Program	Type of studies (cycle)	Third cycle
	Name of the program	Doctoral Studies in Mathematical and Computer Science

Course

Course title	**Harmonic analysis**

Course code	Semester	Course status	ECTS credits	Contact hours
PMAT 660	I	elective	10	30

Aims and intended learning outcomes	Harmonic analysis plays a fundamental role in many areas of mathematical research, particularly through its deep connections with geometric function theory, partial differential equations, and analysis on the Heisenberg group. The course is primarily designed to provide students with the harmonic-analytic tools needed to study boundary value problems associated with differential operators of geometric significance.

Course content/topics

1. Hilbert transform
2. Pseudodifferential operators
3. Fractional and singular integrals
4. Convexity and pseudoconvexity
5. Complex integral operators
6. Hardy spaces
7. Heisenberg group
8. Analysis on the Heisenberg group

LITERATURE

[1] F. M. Christ, Lectures on Singular Integrals, American Mathematical Society 1990.

[2] L. Grafakos, Modern Fourier analysis, Springer 2009.

[3] S. G. Krantz, Explorations in harmonic analysis. Birkhäuser 2009.

[4] C. Sogge, Fourier integrals in classical analysis. Cambridge University Press 1993.

[5] E.M. Stein, Harmonic Analysis: Real-Variable Methods, Orthogonality and Oscillatory Integrals, Princeton University Press 1993.

Grading

	Criterion	Points	Cut-off points
1.	Written assignment	30	10
2.	Project	40	20
3	Final exam	30	20
	Total	100	50