

Course Name: **Topology I**  
Course Code: MATH 250  
Term: Fall 2025  
Credit Hours: 3  
Modality: Face-to-face, with Zoom backup if needed  
Schedule: MW 12:40–2:00 pm  
Location: DGH, Room 217



### **Instructor Information:**

Name: Dr. Minh-Tam Trinh  
Email: TBA  
Phone: (773) 967-8068  
Office: Graduate School Building, Annex 3, Room 201  
Office Hours: MW 2:15–3:15 pm

---

## **Course Syllabus**

### **Course Description:**

Topologies, bases, continuity, open maps and closed maps, product spaces, connectedness, compactness, separation axioms, metrizable spaces, covering spaces, homotopy, fundamental groups.

### **Course Objectives:**

Upon successfully completing the course, students will have proficiency in point-set topology and basic principles of algebraic topology.

### **Prerequisite(s):**

Group theory, at the level of MATH 197–198 (Introduction to Modern Algebra I–II), will be needed in the latter part of the course. We will review it during class time, but very rapidly.

### **Required Course Materials:**

I plan to follow the textbook by Munkres: *Topology*, 2nd Edition, which can be found online. If you cannot acquire this copy, please let me know.

### **Optional/Supplemental Materials:**

Course notes may be posted to the course webpage, as needed.

### **Grading and Evaluation:**

There will be an initial reading assignment, six problem sets (each 6% of the total grade), a midterm exam (24%), and a final exam (40%). The midterm will be held in class on **Wednesday, October 8**.

Please typeset your problem sets using [LaTeX](#) or a similar markup language. Please write in complete sentences. Here are some thoughts by J. S. Milne about mathematical writing that I like, and try to follow: (1) [“Mathlish”](#) (2) [“Tips for Authors”](#) (*note*: satirical).

Problem sets will be due by 11:59 PM on their due dates. I plan to use the following submission policy: You can always submit homework **up to two days late** for 50% credit. You

also get **two chances** to waive the late penalty. Finally, I may grant a further extension or waiver if you are seriously ill, or facing a grave personal situation. In such cases, please provide documentation as soon as possible.

Your raw numerical grade will be the weighted average of your grades on all work, as described above. Your final grade in the course will be a letter grade. I expect a raw percentage of 85% or higher to be an A grade, 75–85% to be a B grade, 65–75% to be a C grade, 60–65% to be a D grade, and below 60% to be an F grade. To receive credit for the course, you must earn a C or higher. Graduate students must maintain a B average overall to remain in good academic standing.

Please keep in mind all other [academic regulations](#) of the Graduate School, especially the zero-tolerance policy for cheating and plagiarism. For instance, on problem sets, please cite any collaborators or sources used, including any large language models (LLMs) or AI-based tools.

At present, I would strongly discourage the use of LLMs to find mathematical information, as the risk of hallucinations and other errors is extremely high. Such tools may remain useful for non-mathematical tasks, like converting handwritten text to LaTeX. In any event, please cite any use of these tools.

### **Attendance and Participation Policy:**

All students are expected to attend class regularly, though I do not plan to have an attendance grade. If you get sick, please let me know (with documentation if needed), stay at home, and take care of yourself—it will be ok.

I do not plan to have a participation grade, either, but if you contribute to class discussion regularly, it will be more engaging and enjoyable for all of us.

**If you need to take the midterm or final exam at an alternate date, then you must email me and receive confirmation well in advance of the original exam date.** Please note that I may not be able to grant last-minute requests.

I will maintain a copy of this syllabus on the following course webpage:

<https://mqtrinh.github.io/math/teaching/howard/math-250/>

**If we need to make changes to the tentative schedule on the next page, or any other aspect of the course, then I will update the syllabus at that webpage, and announce the update(s) over email.**

