GHENT UNIVERSITY

Course Specifications

Valid as from the academic year 2024-2025

Function Spaces (C003570)

Course size *(nominal values; actual values may depend on programme)*

Credits 6.0 **Study time 180 h**

Course offerings and teaching methods in academic year 2025-2026

A (semester 2)	Dutch	Gent	lecture
			seminar

Lecturers in academic year 2025-2026

De Bie, Hendrik	TW06	lecturer-in-charge
Barbier, Sigiswald	TW06	co-lecturer

Offered in the following programmes in 2025-2026	**crdts**	**offering**
Bachelor of Science in Mathematics	6	A
Preparatory Course Master of Science in Mathematics	6	A

Teaching languages

Dutch

Keywords

Function spaces, Fourier transform, Hilbert spaces, Distribution spaces

Position of the course

Gaining knowledge and insight in the theory of function spaces (in particular Lp spaces, spaces of test functions, spaces of distributions), Hilbert spaces, and the Fourier transform of tempered distributions; in this way the student will reach high level competence in this particular field of mathematical analysis.

Contents

- Hilbert spaces, orthogonal systems
- Lp spaces, convolution of functions
- spaces of test functions
- Fourier transform on L1, L2 and S
- spaces of distributions
- Fourier transform of tempered distributions

Initial competences

Final competences of the course Topology and Metric Spaces.

Final competences

1 To acquire a working knowledge of Hilbert spaces.
2 To acquire a working knowledge of Lp spaces.
3 To understand and use the Fourier transform both theoretically and practically.
4 To acquire a working knowledge of distributions.
5 To make connections with other areas of mathematical analysis.
6 To apply the knowledge gained when treating more sophisticated mathematical models.

Conditions for credit contract

Access to this course unit via a credit contract is determined after successful competences assessment

Conditions for exam contract

This course unit cannot be taken via an exam contract

Teaching methods

Seminar, Lecture

Study material

Type: Syllabus

Name: Function spaces
Indicative price: € 10
Optional: yes
Language : Dutch
Number of Pages : 151
Oldest Usable Edition : AY22-23
Available on Ufora : Yes
Online Available : No
Available in the Library : No
Available through Student Association : Yes
Additional information: The electronic version of the course notes is freely available on Ufora. Only for a printed version students have to pay.

References

F. Brackx and R. Delanghe, The theory of distributions: an introduction. Simon Stevin 53, 1979.
I.M. Gelfand and G.E. Shilov, Generalized functions. Vol. 1. Academic Press, New York, 1964.
M. Reed and B. Simon, Methods of modern mathematical physics I. Functional analysis. Academic Press, New York-London, 1972.

Course content-related study coaching

Learning support on individual basis.

Assessment moments

end-of-term assessment

Examination methods in case of periodic assessment during the first examination period

Written assessment

Examination methods in case of periodic assessment during the second examination period

Written assessment

Examination methods in case of permanent assessment

Possibilities of retake in case of permanent assessment

not applicable

Extra information on the examination methods

Written examination, consisting of two parts. Part 1: theoretical true-or-false questions (answer has to be motivated) and some open questions. Part 2: exercises. Use of syllabus is not allowed.

Calculation of the examination mark

100% written exam.