


 Faculty of Applied Sciences

**INMA2415 Computation of economic equilibria**

[30h+30h exercises] 5 credits

This course is taught in the 1st semester

**Teacher(s):** Yves Smeers  
**Language:** French  
**Level:** Second cycle

**Aims**

Training in the formulation, analysis and solution of economic equilibrium models

**Main themes**

Presentation of various types of economic equilibrium, alternative formulations and most important solution methods.

**Content and teaching methods**

## 1. Types of economic equilibrium

Partial and general equilibrium, Nash equilibrium, equilibrium on networks, multilevel equilibrium

## 2. Illustrations and applications

General equilibrium, models of imperfectly competitive markets, models of network industries (energy, transport, telecommunication), multilevel equilibrium (Stackelberg, hierarchical programming, principal/agent, optimisation subject to equilibrium problems, equilibrium problems subject to equilibrium constraints)

## 3. Formulation of equilibrium problems

Optimisation, Fixed-point formation, Linear and nonlinear complementarity problems, Variational inequality problems

## 4. Solution techniques

Differentiable methods: the problem is replaced by sequences of simpler variational inequality or complementarity problems: Interior point methods for complementarity problems, non-differentiable techniques, multilevel techniques.

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

The material is presented through small examples together with their economic interpretation. A linear programming course is a prerequisite.

**Other credits in programs**

<b>ECGE3DS/SC</b>	Diplôme d'études spécialisées en économie et gestion (Master in business administration) (Supply Chain Management)	(5 credits)	Mandatory
<b>ELME23/E</b>	Troisième année du programme conduisant au grade d'ingénieur civil électro-mécanicien (énergie)	(5 credits)	
<b>MAP22</b>	Deuxième année du programme conduisant au grade d'ingénieur civil en mathématiques appliquées	(5 credits)	
<b>MAP23</b>	Troisième année du programme conduisant au grade d'ingénieur civil en mathématiques appliquées	(5 credits)	