

**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