ECO s395M
Real Analysis
Summer 2024, Second Session – Unique IDs 79010 and 79015

Instructor:	Dr. Kirk Blazek
Lecture:	MTWTh 9:00-10:45 in BRB 1.118
Summer Office:	BRB 3.134J
	(Rest of the year) PMA 13.140
Email:	`blazek@math.utexas.edu`
Office Hours:	MTWTh 8:00-9:00
	and 12:45-1:30
TA:	Zhenghao Li
TA's Office:	BRB 2.128
TA's Office Hours:	Monday and Thursday 3:30pm-4:30pm
TA's Review Session:	Friday 9:30-10:30 in BRB 1.118
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.

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.

Homework: Problem sets will be assigned twice a week. Homework will be due on Tuesdays and Fridays (except for the first Tuesday 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: Homework is due in class the day it's due, and will not be accepted late. The lowest homework grade at the end of the course will be dropped. If you are unsure if you will be able to attend class to turn in the homework on time, you should make arrangements to turn it in early or have someone bring it for you.

Exams: This course will have a midterm and a final. The midterm will be given on July 27th in class at the usual time and the final will be on Friday, August 12th from 4-7pm. Exams must be taken with no outside assistance, whether written, electronic, or otherwise.

Makeup Exams: If you are going to miss an exam, you must let me know *immediately* in order to discuss possible arrangements. However, if you contact me after the exam, 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.

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 Disability and Access (D&A) to determine your eligibility for accommodations. You may refer to D&A's website for contact and more information. If you are already registered with D&A, please deliver your accommodation letter to me as early as possible so we can discuss your approved accommodations.

Schedule (Subject to Change):

July 15th: Chapters 1 and 2- Preliminaries and review of some fundamental concepts

July 16th: 3.1-3.2 - Induction and Ordered Fields

July 17th: 3.3-3.4 - Completeness

July 18th: 3.4 - The Topology of $\mathbb{R}$

July 22nd: 3.5-3.6 - Compact Sets and Metric Spaces

July 23rd: 4.1-4.2 - Convergence of Sequences

July 24th: 4.3-4.4 - Monotone Sequences, Cauchy Sequences, and Subsequences

July 25th: 5.1 - Limits of Functions

July 29th: 5.2-5.3 - Continuity of Functions

July 30th: 5.4-5.5 - Uniform Continuity and Continuity in Metric Spaces

July 31st: Midterm

August 1st: 6.1 - The Derivative

August 5th: 6.2-6.3 - The Mean Value Theorem and l'Hospital's Rule

August 6th: 6.4 - Taylor's Theorem

August 7th: 7.1-7.2 - The Riemann Integral

August 8th: 7.3 - The Fundamental Theorem of Calculus

August 12th: 8.1-8.2 - Infinite Series

August 13th: 9.1, 9.2 - Uniform Convergence of Functions

August 14th: 8.3, 9.3 - Applications of Power Series

August 15th: Review

August 16th: Final Exam