

## Spring 2020 Texas A & M-Commerce MTE 505 – Foundation of Analysis

This is the syllabus for MTE 505-Foundation of Analysis, Section 01S (41R, 71R) for the Spring 2020. Please read it carefully. You will be responsible for all information given in the syllabus, and for any modification to it that may be announced in the classes.

**Instructor:** Dr. Yelin Ou

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**Office hours:** MW: 9:30-11:00am, TR: 1:30-2:30 pm,  
and by appointment

**Class meetings and room:** TR 5:00-6:15p, BA 244.

**Text and references:** Introduction to Real Analysis, 4th Edition, by R. Bartle and D. Sherbert. Portions of Chapters 1-6 and 11 in the textbook will be taught and discussed.

**Course Description:** The theory of the real number system, the convergence of sequences and series, the limit, continuity, differentiation, and integration of functions with emphasis on the mathematical ideas, analytic skills and learning the proofs. Some topics like continuity in a metric space or a topological space may be included. Prerequisite: Math 314.

**Learning Outcomes:** Upon successful completion of this course, all students will be able to:

1. Write mathematical definitions and explain the basic concepts of convergence, the limit, continuity, differentiation and integrations.
2. Explain and verify some basic principles and examples concerning the convergence, the limit, continuity, differentiability and integrability based on topological notions of distance and neighborhoods.
3. Write mathematical proofs for some important theorems in the theory of convergence, the limit, continuity, differentiation and integrations of functions of one variable, including the Completeness Property of  $\mathbb{R}$ , Density of Rational numbers, Characterizations of limit superior, Bolzano-Weierstrass Theorem, Cauchy Criterion for Convergence, Bolzano's Intermediate Value Theorem, and Caratheodery's Theorem.
4. Write a report on a project on continuity of functions defined on metric spaces.

**Instruction:** Instruction will include lectures, discussions, and some group work projects, based on time available.

**Computer & supplies:** Using of Mathematica (a computer algebra system available in computers in Math Lab located in 328 Binnon Hall) is helpful but not required for this course.

**Attendance:** Attendance will be checked and it is your responsibility to sign the daily roll sheet. It is your benefit to attend the class.

**Tests:** There will be three midterm tests and a final exam for the course. The tentative schedules for the exams are:

**Test 1:** Feb. 06, Thursday 5:00pm-6:15pm.

**Test 2:** Mar. 05, Thursday 5:00pm-6:15pm.

**Test 3:** Apr. 09, Thursday 5:00pm-6:15pm.

**Final exam:** The comprehensive final exam is scheduled on  
**May 05, Tuesday 5:00pm-7:00pm.**

**No makeup** exam will be given unless you have verifiable evidence showing an acceptable reason to have to miss a test and, in that case, you must notify the instructor before the test or in the earliest possible time.

**Homework & Projects:** Homework will be assigned and collected to grade on a weekly basis. You are strongly recommended to work out homework assignments on a regular basis since **No one can learn mathematics without doing it!** Some homework problems or their similar forms will be used as test questions. You will need to turn in a report on the project on continuity of functions defined on metric spaces.

**Course grades:** The course grade consists of

Homework & Projects:	15%
Three tests:	60%
Final exam:	25%.

As compared to Math 436 students, MTE 505 students will have four extra weekly reading projects, which cover Chapter 11. You are expected to turn in your reading reports and project paper. You are also expected to have more advanced and proof-oriented problems in your homework assignments and exams.

The letter grades will be assigned using the following scale:

A: 90-100%   B: 80-89%   C: 70-79%   D: 60-69%   F: 0-59%

**Withdrawal Policy:** Concerning the deadlines and consequences of withdrawals please check on: <http://www.tamuc.edu/admissions/registrar/academicCalendars/>

**Academic Integrity:** I have a **NO TOLERANCE** policy for cheating and if you are caught cheating you will fail this course. Cheating in this course includes the following:

- Giving or receiving answers during an exam or quiz.
- Viewing the exam or quiz answers of nearby classmates.
- Having notes/practice work available during quizzes or tests.
- Possession or access to test items before the test is given.
- Deception in getting an excused absence to obtain the undeserved opportunity to make-up work.
- Use of cell phones or text messaging technology during exams or quizzes. You may not use the calculator on your cell phones.
- Improper citations in written works, or using another person's ideas and words as your own without giving proper credit.
- **Any** method, no matter how well rationalized or accepted, which improves a person's grade by any means other than study and skillful performances on exams and/or other assignments.

