MATH 447: Honors: Advanced Calculus I

Fall 2014

Course meeting and place:

MWF, 9:05 am–9:55 am, Ayers Hall 120

Instructor contact information:

Name: Dr. Tadele Mengesha
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Phone: 865-974-4314
Office hours: MWF, 10:30 am–11:30 am or By appointment.

Course description:

In this course we go beyond the routine manipulation of formulas and rigorously develop the foundation of calculus from basic principles. We will examine fundamental properties of the real number system, study sequences and the concept of limit, discuss the theory of a class of functions: continuity and differentiability; and finally deal with theory of Riemann integration.

Course objective:

After successfully completing the course, a student will develop the ability to analyze,criticize and construct proofs, using deductive reasoning, to many of the theorems in Calculus (more broadly theorems in elementary real analysis).

This course is a prerequisite to Math 448: Advanced Calculus II that will be given in the Spring semester.

Course Textbook (required):

Introduction to Real Analysis, Robert Bartle and Donald Sherbert, Wiley, 4th edition, 2011. *We will be covering (essentially) the first 7 chapters of this book.*

Other References:

Postmodern Analysis, Jurgen Jost, Springer, Universitext Series, 3rd edition, 2005.

Basic Analysis, Introduction to real analysis, Jiri Lebl, 2013, http://www.jirka.org/ra/realanal.pdf

Blackboard:

All your grades (homework/quiz and exam) and other necessary information and announcements will be made on Blackboard. Please make it your habit to visit the site frequently.

Grading and evaluation:

Homework/quiz:- Homework problems from the textbook will be assigned and collected regularly. I encourage you to discuss homework problems with your classmates. However, you should write up your own solution for the exercises to submit. Quizzes that help you prepare for exams will be given frequently. I will let you know in advance when the quizzes will be given. Given a writing-intensive nature of the course, your solution to homework and quizzes should be neat and professionally prepared. Please write in complete sentences. Incomplete and sloppy arguments with no proper justification are not acceptable. No late homework is acceptable, and there are no make up quizzes.

As part of homework I may assign a project to each of you that challenges you to apply the techniques you learned in the course. The projects are topics in analysis that you will read on, report and present at the end of the semester.

Tests:- There will be two mid-term exams during the semester and a comprehensive final examination that will be given during the final examination period. No books, notes, or calculators may be used in the examinations. The midterm exams will be on the following dates:

Midterm Examination I	October 03
Midterm Examination II	November 14

Grading policy:- Scores for graded assignments will be available on Online@UT. The final grade will be computed using the following weights

Homework/Quiz	30%
Examination I/II	40%
Final Examination	30%
Total	100%

Letter grades will be based on the following scale

Grade	A	A-	B+	B	B-	C+	C	C-	D	F
%-score	93-100	90-92	87-89	83-86	80-82	77-80	73-76	70-72	60-69	0-59

(For graduate students $A- = A$ and $B- = B$, $C- = C$.)

Attendance:- Every student is expected to attend every class. Your attendance is an indication of your seriousness in the course and may be used in making borderline grade decisions, among other factors.

Other notes

- **Retain** all graded tests, and homework up to the end of the semester. Your grades will be posted on Online@UTK. Please contact me when you see any discrepancy.
- Please do not use **cell phones** during class in any form (voice, text messaging, calculator).
- **Information** on this syllabus may change (if I find the change helpful for all of the students) by e-mail or verbal announcement made in class.

Learning Outcomes of the Course:

A successful student will be able to (among other things)

- Identify the algebraic and order properties of the real number system;
- Identify and apply the fundamental properties of real number system such as The completeness property and the Supremum Property;
- Understand formally the concept of the limit of a sequence;
- Classify sequences in terms of their convergence, monotonicity and other criteria;
- Identify and apply the Bolzano-Weierstrass theorem and The Cauchy Criterion;
- Establish the formal notion of continuity and other notions of continuity;
- Recognize and apply the fundamental properties of continuous functions on closed intervals such as the min-max theorem;
- Identify and apply the Mean Value Theorem;
- Identify and apply L'Hospital Rules ;
- Recognize and apply Taylor's Theorem;
- Define and prove elementary properties of the Riemann Integral.

THE UNIVERSITY of TENNESSEE KNOXVILLE

Dear Student,

The purpose of this Campus Syllabus is to provide you with important information that is common across courses at UT. Please observe the following policies and familiarize yourself with the university resources listed below. At UT, we are committed to providing you with a high quality learning experience.

I wish you the best for a successful and productive semester.

