

# Math 4121A/9021 Topology (Fall 2021/2022)

## Course Outline

### 1. Course Information

Class hours: MWF 11:30am-12:30pm, MC 108

**Prerequisites:** Mathematics 3122A/B

Unless you have either the requisites for this course or written special permission from your Dean to enroll in it, you may be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.

### 2. Instructor Information

Prof. Matthias Franz  
Office: MC 103D  
Phone: ext. 86538  
Email: mfranz@addwesterndomain

Students must use their Western (@uwo.ca) email addresses when contacting their instructor via email.

Office hours: TBA

### 3. Course Syllabus and Delivery Mode

In this course, we study point-set topology, which is the basis for further courses in topology, in particular for algebraic topology. Topological spaces generalize metric spaces and appear in almost any branch of mathematics (including analysis, geometry and algebra). Topology is similar to linear algebra in this regard.

Specifically, we are going to study the following topics: topological spaces, neighbourhoods, bases, subspaces, continuity, product and quotient spaces, connectedness, compactness, separation axioms. Time permitting, we may additionally cover nets, normal spaces, compactifications, locally compact spaces, ordinal numbers, paracompactness.

As with any other upper-year course in mathematics, there will be an emphasis on mathematical reasoning and proof-writing, which will be practiced through in-class discussion and homework exercises, for instance. Additionally, I want to focus on the ability to read (and understand!) mathematical texts. To practice this, we will sometimes read parts of the textbook together in class. The goal is to increase the students' ability to learn mathematics on their own, outside of the classroom.

Students are expected to attend all classes and to prepare for them by reviewing the material from previous classes, to do the assigned homework and to read in advance the sections of the textbook that we are going to read together in class.

### **Contingency plan for an in-person class pivoting to 100% online learning**

In the event of a COVID-19 resurgence during the course that necessitates the course delivery moving away from face-to-face interaction, all remaining course content will be delivered entirely online, either synchronously (i.e., at the times indicated in the timetable) or asynchronously (e.g., posted on OWL for students to view at their convenience). The grading scheme will not change. Any remaining assessments will also be conducted online (most likely using Zoom) as determined by the course instructor.

## **4. Course Materials**

While there is no required textbook, the following books may be helpful. Except for the first book, they are on course reserve at the Taylor Library.

J. B. Conway, *A Course in Point Set Topology*, Springer 2014  
Free online access from within the UWO intranet at  
<http://doi.org/10.1007/978-3-319-02368-7>

J. R. Munkres, *Topology*, 2nd ed., Prentice Hall 2000

W. A. Sutherland, *Introduction to metric and topological spaces*, 2nd ed., Oxford Univ. Press 2009

S. Willard, *General Topology*, Dover 2004 (reprint of the original edition published by Addison-Wesley in 1970)

Students should check OWL (<http://owl.uwo.ca>) on a regular basis for news and updates. This is the primary method by which information will be disseminated to all students in the class. Students are responsible for checking OWL on a regular basis.

If students need assistance, they can seek support on the OWL Help page. Alternatively, they can contact the Western Technology Services Helpdesk. They can be contacted by phone at 519-661-3800 or ext. 83800.

## **5. Methods of Evaluation**

The overall course grade will be calculated as listed below:

15% assignments (roughly every other week)  
35% midterm (written)  
50% final exam (oral)

The midterm exam (90 or 120min) is tentatively scheduled for Tue Oct 26, 7-9pm.

In case a student misses the midterm for a valid reason, either a make-up exam will be offered or the weight of the midterm will be transferred at the final exam. This happens at the discretion of the instructor.

The date of the final oral exam (30min) will be scheduled in class once the dates of the other (written) final exams are known.

For Math 9021, the midterm may be replaced by a presentation (45min). Dates and topics will be assigned during the course. The notes for the presentation have to be handed in **one week** before the day of presentation. The presentation and the quality of the notes are together worth 35% of the final grade. There will be a penalty for handing in the notes late. The presentations will be towards the end of the term; a detailed schedule will be made after the course has started. The student must opt for the presentation two weeks before the midterm at the latest.

### **Accommodated Evaluations**

In case of an excused absence for an assignment, the remaining assignments will be reweighted. For the midterm exam, either the final exam will be reweighted or a make-up exam may be offered, at the discretion of the instructor.

