

# ECO s395M

## Real Analysis

Summer 2019, Second Session – Unique IDs 80485, 80490, 80495, and 80500

Instructor: Dr. Kirk Blazek  
Lecture: MTWTh 9:00-10:35 in BRB 1.118  
Summer Office: BRB 2.138  
(Rest of the year) RLM 13.140  
Email: blazek@math.utexas.edu  
Office Hours: MTWTh 8:00-9:00 and 12:45-1:30  
TA: Qingsong Pan  
TA's Office: BRB 4.132  
TA's Office Hours: Friday 8:30-9:30 and 10:30-11:30  
TA's Review Session: Friday 9:30-10:30 in BRB 1.118  
TA's Email: qingsongpan@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.

**Attendance:** I will not take attendance, but class participation will be considered in borderline grades.

**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. Transcribed 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 31st in class at the usual time and the final will be on Friday, August 16th 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, don't expect a whole lot unless you missed the exam due to medical reasons that can be confirmed with a doctor's note.

**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: <http://diversity.utexas.edu/disability/>. 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.

**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 9th:** 8.1-8.2 - Infinite Series
- **August 12th:** Jury Duty - Review session normally on August 9th moved to today
- **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