About This Class

@**Dror Bar-Natan** ➱ **(http://www.math.toronto.edu/~drorbn/)** @**Classes** ➱ **(http://www.math.toronto.edu/~drorbn/classes/)** @**2024-25** ➱ **(http://www.math.toronto.edu/~drorbn/classes/#2425)**

Agenda. Understand "continuity" in the most abstract!

Instructor. Dror Bar-Natan ➱ **(http://www.math.toronto.edu/~drorbn/)** , **drorbn@math.toronto.edu (mailto:drorbn@math.toronto.edu)** (for course administration matters only; math on email is slow and prone to misunderstandings, so I generally avoid it). Office: Bahen 6178.

Teaching Assistants. Brinda Venkataramani (**brinda.venkataramani@mail.utoronto.ca (mailto:brinda.venkataramani@mail.utoronto.ca)**) and Kai Shaikh (**kai.j.shaikh@gmail.com (mailto:kai.j.shaikh@gmail.com)**).

Classes. Tuesdays 3-4pm and Thursdays 2-4pm at GB248.

Office Hours. With Dror on Tuesdays 9:30-10:30 at BA6178 and at **http://drorbn.net/vchat** ➱ **(http://drorbn.net/vchat)** .

Tutorials. Mondays at 1pm-2pm at OI4422 with Kai, at 2pm-3pm at OI4422 with Brinda until October 7 and then with Kai, and at 5pm-6pm at OI8214 with Brinda.

Text. James Munkres' **Topology (https://www.pearson.com/en-ca/subject-catalog/p/topology-classic-version/P200000006299/9780137848669)** (see **Errata** ➱ **(http://drorbn.net/index.php?title=10-327/Errata_to_Munkres%27_Book)**) (required reading!). The topology texts by Dugundji and Massey are also recommended, and many other texts are also available.

Piazza Link. https://piazza.com/utoronto.ca/fall2024/mat327, ➱ **(https://piazza.com/utoronto.ca/fall2024/mat327,)** access code 0k9rwtzm2wj.

Blackboard Shots. See **https://drorbn.net/bbs/show.php?prefix=24-327** ➱ **(https://drorbn.net/bbs/show.php?prefix=24-327)** .

Course Description, taken from the Faculty of Arts and Science Calendar:

> **Hours:** 36L
>
> **Metric spaces, topological spaces and continuous mappings; separation, compactness, connectedness. Fundamental group and covering spaces. Brouwer fixed-point theorem. Students in the math specialist program wishing to take additional topology courses are advised to obtain permission to take MAT1300H, MAT1301H.**

Prerequisite: MAT157Y1/ MAT157Y5/ (MAT157H5, MAT159H5)/ [(MAT237Y1/ (MATB41H3, MATB42H3/ MATB43H3)/ MAT237Y5), MAT246H1]
**Breadth Requirements:** The Physical and Mathematical Universes (5)

Note that our choice of material will be a bit different than what is stated in the calendar, and will be closer to what was done in **2018** ⤷ **(https://www.math.toronto.edu/~drorbn/classes/18-327-Topology/index.html)** .

Warning and Recommendation. This will be a tough and very abstract class, designed for math specialists. I will make every effort to make it understandable, but certain parts of the material require a very high level of mathematical sophistication. Don't take this class unless you are ready to put in the tremendous intellectual effort that will be involved! Every bit of this class absolutely makes sense. But you'll have to think hard at all times, and be ready to repeatedly adjust your perspective, to see that this is so. Don't let go! If you'll fall behind you'll find it nearly impossible to catch up. This actually does not mean "do your homework in time" (highly recommended anyway). It means "do your deep thinking in time".

Marking Scheme. There will be one term test (25% of the total grade) and a final exam (60%), as well as about 10 homework assignments (15%). A renormalization function of the form $m \mapsto 100(m/100)^\gamma$ will then be applied, for a constant γ which will be chosen later with a bias in favour of $\gamma = 1$. Similar renormalizations may or may not also be applied to individual homework assignments or the tests.

The Term Test will likely take place in the evening on Wednesday October 16th, 7-9PM at Bahen 1180 and Bahen 1220. A student who misses the term test without providing a valid reason within one week of the test will receive a mark of 0 on the term test. There will be no make-up term test. If a student misses the term test for a valid reason, the weight of the problem sets will increase to 20% and the weight of the final exam to 80%.

Homework. Assignments will be posted on the course web page (usually on Tuesdays) approximately on the weeks shown in the class timeline. They will be due a week later and they will be (at least partially) marked by the TAs. All students (including those who join the course late) will receive a mark of 0 on each assignment not handed in; though in computing the homework grade, your worst 2 assignments will not count. I encourage you to discuss the assignments with other students or even browse the web, so long as you do at least some of the thinking on your own and you write up your own solutions. Academic integrity rules will not be enforced on homework, so cheating will be easy and may increase your homework grade a bit. But it will hurt your appreciation of yourself, your knowledge, and your exam grades a lot more.

