Course: Integral transforms

Course instructors: Diana Dolićanin-Đekić Stevan Pilipović

Course type: elective

Credit points ECTS: 12

Prerequisites: -

Course objectives:

Introducing different aspects of the theory if integral transforms. Links to theory of generalized functions and solving differential equations. Adopting basic principles if asymptotic analysis and applications.

Learning outcomes:

Connecting different tools of mathematical analysis through applications of integral transforms in timefrequency analysis, differential equations and theory of generalized functions. Insights in basic properties of singular integral operators. Local and global asymptotic analysis of generalized functions through Abelian and Tauberian type theorems. Application to qualitative analysis of solutions to differential equations.

Course description (outline):

Theoretical classes

Fourier and Laplace transforms and solving equations, convolution, Gaussian integral operators, Hilbert transform and singular integrals. Asymptotic analysis of integral transforms, Abelian and Tauberian type theorems.

References:

- 1. S. Pilipović, B. Stanković, J. Vindas *Asymptotic Behavior of Generalized functions*, World Scientific, Singapore, 2012.
- 2. A.H. Zemanian, Generalized Integral Transforms, John Wiley & Sons, New York, 1968.
- 3. F.W.King, Hilbert transforms, Vol 1 and 2, Cambridge University Press, Cambridge, 2009.
- 4. Y.A. Neretin, Lectures on Gaussian Integral Operators and Classical Groups, EMS, Zurich, 2011.

Active teaching hours: 5	Theoretical classes: 5	Practice classes:	
Methods of teaching:			
Lectures, discussions and regular consultations			
Grading structure (100 points)			
Solving selected homework: 50 points, oral exam: 50 points			
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