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| **Economics 312—2022 Spring** | **Mathematical Economics** |
| **MWF 12:00-12:50** | **MC 307** |
| **Instructor: Dr. Jun He** | **Jun.he@trincoll.edu** |
| **Office hour: M 1.30-2.30 pm F 1.30-3 pm** | **Zoom: 432 519 8931** |

**Required Text:**

*Fundamental Methods of Mathematical Economics,* 4th Edition (2005); ISBN: 9780070109100

Chiang, A. and Wainwright, K.

**Course Description**

This is a mathematical economics course with an emphasis on application. After the introduction of mathematical concepts and tools, I will concentrate on teaching how to apply math knowledge to solve relevant economic questions in fields such as Micro and Macroeconomics, Sports Economics, and Law and Economics. The methods conveyed by this course will enable students to analyze economics with rigorous math reasoning.

**Course Objectives**

By the end of this course, students are expected to be able to:

* Reproduce results from fundamental economic models
* Solve practical economic questions that are derived from models
* Interpret the results from math and economic perspectives

The content of this course is designed to be of three modules.

Module 1. Equilibrium analysis with Matrix Algebra

Module 2. Static Analysis of the solutions

Module 3. Optimization Theories (Unconstrained and Constrained Optimization)

**Grade Distributions**

Participation (10%+5%)

Regular participation to class is required. Active engagement in class discussion and solving for questions is appreciated.

Problem sets (20%)

Problems sets will be assigned periodically during the course. They will consist of both economics and math problems to enhance your understanding of the course material. There are 7 or 8 problem sets in total. Collaborative work is allowed but you have to hand in your own work with print-name and date.

Midterm (20% \*2)

There are two midterms. Each of them counts 20% towards the final grade. I will announce the content of the exam in class. The practice exam will be posted one week prior to the exam date to favor your review. No calculator is allowed during the exam and academic misconduct is strictly prohibited.

Final exam (25%)

I will provide a practice exam for the final. The final exam is emphasized on testing your mastery of math modeling under economic context, through mastery of previous knowledge is necessary for deriving the correct answers.

**Office hours:**

**M 1-2 pm and F 1-2.30 pm** on [Zoom](https://trincoll.zoom.us/j/4325198931) (meeting ID: 432 519 8931), where book in advance via [calendly](https://calendly.com/junhe_trin/office-hours) is required. Also, email in advance to inform me the content of meeting is appreciated.

**TA: Dylan Powell** can be contacted at dylan.powell@trincoll.edu. His office hour is TBA. HM questions and practice questions should go primarily to the TA.

**Course Policies**

* Attendance is mandatory. If you miss class, please talk to one of your classmates to get the notes you missed. And you will run the high risk to be unable to follow the subsequent content.
* Problem sets need to be handed in during class time. No email submissions accepted. I will allow only one deadline extension during the entire course, in which case a penalty by 15 points per day will be applied for a late submission. The extension request has to be placed within a week post the deadline.
* Cell phones are not to be used in class. If you need to make/receive a call, please step out of the classroom.
* Mask rule and social distancing are strictly performed unless college policy changes.
* Computers are only allowed for taking notes, although I highly suggest taking notes with pen and paper. Please do not use your computer for personal reasons (online shopping, checking email, watching YouTube, etc.) during class.
* Any appeals over grading should be submitted within a week after the grade is posted. Disputes submitted later than that will not be accepted.
* Absence from class **does not** excuse the student from any assigned work designated by the instructor as part of this course. In the event of an absence, you alone are responsible for promptly discovering what was covered or announced in class and catch up with class assignments as soon as possible. Therefore, please check Moodle announcement at least once per week.
* **No make-up** **will be given**. If you have a ***documented excuse*** for missing a quiz/midterm, the points will be reallocated to the upcoming quiz/midterm. Only the final can have a make-up when *official* proof justifying the absence is presented.
* You should notify me of the unavoidable absence of exams for the above-mentioned reasons only at least a week in advance of the exam day.
* You should consult with me if you have a need for a late drop.

**Tentative Course Outline (subject to change according to progress)**

**Module 1. Equilibrium and Linear Equations**

* Introduction to math econ
* Matrix algebra
* Matrix properties
* Linear models and application

**Midterm 1**

**Module 2. Static Analysis**

* Univariate Derivative and differentiation
* Multivariate calculus
* Comparative static analysis

**Midterm 2**

**Module 3. Optimization**

* Derivative test and optimization
* Uni/Multivariate unconstrained optimization
* Uni/Multivariate optimization with constraint

**Final**

**Grading Scale:** You can refer to the student handbook for a more detailed explanation of the grading policies. Below I am providing the numerical values for the main ones:

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| A+ | A | A- |
| 97-100 | 93-96.99 | 90-92.99 |
| B+ | B | B- |
| 87-89.99 | 83-86.99 | 80-82.99 |
| C+ | C | C- |
| 77-79.99 | 73-76.99 | 70-72.99 |
| D+ | D | D- |
| 67-69.99 | 63-66.99 | 60-62.99 |

**F if below 60 points.**

**Extra Credit:** There will be no extra credit paper offered in this class, so please do not ask for such an opportunity after exams or at the end of the semester. Instead of trying to boost your grade with extra course work, FOCUS on studying and performing well on the mandatory class material. Also, incomplete requests are not accepted.

**Academic Integrity:** The faculty and administration support an environment free from cheating and plagiarism. Each student is responsible for being aware of what constitutes cheating and plagiarism and for avoiding both. The complete text of the Academic Integrity Policy and the Trinity College procedure for implementing that policy may be found at <http://internet2.trincoll.edu/facman/doc0009.html>.

**Students with Academic Accommodations**: Trinity College is committed to creating an inclusive and accessible learning environment consistent with the Americans with Disabilities Act. If you have approval for academic accommodations, please share your accommodation letter during the first two weeks of the semester or a minimum of 10 days prior to needing your accommodations. You may choose to email me a PDF copy of your letter.  If you do so, please copy SARC@trincoll.edu on the email and be sure to meet with me privately to discuss the implementation of your accommodations in at least a week’s advance to the exam. If you do not have a letter but have a disability requiring academic accommodations, or have questions about applying for accommodations, please contact Lori Clapis, Coordinator of Accessibility Resources at 860-297-4025 or Lori.Clapis@trincoll.edu.

**Commitment to the Course:** By signing up for this course, you are expected to get all the materials recommended for this course (textbook & WebAssign), attend all the lectures, and follow the syllabus.