



PHYS2121 Theoretical and mathematical physics 1

[22.5h+15h exercises] 3.5 credits

This course is taught in the 1st semester

Teacher(s): Jean-Pierre Antoine, Jean Bricmont, Philippe Ruelle
Language: French
Level: Second cycle

Aims

The course is centered on the study of the essential tool of quantum mechanics, the Hilbert space. The abstract notions are brought progressively, starting from concrete cases ("special" functions; Fourier series) and are illustrated by applications taken from theoretical physics (in particular quantum mechanics).

Main themes

- Fourier series
- Special functions: orthogonal polynomials (Legendre, Laguerre, Hermite), Bessel functions
- Hilbert space
- Operators in Hilbert space, spectral theory, special types of operators
- Introduction to the theory of distributions

Other information (prerequisite, evaluation (assessment methods), course materials recommended readings, ...)

Prerequisites: candidature level in algebra, analyse and general physics.

Evaluation: written and oral examination.

Support: syllabus.

Openings: Teaching of quantum mechanics (PHYS 2290, PHYS 2300, PHYS 2310); Advanced formation on functional analyse and quantum theory (fields theory).

Other credits in programs

MATH21/G	Première licence en sciences mathématiques (Général)	(3.5 credits)	
PHYS21/A	Première licence en sciences physiques (Physique appliquée)	(3.5 credits)	Mandatory
PHYS21/G	Première licence en sciences physiques	(3.5 credits)	Mandatory
PHYS21/T	Première licence en sciences physiques (Physique de la terre, de l'espace et du climat)	(3.5 credits)	Mandatory