PHYS-469 **Mathematical aspects of quantum physics**

Bossoney Simon

Cursus	Sem.	Type
Ing.-phys	MA1, MA3	Opt.
Physicien	MA1, MA3	Opt.

Language of teaching	English
Credits	4
Session	Winter
Semester	Fall
Exam	Oral
Workload	120h
Weeks	14
Hours	**4 weekly**
Lecture	2 weekly
Exercises	2 weekly
Number of positions	

Summary

This lecture is a more advanced course in fonctionnel Analysis, presenting techniques with spécial interests for quantum Mechanics

Content

Nuclear spaces
Schwartz Nuclear théorèm.
Nuclear spectral théorèm.

Functionnal intégration
Brownian motions
Bochner-Minlos théorèm.

Keywords

distributions.
family of semi-norms
functionnal integration

Learning Prerequisites

Required courses

Analysis 1 to 4
Advanced linear algebra
mathematical methods for physicists
Quantum mechanic I and II

Important concepts to start the course

Basic topology
Hilbert and Banach spaces
Lebesgue integration

Learning Outcomes

By the end of the course, the student must be able to:

- Transcribe physics in math
- Develop

- Model

Transversal skills

- Continue to work through difficulties or initial failure to find optimal solutions.
- Demonstrate the capacity for critical thinking
- Demonstrate a capacity for creativity.
- Communicate effectively, being understood, including across different languages and cultures.

Teaching methods

Ex-cathedra

Expected student activities

The students are expected to participate actively in the lecture.

Assessment methods

The exam will be in oral form.

Resources

Virtual desktop infrastructure (VDI)

No

Bibliography

Kaballo: "aufbaukurs in Funktionalanalysis"
Wightmann "spin, statistics and all that"
Hida "brownian motion"

Ressources en bibliothèque

- Aufbaukurs Funktionalanalysis und Operatortheorie / Kaballo
- PCT, spin and statistics, and all that / Streater
- Brownian motion / Hida

Notes/Handbook

not yet but under construction

Websites

- http://not met

Videos

- http://not met but under construction

Prerequisite for

Research in mathematical or theoretical physics