

# MATH 250 • Topology I



<i>Term</i>	Fall 2025
<i>Credit Hours</i>	3
<i>Modality</i>	Face-to-face
<i>Schedule</i>	MW 12:30–2:00 pm
<i>Location</i>	Room 224, Graduate School Annex III (AN3)
<i>Webpage</i>	<a href="https://mqtrinh.github.io/math/teaching/howard/math-250/">https://mqtrinh.github.io/math/teaching/howard/math-250/</a>
<i>Instructor</i>	Dr. Minh-Tam Trinh
<i>Email</i>	<a href="mailto:minhtam.trinh@howard.edu">minhtam.trinh@howard.edu</a>
<i>Office</i>	Room 202, AN3
<i>Office Hours</i>	By appointment

## Course Syllabus

I will maintain a copy of this syllabus on the course webpage, updating it as needed.

### *Course Description*

Topologies, bases, continuity, 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.

### *Prerequisites*

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.

### *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.

### *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.

## Course Schedule

<i>Week</i>	<i>Dates</i>	<i>Lesson Objectives</i>	<i>Munkres §</i>	<i>Notes</i>
1	8/18–8/20	Syllabus, initial reading	Ch. 1	
2	8/25–8/27	Topological spaces, bases for topologies	Ch. 2, §12–13	
3	9/3	Continuous maps, subspaces	18, 16	PS1 due Wed, 9/3
4	9/8–9/10	Product spaces, metrics	15, 19–20	
5	9/15–9/17	Closed sets, the Hausdorff axiom	17, 21	PS2 due Wed, 9/17
6	9/22–9/24	Quotient spaces, connectedness	22–23	
7	9/29–10/1	Path-connectedness, local (path-)connectedness	24–25	PS3 due Fri, 10/3
8	10/6–10/8	Compactness	26–27	<b>Midterm (Wed, 10/8)</b>
9	10/15	Homotopy	30–31, 51	
10	10/20–10/22	Path homotopy, fundamental groups	51–52	
11	10/27–10/29	Homomorphisms of fundamental groups	52	PS4 due Fri 10/31
12	11/3–11/5	Homotopy equivalences, fundamental groups of $n$ -spheres	58, 54, 59	
13	11/10–11/12	Free products of groups, the Seifert–van Kampen theorem	68–70, 72–73	PS5 due Fri, 11/14
14	11/17–11/19	Covering spaces	53	
15	11/24	Classification of covering spaces	79	PS6 due Wed, 11/26
16	12/2–12/3			<i>Reading Period</i>
17				<i>Final (TBA)</i>

## 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 (ETS) and LMS support:

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

Proctorio support:

- [Visit here](#) for frequently asked questions.
- To contact Proctorio:  
Phone: 480-428-4089 or toll-free at 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.)

## Expected Computer and Digital 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

## Communication Policy

Use Standard English in all areas of communication. 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.

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.

<i>Component</i>	<i>What you may expect from instructors</i>	<i>What is expected of you</i>
<i>Email</i>	An instructor will respond to your emails within 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 email from your instructor on Saturdays or Sundays.	If you have a personal question, please send an email. Please sign all your emails with your full name.
<i>Phone</i>	You are welcome to call your instructor, although our preferred communication is through email. If it is a matter of solving a technology question, please email the helpdesk at	If you do not receive a response follow up. Be sure to check your emails to ensure you are responsive, should

	<a href="mailto:helpdesk@howard.edu">helpdesk@howard.edu</a> . Please be aware that your instructor will not be available to return or receive your calls on Saturdays or Sundays.	the helpdesk have questions. Include your full name, the name of the course, the name of the instructor, and a clear description of your issue. Provide a contact number, should they need to call back.
<i>Announcements</i>	Your instructor will post announcements about any updates to the course.	Read the announcements from the instructor.
<i>Office Hours</i>	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 instructor to set up additional time to meet. Be prepared to use Canvas Collaborate or the designated web conferencing medium in order to access us virtually during your appointed time.

## Privacy Polices

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[Wiley Course Resources & Wiley Plus](#)

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