Program	Level	Second cycle
	Name of the program	Pure Mathematics

COURSE

Course title	**Harmonic Analysis**			
Course code	Semester	Course status	ECTS	Contact hours (L+AE+LE)
PMAT 435	I	Mandatory course	7	3+2+0
Lecturer				
Course Goals	This course introduces students to basic principles of Harmonic Analysis and numerous applications of this theory.			
Learning Outcomes	Upon successful completion of the course students will be able to: - work with discrete/continuous time Fourier transform, - understand the basic principles of harmonic analysis, - apply harmonic analysis techniques to different areas of mathematics.			

COURSE CONTENT

- Discrete-time Fourier transform.
- Fourier transform of periodic functions.
- Convolution kernels. The Dirichlet kernel. The Fejer kernel.
- Convergence of Fourier series. Cesaro summability. The localization principle.
- Conjugate function. Hardy spaces.
- Interpolation theorems.
- Fourier transform of integrabile functions.
- Convolution. Inverse transform. Differential operator.
- Fourier transform on L2. Plancherel theorem.
- Fourier transform on the space of rapidly decreasing functions.
- Fourier transform and tempered distributions.

LITERATURE

[1] H. Helson, Harmonic analysis, 2nd ed., Wadsworth&Brooks/Cole Advanced Books and Software, 1995

[2] E. Hernández, G. Weiss, A first course on wavelets, CRPC 1996

[3] Y. Katznelson, An introduction to harmonic analysis, 3rd ed., Cambridge University Press 2004

[4] E. M. Stein and R. Shakarchi, Fourier analiysis. An introduction, Princeton University Press 2003

STUDENT WORKLOAD (hours in a semester)

Lectures	45	Exercises	30	Individual work	90	T o t a l	165

GRADING			**REMARKS**
Criterion	Maximum points	Minimum points	
Midterm exams	50	25	
Final exam	50	30	
T o t a l	100	55	