Course Schedule				
Week	Dates	Lesson Objectives	Munkres §	Notes
1	8/18–8/20	Syllabus, discussion of initial reading	Chapter 1	
2	8/25–8/27	Topological spaces, bases for topologies, continuous maps	Chapter 2, §12–13, 18	
3	9/3	Subspaces, metrics	16, 20	PS1 due Wed, 9/3
4	9/8–9/10	Product spaces, quotient spaces	15, 19, 22	
5	9/15–9/17	Closed sets, the Hausdorff axiom, connected spaces	17, 21, 23	PS2 due Wed, 9/17
6	9/22–9/24	Connected subspaces of $\mathbf{R}$ , compact spaces	24–26	
7	9/29–10/1	Compact subspaces of $\mathbf{R}$ , the countability axioms	27–28, 30	PS3 due Wed, 10/1
8	10/6–10/8	The separation axioms	31	<i>Midterm</i> (Wed, 10/8)
9	10/15	Homotopy, path homotopy, fundamental groups	51–52	
10	10/20–10/22	The fundamental groups of the circle and of $n$ -spheres	54, 59	
11	10/27–10/29	Deformation retracts, free groups, free products	58, 68–69	PS4 due Wed 10/29
12	11/3–11/5	The Seifert–van Kampen theorem and examples	70, 72–73	
13	11/10–11/12	Covering spaces	53	PS5 due Wed, 11/12
14	11/17–11/19	Classifying covering spaces	79	
15	11/24	<i>Bonus topics</i>		PS6 due Mon, 11/24
16	12/1			<i>Reading Period</i>
Final	TBA			

## University Services

### *Academic and Student Support Services*

For Tutoring Services, visit the [Tutoring & Learning Support Services Office](#).

For Writing assistance, visit the [Writing Center](#).

For Library Services, visit the [Howard University Libraries](#).

For Academic Advising, visit the [Academic Advising Services](#).

For general student academic support, visit the [Center for Academic Excellence](#).

For general student support, visit the [Division of Student Affairs](#).

### **Technology Support**

Enterprise Technology Services:

- For questions about the LMS or third-party tools, visit [My Helpdesk](#) and select LMS Support
- For general tech support questions visit [My Helpdesk](#) and select Technical Support.
- To contact ETS: **Phone & Email**  
**Phone:** 202-806-2020  
**Email:** [huhelpdesk@howard.edu](mailto:huhelpdesk@howard.edu)

LMS Support:

- Canvas has 24/7 support via chat or call 1-877-686-8251. To access Canvas Chat, please click on the Help icon in the bottom left-hand corner of your Canvas Dashboard.
- To contact ETS: **Phone & Email**  
**Phone:** 202-806-2020  
**Email:** [huhelpdesk@howard.edu](mailto:huhelpdesk@howard.edu)

Proctorio Support:

- ETS Proctorio support, [visit here](#) for Frequently Asked Questions (FAQs)
- To contact Proctorio: 24/7 technical support to students  
Phone at (480) 428-4089 or toll-free (866) 948-9248.  
Email [support@proctorio.com](mailto:support@proctorio.com)

## ***University Statements and Compliance***

### ***The Americans with Disabilities Act (ADA)***

Howard University is committed to creating an accessible, inclusive, and safe learning environment for all students and providing equal access to students with documented disabilities. Students seeking reasonable accommodations must first register with the Office of Student Services (OSS). There you can engage in a confidential conversation about the process for requesting reasonable accommodations in the classroom and clinical settings, which the Office of Student Services (OSS) determines. Accommodations must be requested each semester. Accommodations are not provided retroactively. If you want to request accommodations, please contact OSS via email at [oss.disabilityservices@howard.edu](mailto:oss.disabilityservices@howard.edu) or visit <https://howard.edu/disability-services>.

### ***COVID-19 Statement***

The indoor mask mandate has been lifted on campus for all faculty, staff, students, and visitors, with a notable exception like patient settings. Faculty may continue to require masks for individual classes. In those classes where a face mask is required, students will be directed to leave the classroom if a face mask is not worn properly to cover the nose and mouth. Any student who refuses or fails to comply with a specific classroom requirement to wear a face mask, and any other measures the University advances for the safety and protection of the Howard Community, will constitute a violation of the University's Student Code of Conduct and could result in sanctions up to and including expulsion from the University.

