

Mathematics 2050: Applied Analysis I

Fall 2025-2026

PREREQUISITES: Math 2030 or Math 1230

INSTRUCTOR: T. Miao **OFFICE:** RB 2013 **PHONE:** 346-7722
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LECTURES: 3 hours per week
Tuesday and Thursday 10:00 am - 11:30 am RB 1022

LAB: 1 hour per week
Tuesday 4:30 pm - 5:30 pm RB 1022

TEXT: **Advanced Engineering Mathematics**
by Zill (**fourth, or fifth, or sixth or seventh Edition**)

COURSE OUTLINE: The topics to be covered are, tentatively, the following:

- (1) All of Chapter 1.
- (2) Sections 2.2, 2.3, 2.4, and 2.7 of Chapter 2.
- (3) All of Chapter 3, except Sections 3.7, 3.10, 3.11 and 3.12.
- (4) All of Chapter 4, except Sections 4.6.

OFFICE HOURS: Thursday 2:30 pm - 3:30 pm

If these hours do not fit your schedule you are welcome to consult with me whenever you find me in my office. You may also make appointments through email or the Secretary of the Department of Mathematical Sciences in RB 2012; the phone number is 343-8469.

MARK DISTRIBUTION:

Your mark for the course will be calculated according to the following formula:

- (a) 10% from homework assignments.
- (b) 30% from the mid-term test and 60% from the final exam. The final exam may cover both the first half and the second half of the course. The mid-term test will be from 10:00 am to 11:20 am on Thursday, October 23, 2025. **Note this date is subject to change.**

RE-EVALUATION OF TEST:

If you want to have any of the questions in your mid-term test re-evaluated, it is important that you follow the following procedure:

(a) **DO NOT MAKE ANY CHANGES TO YOUR TEST PAPER.** If you do, then I am obliged to report this to the Dean, who shall then seek a severe penalty consistent with the offense, up to and including expulsion from the University.

(b) This instruction must be followed strictly. On a **SEPARATE** piece of paper note what is wrong with the way your test is marked. Attached it to your test paper and hand it to me. **DO NOT WRITE ANYTHING ON THE TEST PAPER.**

(c) No mark changes will be considered after seven days from the day the test is handed back.

Note that in any re-evaluation of your marks, while there is a potential for your mark to increase, there is also the possibility for your mark to decrease as well.

HOMEWORK ASSIGNMENTS: WeBWorK

WeBWorK is a free online homework system that will be required to complete the assignments. The link to access WeBWorK as well as login information will be provide to you on D2L.

Overview of the Course

- (1) Three methods of solving first order de.
 - separable equations
 - exact equations
 - linear equations
- (2) Applications of first order de.
- (3) Solution of higher order linear de, particularly with constant coefficients and second order.
 - (a) Solution of a non-homogeneous equation.
 - Complementary solution;
 - Particular solution.
 - (b) Solution of the associated homogeneous equation to get the complementary solution.
 - linearly independent of solutions and the Wronskian;
 - how to find the fundamental set;
 - reduction of order to find additional solution;
 - convert solution to phase-angle form.
 - (c) Equations of order higher than 2.
 - (d) Methods of finding particular solutions.
 - annihilator method (i.e., method of undetermined coefficients);
 - variation of parameters.
- (4) Cauchy-Euler equation.
- (5) Application of second order linear de.
 - vibrating spring;
 - RLC-circuit.
- (6) Laplace transform methods
 - definition and elementary properties;
 - inverse transform;
 - partial fraction techniques;
 - first and second translation theorems;
 - derivative of transforms;
 - transforms of derivatives, integrals and periodic functions;
 - convolution theorem;
 - application to initial-value problems;
 - Dirac delta function.