Microeconomic Theory I (Econ 60101) : Syllabus

1 General Information

Instructor: Michèle Müller-Itten
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Meeting times: TuTh 9 am - 11 am, 3005 Nanovic Hall
Office hours: Th 11 am - 1 pm (reserve slots here)
Graduate TA: Jacob Hukill, jhukill@nd.edu
TA office hours: Th 3-4pm, 3046 Nanovic Hall
TA section: W 5:30 pm - 6:45 pm, B058 Nanovic Hall
Course Website: https://canvas.nd.edu
Zoom (if needed): meeting ID 951 7868 1757, passcode 0728512133

2 Course Overview

This is the first part of a two-course sequence covering the fundamentals of modern microeconomic theory. It equips students to pursue their own research by familiarizing them with the fundamental tools of decision theory, neoclassical models of consumer and firm behavior, and general equilibrium.

3 Course Learning Goals

Upon successful completion of this course, you will be able to...

... design models of human and firm decision making with and without uncertainty.

... identify key assumptions behind utility maximization models.

... distinguish between cardinal and ordinal properties and techniques.

... construct short, intellectually challenging and mathematically rigorous proofs related to key results from microeconomic theory.

... articulate how markets can foster efficient resource allocations.

... determine the efficient allocation and competitive equilibrium prices for well-behaved multiple agent economies with and without production.

... illustrate the main results from general equilibrium theory using the Edgeworth box.

... identify whether an economic analysis calls for a partial or a general equilibrium framework.

... discuss key frictions that can undermine the efficiency of market mechanisms.

4 Course Organization

4.1 Prerequisites

I will assume that you master the material typically covered in an undergraduate sequence of calculus and linear algebra. You will also need a good command of mathematical notation and proof techniques. For self-study resources on these topics, see Section 4.7.

[MWG]

4.2 Class Website

All class materials will be available to you on Canvas. I will also be using Canvas to record your grades. To find the class website, just go to

https://canvas.nd.edu

and log in with your NetID. As long as you are registered in the course, the class website should come up automatically. If there are any issues, please reach out for technical support to the OIT Help Desk and the Canvas Team. You can contact the Help Desk at oithelp@nd.edu, 574-631-8111 or in person at 128 DeBartolo. I will assume that you have full access to Canvas, and that your notification preferences are set so that you receive announcements made online (make sure you have a current email on file!).

4.3 Study Groups

I believe working in a group is crucially important for your success in this class. These are challenging topics and techniques, and you will benefit tremendously from discussing with your classmates. For this reason, you will form official 'study groups' at the beginning of the semester. We can adjust the groups as needed, but I want you to each be in a working group of students to discuss class material and problem sets. I will do my best to make the class as interactive as possible, and having you brainstorm techniques and solutions as a team will make the material more engaging.

4.4 'Flipped class' Format

Each class consists of two parts: In preparation for our meeting, you will independently work through a dedicated Canvas "module" where I present new material through short lecture videos and readings. This gives you an opportunity to go through the new material at your own pace, and lets us save most class times for more interactive activities. You are expected to complete these modules before each class, and come to class armed with questions. Our time together will be mostly structured as a "problem-solving workshop", where we address the questions that came up during the videos and work on practice problems, mostly in study groups. I will be on-hand to explain any new concepts, answer questions that come up, and give feedback on your answers.

Before each class, you are expected to watch the assigned lecture videos, brainstorm ideas for the day's practice problems, and bring along at least one 'contribution' with you to class. A contribution can be any of the following:

- A comprehension question regarding the current class material, which you write on a *yellow* index card as you enter class.
- A follow-up question that came up as you were revisiting the material from the last class, which you write on a *pink* index card as you enter class.
- A plan of attack for one of the practice problems, which you write on a *green* index card as you enter class.
- A confidential feedback regarding how the class is going for you, or anything you want me to be aware of, which you write on an *orange* index card and hand straight to me.

During class, I expect you to actively participate in your group, and not hesitate to let me know if you have questions. After class, I expect you to revisit the problems until you feel confident that you could tackle them by yourself next time.

You may discover soon that we typically don't have time to go through all "in-class practice problems" that are assigned to a class. This is by design: I like to have some leeway regarding which practice problems I find most relevant to the questions that come up, and I also like to give you extra opportunities to practice on your own, should you find that helpful.

