



Univerza v Mariboru

Fakulteta za naravoslovje
in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	Integralske transformacije
Course title:	Integral Transforms

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Matematika, 2. stopnja		1. ali 2.	1. ali 3.
Mathematics, 2 nd cycle		1. or 2.	1. or 3.

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
45		30			135	7

Nosilec predmeta / Lecturer:

Jeziki / Languages:	Predavanja / Lectures:	<input type="text" value="SLOVENSKO/SLOVENE"/>
	Vaje / Tutorial:	<input type="text" value="SLOVENSKO/SLOVENE"/>

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

Prerequisites:

Vsebina:

Klasične Fouriereve vrste. Hilbertov prostor. Ortonormiran sistem.

Fouriereva in Laplaceova transformacija. Osnovne lastnosti. Inverzna formula.

Uporaba Fouriereve in Laplaceove transformacije.

Primeri drugih integralnih transformacij:

Content (Syllabus outline):

Classical Fourier series. Hilbert space. Orthonormal system.

Fourier and Laplace transform. Basic properties. Inversion formula.

Applications of Fourier and Laplace transform.

Examples of other integral transforms: Two sided Laplace transform. Hartley transform,

Dvostranska Laplaceova transformacija.
Hartleyjeva transformacija. Mellinova transformacija. Weierstrassova transformacija. Abelova transformacija. Hilbertova transformacija.

Mellin transform. Weierstrass transform. Abel transform. Hilbert transform.

Temeljni literatura in viri / Readings:

E. Zakrajšek: Analiza III, DMFA Slovenije, Ljubljana, 1998
 E. Zakrajšek: Analiza IV, DMFA Slovenije, Ljubljana, 1999
 A. Suhadolc: Integralske transformacije, Integralske enačbe, DMFA Ljubljana, 1994.
 A. Suhadolc: Metrični prostor, Hilbertov prostor, Fourierova analiza, Laplaceova transformacija, DMFA-založništvo, Ljubljana, 1998.
 B. Zmazek: Diferencialna analiza, skripta, Maribor, 2006.
 Gabrijel Tomšič, Tomaž Slivnik: Matematika IV, Založba FE in FRI, Ljubljana, 1998.

Cilji in kompetence:

Temeljito spoznati integralske transformacije.
 Poznati uporabo Fourierove in Laplaceove transformacije.

Objectives and competences:

To know thoroughly integral transforms.
 To know thoroughly about applications of Fourier and Laplace transform.

Predvideni študijski rezultati:

Znanje in razumevanje:
 - Razumevanje in uporaba integralskih transformacij.

Prenosljive/ključne spretnosti in drugi atributi:
 - Identifikacija, formulacija in reševanje matematičnih in nematematičnih problemov s pomočjo integralskih transformacij.
 - Prenos znanja v zvezi z integralskimi transformacijami na druga področja (strojništvo, astronomija, fizika in druge)

Intended learning outcomes:

Knowledge and Understanding:
 - Be able to understand and implement integral transforms.

Transferable/Key Skills and other attributes:
 - Identification, formulation and solving mathematical and non-mathematical problems with integral transforms.
 - Knowledge transfer of the concepts, connected with integral transforms into other fields (mechanical engineering, astronomy, physics and others).

Metode poučevanja in učenja:

Predavanja
 Seminarske vaje
 Individualno delo

Learning and teaching methods:

Lectures
 Tutorial
 Individual work

Načini ocenjevanja:

Assessment:

<u>Izpit:</u>	Delež (v %) / Weight (in %)	<u>Exams:</u>
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Pisni izpit – problemi Ustni izpit – teorija	50% 50%	Written exam – problems 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 dvema delnima testoma (sprotne obveznosti).		Written exam – problems can be replaced with two mid-term tests.

Reference nosilca / Lecturer's references:

1. JAKOVAC, Marko, MESARIČ ŠTESL, Daša. On game chromatic vertex-critical graphs. *Bulletin of the Malaysian Mathematical Sciences Society*. Jan. 2023, vol. 46, iss. 1, str. 1-30, ilustr. ISSN 0126-6705. <https://link.springer.com/article/10.1007/s40840-022-01418-6>, DOI: 10.1007/s40840-022-01418-6. [COBISS.SI-ID 139148291]
2. DRAVEC, Tanja, JAKOVAC, Marko, KOS, Tim, MARC, Tilen. On graphs with equal total domination and Grundy total domination numbers. *Aequationes mathematicae*. Feb. 2022, vol. 96, iss. 1, 137-146. ISSN 0001-9054. <https://link.springer.com/article/10.1007/s00010-021-00776-z>, DOI: 10.1007/s00010-021-00776-z. [COBISS.SI-ID 100359427]
3. BUJTÁS, Csilla, JAKOVAC, Marko, TUZA, Zsolt. The k -path vertex cover: general bounds and chordal graphs. *Networks*. July 2022, vol. 80, iss. 1, str. 63-76. ISSN 0028-3045. <https://onlinelibrary.wiley.com/doi/10.1002/net.22079>, DOI: 10.1002/net.22079. [COBISS.SI-ID 116964355]
4. BREŠAR, Boštjan, JAKOVAC, Marko, MESARIČ ŠTESL, Daša. Indicated coloring game on Cartesian products of graphs. *Discrete applied mathematics*. [Print ed.]. Jan. 2021, vol. 289, str. 320-326. ISSN 0166-218X. <https://www.sciencedirect.com/science/article/pii/S0166218X2030500X>, DOI: 10.1016/j.dam.2020.11.007. [COBISS.SI-ID 41803267]
5. JAKOVAC, Marko, OTACHI, Yota. On the security number of the Cartesian product of graphs. *Discrete applied mathematics*. [Print ed.]. Dec. 2021, vol. 304, str. 119-128. ISSN 0166-218X. DOI: 10.1016/j.dam.2021.07.030. [COBISS.SI-ID 72524547]