ECO s395M
Real Analysis
Summer 2021, Second Session – Unique IDs 80450, 80455, 80460, and 80465

Instructor:	Dr. Kirk Blazek
Lecture:	MTWTh 9:00-10:35 in WEL 2.224, `https://utexas.zoom.us/j/93398213283`
Summer Office:	BRB 2.138
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Email:	`blazek@math.utexas.edu`
Office Hours:	MTWTh 8:00-9:00 and 12:45-1:30
TA:	Zhenghao Li
TA's Office:	TBA
TA's Office Hours:	TBA
TA's Review Session:	Friday 9:30-10:30 in WEL 2.224 `https://utexas.zoom.us/j/97240220880`
TA's Email:	`lizhenghao@utexas.edu`

Catalog Description: This is an introductory course in real analysis. The main topics covered will be properties of Euclidean spaces, metric spaces, compactness, and rigorous treatments of continuity, single-variable differentiation and integration, and sequences and series of real-valued functions. Be aware that *this is a rigorous class focused on proofs and an abstract approach to mathematics.*

Prerequisites: There is no official prerequisite for this class, though you are expected to have some familiarity with proof techniques. Please speak with the instructor if you are unsure whether or not you are prepared to take this course. Two of M341, 328K, or 325K with a grade of at least C should be sufficient.

Text: (Required) Lay, Stephen, *Analysis, with an Introduction to Proof*, 5th edition, Pearson, 2014.

(Recommended) Rudin, Walter, *Principles of Mathematical Analysis*, McGraw-Hill, 1976.

(Recommended) Ok Efe, *Real Analysis with Economic Applications*, Princeton, 2007.

(Recommended) Galovich, Steven, *Doing Mathematics: An Introduction to Proofs and Problem Solving*, 2nd edition, Thomson/Brooks Cole, 2007.

Lecture: Lecture will be held Monday through Thursday. If you are unable to attend in person for whatever reason, the lecture will also be simultaneously broadcast through Zoom. I will do my best to monitor chat during lecture. Lectures will then be posted on Canvas for people unable to participate live, or if anyone wants to review lectures at a later time.

Review Sessions: Every Friday there will be a review session led by the TA. The purpose is to answer homework questions, and help to explain and expand topics if you have any trouble. This is a challenging class, and the TA is there not just to talk about homework, but to give a different perspective on the topics. There can be numerous ways to approach these concepts, and the TA will be there to provide another point of view. Like with lecture, if you are unable to attend live, it will be broadcast through Zoom.

Homework: Problem sets will be assigned twice a week. Homework will be due on Tuesdays and Fridays (except for the first week of the course). Partial credit will be awarded, but remember that in order to receive full credit your work must be clear enough to be read and understood by others. You may collaborate on the problems, but your final write-ups must be your own work. Copied solutions are unacceptable.

Late Policy: In order to accommodate students who attend the class remotely, homework will be submitted online through Canvas. Homework will not be accepted late. The lowest homework grade at the end of the course will be dropped. If you run into any problems, it's best to contact me as soon as possible. Please do not wait to submit a few minutes before the deadline. If you run into technical problems and miss the deadline, you will not receive full credit.

Exams: This course will have a midterm and a final. The midterm will be given on July 28th in class at the usual time and the final will be on Friday, August 13th from 4-7pm. Exams must be taken with no outside assistance, whether written, electronic, or otherwise. There will be an online option for students unable to attend in person. This will be discussed further once class starts.

Makeup Exams: If you are going to miss an exam, you must let me know *immediately* in order to discuss possible arrangements. However, don't expect a whole lot unless you missed the exam due to medical reasons that can be confirmed with a doctor's note.

Emergencies: If an emergency situation comes up that will result in you being unable to turn in an assignment or exam, please let me know as soon as possible so we can try to work something out.

Sharing of Course Materials is Prohibited: No materials used in this class, including, but not limited to, lecture hand-outs, videos, assessments (quizzes, exams, papers, projects, homework assignments), in-class materials, review sheets, and additional problem sets, may be shared online or with anyone outside of the class unless you have my explicit, written permission. Unauthorized sharing of materials promotes cheating. It is a violation of the University's Student Honor Code and an act of academic dishonesty. I am well aware of the sites used for sharing materials, and any materials found online that are associated with you, or any suspected unauthorized sharing of materials, will be reported to Student Conduct and Academic Integrity in the Office of the Dean of Students. These reports can result in sanctions, including failure in the course.

Class Recordings: Class recordings are reserved only for students in this class for educational purposes and are protected under FERPA. The recordings should not be shared outside the class in any form. Violation of this restriction by a student could lead to Student Misconduct proceedings.

COVID Caveats: To help keep everyone at UT and in our community safe, it is critical that students report COVID-19 symptoms and testing, regardless of test results, to University Health Services, and faculty and staff report to the HealthPoint Occupational Health Program (OHP) as soon as possible. Please see this link to understand what needs to be reported. In addition, to help understand what to do if a fellow student in the class (or the instructor or TA) tests positive for COVID, see this University Health Services link.

Grading: The overall grade will be determined by the exams given during the class as well as the homework.

30%	Midterm
40%	Final Exam
30%	Homework
100%	Total

Honor Code: The core values of the University of Texas at Austin are learning, discovery, freedom, leadership, individual opportunity, and responsibility. Each member of the University is expected to uphold these values through integrity, honesty, trust, fairness, and respect toward peers and community.

Students with Disabilities: If you are a student with a disability, or think you may have a disability, please contact Services for Students with Disabilities (SSD) to determine your eligibility for accommodations. You may refer to SSD's website for contact and more information. If you are already registered with SSD, please deliver your accommodation letter to me as early as possible so we can discuss your approved accommodations.

    If you need any special arrangments for exams, in order to make sure I can accommodate you, these need to be settled at least two weeks before the exam date.

Schedule (Subject to Change):

July 12th: Chapters 1 and 2- Preliminaries and review of some fundamental concepts

July 13th: 3.1-3.2 - Induction and Ordered Fields

July 14th: 3.3-3.4 - Completeness

July 15th: 3.4 - The Topology of $\mathbb{R}$

July 19th: 3.5-3.6 - Compact Sets and Metric Spaces

July 20th: 4.1-4.2 - Convergence of Sequences

July 21st: 4.3-4.4 - Monotone Sequences, Cauchy Sequences, and Subsequences

July 22nd: 5.1 - Limits of Functions

July 26th: 5.2-5.3 - Continuity of Functions

July 27th: 5.4-5.5 - Uniform Continuity and Continuity in Metric Spaces

July 28th: Midterm

July 29th: 6.1 - The Derivative

August 2nd: 6.2-6.3 - The Mean Value Theorem and l'Hospital's Rule

August 3rd: 6.4 - Taylor's Theorem

August 4th: 7.1-7.2 - The Riemann Integral

August 5th: 7.3 - The Fundamental Theorem of Calculus

August 9th: 8.1-8.2 - Infinite Series

August 10th: 9.1, 9.2 - Uniform Convergence of Functions

August 11th: 8.3, 9.3 - Applications of Power Series

August 12th: Review

August 13th: Final Exam