PURPOSE:
This course is an introduction to topics in game theory. Its objective is to equip the students with tools, which are essential to study economics of information and of strategic behaviour and for setting up and solving a wide range of economic problems.

COURSE DESCRIPTION:
The course consists of six lectures of three hours each.
We begin reviewing decision theory. Then we start with game representations. First, a game tree is defined, as well as information sets and pure, mixed and behavioral strategies, perfect recall and Kuhn’s theorem, complete as well as incomplete information. Then we consider Strategic form games and the relation among different ways of modelling strategic interaction. Thus, properties and calculation of solutions and of Nash equilibria are discussed. Next Nash equilibria in extensive form games are analysed and refinements proposed. Finally, we turn to the analysis of dynamic games with incomplete information.

STRUCTURE:
The lectures will illustrate the main concepts through formal definitions and examples, with a particular attention to the calculus of solutions. There will be problem sets as homework. You are encouraged to form small group to solve problem sets. The problems will be quite difficult: you are not expected to be able to answer all the questions correctly.
In the final part of the course, the students will present in groups research papers to the class. The aim is to learn how to read and understand research topics, in order to prepare the final dissertation.
Your course grade will be based on the homework (20%), on the group presentation (20%) and on the final exam (60%). Good class participation can improve your evaluation. I expect you to come to class prepared to respond intelligently to questions about the readings and assignments.

Textbooks:
2. Martin Osborne and Ariel Rubinstein, A Course in Game Theory, MIT Press, 1994 = OR.
3. Lecture notes.
Few comments on the books:
1. E is a basic, simple and clear book. Personally, I like it very much, unfortunately it is very expensive (more than 100€ on amazon.it), however there are four copies in the Bicocca library.
2. OR is a complete, nice and clear book and it freely downloadable from Rubinstein homepage http://arielrubinstein.tau.ac.il/, unfortunately the notation used for extensive form games is very effective but not standard.

OFFICE HOURS:
Mario Gilli: **Monday 7.30-8.30** or contact Gilli by email mario.gilli@unimib.it
Elena Manzoni: by appointment elena.manzoni@unimib.it

WEB SITE OF THE COURSE
Slides, information and all you need to know can be found at the web site of course: https://elearning.unimib.it/course/view.php?id=22332

**It is crucial that you register yourself at the above website**

LECTURE ROOM
The lectures will be at Bicocca University, DEMS seminar Room, building U7 Room 2104, second floor, Piazza Ateneo Nuovo 1, map: https://www.google.it/maps/place/Edificio+U6,+Piazza+dell'Ateneo+Nuovo,+1,+20126+Milano/@45.5183834,9.2112634,17z/data=!3m1!4b1!4m5!3m4!1s0x4786c745fa87c3c9:0xdbc4a46ab6f8m2!3d45.5183834!4d9.2134521

EXAMINATION:
The examination consists of two parts: four problem sets and a written individual examination.
- **HOMEWORK**: the problem sets will consist in difficult questions that you have to solve working in a group. The marks are relative and they count for 20% of the final mark in Game Theory.
- **GROUP PRESENTATION**: the evaluation of the presentation count for 20% of the final mark in Game Theory.
- **FINAL EXAM**: the final exam will consist in one question in one hour and it will count for 60% of the final mark in Game Theory.
<table>
<thead>
<tr>
<th>Topic of the lecture</th>
<th>Day</th>
<th>Chapters</th>
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</table>
| **L1** Decision Theory | 22/01/2018  
2.00 - 5.00 p.m.  
Seminar Room Bicocca U7/2104 | OR chapter 1 |
| - Decision Theory under certainty, risk and uncertainty  
- information and Bayes Theorem | | |
| **L2** Models of Games | 31/01/2018  
1.30 - 4.30 p.m.  
Seminar Room Bicocca U7/2104 | E chapter 1 |
| - Extensive Form Games  
- Perfect recall and Kuhn Theorem  
- Strategic Form Games | | |
| **HW1** HOMEWORK 1 on games models and information | | |
| **L3** Dominance and Rationalizability | 7/02/2018  
08.30 - 11.30 a.m.  
Seminar Room Bicocca U7/2104 | |
| - Strict and weak dominance, simple and iterated  
- Bayesian rationality and rationalizability  
- Incomplete Information | | |
| **E1** CORRECTION OF HW1 | 11/02/2018  
3.30 - 5.30 a.m.  
Seminar Room Bicocca U7/2104 | |
| **L4** Nash and Bayes-Nash Equilibria | 12/02/2018  
2.30 - 5.30 p.m.  
Seminar Room Bicocca U7/2104 | E chapters 4 and 5  
OR chapter 2  
R section 5.3 |
<p>| - Properties and calculations in strategic and in extensive form games | | |
| <strong>HW2</strong> HOMEWORK 2 on rationalizability and equilibria | | |</p>
<table>
<thead>
<tr>
<th>L5</th>
<th>Refinements in extensive form games -1</th>
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<tbody>
<tr>
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<td>- Sequential rationality</td>
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<td>- Backward Induction</td>
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<td>- Subgame Perfection</td>
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<td>- Weak Perfect Bayesian Equilibria</td>
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<td>13/02/2018</td>
<td>8.30 - 11.30 a.m.</td>
<td>Seminar Room Bicocca U7/2104</td>
<td>E chapter 6 OR chapters 6 and 12 R section 6.1</td>
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| HW3  | HOMEWORK 3 extensive form refinements |

| E2   | CORRECTION OF HW2 |

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<td>18/02/2018</td>
<td>3.30 - 5.30 a.m.</td>
<td>Seminar Room Bicocca U7/2104</td>
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<tr>
<th>L6</th>
<th>Refinements in extensive form games -2</th>
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<tbody>
<tr>
<td></td>
<td>- Sequential equilibrium</td>
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<td>- Forward Induction</td>
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<td>- Signalling games</td>
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<td>21/02/2018</td>
<td>08.30 - 11.30 a.m.</td>
<td>Seminar Room Bicocca U7/2104</td>
<td>E section 7.1</td>
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| HW4  | HOMEWORK 4 on refinements and signaling |

| E3   | CORRECTION OF HW3 |

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<td>28/02/2018</td>
<td>9.00 - 13.00 a.m.</td>
<td>Seminar Room Bicocca U7/2104</td>
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| E4   | CORRECTION OF HW4 |

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| L7   | PRESENTATION BY GROUPS OF STUDENTS |

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<td>04/03/2018</td>
<td>2.00 - 6.00 P.m.</td>
<td>Seminar Room Bicocca U7/2104</td>
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| Exam | ??? |
Topics and Papers

1. Global Games and applications:
   g. Sylvain Chassang and Gerard Padró i Miquel, Conflict and Deterrence under Strategic Risk, *The Quarterly Journal of Economics*, November 2010
   o. Stephen Morris, Contagion, WP
   q. Stephen Morris, Hyun Song Shin, Muhamet Yildiz, Common Belief Foundations of Global Games, WP 2015
   r. Stephen Morris and Hyun Song Shin, Rethinking Multiple Equilibria in Macroeconomic Modeling, mimeo.
2. Bargaining:

3. Political Economics as Principal-Agent Models:

4. Entry Deterrence:

5. Conflict and Strikes:

6. **Conflict Theory:**

7. **Admissibility**

8. **Herd Behavior**
9. **Self Confirming Equilibria**
   e. 61, 523-546, 1993a.

10. **Signaling Games**

11. **Refinements**

12. Psychological Games