Coalitions in cooperative and non-cooperative game theory

Course Level : Master's Degree – second year - M2
Curriculum : Master's in Political Engineering
Semester : 1
Course Duration : 18 hours
Instructor : Stéphane Gonzalez
Contact : stephane.gonzalez@univ-st-etienne.fr

Course Objectives :
This course introduces students to the fundamentals of cooperative game theory, with a particular focus on the core of a TU game and its applications, such as market games, assignment games, and cost games. The course will then proceed to the study of strong Nash equilibrium, Nakamura's theorem, and the main results of implementation in strong Nash equilibrium. Emphasis will be given to the theory and application of coalition formation, power dynamics, and institutional design through the introduction of effectivity functions.

Course Outline :

1. Introduction to Cooperative Game Theory
2. The Core of a TU Game
3. Applications: Market Games, Assignment Games, Cost Games
4. Coalition Formation in Game Theory
5. Strong Nash Equilibrium
6. Nakamura's Theorem
7. Implementation in Strong Nash Equilibrium
8. Power and Institutional Design
9. Introduction to Effectivity Functions

Skills Developed :
By the end of this course, students will have a comprehensive understanding of cooperative game theory, including the core of a TU game and strong Nash equilibrium. They will comprehend the dynamics of coalition formation and how to apply this knowledge in a variety of contexts. Furthermore, they will deepen their understanding of power dynamics, institutional design, and effectivity functions within a game theory context.

Assessment :
Assessment will be based on a written examination….

Prerequisites :
An introductory course in Mathematical Analysis and Game Theory is required.

References / Bibliography:

1. "Game Theory" - Maschler, Solan, and Zamir
2. "Game Theory: Analysis of Conflict" - Roger B. Myerson
3. "Cooperative Microeconomics: A Game-Theoretic Introduction" - Hervé Moulin
4. "Effectivity Functions in Social Choice" - Joseph Abdou
5. "Introduction to the Theory of Cooperative Games" - Bezalel Peleg and Peter Sudhölter