# DEPARTMENT OF MATHEMATICAL AND COMPUTATIONAL SCIENCES UNIVERSITY OF TORONTO MISSISSAUGA

# MAT157Y5Y LEC0101 Analysis I Course Outline - Fall 2019

**Class Location & Time** Tue, 09:00 AM - 11:00 AM CC 2150

Thu, 09:00 AM - 10:00 AM CC 2150

**Instructor** Tyler Holden

Office Location Office Hours E-mail Address

**Course Web Site** 

tyler.holden@utoronto.ca https://q.utoronto.ca

# **Course Description**

A theoretical course in calculus for students with a very serious interest in mathematics; emphasizing proofs and techniques, as well as geometric and physical understanding. Trigonometric identities. Limits and continuity; least upper bounds, intermediate and extreme value theorems. Derivatives, mean value and inverse function theorems. Integrals; fundamental theorem; elementary transcendental functions. Techniques of integration. Taylor's theorem; sequences and series; uniform convergence and power series. [72L, 48T] **Note: MAT157Y5 will be accepted anywhere where MAT137Y5 is accepted.** 

Prerequisite: Minimum 70% in Grade 12 Advanced Functions (MHF4U), Minimum 70% in Grade 12 Calculus and Vectors

(MCV4U)

Corequisite: MAT102H5

Exclusion: MAT157Y1, MATA37H3 (SCI)

Distribution Requirement: SCI

Students who lack a pre/co-requisite can be removed at any time unless they have received an explicit waiver from the department. The waiver form can be downloaded from here.

#### **Textbooks and Other Materials**

- [Option] Calculus by Michael Spivak (4th Edition). Publish or Perish.
- [Optional] Calculus in One Dimension by Tyler Holden (2019 Edition). University of Toronto Bookstore.

#### **Assessment and Deadlines**

Type	Description	<b>Due Date</b>	Weight
Term Test	First term test	2019-10-08	17%
Term Test	Second term test	2019-11-12	10%
Term Test	Third term test	2020-01-28	10%
Term Test	Fourth term test	2020-03-10	8%
Assignment	Sixteen (16) assignments	On-going	15%
Final Exam	Final exam	TBA	40%
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# More Details for Assessment and Deadlines

Assignments

There will be sixteen (16) assignments -- 8 per term -- due roughly weekly. Each assignment will be worth 1% of your final mark, and your lowest assignment will be dropped, for a total weighting of 15%. Assignments are due via Crowdmark at 11:59pm on the due date listed. See this page for more information on how to use Crowdmark.

#### Term tests

There will be two term tests each term for a total of four (4) Term Tests. They will be 110 minutes long, and held**n class** on the following days:

- Tuesday, October 8, 2019
- Tuesday, November 12, 2019
- Tuesday, January 28, 2019
- Tuesday, March 10, 2019

Your lowest term test will be weighted at 8%, your highest term test will be weighted at 17%, and the other two term tests will be worth 10%. This makes your term tests worth 45% of your mark.

#### **Penalties for Lateness**

Late work is not accepted.

#### **Procedures and Rules**

# **Missed Term Work**

If you are forced to miss a term test because of an illness or other extenuating circumstance, you **must alert the course instructor Tyler Holden within 24 hours of the term test**, and provide supporting documentation no later than **one week after the term test**. In particular, the university has <u>very precise procedures regarding documentation of sick notes</u>, and a <u>form for extenuating circumstances</u>.

Failure to adhere to any of these policies will result in your term test being assigned a grade of zero (0).

Students granted an exemption will have the weight of all missed term tests transferred to the final examination.

#### **Missed Final Exam**

Students who cannot write a final examination due to illness or other serious causes must file an<u>online petition</u> within 72 hours of the missed examination. Original supporting documentation must also be submitted to the Office of the Registrar within 72 hours of the missed exam. Late petitions will NOT be considered. If illness is cited as the reason for a deferred exam request, a U of T Verification of Student Illness or Injury Form must show that you were examined and diagnosed at the time of illness and on the date of the exam, or by the day after at the latest. Students must also record their absence on ACORN on the day of the missed exam or by the day after at the latest. Upon approval of a deferred exam request, a non-refundable fee of \$70 is required for each examination approved.

# **Academic Integrity**

Honesty and fairness are fundamental to the University of Toronto's mission. Plagiarism is a form of academic fraud and is treated very seriously. The work that you submit must be your own and cannot contain anyone elses work or ideas without proper attribution. You are expected to read the handout How not to plagiarize (<a href="http://www.writing.utoronto.ca/advice/using-sources/how-not-to-plagiarize">http://www.writing.utoronto.ca/advice/using-sources/how-not-to-plagiarize</a>) and to be familiar with the Code of behaviour on academic matters, which is linked from the UTM calendar under the link Codes and policies.

# **Final Exam Information**

Duration: 3 hours Aids Permitted: None

# **Additional Information**

MAT157 is a first year course in analysis. It is designed for students who are interesting in pursuing a degree in mathematics, or a mathematically heavily field. It is a full credit course, and covers

- A (very quick) review:
  - Functions
  - The construction of the real numbers
- Limits
  - The  $\varepsilon$   $\delta$  definition of the limit
  - Tools for limits
  - (Uniform) Continuity
  - The intermediate and extreme value theorems
- Differential calculus

- The "rules" of calculus
- The Inverse Function Theorem
- The Mean Value Theorem (and its implications)
- Integral Calculus
  - Darboux sums and the Riemann integral
  - The Fundamental Theorem of Calculus
  - Improper Integrals
- Sequences and series
  - Convergent sequences and series, including uniform convergence
    Power and Taylor series

Last Date to drop course from Academic Record and GPA is February 17, 2020.