## **6. Accommodation and Accessibility**

### **Accommodation Policies**

Students with disabilities work with Accessible Education (formerly SSD) which provides recommendations for accommodation based on medical documentation or psychological and cognitive testing. The Academic Accommodation for Students with Disabilities policy can be found at:

[https://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/Academic\\_Accommodation\\_disabilities.pdf](https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic_Accommodation_disabilities.pdf)

### **Academic Consideration for Student Absence**

Students will have up to two (2) opportunities during the regular academic year to use an on-line portal to self-report an absence during the semester, provided the following conditions are met: the absence is no more than 48 hours in duration, and the assessment for which consideration is being sought is worth 30% or less of the student's final grade. Students are expected to contact their instructors within 24 hours of the end of the period of the self-reported absence, unless noted on the syllabus. Students are not able to use the self-reporting option in the following circumstances:

- for exams scheduled by the Office of the Registrar (e.g., December and April exams)
- absence of a duration greater than 48 hours,
- assessments worth more than 30% of the student's final grade,
- if a student has already used the self-reporting portal twice during the academic year

If the conditions for a Self-Reported Absence are *not* met, students will need to provide a Student Medical Certificate if the absence is medical, or provide appropriate documentation if there are compassionate grounds for the absence in question. Students

are encouraged to contact their Faculty academic counselling office to obtain more information about the relevant documentation.

Students should also note that individual instructors are not permitted to receive documentation directly from a student, whether in support of an application for consideration on medical grounds, or for other reasons. **All documentation required for absences that are not covered by the Self-Reported Absence Policy must be submitted to the Academic Counselling office of a student's Home Faculty.**

For policy on Academic Consideration for Student Absences - Undergraduate Students in First Entry Programs, see:

[https://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/Academic\\_Consideration\\_for\\_absences.pdf](https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic_Consideration_for_absences.pdf)

and for the Student Medical Certificate (SMC), see:

[http://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/medicalform.pdf](http://www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform.pdf)

### **Religious Accommodation**

Students should consult the University's list of recognized religious holidays, and should give reasonable notice in writing, prior to the holiday, to the Instructor and an Academic Counsellor if their course requirements will be affected by a religious observance.

Additional information is given in the Western Multicultural Calendar:

<https://multiculturalcalendar.com/ecal/index.php?s=c-univwo>

You may also be eligible to write the Special Exam if you are in a "Multiple Exam Situation" (see [http://www.registrar.uwo.ca/examinations/exam\\_schedule.html](http://www.registrar.uwo.ca/examinations/exam_schedule.html)).

If a student fails to write a scheduled Special Examination, the date of the next Special Examination (if granted) normally will be the scheduled date for the final exam the next time this course is offered. The maximum course load for that term will be reduced by the credit of the course(s) for which the final examination has been deferred. See Academic Calendar for details (under [Special Examinations](#)).

## **7. Academic Policies**

The website for Registrarial Services is <http://www.registrar.uwo.ca>.

In accordance with policy, <http://www.uwo.ca/its/identity/activatenonstudent.html>, the centrally administered e-mail account provided to students will be considered the individual's official university e-mail address. It is the responsibility of the account holder to ensure that e-mail received from the University at his/her official university address is attended to in a timely manner.

Participants in this course are **not permitted to record the online sessions**, except where recording is an approved accommodation, or the participant has the prior written permission of the instructor.

**Scholastic offences** are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site:

[http://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/scholastic\\_discipline\\_undergrad.pdf](http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf)

For homework assignments using Gradescope, you may directly produce an electronic document, for example by writing (neatly!) on a tablet. If you write on paper, then you need a way to scan your sheets and produce a PDF file. If you don't have access to a scanner, you may use a scanning app for smartphones.

## **8. Support Services**

Please visit the Science & Basic Medical Sciences Academic Counselling webpage for information on add/drop courses, academic considerations for absences, appeals, exam conflicts, and many other academic related matters: <https://www.uwo.ca/sci/counselling/>

Please contact the course instructor if you require lecture or printed material in an alternate format or if any other arrangements can make this course more accessible to you. You may also wish to contact Student Accessibility Services (SAS) at (519) 661-2147 if you have any questions regarding accommodations.

Western University is committed to a thriving campus as we deliver our courses in the mixed model of both virtual and face-to-face formats. We encourage you to check out the Digital Student Experience website to manage your academics and well-being: <https://www.uwo.ca/se/digital/>.

Learning-skills counsellors at the Student Development Centre (<http://www.sdc.uwo.ca>) are ready to help you improve your learning skills. They offer presentations on strategies for improving time management, multiple-choice exam preparation/writing, textbook reading, and more. Individual support is offered throughout the Fall/Winter terms in the drop-in Learning Help Centre, and year-round through individual counselling.

Students who are in emotional/mental distress should refer to Mental Health@Western ([http://www.health.uwo.ca/mental\\_health](http://www.health.uwo.ca/mental_health)) for a complete list of options about how to obtain help.

Additional student-run support services are offered by the USC, <http://westernusc.ca/services>.