

Advanced Microeconomic Theory

ECON 510-002

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University of North Carolina

Fall, 2020



THE UNIVERSITY
of NORTH CAROLINA
at CHAPEL HILL

Outline

- 1 Syllabus
 - Goals
 - Coverage
 - Research
 - Class
 - Contact Information
 - Exam Dates and Grading Policy
 - Student Support Services
 - First Week To Do List
 - Class Discussion
 - Assignments

2 On Math

3 FAQ



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Course Objectives

Our main learning goals are to acquire tools to:

- ① construct models of micro-economic behavior,
- ② identify their (built-in) limitations and
- ③ think critically about how to apply them to real-life.
- ④ write a research essay/proposal/project



On Exactitude in Science

Jorge Luis Borges, *Collected Fictions*, translated by Andrew Hurley.

“In that Empire, the Art of Cartography attained such Perfection that the map of a single Province occupied the entirety of a City, and the map of the Empire, the entirety of a Province. In time, those Unconscionable Maps no longer satisfied, and the Cartographers Guilds struck a Map of the Empire whose size was that of the Empire, and which coincided point for point with it. The following Generations, who were not so fond of the Study of Cartography as their Forebears had been, saw that that vast Map was Useless, and that they delivered it up to the Incumbents of the Holy and Universal Church, who had it translated into Arabic, and then into Latin, and then into Greek, and then into the various tongues of the West. In the process, all the details were lost, and the Map grew smaller and smaller, until it was the size of a Pinpoint, and still the King of the Empire was vexed and dissatisfied. The Map-makers were then obliged to do their best to represent the Empire on a piece of Paper, and the result was the present Map, which is no other than a little square of Paper upon which the Geography of the Empire has been minutely described. In fact, the Empire has never been smaller than this: it is still the same size, but it is now so small that it can be contained in a little square of Paper, and that is the reason why the Kings of the Empire have not been able to conquer it, although they have not ceased to work at it. This is the last Map of the Empire that will ever be made: and the Cartographers Guilds are celebrating the Anniversary of its completion.”

Suarez Miranda, *Viajes de varones prudentes*, Libro IV, Cap. XLV, Lerida, 1658.”



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and they destroyed it. They then made a second map, smaller than the first, but still too large to carry about in their pockets, and they left it to the ants. The third map was still smaller, but it was made of a material that could be rolled up like a rug, and carried about, and slept on. Its name in the Empire was *Atlas*.
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Mont Sainte Victoire

Photography vs Cézanne



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Required Book

Boldrin, Michele and Levine, David K

Against intellectual monopoly, any edition or format.



Reaching Our Goals

- In this course, we will read and discuss Bouldrin and Levin's book "Against intellectual monopoly" in order to be exposed to real-life, contemporary, economic issues.
- However, as "Against intellectual monopoly" is intended to a general audience (lawyers, policy makers, etc...), it lacks any explicit economic modeling.
- Most of this course will be devoted to studying the microeconomic models covered in our lecture notes, which we will then apply to some of the topics discussed in "Against intellectual monopoly".
- We will learn how to use computer algebra package, Mathematica, which will be an indispensable tool.



Tentative Coverage

Besides all the chapters of “Against Intellectual Monopoly”, we shall cover the following topics.

- 1 Mathematics: Taylor’s rule and the Chain Rule
- 2 Review: Consumer Theory with Many Goods
- 3 Duality in Consumer Theory
- 4 Revealed Preferences
- 5 Welfare Analysis
- 6 Market Structure and Innovation
- 7 R&D Races

Research

- Econ 510 is a research-intensive course.
- Research readings and assignments will be posted weekly on Sakai.
- Students will work on a final research project. The topic of the project will be on “intellectual property”.

