

Mathematics 2050: Applied Analysis I  
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Fall 2020-2021  
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**PREREQUISITES:** Math 1230 or Math 1172

**INSTRUCTOR:** T. Miao   **OFFICE:** RB 2013   **PHONE:** 346-7722  
**E-MAIL:** tmiao@lakeheadu.ca

**LECTURES:** 3 hours per week

Tuesday and Thursday 1:00 pm - 2:30 pm zoom FDE  
Tuesday and Thursday 5:30 pm - 7:00 pm zoom FDF

**LAB:** 1 hour per week

Monday 1:30 pm - 2:30 pm zoom

**TEXT:** **Advanced Engineering Mathematics**  
by Zill ( **Sixth 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:** Monday and Friday 12:00 noon - 1:00 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 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 on Thursday, October 29, 2020. **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:**

Homework assignments are given as topics are covered in class. Some of the questions are required to be handed in for marking; others are there for you to practise. The assignments are to be submitted online into the assignment box of the course D2L website. **No late assignments will be accepted.**

## 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.