4.5 Tutorials

Every week, there will be a tutorial session held by our graduate student instructor for the course, which serves as an opportunity to review material and get more practice.

If you are an undergraduate student interested in taking this class, you should consider these tutorials as mandatory. If you are a graduate student, I leave it up to you whether you want to attend from week to week, but you are still strongly encouraged to do so.

4.6 Time Investment

The average weekly time investment for this class is 10 hours. If you are an undergraduate student wishing to take this class, please take into consideration that your time investment will likely be significantly larger than for an undergraduate class for equal credit.

Of that 10 hours, you should set aside about one hour for lecture prep twice a week to work through the module, preview the in-class questions, and prepare your 'daily contribution'. Class meetings account for another 2 hours twice a week, and the tutorial takes 1 hour each week. Homework is due roughly every other week, and should take about 5 hours. That leaves you with about 30 minutes in the average week for class review, additional readings, and office hour visits.

The time estimates are averages — in reality, the assigned video lectures are much longer in the first few weeks when we review the required math background. You may need to allocate up to two hours before each of these classes, especially if you are not yet familiar with the topics. In turn, some of the lectures at the end of the semester require only a few pages of reading, and you may be done in 30 minutes. Although it may be a bit of a shock at first, students generally appreciate that the class is somewhat 'front-heavy', since other

responsibilities have a way of sneaking up during the semester. Still, if you ever feel like you are spending significantly more time on micro theory than on your other grad classes, please let me know so that we can 'right the ship'.

4.7 Textbooks

The main textbook for this class is Mas-Colell, Whinston, and Green [MWG], which is considered *'the'* standard in the profession, and covers many topics in a lot more depth than we will need. Used copies can be much more affordable than new ones, and I will work with you if you do not have the latest edition. If you find that you would benefit from a more high-level description of the main concepts, you may look into Jehle and Reny [J&R] or Varian [Var]. You can borrow either book from the library.

Part of this and other first-year grad classes is about (re-)discovering mathematical techniques in economic terms. Simon and Blume [S&B] is a useful as a self-study tool to revisit basic linear algebra or calculus concepts from your undergraduate studies, or look up more advanced topics as needed. For an introduction to logic, set notation, and proof techniques, as well as many useful exercises that are helpful across disciplines, I am partial to Hammack [BoP].

I will upload slides to Canvas for your reference. I will also give you access to my lecture notes, but be aware that they are incomplete and contain errors. I appreciate it if you point out any mistakes to me, so I can correct them. Do not rely solely on my printed notes and slides however; they are not comprehensive summaries of what happens during class. I will not post any answers for the in-class practice problems. You are expected to take your own notes to serve as a foundation for your learning, or to revise for the final. Research shows that taking your own hand-written notes during class boosts understanding and retention.[1]

4.8 Asking Questions

This is a challenging course; it is not intended to merely introduce you to new ideas and methods (as in an undergraduate class), but to push you to master a subject and grow as a thinker, researcher, and economist. If you struggle with any of the presented material, I expect that you immediately seek out help from the other students, textbooks or myself.

For questions related to the material, I encourage you to ask in class. This allows other students to benefit from the discussion. Office hours are better suited for very specific questions, such as extensions of the material or questions about specific homework exercises. That being said, you are always welcome to stop by during office hours for any subject matter. I want to also specifically encourage questions from those who speak English as a second language (or have trouble understanding my own accent :)). It is never a bother to me to repeat a sentence or rephrase it so that the content is accessible to all.

If you send me an email, I will do my best to answer within 24 hours (excluding weekends). If you do not receive an acknowledgment within 48 hours, please send me a reminder. For questions pertaining to a homework or a problem from class, I reserve the right to copy

[1] May, Cindy. "A Learning Secret: Don't Take Notes with a Laptop." *Scientific American*, June 3, 2014.

the text (anonymously) to a canvas announcement and answer it there, so that everyone can benefit from the clarification.

5 Grading

Your final grade will be determined based on the following class components:

15% participation + 15% Homework
+ 10% Graded practice session + 30% Midterm + 30% Final

Final grades may be curved, but only in the upward direction. My objective (in accord with departmental norms) is for the average course grade to be close to a B+.

Participation. Regular attendance is absolutely required to succeed in the assignments and exams. Your participation score reflects whether you watch all the assigned lecture videos, bring your daily contributions to class, and actively participate in your group.

