MAT246H1-S – LEC0201/9201 Concepts in Abstract Mathematics

Syllabus

University of Toronto Winter 2021

Be careful: the MAT246H1-S sections are run completely independently and the present syllabus refers only to section LEC0201/9201. The other sections are LEC0101/9101 taught by Avner Kiro and LEC5101/LEC6101 taught by Soheil Homayouni-Boroojeni.

1 Teaching team

Instructor Jean-Baptiste (JB) Campesato campesat@math.utoronto.ca

Teaching assistants Matthew Sunohara matthew.sunohara@mail.utoronto.ca

Tianyu Zhou ty.zhou@mail.utoronto.ca

The office hour schedule will be announced later.

2 Class times

Lectures Classes will be held on

- Tuesday 13:00 14:00
- Thursday 12:00 14:00

The first lecture will take place on Tuesday, January 12.

Tutorials Tutorials will start the week of January 18. The tutorial sections assigned to MAT246H1-S LEC0201/9201 are

- TUT0201/9201: Monday 16:00 17:00
- TUT0302/9302: Tuesday 15:00 16:00
- TUT0402/9402: Wednesday 13:00 14:00
- TUT5102/6102: Monday 17:00 18:00

Make sure that you are enrolled in one of the above sections.

Be careful The other tutorial sections are assigned to the other course sections and are not relevant to MAT246H1-S LEC0201/9201.

3 Course overview

Hours: 36L/12T

Course description: Designed to introduce students to mathematical proofs and abstract mathematical concepts. Topics may include modular arithmetic, sizes of infinite sets, and a proof that some angles cannot be trisected with straightedge and compass.

Prerequisite: MAT133Y1/(MAT135H1, MAT136H1)/MAT137Y1, MAT223H1

Exclusion: MAT157Y1

Distribution Requirements: Science

Breadth Requirements: The Physical and Mathematical Universes (5)

Textbook (**recommended**): *A Readable Introduction to Real Mathematics*, 2nd ed., by Daniel Rosenthal, David Rosenthal, Peter Rosenthal (Undergraduate Texts in Mathematics, Springer, 2018) An electronic version is available through the library at:

https://link-springer-com.myaccess.library.utoronto.ca/book/10.1007/978-3-030-00632-7
(UTORid required)

How this course is organized:

This course will consist of two weekly lectures and a weekly tutorial. Due to the Covid-19 pandemic, all components of the course will be delivered online synchronously on Zoom (the credentials will be posted on Quercus beforehand). Lectures will be recorded and the video recordings will be made available to students enrolled in the course (via Quercus). The slides and notes used in class will be posted on the course website at http://www.math.toronto.edu/campesat/mat246.html.

Tutorials will be synchronous, so you will be expected to attend the tutorial at the scheduled time for their registered section.

You will be asked to submit your solutions electronically via Crowdmark. No paper copy will be accepted. To get started with Crowdmark, see https://crowdmark.com/help/.

Technical Requirements:

In order to participate in this course, you are required to have a reliable internet access and a computer satisfying the minimum technical requirements, see

https://www.viceprovoststudents.utoronto.ca/covid-19/tech-requirements-online-learning/

The easiest way to prepare your solutions before uploading them on Crowdmark is to use a scanner, but if you don't have access to one, you can also use a scanner app on your phone. Make sure that your work is legible before submitting it; otherwise, it will not be accepted.

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.

Provisional plan:

- 1. Natural numbers
- 2. Integers
- 3. Prime numbers
- 4. Modular arithmetic
- 5. The RSA algorithm

- 6. Rationals and reals
- 7. Cardinality
- 8. Algebraic and transcendent numbers
- 9. Constructible numbers
- 10. The complex plane

4 Marking scheme

There will be five problem sets (late submissions will not be accepted for any reason) and a 24h final assessment (that is, the exam will be posted at a certain time, and will be due 24 hours after that).

Your final grade will be the largest of the following two marking schemes:

• PS1(15%)+PS2(15%)+PS3(15%)+PS4(15%)+PS5(15%)+Final(25%).

• PS1(15%)+PS2(15%)+PS3(15%)+PS4(15%)+Final(40%) where the lowest problem set is dropped. The problem sets will be due every two weeks, the first one being assigned on January 22 and due on February 5.

5 Course policies

Problem set collaboration You may discuss problem sets with classmates, but your final answers must be written independently, in your own words. Otherwise, this will be considered an offence under the University of Toronto's Code of Behaviour on Academic Matters, see below.

Policy on Missed Term Work As flexibility for missed or late course assignments have been built into the marking scheme, late and missed problem sets will not be accepted for any reason.

Email Policy Should you have a question that is not answered on the course site or on Quercus (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 (MAT246) included at the beginning of the subject line. If these instructions are not followed, your email may not be responded to.

6 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). Note that you are expected to seek out additional information on academic integrity from institutional resources. See for example, the University of Toronto website on Academic Integrity at http://academicintegrity.utoronto.ca/

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 require accommodation or have accessibility concerns, please visit the following webpage:

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https://studentlife.utoronto.ca/department/accessibility-services/
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Use of Course Materials Course materials belong to your instructor, the University, and/or other sources depending on the specific facts of each situation and are protected by copyright. They are provided for the use of enrolled students only. Students are not allowed to post, share, or sell course materials without the explicit instructor's permission.

Lectures will be recorded, including your participation, and will be available to students enrolled in the course for viewing remotely. For questions about the recording and use of videos in which you appear, please contact your instructor.