

# Summer I 2015 Texas A & M-Commerce Math 573 – Calculus of Real and Complex Functions

This is the syllabus for Math 573-Cal. Real and Complex Functions, Section 01S (41R, 71R) for Summer I, 2015. 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: 11:00am-12:00 pm, MR: 1:30pm-3:0pm.

**Class meetings and room:** MW 8:30am-12:20pm, BA244

## **Text and references:**

1. Complex Analysis: A First Course with Applications, by [Dennis G. Zill](#), [Patrick D. Shanahan](#), Jones & Bartlett Learning; 3rd edition (September 20, 2013), ISBN-13: 978-1449694616
2. Introduction to Real Analysis, by William F. Trench (**free downloadable from internet**)

**Course Description:** The course explores similarities and differences between functions whose domain and range consist of sets of real numbers, and sets of complex numbers. Complex numbers will be reviewed, with nontraditional applications to plane geometry. Alternate approaches to the meaning of derivatives are given so as to provide links between the notions of  $f(x)$  and  $f(z)$  ( $x$  real,  $z$  complex), ways of understanding derivatives of inverse functions and composition functions. The geometry of functions of a complex numbers are explored. Cauchy-Riemann equations are derived and utilized. Power series in both real and complex context are compared. The course is designed to prepare students for more advanced courses such as real analysis (Math511/512), complex analysis (Math 538/539), differential equations, and differential geometry. Prerequisite: Math 192.

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

1. Define and explain the basic concepts of the limit, continuity, differentiation of real-valued functions of one real variable.
2. Define and explain the basic concepts of the limit, continuity, differentiability and analyticity of functions of one complex variable.

3. Explain and prove some important theorems of differential calculus of functions of real variable, including the chain rule, extreme values theorem, Rolle's theorem, the intermediate value theorem, the mean value theorems and Taylor's theorem.
4. Derive Cauchy-Riemann equation and use it to verify analyticity of some elementary functions.
5. Define elementary analytic functions and their inverses and explain some geometric properties of these functions.
6. Compare the power series of real and complex variables and the Taylor series of real and complex functions.

**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 one midterm and a final exam for the course. The tentative schedules for the exams are:

**Midterm Test:** June. 22, Monday 8:30am-10:00am.

**Final exam:** The comprehensive final exam is scheduled on

**July 9, Thursday 10:00am-12:00pm.**

**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 & Quizzes:** Homework assignments are attached to this syllabus. You are strongly recommended to work out homework assignments on a regular basis since **No one can learn mathematics without doing it!** The assigned homework will be collected for grading on the following dates: 06/15, 06/22, 06/29, 07/06. Some homework problems or their similar forms will be used as test questions.

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

Homework & Quizzes:	20%
Midterm Test:	35%
Final exam:	45%.

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/>

**Basic Tenets of Common Decency:** “All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment.” (Student’s Guide Handbook, Policies and Procedures, Conduct). 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.

**Students with Disabilities:** 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/ Gee Library  
Room 132 . Phone (903) 886-5150 or (903) 886-5835, Fax (903) 468-8148, and  
Web: [StudentDisabilityServices@tamuc.edu](mailto:StudentDisabilityServices@tamuc.edu)**

**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. You are welcome to come to me or use email communication for help.