Homework. There will be seven homework assignments that both review material from prior lectures and preview upcoming material for future lectures. These homework assignments are due *at 11:55 pm EDT* on the indicated due date; late problem sets will not be accepted. Homework will posted and submitted electronically using gradescope (instructions). You can access gradescope on canvas. You are encouraged to discuss problems collaboratively, but final solutions must be produced independently.

Homeworks will be graded purely in terms of effort. They are primarily meant to be a learning opportunity, and you will obtain the maximum score as long as it is clear that you have made a good faith effort for all problems. However, this also means that you are always responsible to check the posted solutions and work through any discrepancies. Making errors is the best way to learn, but you will only make progress if you identify and correct your mistakes.

As throughout this course, feel free to cite any previous results from class or homework. If you can answer a question with one sentence simply by referring to a theorem from class, or by matching it to a previous exercise, please do so! The goal is to create a thorough understanding of the entire body of knowledge, rather than merely reiterating the same techniques over and over.

Midterm. There will be one written midterm that focuses on economic models, consumer and firm theory, relying on the mathematical techniques covered at the beginning of the semester.

Should you have a valid, University-approved conflict with the date mentioned in Section 7, consult with me at least a week ahead of the exam. Failure to resolve exam conflicts at least a week in advance may mean that no alternative arrangements will be made.

Final exam. There will be a final exam at the end of the term, during the official exam period. The exam will be conducted orally, and will cover all material of the class. Students will receive a list of possible exam questions ahead of time, and sign up for a 15 minute exam. The exam will be held in person with the student, the instructor, and the TA present. Exams will be recorded by the instructor and maintained for archival purposes. During the exam, each student will randomly be assigned to one of the prepared questions. The student will first present his solution to the assigned question, followed by live Q&A on the question or related topics.

Graded Practice Session. To prepare for the format and nature of the final exam, we will hold two graded practice sessions during class. These will be similar in format to the final exam, except that questions will be covered sequentially, and instead students will be drawn at random (without replacement). Everybody will be able to participate in these sessions and ask questions, so that by the end of the semester you have seen several examples of how oral exams work.

Conversion to letter grades. The following cutoffs are used to determine letter grades:

A	94 - 100
A−	90 - 93.99
B+	87 - 89.99
B	83 - 86.99
B−	80 - 82.99

C+	77 - 79.99
C	73 - 76.99
C−	70 - 72.99
D	60 - 69.99
F	0 - 59.99

6 Administrative notes

6.1 Academic Integrity.

This class follows the binding Code of Honor at Notre Dame. Cheating and plagiarism will not be tolerated in any form. Any violation of the academic code of honor will result in a punishment proportional to the crime, as determined by the instructor and student or through the Honesty Committee process. Except when otherwise noted, all graded work you do in this class must be your own. When collaboration is explicitly allowed, indicate who you were working with.

6.2 Health and Safety Protocols

In this class, as elsewhere on campus, students must comply with all University health and safety protocols. Face masks are optional in class, but required during office hours.

6.3 Printing issues

I will provide all homework and solutions in pdf format. In the past, some students have encountered issues when printing directly from a browser, with some symbols missing or appearing scrambled. Please use Adobe Reader to open the files, as this guarantees correct

display across platforms. If you have another favorite app, test it by comparing the two following lines both. They should look identical, both on screen and in print.

$$\in \succeq \not\supseteq \emptyset \succ \not\subset \subset \subseteq \exists \forall \{\} \prec \not\preceq \Rightarrow \Leftarrow \Leftrightarrow$$

$$\in \succeq \not\supseteq \emptyset \succ \not\subset \subset \subseteq \exists \forall \{\} \prec \not\preceq \Rightarrow \Leftarrow \Leftrightarrow$$

6.4 Special Accommodations

It is university policy to provide reasonable accommodations for students with properly documented disabilities. Students who think they may have a disability are invited to contact Sara Bea Disability Services (sarabeadisabilityservices.nd.edu) for a confidential discussion. Because the university's academic accommodations processes generally require students to request accommodations well in advance of the dates when they are needed, please do not delay such requests.