### ***LGBTQ+***

Howard University is committed to providing an educational, living, and working environment that is welcoming, respectful, and inclusive of all members of the University community, including all sexes, sexual orientations, gender expressions, and gender identities. For more information please contact the [Division of Student Affairs](#).

### ***Educational Benefits and Opportunities***

No member of the University Community shall deny a student fair access to all educational opportunities and benefits available at the University. To find more information on this policy, please refer to the [Code of Ethical Conduct](#). To report a concern, visit the [Office of Student Affairs](#).

### ***The Family Educational Rights and Privacy Act (FERPA)***

It is the policy of Howard University (the "University") to ensure that information contained within the education records of all students is protected to the fullest extent of the law. To find more information about this policy visit the [FERPA Policy](#) page.

## ***Title IX Statement***

Howard University's [\*Policy Prohibiting Sex and Gender-Based Discrimination, Sexual Misconduct and Retaliation\*](#) (aka, the Title IX Policy) prohibits discrimination, harassment, and violence based on sex, gender, gender expression, gender identity, sexual orientation, pregnancy, or marital status. With the exception of certain employees designated as confidential, note that all Howard University employees – *including all faculty members* – are required to report any information they receive regarding known or suspected prohibited conduct under the Title IX Policy to the Title IX Office ([TitleIX@howard.edu](mailto:TitleIX@howard.edu) or 202-806-2550), regardless of how they learn of it. For *confidential* support and assistance, you may contact the Interpersonal Violence Prevention Program (202-836-1401) or the University Counseling Service (202-806-7540). To learn more about your rights, resources, and options for reporting and/or seeking confidential support services (including additional confidential resources, both on and off campus), visit <https://howard.edu/title-ix>.

## ***Academic Code of Conduct***

Howard University is a community of scholars composed of faculty and students both of whom must hold the pursuit of learning and search for truth in the highest regard. Such regard requires adherence to the goal of unquestionable integrity and honesty in the discharge of teaching and learning responsibilities. The prescribed policies and procedures that pertain to violation of the academic integrity policy are contained in the [\*Student Handbook\*](#). Please note include the appropriate student handbook from your perspective college or school (e.g. Howard university school of law student handbook, etc.)

## **Minimum Technology Requirements**

In order to make the most of your distance learning experience using the Learning Management System, there are several technical requirements.

Refer to the Guidelines below to help ensure your Distance Learning success:

	Minimum	Recommended
<b>Operating Systems</b>	Windows 10, version 1809 or higher Mac OSX 10.13 or higher	Windows 10 version 2004 or better Mac OS 10.15 or better
<b>Processor</b>	1 GHz processor	2 GHz or faster processor
<b>Memory</b>	512 MB of RAM	2 GB of RAM or higher
<b>Monitor Resolution</b>	1024 x 768	1024 x 768 or higher
<b>Free Hard Disk Space</b>	5 GB of free disk space	20 GB or higher of free space
<b>Internet Connection</b>	Broadband (high-speed) Internet connection with a consistent minimum speed of 1.5 Mbps.	Broadband (high-speed) Internet connection with a speed of 4 Mbps or higher
<b>Internet Browser</b>	Chrome, Edge, Firefox, Safari	Chrome

	Desktop Browser Versions	Mobile Browser Versions
<b>Chrome<sup>2</sup></b>	63+	63+
<b>Edge<sup>3</sup></b>	42+	38+
<b>Firefox</b>	57+	57+
<b>Internet Explorer<sup>4</sup></b>	Unsupported	Unsupported
<b>Safari</b>	12+ (Mac OS only)	With iOS 11+

Category	Tested
<b>Operating Systems</b>	Windows 8, Windows 10, Mac OS 10.12, Mac OS 10.13, Mac OS 10.14, iOS, Android, Windows Mobile, Chrome OS
<b>iOS Devices</b>	iPod Touch, iPhone 4S, iPhone 5S, iPhone5c, iPhone 6, iPad 2, iPad 3, iPad Mini 3, iPad Air 2
<b>Android Devices</b>	Galaxy S4, Galaxy S5, HTC G1, LG C800 myTouch, HTC One, Galaxy Note 2014, HTC One M8
<b>Windows Mobile Devices</b>	Venue 8 Pro, Lumia 520, Lumia 930
<b>Chrome OS Devices</b>	Chromebook (Chrome browser; features requiring NPAPI plug-ins are not supported)

### Important!!

JavaScript needs to be enabled in your browser.

