Overview
International politics is about strategic interaction among actors (states, leaders, etc) in the world arena. When governments make choices about the deployment of military forces, whether to reduce or raise trade barriers or whether to comply with international agreements, they take into account the likely responses and actions of others. This course introduces the logic of strategic interaction in international politics by way of game theory. The principles of game theory will be introduced, and you will learn how to solve simple games. Mathematical topics covered include probabilities, infinite series, as well as linear and quadratic equations. The games are illustrated with examples drawn from international politics. The logic of strategic interaction and techniques of game theory explored in this course have a variety of applications outside the field of international relations.

When we study international relations, we take into account the incentives for states to anticipate the likely actions and responses of other states. States cannot gain their objectives in the international arena if they ignore the potential for others to react to their actions. International relations is a realm of interdependent decisions. States strategize. Analysts study this strategic interaction using both informal and mathematical methods. One mathematical approach to strategic interaction is called game theory.

The strategic analysis of international politics has deep historical roots. It began with studies of deterrence and bargaining. Over time, studies of these issues have become more mathematical in their approach. They have also been supplemented by studies of other types of international interaction, such as trade, cooperation, environmental issues and more. The use of game theory is now standard in the analysis of international relations. Applied game theory ranges from very simple games to highly sophisticated formal models.

The study of international strategic interaction thus provides an ideal framework for introducing the basics of game theory. From the perspective of quantitative reasoning, perhaps the most important set of lessons will be the logic of strategic interaction and the notion of equilibrium.
**Structure of the Course**

We will begin by introducing the basic elements of game theory. From there, we move on to two different ways to present games, the extensive form and the strategic (or normal) form. We then turn to the notion of repeated games. We finally move on to consider how incomplete information can be integrated into game theory, and finish with some applications and extensions. The course schedule can be found below.

There is no required text for this course. Instead, lectures are self-contained and cover all of the material relevant to the course. As such, *lecture attendance is extremely important* since this is where all concepts will be introduced. Since this course does not include a discussion component, lecture is also where we will practice the mathematical skills required for the course.

Lectures, problem sets, study guides and supplemental readings will be posted on Learn@UW. You will have seven problem sets due over the course of the semester (due dates are listed below). Problem sets are due at the beginning lecture on the date indicated. There are two in-class midterms and a final examination.

**Grading**

Grades will be calculated using the following formula:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem sets</td>
<td>30%</td>
</tr>
<tr>
<td>Midterms</td>
<td>40% (20% each)</td>
</tr>
<tr>
<td>Final exam</td>
<td>30%</td>
</tr>
</tbody>
</table>

*Please note:* The material in this course is cumulative. That is, each module builds on the material covered in previous weeks. That means that the work, particularly the math, gets more difficult over the course of the semester. Please be aware that students who do well on the first midterm often find that they must put in more effort on the second midterm and final exam to achieve the same grade.

Practice and repetition are essential for one to fully learn the skills presented in this course. In addition, while there is not a specific grade for participation/attendance, these will be taken into account to adjust final grades for students near the borderline between grade ranges.

**Text**

As stated above, there is no required text for this course. Some students may wish to purchase one of two recommended texts to read through the technical aspects of the concepts presented in this course in greater depth. The Osborne text is the more advanced of the two, while the DSR text tends to employ some non-standard terminology.


Martin Osborne *An Introduction to Game Theory* (Oxford University Press, 2004)
Course Schedule
(subject to change)

Week 1—Sept 3
Introduction and Syllabus

Week 2—Sept 8 & 10
Overview of Game Theory
Terms and Assumptions
Economist Article on applications of game theory

Week 3—Sept 15 & 17
Rationality and Expected Utility

Week 4—Sept 22 & 24
Review Expected Utility
Extensive Form Games
Problem set 1 due Sept 24
Rollback, Backward Induction and Subgame Perfection

Week 5—Sept 29 & Oct 1
More on Extensive Form Games
Intro to Strategic Form Games
Problem set 2 due Oct 1

Week 6—Oct 6 & Oct 8
Dominance and Pure Strategy Equilibria
More with Nash Equilibria
Problem set 3 due Oct 8
Midterm Review

Week 7—Oct 13
Midterm 1

Oct 15
Intro to Mixed Strategies

Week 8—Oct 20 & 23
Mixed Strategies

Week 9—Oct 27 & 29
Spatial Models
Repeated games
Problem set 4 due Oct 29

Bruce Bueno de Mesquita, *Principles of International Politics*, 4th ed. (2006), Ch. 2

**Week 10—Nov 3 & 5**  
More with repeated games  
Midterm review  

**Week 11—Nov 10**  
Midterm 2  

**Nov 12**  
Bayes’ Theorem  

**Week 12—Nov 17 & 19**  
Signaling  

**Problem set 5 due Nov 5**  

**Problem set 6 due Nov 19**  

**Week 13—Nov 24**  
Bargaining  

**Nov 26**  
No Class—Thanksgiving  

**Week 14—Dec 1 & 3**  
More on Bargaining  

**Problem set 7 due Dec 1**  

**Week 15—Dec 8 & 10**  
Advanced Topics/Applications  
Exam Review  

***Students affiliated with the McBurney Center should see me about any necessary accommodations.***