UCL Faculté des sciences appliquées

FSA

INMA2335 PARTIAL DIFFERENTIAL EQUATIONS

[30h] 3 credits

This course is taught in the 2nd semester

Teacher(s): Patrick Habets, Jean Mawhin
Language: french
Level: 2nd cycle course

Aims

To introduce the student to the major methods for study of elliptic partial differential equations and to the corresponding Dirichlet problem.

Main themes

Methods of potential theory and Hilbert space methods.

Content and teaching methods

Methods of potential theory :
- Laplace equation - harmonic functions
- Dirichlet problem for the Laplacian operator on a ball
- Dirichlet problem for the Laplacian operator on a bounded domain
- Maximum principle for elliptic second order operators

Hilbert space methods :
- Generalized derivatives, Sobolev spaces, Lax-Milgram lemma
- Non-homogeneous Dirichlet problem for elliptic second order operators

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

The course INMA 2315 is a mandatory prerequisite. The courses MATH 2111 " Functional analysis " and INMA 2325 " Ordinary differential equations " will be quite helpful.

Other credits in programs

MAP23	Troisième année du programme conduisant au grade d'ingénieur civil en mathématiques appliquées	(3 credits)
MATH22/E	Deuxième licence en sciences mathématiques (Economie mathématique)	(3 credits)
MATH22/G	Deuxième licence en sciences mathématiques	(3 credits)
MATH22/S	Deuxième licence en sciences mathématiques (Statistique)	(3 credits)