Class Information and policies

- Until **Feb. 4th**, we meet online Tuesdays and Thursdays, from 2 pm to 3:15 pm. See Sakai>Calendar for the ZOOM link. Make sure to login to unc.zoom.us using the **SSO** option.
- Please install Mathematica in the computer or laptop you intend to use with ZOOM so you can share your screen/work. Avoid using a tablet/ipad for the ZOOM calls.
- Sakai will be used to schedule office hours meetings, post grades, course announcements, readings, supplementary materials, messaging, problem sets, class ZOOM links, etc...
- This course requires synchronous participation through Zoom. You need to be in front of your computer during the designated class time and be able to interact with your instructor and classmates. Please, turn your camera and microphone on during class because you need to be visible and audible to your instructor and your classmates during class.
- Some (but not all) ZOOM recordings of our class meetings may be available as a study resource. However, synchronous participation in class is required. Recordings will be accessible only to enrolled students, instructor, and teaching assistant. All recordings in which students appear will be deleted after the end of the course. Feel, free to use a virtual background if you need more privacy. However, your camera and audio must be on.
- Suggestions: Please, try to connect from a quiet environment without background noise and, take class notes in a notebook..
- After **Feb. 4th**, we meet at the same times at Coker Hall, room 0201. The safety community standards (masks, six feet distancing,etc...) will be strictly enforced.

Contact Info and Office Hours

- ① Email: sergiop@unc.edu.
- ② Please, use Sakai messages instead of regular email.
- ③ Office hours (OH) are by appointment only:
 - Wed: 3–4 pm,
Fri: 11 am–12 pm.
 - To schedule an OH meeting use Sakai > Sign-up. The sign-up opens a week before and closes one day before the OH meeting.
 - Do not hesitate to email-me to schedule meetings **outside** regular OH if your schedule conflicts with the regular OH.

Evaluation

- **March 2nd** — 1st Midterm
- **April 13th** — 2nd Midterm
- **May 13th, noon** — Final Examination
- Midterm grades account for 35% of the final grade.
- Final examination grade is worth 35% of the final grade.
- Ten or more problem sets and/or research readings: 20%.
- Final Research Project: 10%.
- The weight of any missing midterm (with justification) is transferred towards the final exam.

Computing Grades

- Exam grades are converted into scores accordingly to:

$$\text{Score} = \text{Exam Grade} + 100 - \max(\text{Top Exam Grade}, 50).$$

- Assignments scores are identical to assignment grades.
- Course grades are computed accordingly to the table:

letter grade	min. score
A	95
A-	90
B+	87
B	83
B-	80
C+	77
C	73
C-	70
D+	67
D	60

Student Support Services

- The University of North Carolina at Chapel Hill facilitates the implementation of reasonable accommodations, including resources and services, for students with disabilities, chronic medical conditions, a temporary disability or pregnancy complications resulting in barriers to fully accessing University courses, programs and activities. Accommodations are determined through the Office of Accessibility Resources and Service (ARS) for individuals with documented qualifying disabilities in accordance with applicable state and federal laws. See the ARS Website for contact information: ars.unc.edu or email ars@unc.edu.
- Any student who is impacted by discrimination, harassment, interpersonal (relationship) violence, sexual violence, sexual exploitation, or stalking is encouraged to seek resources on campus or in the community. Please contact the Director of Title IX Compliance (Adrienne Allison – Adrienne.allison@unc.edu), Report and Response Coordinators in the Equal Opportunity and Compliance Office (reportandresponse@unc.edu), Counseling and Psychological Services (confidential), or the Gender Violence Services Coordinators (gvsc@unc.edu; confidential) to discuss your specific needs. Additional resources are available at safe.unc.edu
- CAPS is strongly committed to addressing the mental health needs of a diverse student body through timely access to consultation and connection to clinically appropriate services, whether for short or long-term needs. Go to their website: caps.unc.edu or visit their facilities on the third floor of the Campus Health Services building for a walk-in evaluation to learn more.

To do list for the first week

- 1 If you are eligible for taking exams with Accessibility Resources, please schedule with them within the first or second week of classes and notify me.
- 2 If a) you have more than 3 final exams in more than 24 hours; b) ECON510 is one of these exams; and c) you wish to re-schedule one of your exams; then you **MUST** ask for an alternative date before the first midterm. If you do not follow these procedures your request will not be accommodated.
- 3 Place an order for the software *Mathematica* throughout software.sites.unc.edu/software/mathematica/. The *student license is free*. However, you must place an order.

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Class Discussion

During this course, we shall employ additional material from TV, movies, or literature to discuss strategic related issues.

Sometimes, you may find the political or religious views; or the profanity contained in the additional material offensive or objectionable and you may feel uncomfortable.

I **do not** endorse any particular views ex but ...

