> <p>2. BANIČ, Iztok, ŽEROVNIK, Janez. The fault-diameter of Cartesian products. <i>Adv. appl. math.</i>, 2008, vol. 40, iss. 1, str. 98-106. http://dx.doi.org/10.1016/j.aam.2007.04.005. [COBISS.SI-ID 12049430]</p> <p>3. BANIČ, Iztok. Continua with kernels. <i>Houst. j. math.</i>, 2008, vol. 34, no. 1, str. 145-163. http://math.uh.edu/~hjm/restricted/pdf34(1)/08banic.pdf. [COBISS.SI-ID 12049686]</p> <p>4. BANIČ, Iztok. Inverse limits as limits with respect to the Hausdorff metric. <i>Bull. Aust. Math. Soc.</i>,</p>
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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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