

Game Theory Syllabus

Course Description

Many events in life are competitive in one way or another, and Game Theory in the past few decades has revolutionized what to look for—and how to act—when engaged in competition. But this is not new. Many people have used these tactics in order to gain success, or even to conquer nations throughout the ages. As students complete high school and set their sights on college or on a career, a basic knowledge of Game Theory can dramatically improve strategic instincts and decision-making skills. The course uses a common sense approach to every day conflicts (“games”), from social settings to business environments, including analyses of getting a job or gaining admission to college, managing, bluffing, promising and even dating, to name just a few of the areas studied. Knowledge of self-interest (one's own and the other party's) is a bedrock concept of Game Theory and concrete examples and interactions are used to introduce the student to a new and effective way of systematically approaching all conflicts. Students will also reflect on these tools of competition in history as studied through *The Art of War* by Sun Tzu.

Textbook

This course is not textbook dependent.

Course Objectives

Upon successful completion of this course, the student will be able to:

- Define the basics of a “game”
- Translate the basic of a “game” into a wide range of conflicts
- Analyze conflict dynamics from the standpoint of rationality
- Evaluate conflict dynamics from the standpoint of the self interests of the “Players”
- Integrate increasing analytical skills into increasingly complex conflicts
- Theorize possible and probable strategies where information is incomplete
- Appraise theoretical predictions obtained from Game Theory analyses against real world conflicts
- Formulate strategic alternatives which take into account the actions of others (commonly known as a “Nash Equilibrium”)
- Identify Nash Equilibria in various everyday settings
- Recognize the classic “Prisoners' Dilemma”
- Appraise the application of Prisoners' Dilemma to a variety of real-world conflicts
- Evaluate Game Theory principles in workplace settings.
- Write an autobiographical essay
- Establishing a monthly budget
- Compare Career Fields
- Write a cover letter and resume

- Apply to College
- Apply for Grants and Scholarships
- Fill out a job application
- Give a successful interview
- Look for good financial investments

Course Outline

Unit	Activities
1 Game Theory Basics	<p>Learning Outcomes</p> <ul style="list-style-type: none"> • Pre-Test <p>Lecture: Game Theory Basics</p> <ul style="list-style-type: none"> • Assignment: Analyzing Conflict <p>Lecture: Being a Warrior When it Comes to Your Future</p> <p>Presentation: Introduction to General Tzu</p> <p>Lecture: The Art of War: Plan of Attack</p> <p>Reading Selection: The Art of War Part I: "Laying Plans"</p> <ul style="list-style-type: none"> • Assignment: Applications--What Are Your Plans After High School? • Assignment: Writing an Autobiographical Essay <p>Discussion</p> <ul style="list-style-type: none"> • Establishing Goals • Identifying Challenges <p>Conversations with the General:</p> <ul style="list-style-type: none"> • Danger / Opportunity • Assessing the Situation <p>Unit 1 Quiz</p> <p>Project: (Choose One)</p> <ul style="list-style-type: none"> • Home Run • Famous Generals Throughout Time

	<ul style="list-style-type: none"> • Create Your Own Game
2 Price Competition	<p>Learning Outcomes</p> <ul style="list-style-type: none"> • Pre-Test <p>Lecture: Price Competitions</p> <ul style="list-style-type: none"> • Assignment: Comparing Prices • Apply: Identifying Bizarre Security Situations <p>Discussion: Price Fixing</p> <p>Lecture: The Art of War: Assessing Cost</p> <p>Reading Selection: The Art of War Part II: "Waging War"</p> <ul style="list-style-type: none"> • Assignment: How Much Will Attaining Your Goals Cost You? • Assignment: Creating a Monthly Budget <p>Conversations with the General:</p> <ul style="list-style-type: none"> • Multiple Opportunities • Planning Insures Victory • Weigh Costs Before You Plan an Attack <p>Unit 2 Quiz</p> <p>Project:</p> <ul style="list-style-type: none"> • Task Definition
3 Nash Equilibrium	<p>Learning Outcomes</p> <ul style="list-style-type: none"> • Pre-Test <p>Lecture: Nash Equilibrium</p> <ul style="list-style-type: none"> • Assignment: Looking for Dominance • Apply: Nash Equilibrium in Your Neighborhood <p>Discussion:</p> <ul style="list-style-type: none"> • John Nash