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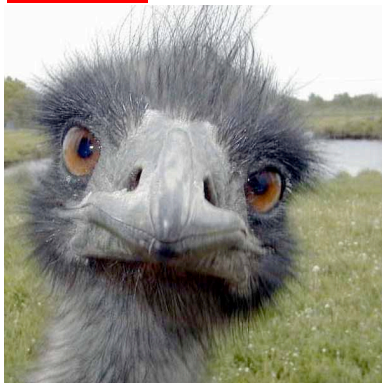
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Class Discussion

I believe that as part of your **university** education, it is important you



engage in **critical thinking**, while respecting different opinions expressed by your classmates. I will strive to maintain a welcoming and inclusive environment even when we discuss uncomfortable topics.

Real-life Applications

To discuss real-life applications, it is recommended that you read at least one newspaper regularly, and pay special attention to economic relevant events.

Moreover, if you are heading to graduation and the job-market I suggest you follow a major newspaper such as the New York Times or Wall Street Journal. Another good source of economic news is the NPR podcast [Planet Money](#).

Assignments

- 1 Assignments are posted on Sakai.
- 2 Past due assignments are not accepted without proper justification.
- 3 Please be prepared to present and discuss the PS.
- 4 Most problem sets will be assigned to groups.
- 5 New groups will be formed randomly for each PS.
- 6 The grading criteria for the PS are:

grade	solutions	work	presentation
4.0	correct	explained	reasonable
3.5	comput. err.	explained	reasonable
3.0	concept. err.	explained	reasonable
2.0	–	omitted	reasonable
1.0	–	–	poor
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Some words about math.

We will cover bits of optimization, set theory and proof reasoning but I assume you have knowledge equivalent to Osborne's (suggested reading) mathematical appendix – please browse it – and please, do report any doubts or questions to me as soon as possible I can help you. Or check topics 1 to 2.3 in [Martin Osborne's tutorial](#).

- Language of Set Theory
- Basic Calculus (derivation and integration).
- Probability (expectation of random variables)
- Reading Proofs.
- Finding Maxima and Minima.

Mathematics is a tool (language)



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If $f : [a, b] \rightarrow \mathbb{R}$ satisfies $[\forall x \in [a, b]$ and $\forall \varepsilon > 0, \exists \delta > 0$; such that
 $|x - y| < \delta \Rightarrow |f(x) - f(y)| < \varepsilon]$
 $\Rightarrow \exists z \in [a, b]; \forall x \in [a, b] f(z) \geq f(x)$.

If a real-function defined on a closed interval on the real line is continuous then it attains a maximum on the interval.

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Questions & Answers

I understand the lecture notes but during the exams I am not able to answer the questions. What am I doing wrong? How should I study for this class?

The only way to make sure you understood the material is to solve problems. Try to work in groups and try to solve as many problems as you can. Do not be frustrated if you get stuck with a problem. The problems where you get stuck are precisely the ones that are useful for your study. They should serve as a guide to where the focus of your reading should go and to which questions you should bring to class.

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I am trying to solve problems but many of the posted or suggested problems lack an answer key. How can I check if my work is correct? What use is to solve a problem if I do not know whether my solution is correct?

The point of solving problems is not to come up with a right answer but rather to elicit questions that you may have about the material. If you are unsure about your work or answer this is good signal. Please do bring the problem to class and express your doubts. If you faced a challenge when trying to solve a problem and you are not sure of your answer or not sure on how to proceed at some step, chances are, your colleagues have similar questions and it is worth to discuss it in class.

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It depends on your degree of risk-aversion. The variance of grades sometimes is high.

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It depends on your degree of risk-aversion. The variance of grades sometimes is high.

Is this course useful? for an Econ PhD

I want to go to grad. school in Economics. Microeconomic Theory is very important for Economics, should I take this course?

No. In grad school, you will have several opportunities to take Microeconomic Theory classes. If you want to increase your chances of being accepted by a top program, you should take more classes at the Mathematics Department.

Is this course useful?

Econ and other fields

Would you recommend this course to any Econ, CS or Poli Sci major or PPE minor?

Of course: if you want to learn more about when markets work (or fail), this is a good course for you. If you plan to go to Law School, grad school in Public Policy, Political Science, etc ... or if you just want to learn for the sake of learning, this is a terrific course for you.

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Chances are, you will not write down a model for some concrete real-life situation, solve for its equilibrium and make accurate predictions based on it. But that does not mean that models are useless. Economic Theory may help you avoid real-life pitfalls. Also check this Noah Smith's article for several interesting examples of applications of Microeconomics to real-life.

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