

**ANALYSE FONCTIONNELLE : THÉORIE ET APPLICATIONS****FUNCTIONAL ANALYSIS : THEORY AND APPLICATIONS****Lecturers:** Martine MARION

| Lecturers : 18.0 | TC : 14.0 | PW : 0.0 | Autonomy : 0.0 | Study : 0.0 | Project : 0.0 | Language : FR

Objectives

For a long time been the study of partial differential equations (PDE) has consisted in the explicit resolution of very few equations. The developments in the theory of Functional Analysis have allowed to investigate much more general problems. This course has two objectives :

- to study functional spaces involved in the study of PDEs
- to investigate linear and nonlinear PDEs

Keywords : Functional analysis, partial differential equations, optimization**Programme**

Part I - Linear problems
Chapter 1 : Sobolev spaces
Chapter 2 : Study of linear elliptic problems
Part II - Non linear problems
Chapter 3 : Weak topology
Chapter 4 : Minimization in infinite dimension and application to PDEs

Learning outcomes

- to understand and use the basic functional spaces involved in the study of PDEs
- to understand and use different methods to investigate PDEs

Independent study**Objectifs :****Méthodes :****Core texts**

H. Brezis, *ANALYSE FONCTIONNELLE*, Dunod, 2005
G. Allaire *ANALYSE NUMÉRIQUE ET OPTIMISATION*, Editions de l'Ecole Polytechnique, 2009

Assessment

Final mark = 80% Knowledge + 20% Know-how
Knowledge N1 = 100% final exam
Know-how N2 = 100% of continuous assessment