6.5 Support for Student Mental Health at Notre Dame

Care and Wellness Consultants provide support and resources to students who are experiencing stressful or difficult situations that may be interfering with academic progress. Through Care and Wellness Consultants, students can be referred to The University Counseling Center (for cost-free and confidential psychological and psychiatric services from licensed professionals), University Health Services (which provides primary care, psychiatric services, case management, and a pharmacy), and The McDonald Center for Student Well Being (for problems with sleep, stress, and substance use). Visit care.nd.edu.

6.6 Diversity in and outside of the classroom

I try to make this class as varied as possible. There's careful and precise mathematical reasoning, there are broad discussions on topics related to current economic research, and there's practical application of the concept to specific models. I know each of you can bring a unique perspective to the classroom, and I want to really encourage you to contribute your view point, your ideas and your questions. If at any point, you have ideas on how I can improve in doing so, please let me know. (It is possible to do so anonymously through our department mail boxes located in 3060 Nanovic Hall). I firmly believe each one of you can succeed. Those less familiar with the material may require some more explanations or examples, which I am happy to provide. However, the responsibility is on you to reach out, attend office hours, and dig into the resources listed in the syllabus.

I am also aware that all of our lives extend beyond this classroom, and that world politics, the public health situation, career planning and personal relationships will all impact your life over the coming semester. It is important to me that you know that I care for you as a person and not just as a final grade. If you would like to chat about any issues that come up, whether academic or not, I will gladly make time.

That being said, please note that all professors are considered mandatory reporters of harassment and discrimination by Title IX law. Mandatory reporters are responsible for reporting all Title IX violations of sex-based discrimination and sexual harassment, including sexual violence, stalking/dating violence, and child sexual abuse. If students disclose cases that meet this definition in written or verbal communication, I am obligated to report that to our Title IX office so they can help provide support and track such incidents.

6.7 Acknowledgements

In designing this course, I have built upon material graciously provided to me by Terence Johnson, Maciej Kotowski, David Ahn and Jonathan Levin. I am indebted to them for their willingness to share their hard work, and will be happy to pay it forward if any of you end up teaching Micro Theory in the future.

7 Detailed Class Calendar

For easy reference, due dates are marked with a calendar symbol (🗓). Unless otherwise noted, all submissions are due at midnight on the date indicated. Required readings are indicated by the symbol 🔖, optional background reading is marked as 🔖.

Tuesday	*Thursday*
Aug 23: Course Overview (1) Ingredients of an economic model Basic questions of economic analysis 🔖 Syllabus 🔖 Lecture Notes: Chapter 1	**Aug 25: Math Background I** (2) Sets, Logic and Proof Strategies 🔖 Lecture Notes: Chapters 2.1-2, 2.6-7 🔖 [BoP]: Chapters 1.1-8; 2.1-3,5-10; 4-9
Aug 30: Math Background II (3) Functions and Correspondences Binary Relations 🔖 Lecture Notes: Chapters 2.3, 2.5 🔖 [BoP]: Chapters 11.1-3; 12.1-2,4 🗓 Homework 1	**Sep 1: Math Background III** (4) Optimization over $\mathbb{R}^n$: Setup, Important Theorems 🔖 Lecture Notes: Chapter 2.9 🔖 Lecture Notes: Chapter 2.8 🔖 [J&R]: Chapters A2.2-5 🔖 [S&B]: Chapters 16-19,21 🔖 [MWG]: Chapters M.A,C-H,J-L

Sep 6: Math Background IV (5) Optimality conditions Comparative statics Lecture Notes: Chapter 2.9 [J&R]: Chapters A2.2-5 [S&B]: Chapters 16-19,21 [MWG]: Chapters M.A,C-H,J-L	**Sep 8: Graded practice session**
Sep 13: Decision Theory I (6) Choice Rules and Rationality Lecture notes: Chapters 3.1-2 [LM04]: Chapters 1-3 Homework 2	**Sep 15: Decision Theory II** (7) Preferences Lecture notes: Chapters 3.3 [LM04]: Chapters 1-3
Sep 20: Decision Theory III (8) Utility maximization Axiomatic Approach Lecture notes: Chapters 3.4-5 [LM04]: Chapter 4	**Sep 22: Consumer Theory I** (9) Marshallian Demand Compensated Law of Demand Lecture notes: Chapter 4.1 [MWG]: Chapters Homework 3
Sep 27: Consumer Theory II (10) Indirect utility and Roy's identity Hicksian demand and expenditure Shepard's Lemma Lecture notes: Chapters 4.1-2	**Sep 29: Consumer Theory III** (11) Slutsky decomposition Giffen goods Lecture notes: Chapters 4.3
Oct 4: Firm Theory I (12) Production sets Profit maximization and cost minimization Lecture notes: Chapters 5.1-5.3	**Oct 6: Math Background VI** (13) Basics of discrete probability Lecture notes: Chapter 6 Homework 4
Oct 11: Midterm	**Oct 13: Decision Theory IV** (14) Preference over gambles Lecture notes: Chapter 7.1

