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 an equilibrium.
Structure of the Course

The organization of the course generally follows that of the Dixit, Skeath, and Reiley text. 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, along with assigned readings, can be found below. Most weeks include readings from Dixit, Skeath and Reiley, while supplemental readings that relate these techniques to the study of international relations are included as applicable. These additional readings can be found on Learn@UW.

You will have seven problem sets due over the course of the semester. These will be posted on Learn@UW, and their due dates are listed below. Problem sets are due in 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 week 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.

Discussion sections will be used to go over material from lecture, problem sets, and exams. Your TA will work through more examples of games and answer any questions you have about lectures or readings. Section participation will be taken into account if your final grade is near a cutoff (say, on the margin between B and AB).

Book


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***Students affiliated with the McBurney Center should see me about any necessary accommodations.***
Course Schedule
(subject to change)

**Week 1--Jan 22**
Introduction and Syllabus

**Week 2--Jan 27 and Jan 29**
Overview of Game Theory

D,S&R Ch. 1
Economist Article on applications of game theory

**Week 3--Feb 3 and Feb 5**
Elements of Games

D,S&R Ch. 2, pp. 17-27

**Week 4--Feb 10**
Rationality

D,S&R Ch. 2, pp. 27-41; Ch. 7, pp. 251-58

**Feb 12**
Extensive Form Games

D,S&R Ch. 3, pp. 47-57

**Problem set 1 due**

**Week 5--Feb 17**
More on Extensive Form Games

D,S&R Ch. 3, pp. 57-79

**Feb 19**
Strategic Form Games

D,S&R Ch. 4, pp. 89-104

**Problem set 2 due**

**Week 6--Feb 24**
Pure Strategy Equilibria

D,S&R Ch. 4, pp. 104-120

**Feb 26**
Mixed Strategies

D,S&R Ch. 7, pp. 213-230

**Problem set 3 due**
Week 7--Mar 3
Midterm 1

Mar 5
More on Mixed Strategies

D,S&R Ch. 8, pp. 262-68

Week 8--Mar 10 and Mar 12
Spatial Models

Problem set 4 due Mar 12

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

Mar 17 & 19
NO CLASS—SPRING BREAK

Week 9--Mar 24 and Mar 26
Repeated games

Problem set 5 due Mar 26

D,S&R Ch. 11


Week 10--Mar 31
Structure-induced Equilibria

D,S&R Ch. 10


Apr 2
Uncertainty

D,S&R Ch. 9, pp. 307-17

Week 11--Apr 7
Midterm 2
**Apr 9**  
Bayes’ Theorem  
D,S&R Ch. 7, pp. 224-26; Ch. 9, pp. 359-61

**Week 12--Apr 14 and Apr 16**  
Signaling  
D,S&R Ch. 9, pp. 323-44

**Week 13--Apr 21 and Apr 23**  
Bargaining  
D,S&R Ch. 18

**Week 14--Apr 28 and Apr 30**  
Advanced Topics/Applications

**Week 15--May 5 and May 7**  
Advanced Topics/Applications  
Exam Review