Fall 2017

Math 5317 – Real Analysis

Section 001 (86739) (Mo, We 5:30-6:50 PM, Room PKH 113)

INSTRUCTOR: Yue Liu   **E-MAIL:**   yliu@uta.edu
OFFICE HOURS: Mo, We 3:00 pm-5:00 pm or by appointment   **OFFICE:**   433 Pickard Hall

TEXT: *Real Analysis*, by H. L. Royden, Third Edition.

COURSE CONTENT: Sigma-fields, measures, measurable functions, convergence in measure and almost everywhere, integration, Fatou's Lemma, Lebesgue-dominated convergence, signed measures, Radon-Nikodym Theorem, product measures, Fubini's Theorem.

PREREQUISITES: MATH 5308 or consent of Graduate Advisor.

HOMEWORKS: The instructor will distribute a list of suggested homework problems from your textbook, as well as assign some other problems (not from the textbook) at his own discretion throughout the semester. The homework problems are suggested, i.e. **they should not to be turned in for a grade**. However, you are strongly encouraged to work on these problems, since similar ones are going to appear on your exams.

GRADING POLICY:

Midterm Exam	50 %	A = 90-100
Final Exam	50 %	B = 80-89
Total Points	100 %	C = 60-79

Exam Schedule	
Midterm Exam (tentative date)	Final Exam
Monday, October 16, 2017	Monday, December 11, 5:30-8:00 PM

ATTENDANCE POLICY: At The University of Texas at Arlington, taking attendance is not required. Rather, each faculty member is free to develop his or her own methods of evaluating students' academic performance, which includes establishing course-specific policies on attendance. As the instructor of this section, I strongly recommended that you attend every class. A missed exam cannot be made up.

IMPORTANT DATES:

September 11, Monday	Census Date
November 1, Wednesday	Last day to drop this class
November 23 – 26	Thanksgiving Holidays
December 6, Wednesday	Last day of classes

ELECTRONIC COMMUNICATION: UT Arlington has adopted MavMail as its official means to communicate with students about important deadlines, events, as well as to transact university-related business regarding financial aid, tuition, grades, graduation, etc. All students are assigned a MavMail account and are responsible for checking the inbox regularly. There is no additional charge to students for using this account, which remains active even after graduation. Information about activating and using MavMail is available at http://www.uta.edu/oit/cs/email/mavmail.php.

STUDENT SUPPORT SERVICES: UT Arlington provides a variety of resources and programs designed to help students develop academic skills, deal with personal situations, and better understand concepts and information related to their courses. Resources include tutoring, major-based learning centers, developmental education, advising and mentoring, personal counseling, and federally funded programs. For individualized referrals, students may visit the reception desk at University College (Ransom Hall), call the Maverick Resource Hotline at 817-272-6107, send a message to resources@uta.edu, or view the information at http://www.uta.edu/universitycollege/resources/index.php.

ACADEMIC INTEGRITY: All students enrolled in this course are expected to adhere to the UT Arlington Honor Code:

I pledge, on my honor, to uphold UT Arlington's tradition of academic integrity, a tradition that values hard work and honest effort in the pursuit of academic excellence.

I promise that I will submit only work that I personally create or contribute to group collaborations, and I will appropriately reference any work from other sources. I will follow the highest standards of integrity and uphold the spirit of the Honor Code.

Instructors may employ the Honor Code as they see fit in their courses, including (but not limited to) having students acknowledge the honor code as part of an examination or requiring students to incorporate the honor code into any work submitted. Per UT System *Regents' Rule* 50101, §2.2, suspected violations of university's standards for academic integrity (including the Honor Code) will be referred to the Office of Student Conduct. Violators will be disciplined in accordance with University policy, which may result in the student's suspension or expulsion from the University.

