

Markets & Behavior

ECON 510-001

Sérgio O. Parreiras

Department of Economics
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
 - First Week To Do List
 - Class Discussion
 - Assignments

2 On Math

3 FAQ



THE UNIVERSITY
of NORTH CAROLINA
at CHAPEL HILL

Outline

- 1 Syllabus
 - Goals
 - Coverage
 - Research
 - Class
 - Contact Information
 - Exam Dates and Grading Policy
 - First Week To Do List
 - Class Discussion
 - Assignments
- 2 On Math
- 3 FAQ



Outline

- 1 Syllabus
 - Goals
 - Coverage
 - Research
 - Class
 - Contact Information
 - Exam Dates and Grading Policy
 - First Week To Do List
 - Class Discussion
 - Assignments
- 2 On Math
- 3 FAQ





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 not without Effort and Expense, they delivered it up to the Architects, who had always been in the Desert of the Theory, all kinds of Plans, and they drew thereon that Map, entitled by Agreement and Tradition, and there were no other Plans of the Empire since the Cartographers Suarez Miranda, *Viajes de varones prudentes*, Libro IV, Cap. XLV, Lerida, 1658.”



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,

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



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 not without some Pitilessness was it, that they delivered it up to the Inclemencies of Sun and Winters. In the Deserts of the West, still today, there are Tattered Ruins of that Map, inhabited by Animals and Beggars; in all the Land there is no other Relic of the Disciplines of Geography.

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



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 not without some Pitilessness was it, that they delivered it up to the Inclemencies of Sun and Winters. In the Deserts of the West, still today, there are Tattered Ruins of that Map, inhabited by Animals and Beggars; in all the Land there is no other Relic of the Disciplines of Geography.

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



Mont Sainte Victoire

Photography vs Cézanne



THE UNIVERSITY
of NORTH CAROLINA
at CHAPEL HILL

Mont Sainte Victoire

Photography vs Cézanne



THE UNIVERSITY
of NORTH CAROLINA
at CHAPEL HILL

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

- We meet online Tuesdays and Thursdays, from 4:45 pm to 6:00 pm. Please, see Sakai > Announcements for the ZOOM links.
- 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.

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

- **September 8th** — 1st Midterm
- **October 27th** — 2nd Midterm
- **TBA by the University Registrar** — 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	63
F	50

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.

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.

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.

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 ...

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 ...

Class Discussion

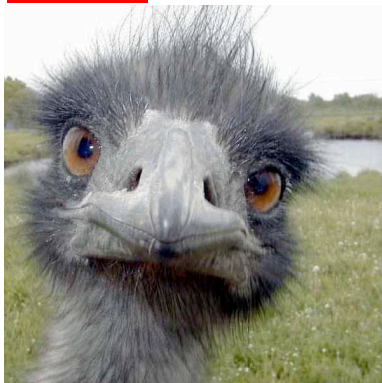
During this course, we shall employ additional material from TV, movies, or literature to discuss strategic related issues.

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 ...

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
0	–	–	–

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
0	–	–	–

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
0	–	–	–

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
0	–	–	–

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
0	–	–	–

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
0	–	–	–

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)



Mathematics is a tool (language)

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.

Mathematics is a tool (language)

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.

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.

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.

Questions & Answers

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.

The lack of an answer key is, for most of the cases, **deliberate**. It is designed to give incentives for you to work the problems rather than trying to memorizing solutions.

Questions & Answers

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.

The lack of an answer key is, for most of the cases, **deliberate**. It is designed to give incentives for you to work the problems rather than trying to memorizing solutions.

Questions & Answers

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.

The lack of an answer key is, for most of the cases, **deliberate**. It is designed to give incentives for you to work the problems rather than trying to memorizing solutions.

Questions & Answers

*I am about to graduate. I need an upper level requirement course.
This course is the only one that fits my schedule.
Should I take this class?*

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

Questions & Answers

I am about to graduate. I need an upper level requirement course. This course is the only one that fits my schedule. Should I take this class?

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.

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.

Is this course useful? outside academia

I do not want to pursue (at the moment) any other future academic degree after my graduation, I want to find a job related to economics or business: industry, commerce or in the financial sector. But in real life people are not fully rational, will I be able to use any of the “equations” I learn in this class? What is the use of learning the equilibria of these artificial models?

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.

Is this course useful? outside academia

I do not want to pursue (at the moment) any other future academic degree after my graduation, I want to find a job related to economics or business: industry, commerce or in the financial sector. But in real life people are not fully rational, will I be able to use any of the “equations” I learn in this class? What is the use of learning the equilibria of these artificial models?

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.