GHENT UNIVERSITY

Course Specifications

Valid as from the academic year 2024-2025

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

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
Master of Science in Teaching in Science and Technology(main subject Mathematics)	6	A
Master of Science in Mathematics	6	A
Exchange Programme in Mathematics (master's level)	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. 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%.