	<ul style="list-style-type: none"> • Nash Equilibrium <p>Lecture: The Art of War: Compromise</p> <p>Reading Selection: The Art of War Part III: "Attack by Stratagem"</p> <ul style="list-style-type: none"> • Assignment: Assessing Obstacles • Assignment: Career Fields Comparison • Assignment: Career Field Interviews <p>Conversations with the General:</p> <ul style="list-style-type: none"> • Know Yourself / Know Your Enemy--The Importance of Compromise <p>Unit 3 Quiz</p> <p>Project: Information Seeking Strategies</p>
4 Prisoner's Dilemma	<p>Learning Outcomes</p> <p>Lecture: Prisoner's Dilemma</p> <ul style="list-style-type: none"> • Assignment: Avoiding / Managing Prisoner's Dilemma • Apply: "Short Term Thinker" <p>Discussion:</p> <p>Class Check-in</p> <p>Lecture: The Art of War: Responsibility and Accountability</p> <p>Reading Selection: The Art of War Part IV; "Tactical Dispositions"</p> <ul style="list-style-type: none"> • Assignment: Importance of Visualization <p>Conversations with the General:</p> <ul style="list-style-type: none"> • Securing Against Defeat • On Excellence • Assignment: Writing a Cover Letter • Assignment: Writing a Resume <p>Midterm Exam</p>

<p>5 Surviving with Limited Information</p>	<p>Learning Outcomes</p> <ul style="list-style-type: none"> • Pre-Test <p>Lecture: Surviving with Limited Information</p> <ul style="list-style-type: none"> • Assignment: Basing Action on Appearances • Apply: Price Discrimination <p>Discussion:</p> <ul style="list-style-type: none"> • Top Dollar / Discount <p>Lecture: The Art of War: Emphasizing Strengths</p> <p>Reading Selection: The Art of War Part V: "Energy"</p> <ul style="list-style-type: none"> • Assignment: Interviewing Well <p>Conversations with the General:</p> <ul style="list-style-type: none"> • Courage • Experience • Assignment: Filling Out a Job Application <p>Unit 5 Quiz</p> <p>Project: Location and Access</p>
<p>6 Spending Money</p>	<p>Learning Outcomes</p> <ul style="list-style-type: none"> • Pre-Test <p>Lecture: Spending Other People's Money</p> <ul style="list-style-type: none"> • Assignment: "Free Rider" Problem • Apply: Spending Other People's Money <p>Discussion:</p> <ul style="list-style-type: none"> • B.C Forbes on Profitable Business Arrangements • Benjamin Franklin on Necessity vs. Bargain <p>Lecture: The Art of War: Making the Right Decision</p>

	<p>Reading Selection: The Art of War Part VI: Weak Points and Strong</p> <p>Conversations with the General:</p> <ul style="list-style-type: none"> • Darwin on Change • Strength • Assignment: Virtual College and University Tours • Assignment: Applying for College / University / Trade School <p>Lecture: Grants and Scholarships</p> <p>Unit 6 Quiz</p> <p>Project: Use of Information</p>
7 Stock Market	<p>Learning Outcomes</p> <p>Lecture: The Stock Market</p> <ul style="list-style-type: none"> • Apply: Opinion on News Coverage of the Current Market • Assignment: Designing an Auction System • Assignment: Who Owns It? • Assignment: Reading Stock Quotes • Assignment: Playing the Stock Market <p>Discussion:</p> <ul style="list-style-type: none"> • Assessment of Investments • Learning from Your Mistakes <p>Project: Synthesis</p>
8 End of Course Summation	<p>Learning Outcomes</p> <ul style="list-style-type: none"> • Submit Final Project • Project Sharing and Class Critique <p>Conversations with the General:</p> <ul style="list-style-type: none"> • Winning • Masters of Your Fate <p>Final Exam</p>

Course Methodology

This is an inquiry- and project-based course where every day examples of conflicts (“games”) are used to illustrate the basic principles of Game Theory. Those principles also translate well into life experiences. Current examples of “games” in daily news will be brought forth for study, particularly in Threaded Discussions. Assessment is based not only on quizzes, a mid-term exam and a Final exam, but also on the quality and extent of participation in the course.

Time Management

Because this full semester course is completed in sixteen weeks, you should expect to spend 12-15 hours per week on the readings, assignments, discussions (synchronous and asynchronous), quizzes, project, test preparation and tests. Keep a regular schedule so you do not fall behind. The pacing of the course and assignments are set forth in the Course Outline, which will vary from instructor to instructor.

Grading

NUVHS grading standards are as follows:

- A = Outstanding Achievement
- B = Commendable Achievement
- C = Marginal/Acceptable Achievement
- D = Unsatisfactory/Marginal Achievement
- F = Failing

Grading Scale

90-100%	A
80-89%	B
70-79%	C
60-69%	D
0-60%	F