

# Title: Locally compact groups

STATUS: OPTIONAL A

STRUCTURE	Lect.	Lab.
CLASS HOURS	30	0
GRADING	E	0
ECTS	3	

SEMESTER					
1	2	3	4	5	6
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## LECTURER

prof. dr hab. Witold Jarczyk

## PRE-REQUISITES

basics of theory of group, theory of measure and integration, general topology and functional analysis

## COURSE OBJECTIVES (LEARNING OUTCOMES)

When completing the course *Locally compact groups* the student should be able to study single-handedly basics of harmonic analysis and to work in any field making use of its tool.

## COURSE CONTENT

**the case of finite Abelian groups** (dual group, Fourier transform, convolution), **locally compact Abelian groups** (metric and topology, completion, locally compact Abelian groups), **dual group** (dual group as a locally compact Abelian group, Pontryagin duality), **Haar measure** (existence and uniqueness of Haar measure, properties of the Haar measure and Haar integration), **Plancherel Theorem** (convolution, Plancherel's theorem), **Matrix groups** (topological properties of general linear groups and unitary groups, representations, the exponential)

## LITERATURE

1. A. Deitmar, *A First Course in Harmonic Analysis*, Universitext, 2nd ed., Springer, New York, 2005.
2. P.R. Halmos, *Measure Theory*, Graduate Texts in Mathematics 18, Springer, New York, 1974.
3. E. Hewitt, K.A. Ross, *Abstract Harmonic Analysis. Vol.I: Structure of topological groups, integration theory, group representations*, Grundlehren der Mathematischen Wissenschaften 115, Springer, Berlin, 1994.
4. E. Hewitt, K.A. Ross, *Abstract Harmonic Analysis. Vol.II: Structure and analysis for compact groups. Analysis on locally compact Abelian groups*, Grundlehren der Mathematischen Wissenschaften 152, Springer, Berlin, 1994.
5. E. Hille, R.S. Phillips, *Functional Analysis and Semigroups*, Amer. Math. Soc. Colloquium Publ. 31, Providence, 1957.
6. W. Rudin, *Real and Complex Analysis*, 3rd ed., McGraw-Hill, New York, 1987.

## ASSESSMENT

examination