Performance in MAT137Y as a function of problem sets submitted (2017-2018)
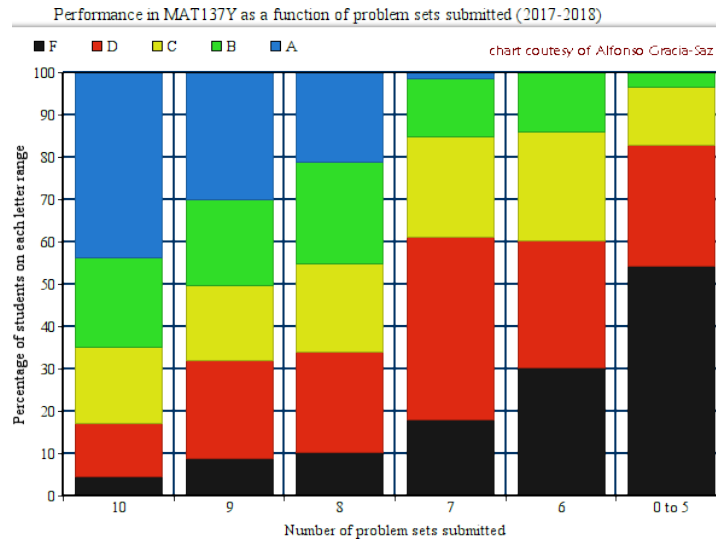
Solution Sets. No "official" solution sets for homework assignments and for the term test will be provided. However, I encourage students who got 90% or more on any given assignment (or test) to scan and send me their marked assignments, and I will post their solutions on the class web site as a service to everybody else. Notes:

- Please hide student ID numbers in all such scans! You may or may not wish to also suppress your name.
- Scans must of of good quality: they must be of high resolution and contrast, and the paper must look "flat". Use a flatbed scanner or one of those phone apps that simulate a flatbed scanner. Do not use a cellphone camera directly.
- I prefer to receive PDF files, but I'll also take .jpg images if a solution is only 1-3 pages long.
- You may fix and improve your solution set before sending it to me, yet please keep a clear distinction between what was written before submission and what was written after; for example, use a pen of a different colour for the later edits.
- I will remove all solution sets from the class web site sometime in January 2025.

Photo Album. Just for fun, I maintain a public photo album related to MAT327, **here** ⬀ **(http://drorbn.net/AcademicPensieve/Classes/24-327-Topology/Album/)** . Please send me photos! You may send your own portrait or any other photo of you or other students engaging in MAT327-related activities. You may overlay your photos with some caption text, if you wish. If your photos contain images or names of any persons other than yourself you must obtain permission from these people before you submit their photos, and when you submit, you must CC all people seen or mentioned in the photos. If anybody will ever ask me to remove a photo in which they appear or are mentioned, I will do so ASAP with no questions asked.

Academic Integrity. Avoid these troubles! Carefully read the Office of Student Academic Integrity's **Information for Students (https://www.artsci.utoronto.ca/current/academic-advising-and-support/student-academic-integrity#:~:text=Academic%20Integrity%20in%20the%20Faculty,%2C%20respect%2C%20responsibility%20and%20courage.)** .

Cheating will be possible in MAT327. You are smart and clever and if you truly want it and if you don't mind the harm it will do to your knowledge and to your appreciation of yourself, surely you'll find ways. I'm smart and clever too, and experienced, and my avatars have accounts on several relevant web sites. I will aggressively pursue any cases of suspected cheating while fully respecting all university rules. I will do it out of love and respect, not hate and disgust. I am not disgusted by cheaters. Yet respect for the fair majority will force me to act, and as needed, act I will.

Telling - again with love in mind and respect for the fair, I encourage you to tell me if you know anything. Anonymous is fine and in all cases privacy will be respected. Though keep in mind that I cannot act on words but only on evidence. I care about means even more than I care about names.

Accessibility Needs. The University of Toronto is committed to accessibility. If you require accommodations for a disability, or have any accessibility concerns about the course, the classroom or course materials, please contact **Accessibility Services (https://www.studentlife.utoronto.ca/as)** as soon as possible.

STUDY

25-35

HOURS/WEEK

Department of Mathematics
University of Toronto

How to Succeed in this Class

- **Keep up!** Don't fall behind on reading, listening, and doing assignments! MAT327 moves at a very high pace. New material is covered once and just once. There will be no going over the same thing again and again - if you fall behind, you stay behind.
- Unless you are an Einstein, there is no way to do well in this class merely by attending lectures - you must think about the material much more than just 3 hours a week if you want it to sink in. And if you are planning on not attending lectures, well, think again. Most people find it very hard to pace their own studies without a human contact; if you'll try, you are likely to discover the hard way that you belong to the majority.
- Take your own class notes, in your own handwriting, and strive to make them as complete as possible. Writing "burns" things into your brain and forces you to keep from daydreaming. And nothing beats reading your own notes when you review the material later on.
- Math is about understanding, not about memorizing. To understand is to internalize; it is to come to the point where whatever the professor does on the blackboard or whatever is printed in the books becomes yours; it is to come to the point where you appreciate why everything is done the

way it is done, what does it mean, what are the reasons and motivations and what is it all good for. Don't settle for less!

- This said, you are expected know all definitions and all proofs, and memorizing helps. Memorizing is sometimes the first step towards understanding. If you remember something, you can think about it on the subway ride back home instead of reading advertisements.
- Keep asking yourself questions; many of them will be answered in class, but not all. Remember the old Chinese proverb:

"Teachers open the door, but you must enter by yourself"

"师傅领进门,修行靠个人!"