To enable JavaScript in your browser [click here](#).

### Expected Computer and Digital Information Literacy Skills

The following computer skills and digital information literacy skills expected for this course include:

- Using the learning management system (Canvas)
- Using email
- Uploading and downloading documents, files, etc.
- Using web conferencing tools and software
- Using remote/virtual libraries and databases
- Properly citing information sources

## How To Be Successful in the Distance Learning Environment

- **Be Disciplined.** Set aside time for your course. Each week you should allow at least five hours of work divided between working on the Canvas platform of our course (reading and answering to postings), reading and conducting research, and completing your written assignments.
- **Follow Directions Carefully and Precisely.** Read the announcements carefully and all course information posted on Canvas. Get acquainted with the communication policy, grade policy, and other requirements for the course. A good idea is to print the syllabus and keep it handy for future reference.
- **Manage Your Time Efficiently.** Work on organizing your time so that you meet all course assignment deadlines. Late work will not be accepted for this course, therefore you are advised to start your papers at least a week BEFORE the due date to allow yourself plenty of time to finish.
- **Access the Course Site Frequently.** Plan to log into the course at least three times a week to read instructor announcements and students' postings in the discussion board. This work does not include the time you must spend writing your assignments.
- **Be Patient.** The course instructors check course emails regularly but may take 24-48 hours to respond to your message.

### Distance Learning “Netiquette”

Distance Learning communication lacks verbal and non-verbal cues such as intonation, gestures, stance, and facial expressions that are a regular part of face-to-face communication. The absence of these cues can quickly lead to misunderstandings in the distance learning environment. In order to reduce the occurrence of misunderstandings and to promote a distance learning environment where students feel safe, teachers and students should follow distance learning netiquette.

### The **WRITE** Way to Communicate in the Distance Learning Environment

Lewis' advice about the Write Way to communicate is directed to teachers, but it could easily be adapted for students. "The **WRITE** way involves communicating in a manner that is (**W**)arm, (**R**)esponsive, (**I**)nquisitive, (**T**)entative, and (**E**)mpathetic.

**Warmth** – "Being warm is a way of reminding others (and you) that it is people who are engaged in communication, not software"

**Responsive** -- "Try to return personal messages as soon as possible, and set up a regular rhythm of communication for other responses."

**Inquisitiveness** – "Defensiveness is reduced if people ask questions rather than make statements."

**Tentativeness** – "A question – framed in a tentative manner – reduces defensiveness and can also contribute valuable information (e.g., 'Don't you think it'd be better if we . . .')."

**Empathy** – ". . . put yourself in the shoes of your audience."

Lewis, C., (2000). "Taming the Lions and Tigers and Bears: The WRITE WAY to Communicate Online." In K. Anderson & B. Weight (Eds.), *The Online Teaching Guide: A Handbook of Attitudes, Strategies, and Techniques for the Virtual Classroom* (pp. 13-23). Needham Heights, MA: Allyn and Bacon.



## **Web Course Policies and Expectations:**

**Please read these policies carefully and follow them throughout our course.**

### **Web Policy # 1** Use only Standard English

This rule refers to the use of Standard English in all areas of our communication, including e-mails, postings, journals, and blog posts.

If you need to email the course instructors, please use proper salutations and remember to sign your email with your name as it appears in the course roster. Observe *Netiquette* rules and avoid communication errors such as, using only capital letters (i.e. SHOUTING) or all lower-case letters (i.e. informal tone). Use full and proper paragraphs to communicate your ideas. Please access and read the link and file in the previous section (above) to learn more about e-mail netiquette rules.

**Web Policy # 2** Discussion forum postings should relate to the course content and specific topic in ways that are substantive and meaningful. Thus, aim for discussion postings that are thoughtful, well developed and that, extend the course discussion in concrete ways. Drawing from helpful outside sources to support your ideas, including relevant examples to illustrate your point and posting thoughtful questions about the readings are all ways of developing your discussion postings.