Students found guilty of an act of academic dishonesty in this course will be subject to receiving an "F" in this course.

**Classroom Behavior:** "All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment" (See Student's Guidebook). A&M-Commerce will comply in the classroom, and in online courses, with all federal and state laws prohibiting discrimination and related retaliation on the basis of race, color, religion, sex, national origin, disability, age, genetic information or veteran status. Further, an environment free from discrimination on the basis of sexual orientation, gender identity, or gender expression will be maintained.

**The information for students with disability:** The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you have a disability requiring an accommodation, please contact: Office of Student Disability Resources and Services, Texas A&M University-Commerce, Gee Library, Room 132, Phone (903) 886-5150 or (903) 886-5835, Fax (903) 468-8148, email: [StudentDisabilityServices@tamuc.edu](mailto:StudentDisabilityServices@tamuc.edu)

**Campus Concealed Carry** Texas Senate Bill - 11 (Government Code 411.2031, et al.) authorizes the carrying of a concealed handgun in Texas A&M University-Commerce buildings only by persons who have been issued and are in possession of a Texas License to Carry a Handgun. Qualified law enforcement officers or those who are otherwise authorized to carry a concealed handgun in the State of Texas are also permitted to do so. Pursuant to Penal Code (PC) 46.035 and A&M-Commerce Rule 34.06.02.R1, license holders may not carry a concealed handgun in restricted locations. For a list of locations, please refer to (<http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/34SafetyOfEmployeesAndStudents/34.06.02.R1.pdf>) and/or consult your event organizer). Pursuant to PC 46.035, the open carrying of handguns is prohibited on all A&M-Commerce campuses. Report violations to the University Police Department at 903-886-5868 or 9-1-1.

**Getting help:** A better way to learn math is to keep progress and leave no gaps in one's study. So please get help as soon as you need it and do not wait until it is too late. You are welcome to come to me or go to Math Skills Center located in **Bin 328** where you can find free tutors for help. The tutoring hours of Math Skills Center for the current semester are:

**MW: 8am – 8pm, TR: 8am – 6pm, F: 8am – noon.**

## Homework assignments for Math 505:

Section 1.1: 7, 8, 10, 14, 15, 21.

Section 1.2: 6, 10, 14.

Section 1.3: 3, 7, 9.

Section 2.1: 7, 8, 9, 14, 17.

Section 2.2: 4, 13, 16, 17.

Section 2.3: 1, 2, 3, 4, 14.

Section 2.4: 1, 2, 4(b), 6(1<sup>st</sup> part), 8(2<sup>nd</sup> part)

Section 2.5: 1, 2, 7, 8.

Section 3.1: 1(a), (d), 2(c), (d), 5(a), (d), 7.

Section 3.2: 1(c), (d), 2, 5(b), 7, 8.

Section 3.3: 1, 3, 12(a), (b), 13

Section 3.4: 1, 3, 4, 13, 19.

Section 3.5: 1, 2(b), 3(b), 4, 9.

Section 3.6: 1, 3, 4(a), 8(d).

Section 3.7: 2, 3(a), 4, 5, 6(a)

Section 4.1: 2, 3, 8, 9(b), 11(a).

Section 4.2: 1(b), 2(c), 4, 6, 7.

Section 4.3: 2, 5(a), (b), (c), (d), 7, 10

Section 5.1: 2, 4(b), (c), 5, 6, 10.

Section 5.2: 1(a), (d), 2, 3,

Section 5.3: 1, 7, 8.

Section 5.4: 1, 5, 6, 10.

Section 6.1: 1(b), 2, 3,

Section 6.2: 1(b), (d), 2(c), 3(a), 9.

Section 6.3: 6, 7(c), (d), 9(a), 14

Section 6.4: 4, 5, 6, 9.

Section 7.1: 1(a), (c), 2(c), (d), 7, 8, 14.

Section 7.2: 2, 8, 9, 10.

Section 7.3: 2, 3, 5, 17.

Section 7.4: 1, 3, 5, 7.

Section 7.5: 1, 2, 12,

**To be extended/continued**