GAME THEORY I

UNIVERSITY OF VIRGINIA
WEDNESDAYS 2–4:30 PM, ONLINE
SPRING 2021

INSTRUCTOR: ANNE MENG
Email: ameng@virginia.edu
Office Hours: Tuesdays 3:30-5:30 PM*
*Please email me if you plan to attend! If you can't make this time, I'm happy to set up another time with you.

GRADER: SIMONAS CEPENAS
Email: sc2ru@virginia.edu

COURSE DESCRIPTION

This course is an introduction to graduate level game theory. The goal of the course is to expose students to basic concepts in game theory as well as how to solve commonly used models in political science. The goal of this class is to prepare students to be "consumers" of game theoretic work in political science. We will not focus on writing your own formal models in this class. We will not use very advanced math in this class – I will assume a working knowledge of algebra.

COURSE REQUIREMENTS

1. Problem Sets – 10%
Problem sets will be assigned approximately every two weeks and solutions will be provided after problem sets are due. Problem sets are due in class on the dates marked.

2. Midterm – 40%
We will have an in-class midterm on **Wednesday, March 24***
*This date is tentative right now – I'm going to see how quickly we're moving through the material for the first couple of weeks, and I will confirm the midterm date with you soon.

3. Final – 50%
We will have a final on **Wednesday, May 12 from 2:00-4:30 PM**.

Both exams will be open note/ open book.

Pandemic note: Don't worry about your grade. I know that we are in an incredibly stressful and challenging situation. Your mental and physical well-being are very important to me. My hope is that you learn some interesting and useful things from this class, but I absolutely do **not** want this class to be a source of stress. Don't worry about your grade.

SOME GUIDANCE

Math can feel hard for everyone sometimes. **Do not be afraid or embarrassed to ask for help – either from me or from your classmates.** Take advantage of office hours and please feel free to ask questions at any time in class. If anyone does not understand something, I am more than happy to stop and clarify the point before we move on. It is not a good idea to "skip" things in math – if you don't understand something now, don't wait. Clarify immediately. A lot of things build on top of each other, and a small question now will likely turn into much more confusion later. **Try to stay on top of problem sets as best as you can.**

PROBLEM SETS AND COLLABORATION

Collaboration is always a good idea in methods classes – you can learn as much from your classmates as you do from me! I will organize you into study groups. Please try to meet once a week for 1 hour. **Each person should turn in their own problem set.**

Here is my recommendation for the best way to approach problem sets: First try the problems on your own. Then come together as a group to talk through any questions. You can also come talk to me during office hours. Finish up the problem set on your own.

You will not learn anything by simply copying someone else's problem set. I would rather you not turn anything in than copy someone else's problem sets – it wastes everyone's time, including the grader's. Note that problem sets are worth VERY LITTLE. I would rather you turn in a problem set that you worked through on your own with a lot of mistakes because it is better than you engaged with the material.

We will supply solutions to the problems after the problem sets are due.

There will be 4 problem sets and they are the topics they will cover:
Problem Set 1: Normal Form Games and Mixed Strategies
Problem Set 2: Extensive Form Games
Problem Set 3: Bargaining Models and Repeated Games
Problem Set 4: Imperfect Information

TEXTBOOKS

There isn't a single game theory textbook that will work perfectly for everyone. I will use *Strategies and Games: Theory and Practice* by Prajit K. Dutta as the main textbook for our course (partly because it's available as an e-book on the UVA library website). It's also at a good level for our purposes – the book was written as an advanced undergraduate/ intro graduate level text.

Here are some other options:
An Introduction to Game Theory by Martin Osborne is also very good, and it's used in a lot of other departments. Unfortunately it's not available as an e-book on the UVA library website, but you can probably get a used copy online.

Game Theory: An Introduction by Steven Tadelis is another good option. It's a little more technical than the Osborne book but is still very clearly written. It's also not available as an e-book on the UVA library website, but there is a Kindle version available to rent on Amazon.

Political Game Theory by Nolan McCarty and Adam Meirowitz can also be very useful, since it is written by two political scientists, for a political science audience in mind. It is also on the advanced side. This is available as an e-book on the UVA library website.

A Course in Game Theory by Martin Osborne and Ariel Rubinstein is a much more technical text, so this is a great option if you're looking for something more advanced. This is available as an e-book on the UVA library website.

My recommendation: Definitely don't go and buy all these books right now! Start with the free ones that are available online and see which book you like. In my experience, students don't actually don't end up relying on textbooks that much. You'll probably mostly end up referring to your class notes and googling things.

SCHEDULE

Below is a tentative schedule for the semester. We might adjust things as we go along, depending on everyone's needs.

Feb 3 – Introduction to game theory and rational choice
Dutta: Chapter 1-2

STATIC GAMES WITH COMPLETE INFORMATION

Feb 10 –Normal Form Games and Nash Equilibrium (Part 1)
Dutta: Chapters 3-5

Feb 17 –Normal Form Games (Part 2)
Dutta: Chapters 3-5

Feb 24 – Mixed Strategies
Dutta: Chapter 8

DYNAMIC GAMES WITH COMPLETE INFORMATION

March 3 – Extensive Form Games (Part 1)
Dutta: Chapters 11, 13
Problem Set 1 due

March 10 – Extensive Form Games and Subgame Perfect Nash Equilibrium (Part 2)
Dutta: Chapters 11, 13

March 17 – Midterm Review
Problem Set 2 due

March 24 – ***MIDTERM EXAM***

March 31 – **Break! *No class***

April 7 – Bargaining Models and Repeated Games
PDF of Osborne Chapter 16 provided by instructor, Dutta: Chapters 14-15

April 14 – Article workshop

INCOMPLETE INFORMATION

April 21 – Extensive Form Games with Incomplete Information
PDF of Osborne Chapter 10 provided by instructor
Problem Set 3 due

April 28 – Signaling Games and Perfect Bayesian Equilibrium
PDF of Osborne Chapter 10 provided by instructor

May 5 – Final review and extra office hours
Problem Set 4 due

FINAL EXAM – Wednesday, May 12, 2:00-4:30 PM