

## Functional Analysis (C004109)

**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 2024-2025**

A (semester 1)	English	Gent	seminar lecture
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**Lecturers in academic year 2024-2025**

Vindas Diaz, Jasson	WE16	lecturer-in-charge
Debruyne, Gregory	WE16	co-lecturer

**Offered in the following programmes in 2024-2025**

	crdts	offering
<a href="#">Master of Science in Teaching in Science and Technology(main subject Mathematics)</a>	6	A
<a href="#">Master of Science in Mathematics</a>	6	A
<a href="#">Exchange Programme in Mathematics (master's level)</a>	6	A

**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. Trèves  
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.  
Trèves, 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%.