

Course description
MM845: Functional Analysis

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The Study Board for Science

Teaching language: English
EKA: N310041102
Assessment: Second examiner: External
Grading: 7-point grading scale
Offered in: Odense
Offered in: Autumn
Level: Master

STADS ID (UVA): N310041101
ECTS value: 5

Date of Approval: 12-03-2025

Duration: 1 semester

Version: Approved - active

▼ Entry requirements

None

▼ Academic preconditions

Students taking the course are expected to:

- Know material from MM548 Measure and Integration and Banach Spaces or equivalent.

▼ Course introduction

This course introduces the students to fundamental methods and techniques of Functional Analysis, building on the knowledge acquired in the course on Hilbert and Banach Spaces.

▼ Expected learning outcome

The learning objectives of the course is that the student demonstrates the ability to:

- Reproduce definitions and results, including their proofs, covered in the course.
- Be able to use these results to analyse concrete examples.
- Formulate and present definitions, proofs and calculations in a mathematically rigorous way.

▼ Content

The following main topics are contained in the course:

- Banach space theory, including the Hahn-Banach Theorem, The Principle of Uniform Boundedness, The Open Mapping Theorem.
- Supplementary topics from Topology, including nets and filters, weak topologies, Banach-Alaoglu Theorem, Ascoli-Arzela Theorem.
- Compact operators on a Hilbert space.

▼ Literature

See itslearning for syllabus lists and additional literature references.

▼ Examination regulations

▼ Exam element a)

▼ Timing

Autumn (week 44)

▼ Tests

▼ Oral examination

▼ EKA

N310041102

▼ Assessment

Second examiner: External

▼ Grading

7-point grading scale

▼ Identification

Student Identification Card - Name

▼ Language

English

▼ Duration

Exam consists of 30 minutes preparation time and 30 minutes actual exam

▼ Examination aids

Allowed during preparation time, not allowed during the actual exam, a closer description of the rules will be posted in itslearning.

▼ ECTS value

5

▼ Additional information

▼ Indicative number of lessons

42 hours per semester

▼ Teaching Method

Planned lessons

Total number of planned lessons: 42

Hereof:

Common lessons in classroom/auditorium 42

A modified version of the classical lecture is employed, where the terms and concepts of the topic are presented, from theory as well as from examples based on actual data. In these lessons there is room for questions and discussions. In addition, the students work with data-based problems and discussion topics, related to the content of the previous lectures. In these hours there is a possibility of working specifically with selected difficult concepts.

Other planned teaching activities:

The students work independently with problems and the understanding of the terms and concepts of the topic. Questions from this activity can afterwards be presented in either the common lessons.

▼ **Teacher responsible**

Name	E-mail	Department
Wojciech Szymanski	szymanski@imada.sdu.dk	Analyse

▼ **Timetable**

Odense

Show full time table

▼ **Administrative Unit**

Institut for Matematik og Datalogi (matematik)

▼ **Team at Registration**

NAT

▼ **Offered in**

Odense

▼ **Recommended course of study**

Profile	Education	Semester	Offer period
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▼ **Transition rules**

Transitional arrangements describe how a course replaces another course when changes are made to the course of study.

If a transitional arrangement has been made for a course, it will be stated in the list.

See transitional arrangements for all courses at the Faculty of Science.