EXPECTED LEARNING OUTCOMES: Upon completion of Math 5317, the students should have a solid knowledge of the material including (but not limited to) the topics outlined below:

1. Measure theory
a. Fields, sigma-fields
b. Additive set functions
c. Measures, extension theorem
d. Sigma-algebras of Borel and Lebesgue sets
e. Lebesgue-Stieltjes measures on the real line

2. Convergence
a. Measurable functions
b. Convergence in measure
c. Convergence almost everywhere
d. Almost uniform convergence – Egorov's theorem

3. Integration
a. Definition of Lebesgue integral and its properties
b. Fatou's lemma
c. Monotone convergence th
d. Dominated convergence th
e. Uniform integrability
f. Convergence in L_p

4. Product measure
a. Construction of the product measure
b. Funbini's theorem

5. Signed measures
a. Hahn-Jordan decomposition
b. Total variation
c. Radon-Nikodym theorem
d. Lebesgue decompostion

6. Real line functions
a. Differentiation of monotone functions
b. Absolute continuity

DISABILITY ACCOMODATIONS: UT Arlington is on record as being committed to both the spirit and letter of all federal equal opportunity legislation, including The Americans with Disabilities Act (ADA), The Americans with Disabilities Amendments Act (ADAAA), and Section 504 of the Rehabilitation Act. All instructors at UT Arlington are required by law to provide "reasonable accommodations" to students with disabilities, so as not to discriminate on the basis of that disability. Students are responsible for providing the instructor with official documentation in the form of a letter certified by the staff in the Office for Students with Disabilities (OSD). Students experiencing a range of conditions (Physical, Learning, Chronic Health, Mental Health, and Sensory) that may cause diminished academic performance or other barriers to learning may seek services and/or accommodations contacting:
The Office for Students with Disabilities, (OSD) www.uta.edu/disability or calling 817-272-3364.
Counseling and Psychological Services, (CAPS)   www.uta.edu/caps/ or calling 817-272-3671.

Only those students who have officially documented a need for an accommodation will have their request honored. Information regarding diagnostic criteria and policies for obtaining disability-based academic accommodations can be found at www.uta.edu/disability or by calling the Office for Students with Disabilities at (817) 272-3364.

DROP POLICY: Students may drop or swap (adding and dropping a class concurrently) classes through self-service in MyMav from the beginning of the registration period through the late registration period. After the late registration period, students must see their academic advisor to drop a class or withdraw. Undeclared students must see an advisor in the University Advising Center. Drops can continue through a point two-thirds of the way through the term or session. It is the student's responsibility to officially withdraw if they do not plan to attend after registering. **Students will not be automatically dropped for non-attendance.** Repayment of certain types of financial aid administered through the University may be required as the result of dropping classes or withdrawing. For more information, contact the Office of Financial Aid and Scholarships (http://wweb.uta.edu/ses/fao).

STUDENT FEEDBACK SURVEY: At the end of each term, students enrolled in classes categorized as lecture, seminar, or laboratory shall be directed to complete a Student Feedback Survey (SFS). Instructions on how to access the SFS for this course will be sent directly to each student through MavMail approximately 10 days before the end of the term. Each student's feedback enters the SFS database anonymously and is aggregated with that of other students enrolled in the course. UT Arlington's effort to solicit, gather, tabulate, and publish student feedback is required by law; students are strongly urged to participate. For more information, visit http://www.uta.edu/sfs.

FINAL REVIEW WEEK: A period of five class days prior to the first day of final examinations in the long sessions shall be designated as Final Review Week. The purpose of this week is to allow students sufficient time to prepare for final examinations. During this week, there shall be no scheduled activities such as required field trips or performances; and no instructor shall assign any themes, research problems or exercises of similar scope that have a completion date during or following this week unless specified in the class syllabus. During Final Review Week, an instructor shall not give any examinations constituting 10% or more of the final grade, except makeup tests and laboratory examinations. In addition, no instructor shall give any portion of the final examination during Final Review Week. During this week, classes are held as scheduled. In addition, instructors are not required to limit content to topics that have been previously covered; they may introduce new concepts as appropriate.

TITLE IX: The University of Texas at Arlington does not discriminate on the basis of race, color, national origin, religion, age, gender, sexual orientation, disabilities, genetic information, and/or veteran status in its educational programs or activities it operates. For more information, visit uta.edu/eos. For information regarding Title IX, visit www.uta.edu/titleIX.

EMERGENCY EXIT PROCEDURES: Should we experience an emergency event that requires us to vacate the building, students should exit the room and move toward the nearest exit. When exiting the building during an emergency, one should never take an elevator but should use the stairwells. Faculty members and instructional staff will assist students in selecting the safest route for evacuation and will make arrangements to assist handicapped individuals.