



INMA1315 Mathematical analysis : complements

[30h+22.5h exercises] 5 credits

This course is not taught in 2005-2006

This course is taught in the 1st semester

Language: French

Level: First cycle

Aims

. To give the necessary background to follow the courses in analysis of the master's degree in mathematics, in particular a modern approach to the theory of dynamical systems and partial differential equations.

Methods and competences to be acquired by the students : To get a firm grasp of the basic notions in measure and integration theory, in Fourier analysis and in functional analysis, in view of applications to differential and integral equations.

Main themes

Supplementary chapters of analysis in the areas of measure and integration theory, as well as of Fourier analysis. Introduction to functional spaces. Applications to differential and integral equations.

Content and teaching methods

-Metric and Banach spaces. Compactness, Arzelà-Ascoli theorem, Banach contraction theorem, Schauder's theorem. Applications to ordinary differential equations, Cauchy problem.

-Measure theory and Lebesgue integral. Lebesgue dominated convergence theorem, Fatou's theorem. Applications.

-Hilbert spaces and Fourier analysis. Riesz Theorem, Hilbert-Schmidt Theorem. Applications to Sturm-Liouville type problems and to integral equations.

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

Prerequisites : Mathematics 1, 2 et 3.

Evaluation : two projects during the semester and a final written exam.

Support : syllabus, weekly problem session.