Game Theory is the social science that analyzes how to think (and act) strategically in interactive situations in which your actions impact others and vice-versa. We will cover the basic analysis of simultaneous-move and sequential-move games, and then focus extensively on Economics applications in a variety of areas including imperfect competition, merger analysis, bargaining, signaling, mechanism design, voting and public choice, principal-agent problems, auction design, bidding strategy, and so forth.

This course has some features perhaps unusual for an Economics course:

- **In-class games:** We will play about 20 games in class over the course of the semester. These well-known games are designed to illustrate various concepts, and to provide you with a better understanding of how to work through the strategic dimensions of different game theoretic challenges. Prizes, of differing quality, are awarded to provide incentive.

- **The Prisoners’ Dilemma Challenge:** We will also be running a repeated play Prisoners’ Dilemma challenge, perhaps the most famous repeated play game in Game Theory. This challenge will last for about five weeks, and will feature teams of students in competition with one another. Details to follow.

The insights that emerge from these games and this Challenge are *fair game* for the exams.

**Prerequisites:** Intermediate microeconomics (EC 201 or 203). No exceptions. I also assume that you are familiar with basic calculus, and in particular, elementary simple and partial differentiation (which will be used extensively in solving optimization problems and deriving equilibrium strategies).

**Required text:**


I have deliberately not listed the edition; if you decide to purchase the text, feel free to buy the first or second edition. While we will cover much of the material in the text, and I will point out from time to time where we are in the text, we will not be following the text closely.

A copy of DS will be placed on reserve at the O’Neill Library.
Some additional texts (I list them just because sometimes it is useful to see a different presentation of the material. Warning: Most of these are more technical than DS.)


Grading:

- Mid-Term Exams: 70% (35% each). These in-class exams are scheduled for:
  - Thursday, March 17\(^{th}\) (the week after Spring Break)
  - Tuesday, May 3\(^{rd}\) (the next to last class)
- Problem Sets: 20% (five problem sets)
- Class Participation and the Prisoners’ Dilemma challenge: 10%
- Optional Final Exam: If you take the optional Final Exam (which will cover the entire semester) your Final Exam grade counts for 40% of the total, and each Mid Term grade will be worth 15%. You must commit to taking the Final Exam at the time you pick up the exam (conditional course grades, assuming that you are not taking the Final Exam, will be posted on BlackboardVista by the end of the day, Friday, May 6\(^{th}\)).

  The Final Exam is scheduled for: Tuesday, May 10\(^{th}\) at 12:30 PM.

Only in extraordinarily compelling situations will I even consider the possibility of a “make up” exam. It is your responsibility to plan your schedule accordingly (I note that all of the exam dates have been set).

**Problem Sets:** The Problem Sets will be very helpful to you in learning the course material. The problems are not equally difficult. Some are fairly straightforward, solely designed to give you some practice with certain techniques; others are more difficult and intended to teach you
some Economics. I encourage you to work collaboratively on the Problem Sets, but please submit your own write-ups.

**BlackboardVista:** All handouts, problem sets, exams, and answers will eventually be posted on the course’s BlackboardVista site. Let me know if you have trouble accessing that material.

**Academic Integrity:** You will be held to Boston College’s standards of academic integrity. If you have any questions as to what that means, please go to [http://www.bc.edu/integrity](http://www.bc.edu/integrity).

**Topics:** We will loosely follow the DS text, with lots of additional examples and illustrative games (chapter numbers here are for the 2nd ed.). The first part of the course focuses on theory, and the second, on applications.

1) Introduction and General Principles:
   a) DS 1 & 2: Basic ideas and examples. How to think about strategic games.

2) Theory (may reverse order of chapters)
   a) Simultaneous Move Games
      i) Basics:
         (1) DS 4: Simultaneous move games with pure strategies: Discrete strategies.
      ii) Mixed strategies:
         (1) DS 7 & 8: Simultaneous move games with mixed strategies: Zero-Sum games, Non-Zero-Sum games.
      iii) More advanced:
         (1) DS 5: Simultaneous move games with pure strategies: Continuous strategies.
   b) Sequential Move Games
      i) Basics:
         (1) DS 3: Games with sequential moves.
      ii) More advanced:
         (1) DS 6: Combining sequential and simultaneous moves.
      iii) Games Against Nature
   c) Risk Aversion (we may skip this topic)
      i) DS Appendix to Chapter 7: Decision analysis and behavior under uncertainty.

3) Applications (topics and order subject to change)
   a) DS 11: Prisoner’s dilemma and repeated play games
   b) DS 17: Bargaining
   c) DS 9: Asymmetric information, signaling and screening

We will, in all likelihood, end here. … but if time permits:
d) DS 16: Auction design and bidding strategy

e) DS 15: Voting and mechanism design

f) DS 14: Brinkmanship: The Cuban missile crisis

g) DS 10: Threats, commitments and strategic moves