

**MAT240F: Math Course Name**  
**Fall 2021**  
**University of Toronto**

**I. Instructor and Teaching Assistants**

**Course Instructor**

Name: Marco Gualtieri  
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Office Hours: R13-14 starting 9 Sept 2021

**TA(s)**

Name: Gal Gross  
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Name: Mohammad Honari  
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Name: Jacob Taylor  
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Office Hours: F13-15

**II. Course Overview**

**Course Description**

**Hours:** 36L/24T

*A theoretical approach to: vector spaces over arbitrary fields, including  $\mathbb{C}$  and  $\mathbb{Z}_p$ . Subspaces, bases and dimension. Linear transformations, matrices, change of basis, similarity, determinants. Polynomials over a field (including unique factorization, resultants). Eigenvalues, eigenvectors, characteristic polynomial, diagonalization. Minimal polynomial, Cayley-Hamilton theorem.*

**Prerequisite:** High school level calculus

**Corequisite:** [MAT157Y1](#)

**Distribution Requirements:** Science

**Breadth Requirements:** The Physical and Mathematical Universes (5)

**Course Objectives**

*This course is an introduction to linear algebra, with a focus on the conceptual structure of the subject in addition to its computational aspects.*

*\*Text Book:\* [Linear Algebra Done Right, by S. Axler] (third edition)*

*This is the textbook I will refer to when assigning reading. We will cover chapters 1 (Vector spaces), 2 (Finite-dimensional vector spaces), 3 (Linear maps), 4 (Polynomials), and 5 (Eigenvalues, eigenvectors and invariant subspaces). I will provide extra reference material for special topics.*

*Linear algebra is a very standardized topic; buying the textbook is not strictly necessary. With the guidance given in class, a student could use any of the following alternative references to learn the material:*

- *Linear Algebra, by Hoffman and Kunze*
- *Linear Algebra, by Friedberg, Insel and Spence*
- *[Linear Algebra done Wrong], by Treil*
- *Introduction to Linear Algebra, by Lang*
- *Linear Algebra and Its Applications, by Strang.*

*[Linear Algebra Done Right, by S. Axler] <http://linear.axler.net/>*

*[Linear Algebra done Wrong]  
<https://www.math.brown.edu/~treil/papers/LADW/>*

### **How this course is organized:**

This course will consist of two weekly lectures (T11-13 & R12-13) and a weekly tutorial. The plan is to conduct all course meetings via Zoom, using links that will be sent to you through Quercus.

Tutorials will start the week of Sep 20<sup>th</sup> and will be conducted online. Students will be expected to attend the tutorial at the scheduled time for their registered section.

There is also a Piazza Question and Answer site set up for this course:

<https://piazza.com/utoronto.ca/fall2021/mat240/home>

Please note that due to the ongoing COVID-19 pandemic, the course delivery method may change after term has started and this may alter the course organization. Students are expected to check the course site for updates as the contents of this syllabus may change:

<http://www.math.toronto.edu/mgualt/courses/21-240/>

### **Technical Requirements**

In order to participate in this course, students will be required to have:

- Reliable internet access. It is recommended that students have a high speed broadband connection (LAN, Cable, or DSL) with a minimum download speed of 5 Mbps.
- A computer satisfying the minimum technical requirements (<https://www.vicprovoststudents.utoronto.ca/covid-19/tech-requirements-online-learning/>)

Other recommended items include headphones, microphone, webcam.

If you are facing financial hardship, you are encouraged to contact your college or divisional registrar (<https://future.utoronto.ca/current-students/registrars/>) to apply for an emergency bursary.

### **III. Evaluation/ Grading Scheme**

#### **Mark Breakdown**

Assignments	60%
Final exam	40%

#### **Assignments**

There will be 10 assignments, of which the two with lowest grades will be dropped (late submissions will receive a mark of zero).

#### **Final Exam**

The final assessment will be held during the final assessment period in December 2021 and will be scheduled by the registrar. Information about the format will be provided during the Fall semester.

### **IV. Course Policies**

#### **Policy on Missed Term Work**

As flexibility for missed or late course assignments have been built into the marking scheme, late and missed assignments will not be accepted for any reason.

Please note that Verification of Illness forms (also known as a “doctor’s note”) are temporarily not required. Students who are absent from class for any reason (e.g., COVID, cold, flu and other illness or injury, family situation) and who require consideration for missed academic work should report their absence through the online absence declaration. The declaration is available on ACORN under the Profile and Settings menu.

If you miss a term test or the final assessment, then you must inform your course Instructor within 72 hours of the test. No exceptions. If your request is approved, you may receive an accommodation in the form of an oral exam, written make-up test, or a re-weighting of your assessments.

#### **Email Policy**

Should you have a question that is not answered on the course site (please check there first!) please note that all communications with the Course Instructor or TA’s must be sent from your official utoronto email address, with the course number included in the subject line. If these instructions are not followed, your email may not be responded to.

## **V. Institutional Policies and Support**

### **Academic Integrity**

All suspected cases of academic dishonesty will be investigated following procedures outlined in the Code of Behaviour on Academic Matters

(<https://governingcouncil.utoronto.ca/secretariat/policies/code-behaviour-academic-matters-july-1-2019>).

If you have questions or concerns about what constitutes appropriate academic behaviour or appropriate research and citation methods, please reach out to your Course Instructor. Note that you are expected to seek out additional information on academic integrity from me or from other institutional resources (for example, the University of Toronto website on Academic Integrity <http://academicintegrity.utoronto.ca/>).

### **Copyright**

This course, including your participation, will be recorded on video and will be available to students in the course for viewing remotely and after each session.

Course videos and materials belong to your instructor, the University, and/or other sources depending on the specific facts of each situation and are protected by copyright. Do not download, copy, or share any course or student materials or videos without the explicit permission of the instructor.

For questions about the recording and use of videos in which you appear, please contact your instructor.

### **Accessibility**

The University provides academic accommodations for students with disabilities in accordance with the terms of the Ontario Human Rights Code. This occurs through a collaborative process that acknowledges a collective obligation to develop an accessible learning environment that both meets the needs of students and preserves the essential academic requirements of the University's courses and programs.

Students with diverse learning styles and needs are welcome in this course. If you have a disability that may require accommodations, please feel free to approach your Course Instructor and/or the Accessibility Services office as soon as possible. The sooner you let us know your needs the quicker we can assist you in achieving your learning goals in this course.

Link to Accessibility Services website: <https://studentlife.utoronto.ca/department/accessibility-services/>

### **Equity, Diversity and Inclusion**

The University of Toronto is committed to equity, human rights and respect for diversity. All members of the learning environment in this course should strive to create an atmosphere of mutual respect where all members of our community can express themselves, engage with each other, and respect one another's differences. U of T does not condone discrimination or harassment against any persons or communities.

### **Important Academic Dates & Deadlines**

The academic dates include enrolment dates, drop deadlines, exam periods, petition deadlines and more.

<https://www.artsci.utoronto.ca/current/dates-deadlines/academic-dates>

### **Other Academic and Personal Supports**

- Writing Centre <https://writing.utoronto.ca/writing-centres/arts-and-science/>
- U of T Libraries <https://onesearch.library.utoronto.ca/>
- Feeling Distressed? <https://studentlife.utoronto.ca/task/support-when-you-feel-distressed/>
- Academic Success Centre <https://studentlife.utoronto.ca/department/academic-success/>
- College/Faculty Registrars <https://future.utoronto.ca/current-students/registrars/>