

# Course Specifications

Valid as from the academic year 2024-2025

# Functional Analysis (C004109)

Course size	(nominal values; actual value	es may depend on prog	ramme)			
Credits 6.0	Study time 180 h					
Course offerings and	teaching methods in academic y	ear 2024-2025				
A (semester 1)	English	Gent		seminar		
				lecture		
Lecturers in academic	year 2024-2025					
Vindas Diaz, Jasson			WE16	lecturer-in-ch	lecturer-in-charge	
Debruyne, Gregory			WE16	co-lecturer		
Offered in the following programmes in 2024-2025				crdts	offering	
Master of Science in Teaching in Science and Technology(main subject Mathematics)			6	А		
Master of Science in Mathematics				6	А	
Exchange Programme in Mathematics (master's level)			6	А		

# Teaching languages

English

## Keywords

Functional analysis, topological vector spaces, generalized functions.

#### Position of the course

The goal of this course is to get the student acquainted with various topics in functional analysis and to prepare him/her for further research in this field. We put emphasis on methods from functional analysis that can be applied to solve problems from other areas of mathematical analysis.

#### Contents

The course content consists of a number of topics in functional analysis, such as (not exhaustively): topological vector spaces, locally convex spaces, topologies on dual spaces, spaces of smooth and holomorphic functions, distribution theory, Fourier analysis.

#### Initial competences

The courses "Analyse I-II", "Complexe analyse" en "Topologie en metrische ruimten".

#### **Final competences**

- 1 The student has specialized knowledge on functional analysis.
- 2 The student can independently solve problems within functional analysis.
- 3 The student has insight into the connections between functional analysis and other areas of mathematical analysis.
- 4 The student is able to apply functional analysis techniques to solve problems from other areas of mathematical analysis.
- 5 The student knows the proofs of some fundamental theorems

#### 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

#### Extra information on the teaching methods

Theory: lectures and interactive seminar in which examples will be worked out.

Exercises: the student prepares the exercises in advance and then these are worked out during the exercise sessions. Some proofs and applications will be studied in the exercises.

# Study material

Type: Handbook

Name: Topological vector spaces, distributions and kernels Indicative price: Free or paid by faculty Optional: yes Language : English Author : F. Treves ISBN : 978-0-08087-337-4 Number of Pages : 565 Oldest Usable Edition : 1967 Online Available : Yes Available in the Library : Yes Available through Student Association : No Usability and Lifetime within the Course Unit : regularly Usability and Lifetime within the Study Programme : one-time Usability and Lifetime after the Study Programme : occasionally Additional information: Available through the library

# Type: Syllabus

Name: Functional Analysis Indicative price: € 10 Optional: no Language : English Number of Pages : 109 Oldest Usable Edition : Edition 2024-2025 Available on Ufora : Yes Online Available : No Available in the Library : No Available through Student Association : No

#### References

Horvath, J, Topological vector spaces and distributions. Reading (Mass.) : Addison-Wesley, 1966. Schaefer, H. H., Topological vector spaces. New York (N.Y.) : Springer, 1971. Treves, F., Topological vector spaces, distributions and kernels. New York : Academic press, 1970.

#### Course content-related study coaching

The lecturer is available for answering individual questions, also outside of the lecture periods (on appointment).

#### Assessment moments

end-of-term assessment

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

Written assessment with open-ended questions

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

Written assessment with open-ended questions

#### Examination methods in case of permanent assessment

#### Possibilities of retake in case of permanent assessment

not applicable

#### Extra information on the examination methods

Written exam. The exam questions are meant to test the student knowledge on the new concepts and techniques and their relation with the theory. They evaluate the students insights in the theory, but also emphasis is given to the application of the

techniques in concrete situations.

# Calculation of the examination mark

Periodic evaluation 100%.