Provost Susan Martin

UNIVERSITY CIVILITY STATEMENT

Civility is genuine respect and regard for others: politeness, consideration, tact, good manners, graciousness, cordiality, affability, amiability and courteousness. Civility enhances academic freedom and integrity, and is a prerequisite to the free exchange of ideas and knowledge in the learning community. Our community consists of students, faculty, staff, alumni, and campus visitors. Community members affect each other's well-being and have a shared interest in creating and sustaining an environment where all community members and their points of view are valued and respected. Affirming the value of each member of the university community, the campus asks that all its members adhere to the principles of civility and community adopted by the campus: http://civility.utk.edu/.

ACADEMIC INTEGRITY

"An essential feature of the University of Tennessee, Knoxville is a commitment to maintaining an atmosphere of intellectual integrity and academic honesty. As a student of the university, I pledge that I will neither knowingly give nor receive any inappropriate assistance in academic work, thus affirming my own personal commitment to honor and integrity."

DISABILITIES THAT CONSTRAIN LEARNING

"Any student who feels he or she may need an accommodation based on the impact of a disability should contact the Office of Disability Services (ODS) at 865-974-6087 in 2227 Dunford Hall to document their eligibility for services. ODS will work with students and faculty to coordinate reasonable accommodations for students with documented disabilities."

YOUR ROLE IN IMPROVING TEACHING AND LEARNING THROUGH COURSE ASSESSMENT

At UT, it is our collective responsibility to improve the state of teaching and learning. During the semester, you may be requested to assess aspects of this course either during class or at the completion of the class. You are encouraged to respond to these various forms of assessment as a means of continuing to improve the quality of the UT learning experience.

KEY RESOURCES FOR STUDENTS:

- Undergraduate Catalogs: http://catalog.utk.edu (Listing of academic programs, courses, and policies)
- Graduate Catalog: http:- http://catalog.utk.edu/index.php?catoid=2
- Hilltopics: http://dos.utk.edu/hilltopics (Campus and academic policies, procedures and standards of conduct)
- Course Timetable: https://bannerssb.utk.edu/kbanpr/bwckschd.p_disp_dyn_sched (Schedule of classes)
- Academic Planning: http://www.utk.edu/advising (Advising resources, course requirements, and major guides)
- Student Success Center: http://studentsuccess.utk.edu (Academic support resources)
- Library: http://www.lib.utk.edu (Access to library resources, databases, course reserves, and services)
- Career Services: http://career.utk.edu (Career counseling and resources; HIRE-A-VOL job search system)

Week	Day	Date	Section (s)
1	Monday	August 18	
	Tuesday	August 19	
	Wednesday	August 20	First class.
	Thursday	August 21	
	Friday	August 22	
2	Monday	August 25	
	Tuesday	August 26	
	Wednesday	August 27	
	Thursday	August 28	
	Friday	August 29	
3	Monday	September 01	Labor Day: No Class
	Tuesday	September 02	
	Wednesday	September 03	
	Thursday	September 04	
	Friday	September 05	
4	Monday	September 08	
	Tuesday	September 09	
	Wednesday	September 10	
	Thursday	September 11	
	Friday	September 12	
5	Monday	September 15	
	Tuesday	September 16	
	Wednesday	September 17	
	Thursday	September 18	
	Friday	September 19	
6	Monday	September 22	
	Tuesday	September 23	
	Wednesday	September 24	
	Thursday	September 25	
	Friday	September 26	
7	Monday	September 29	
	Tuesday	September 30	
	Wednesday	October 01	
	Thursday	October 02	
	Friday	October 03	MID-Term I
8	Monday	October 06	
	Tuesday	October 07	
	Wednesday	October 08	
	Thursday	October 09	

Week	Day	Date	Section(s)
9	Monday	October 13	
	Tuesday	October 14	
	Wednesday	October 15	
	Thursday	October 16	Fall Break: No Class!
	Friday	October 17	Fall Break: No Class!
10	Monday	October 20	
	Tuesday	October 21	
	Wednesday	October 22	
	Thursday	October 23	
	Friday	October 24	
11	Monday	October 27	
	Tuesday	October 28	
	Wednesday	October 29	
	Thursday	October 30	
	Friday	October 31	
12	Monday	November 03	
	Tuesday	November 04	
	Wednesday	November 05	
	Thursday	November 06	
	Friday	November 07	
13	Monday	November 10	
	Tuesday	November 11	
	Wednesday	November 12	
	Thursday	November 13	
	Friday	November 14	MID-Term II
14	Monday	November 17	
	Tuesday	November 18	
	Wednesday	November 19	
	Thursday	November 20	
	Friday	November 21	
15	Monday	November 24	
	Tuesday	November 25	
	Wednesday	November 26	
	Thursday	November 27	Thanksgiving: No Class!
	Friday	November 28	Thanksgiving: No Class!
16	Monday	December 01	
	Tuesday	December 02	Class ends
	Wednesday	December 03	
	Thursday	December 04	
	Friday	December 05	