Fall Break — no class

Oct 25: Decision Theory V (15) Expected utility maximization 🔖 Lecture notes: Chapter 7.1	**Oct 27: Decision Theory VI** (16) Estimating the utility index Risk attitudes 🔖 Lecture notes: Chapter 7.1
Nov 1: Decision Theory VII (17) Subjective probabilities Allais Paradox, Ellsberg Paradox Rational Inattention 🔖 Lecture notes: Chapter 7.2 📅 Homework 5	**Nov 3: Graded practice session**
Nov 8: General Equilibrium I (18) Exchange economies Pareto optimality Walrasian Equilibrium 🔖 [Lev06]: Chapter 1-2 🔖 [Var]: Chapter 17.1-2	**Nov 10: General Equilibrium II** (19) Edgeworth Box First and Second Welfare Theorems 🔖 [Lev06]: Chapter 3-5 🔖 [Var]: 17.3,6-8 🔖 [MWG]: 15.B, 16.C-D
Nov 15: General Equilibrium III (20) Partial vs General Equilibrium Realism of price-taking Contingent commodities 🔖 [Lev06]: 10 🔖 [MWG]: 15.E, 16.G 🔖 [Var]: 20.1-2	*conference travel — no class*
Nov 22: General Equilibrium IV (21) Equilibrium existence and uniqueness Empirical Implications 🔖 [Lev06]: 6, 7.1-5 🔖 [MWG]: 17 🔖 [Var]: 17.4-5 📅 Homework 6	*Thanksgiving Break — no class*

Nov 29: General Equilibrium V (22) Production Economies Centralized vs decentralized allocations 🔖 [Lev06]: Chapter 9 🔖 [Var]: 18 🔖 [MWG]: 16.B	**Dec 1: General Equilibrium VI** (23) Robinson Crusoe Economy 🔖 "Robinson Crusoe meets Walras and Keynes" [McF03] 🔖 [Var]: 18 🔖 [MWG]: 15.C
Dec 6: Market Limitations (24) Externalities Incomplete markets 🔖 [Var]: 24 📅 Homework 7	**Dec 8: Review Session** (25) Practice problems Some dissertation advice 🔖 "What use is economic theory?" [Var93]

Thursday, December 15: Final Exam (10:30 am – 12:30 pm)

Recommended Textbooks and Course Notes

[BoP] Richard H Hammack. *Book of proof*. 2013. URL: https://www.people.vcu.edu/~rhammack/BookOfProof/.

[J&R] Geoffrey A Jehle and Philip J Reny. *Advanced Microeconomic Theory (Third Edition)*. Essex: Pearson Education Limited, 2011.

[Lev06] Jonathan Levin. *General Equilibrium*. Course notes. 2006. URL: https://web.stanford.edu/~jdlevin/Econ%20202/General%20Equilibrium.pdf.

[LM04] Jonathan Levin and Paul Milgrom. *Introduction to choice theory*. Course notes. 2004. URL: http://web.stanford.edu/jdlevin/Econ.

[MWG] Andreu Mas-Colell, Michael Dennis Whinston, and Jerry R Green. *Microeconomic theory*. Vol. 1. Oxford university press New York, 1995.

[S&B] Carl P Simon and Lawrence Blume. *Mathematics for economists*. Vol. 7. Norton New York, 1994.

[Var] Hal R Varian. *Microeconomic analysis (Third Edition)*. Norton New York, 1992.

Additional Readings

[McF03] Daniel McFadden. "Robinson Crusoe meets Walras and Keynes". Available online. 2003. URL: https://eml.berkeley.edu/~mcfadden/eC103_f03/Robinson.pdf.

[Var93] Hal R Varian. "What use is economic theory?" Available online. 1993. URL: http://people.ischool.berkeley.edu/~hal/Papers/theory.pdf.