



## MATH2421 Convex analysis and calculation of variations

[30h] 3 credits

This course is taught in the 1st semester

**Teacher(s):** Michel Willem  
**Language:** French  
**Level:** Second cycle

### Aims

The course constitutes an introduction to convex analysis and to the calculation of variations.

### Main themes

- the direct method of calculus of variations, minimisation of multiple integrals, free and constrained problems, lack of compactness.
- Necessary conditions and sufficient conditions, Euler-Lagrange equations.
- Optimal solution symmetry, symmetry breaking, Noether theory.

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

Prerequisites: functional analyse (MATH 2110).

Evaluation: quarterly written examination.

References:

- M. Willem, Analyse harmonique réelle, Hermann, Paris, 1996.
- M. Willem, Minimax theorems, Birkhauser, 1995.
- M. Willem, book in preparation.

### Other credits in programs

<b>MAP22</b>	Deuxième année du programme conduisant au grade d'ingénieur civil en mathématiques appliquées	(3 credits)	
<b>MAP23</b>	Troisième année du programme conduisant au grade d'ingénieur civil en mathématiques appliquées	(3 credits)	
<b>MATH22/E</b>	Deuxième licence en sciences mathématiques (Economie mathématique)	(3 credits)	Mandatory
<b>MATH22/G</b>	Deuxième licence en sciences mathématiques	(3 credits)	