Aim for initial postings of at least 250 words and responses to others that are at least 75 words. Please avoid posting short responses to others such as, "Great post", "I agree," or "Me too." Instead, think in terms of commenting on specific areas of others' posts. In addition to using fully expressive postings, please remember to always proofread and spell check your work. To do so, click on the ABC check-mark icon on the menu placed on top of the window where you write.

Each week, in order to receive credit for the weekly discussion forums, you must submit an initial post by Wednesday 11:59 (just prior to midnight) and reply to at least two classmates' responses by Sunday 11:59 (just prior to midnight).

### **Web Policy # 3** No late assignments are accepted for this course.

Distance Learning provides you the flexibility to work when it's convenient for you, but you must show discipline and adhere to the pacing and structure of this course. Since this is not a correspondence course, the timing of assignments, readings, and postings are crucial to the smooth operation and full engagement of this course. Therefore, no exceptions to this rule will be granted.

## Communication Policy

- If you have any questions regarding the course, feel free to post them in the **Café forum (faculty must create the forum and can call it whatever forum they chose, e.g. student lounge, etc)** in the Discussion Board (DB). If you know the answer to a posted question, please feel free to respond. In this way, we leverage collective knowledge and participants may receive a quicker answer.
- Use Standard English in all areas of communications. Although many Internet users are accustomed to lower-case writing and abbreviations, our written exchange should reflect the educational setting in which we are operating. Therefore, out of respect for our institution, as well as to model good practices for our distance learners, please use only polished, thoughtful written expression.
- Always use the Spellchecker option of this new version of Canvas which you can find in the menu; it looks like a checkmark that includes the letters ABC.
- Frequency is more important than long stretches of work on the course site. It is important that you interact with regular frequency. Log-on frequently (Monday – Friday) to our Canvas course site. This is what you will expect your student to do as well.
- Do not hesitate to ask questions, give suggestions, or raise an issue during the course. If you feel lost or frustrated, please contact one of the facilitators as soon as possible, and let others help you. Learning to find help is an important learning strategy that should be accomplished / mastered by the end of this course.

Course Components	What you may expect from the facilitators:	What is expected of you:
<b>Email</b>	An instructor will respond to your e-mails within 24 to 48 hours. We often check our email and typically respond promptly. However, please allow an entire business day before emailing again on the same question or issue. Emails sent on Saturday or Sunday will receive a reply by Monday or Tuesday. Please do not expect to receive returned email from your instructor on Saturdays or Sundays.	If you have a personal question, please send an email. Questions regarding the course content should be posted in the discussion forum titled – Café. Please sign all your emails with your full name.
<b>Phone</b>	You are welcome to call your instructors, although our preferred communication is through email. If it is a matter of solving a technology question, please email the helpdesk at <a href="mailto:helpdesk@howard.edu">helpdesk@howard.edu</a> . Please be aware that your instructors are not available to return or receive your calls on Saturdays or Sundays.	If you do not receive a response follow up. Be sure to check your emails to ensure you are responsive should the helpdesk have questions. Include your full name, name of the course, name of the instructor and a clear description of your issue. Provide a good contact number should they need to call you back.

<b>Announcements</b>	We will post new announcements to alert you of any new happenings in our course, or the lab.	Read the announcements for any new updates and the important notices from the facilitators.
<b>Virtual Office Hours</b>	We will be available to make an appointment with you should you require additional assistance outside of our established lab sessions. Please be aware that it will be imperative to email us to set up an appointment time and we will be available virtually.	Contact the facilitators of this course to set up additional time to meet as well be prepared to utilize the Canvas Collaborate or the designated web conferencing medium selected feature in order to access us virtually during your appointed time.

## Privacy Policies

[Adobe](#)

[Canvas](#)

[Echo 360](#)

[Flickr](#)

[McGraw Hill Campus & Higher Education](#)

[Microsoft](#)

[Pearson My Lab & Mastering](#)

[Poll Everywhere](#)

[Proctorio](#)

[SlideShare](#)

[Wiley Course Resources & Wiley Plus](#)

[YouTube](#)