UČNI NAČRT PREDMETA / COURSE SYLLABUS			
Predmet:	Uvod v harmonično analizo		
Course title:	Introduction to harmonic analysis		

Študijski program in stopnja **Study programme and level**	**Študijska smer** **Study field**	**Letnik** **Academic year**	**Semester** **Semester**
Magistrski študijski program Matematika	ni smeri	1 ali 2	prvi ali drugi
Master's study programme Mathematics	none	1 or 2	first or second

Vrsta predmeta / Course type	izbirni

Univerzitetna koda predmeta / University course code:	M2122

Predavanja **Lectures**	**Seminar** **Seminar**	**Vaje** **Tutorial**	**Klinične vaje** **work**	**Druge oblike** **študija**	**Samost. delo** **Individ.** **work**	**ECTS**
45		30			105	6

Nosilec predmeta / Lecturer:	doc. Oliver Dragičević

Jeziki / **Languages:**	**Predavanja /** **Lectures:**	slovenski/Slovene, angleški/English
	Vaje / Tutorial:	slovenski/Slovene, angleški/English

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

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

Fourierove vrste, sumacijske metode, Riesz-Thorinov interpolacijski izrek,	Fourier series, summation methods, Riesz-Thorin interpolation theorem,
harmonične funkcije, Poissonovi integrali, Hardyjevi prostori, harmonična konjugiranka, Hilbertova transformacija,	Harmonic functions, Poisson integrals, Hardy spaces, harmonic conjugate, Hilbert transform,
Schwartzov razred, Fourierova transformacija, distribucije in umirjene distribucije,	Schwartz class, Fourier transform, distributions and tempered distributions,
šibki Lp prostori in Marcinkiewiczev interpolacijski izrek, Paley-Wienerjev izrek ter princip nedoločenosti,	weak Lp spaces and the Marcinkiewicz interpolation theorem, the Paley-Wiener theorem and the uncertainty principle,
Hardy-Littlewoodova maksimalna funkcija,	Hardy-Littlewood maximal function,
Calderón-Zygmundovi singularni integralski operatorji,	Calderón-Zygmund singular integral operators,
linearni parcialni diferencialni operatorji s konstantnimi koeficienti, fundamentalna rešitev, prostori Soboljeva.	linear partial differential operators with constant coefficients, fundamental solution, Sobolev spaces.

Temeljni literatura in viri / Readings:

L. Grafakos: Classical Fourier Analysis, Second Edition, Graduate Texts in Mathematics 249, Springer, 2008.

E. M. Stein, G. L. Weiss: Introduction to Fourier Analysis on Euclidean Spaces, Princeton University Press, 1971.

A. Torchinsky: Real-Variable Methods in Harmonic Analysis, Academic Press, 1986.

Y. Katznelson: An introduction to harmonic analysis, Dover, New York,1976.

L. Hörmander: The Analysis of Linear Partial Differential Operators I: Distribution Theory and Fourier Analysis, Berlin Heidelberg New York 1990.

Cilji in kompetence:	**Objectives and competences:**
Spoznavanje temeljnih pojmov in orodij harmonične analize na evklidskih prostorih, umeščanje v kontekst parcialnih diferencialnih enačb.	Acquiring knowledge of fundamental notions and tools of euclidean harmonic analysis, placing them into the context of partial differential equations.

Predvideni študijski rezultati:

Znanje in razumevanje: Obvladovanje osnovnih konceptov harmonične analize na evklidskih prostorih.
Uporaba: Parcialne diferencialne enačbe, matematična fizika, naravoslovje, medicina.

Refleksija: Gre za eno temeljnih področij sodobne matematične analize.

Prenosljive spretnosti – niso vezane le na en predmet: Prepoznavanje problemov, ki sodijo v področje harmonične analize oziroma formulacija in reševanje nalog s pomočjo metod klasične Fourierove analize.

Intended learning outcomes:

Knowledge and understanding: Mastering basic concepts of euclidean harmonic analysis.
Application: PDE, mathematical physics, natural sciences, medicine.

Reflection: The course subject is one of the cornerstones of modern mathematical analysis.

Transferable skills: Recognition of problems in the realm of harmonic analysis, formulation and solving problems with methods of classical Fourier analysis.

Metode poučevanja in učenja:

predavanja, vaje, domače naloge, konzultacije

Learning and teaching methods:

Lectures, exercises, homeworks, consultations

Načini ocenjevanja:

	Delež (v %) / Weight (in %)	Assessment:
Način (pisni izpit, ustno izpraševanje, naloge, projekt): domače naloge		Type (examination, oral, coursework, project): homework assignments
ustni zagovor		oral exam
Ocene: 1-5 (negativno), 6-10 (pozitivno) (po Statutu UL)	50% 50%	Grading: 1-5 (fail), 6-10 (pass) (according to the Statute of UL)

Reference nosilca / Lecturer's references:

Oliver Dragičević:

– DRAGIČEVIĆ, Oliver. Weighted estimates for powers of the Ahlfors-Beurling operator. Proceedings of the American Mathematical Society, ISSN 0002-9939, 2011, vol. 139, no. 6, str. 2113-2120 [COBISS.SI-ID 15876697]

– DRAGIČEVIĆ, Oliver, VOLBERG, Alexander. Bilinear embedding for real elliptic differential operators in divergence form with potentials. Journal of functional analysis, ISSN 0022-1236, 2011, vol. 261, iss. 10, str. 2816-2828 [COBISS.SI-ID 16051545]

– DRAGIČEVIĆ, Oliver, VOLBERG, Alexander. Linear dimension-free estimates in the embedding theorem for Schrödinger operators. Journal of the London Mathematical Society, ISSN 0024-6107, 2012, vol. 85, p. 1, str. 191-222 [COBISS.SI-ID 16214873]