

**Syllabus**  
**Transitions to Advanced Mathematics**  
**MATH 3325, Spring 2021**

**Class:** Tu Th 10-11:20am, MS Teams

**Instructor:** Bernhard Bodmann, bgb@uh.edu

**Office hours:** Tu Th 11:30-12:30, MS Teams

**TA:** Aaron Smith, wasmith.math@gmail.com

**Content:** This course is an introduction to proofs and abstract concepts that appear in upper level mathematics courses. It serves as a transition into advanced mathematics, and should be taken after the initial calculus sequence and before (or concurrently with) mid-level mathematics courses. The goal is to give students the skills and techniques that they will need as they study any type of advanced mathematics, whether it be in pure mathematics, applied mathematics, or application-oriented courses. In particular, this course covers topics that are ubiquitous throughout mathematics (e.g. logic, sets, functions, relations) and helps prepare students for classes such as Real Analysis, Abstract Algebra, and Advanced Linear Algebra, that are required for majors and minors. A major objective of the course will be to teach students how to read, write, and understand proofs.

**Topics:** In an introductory part, we examine essentials of reasoning and mathematical proofs.

Next, we study elements of logic and precise statements. This leads us into set theory and axioms that are fundamental in mathematics.

We continue with the topic of natural numbers and inductive proofs.

Then, we study relations, functions and a precise definition of cardinality.

The real numbers appear as an example of an uncountable set. In addition, we study limits of sequences and the rigorous definition of continuity.

**Prerequisites:** Calculus I and II

**Text:** A Transition to Advanced Mathematics, by Douglas Smith, Maurice Eggen, and Richard St. Andre, 7th edition, Brooks/Cole, Boston, 2011. Newer editions are admissible, but not needed.

**Format of Instruction and Final Exam** This course is being offered in the synchronous online format. Synchronous online class meetings will take place according to the class schedule. There is no face-to-face component to this course. In between synchronous class meetings, there may also be asynchronous activities to complete (e.g., discussion forums and assignments). This course will have exams as announced in the tentative schedule further below. Prior to the exam, descriptive information, such as the number and types of exam questions, resources that are allowed and disallowed in the process of completing the exam, and procedures to follow if connectivity or other resource obstacles are encountered during the exam period, may be provided.

**Communications and Announcements:** Email communications related to this course will be sent to your Exchange Email Account, which each University of Houston student receives (or whichever email address is linked to your student ID on ACCESS UH). Exchange email accounts can be accessed by logging into Office 365 with your Cougarnet credentials or through Access UH. Additional course communications may be announced on MS Teams during synchronous lectures.

**Equipment Needed:** Students will need the following equipment to be able to follow classes: a computer or tablet with working speaker or earphones (and ideally a microphone), broadband internet connection, ability to log in to Blackboard for online assignments, ability to access MS Teams to attend live meetings and watch recordings, and scanner or certain smartphone apps so that you can submit your homework as a PDF file. For technical problems, please contact UH IT Help Desk; your instructor might not be able to help with technical issues. Students that do not have access to the required equipment can find the needed computer equipment in the library. Additional information and technical support is available at <https://www.uh.edu/infotech>.

**Late Registration:** No special accommodations will be made for students who register late for this class, miss class, or are denied access to Blackboard owing to late registration. It is the sole responsibility of the student to seek out and obtain course materials or announcements if they miss class or cannot access these items through Blackboard. No make-up exams or extensions on assignments will be granted for late registration. If you do encounter problems accessing the course material, please contact the TA and instructors immediately for help, in person and via email. We are best able to help you the sooner you let us know.

**Grade:** The grade will be based on homework (30%), 2 exams (20% each), and one final exam (30%).

**Homework:** Homework assignments will be given generally on a weekly basis. There will be a total of approximately 10 homework assignments. Homework assignments will mostly consist of exercises taken from the textbook. In fairness to fellow students and graders, late homework will not be accepted. However, your lowest homework score throughout the term will be dropped to allow for missed assignments. The homework will be uploaded to a shared OneDrive directory. You will receive a link to this directory by email. A list of problems will be posted the week preceding the due date. You can use the CamScanner App on your preferred mobile device to create a PDF for upload if you do not have access to a scanner.

If you do not submit your homework on time you will receive a score of zero. Homework scores cannot be changed after one week after they have been returned. It is expected that you express your ideas clearly, legibly, and completely, which often requires complete English sentences (i.e., a justification) rather than a long string of equations or unconnected mathematical expressions. Homework can and should be worked on and discussed with others. Collaboration is a big part of learning and of scholarship in general. I strongly encourage you to participate in study groups with fellow students attending this course. However, the write-up of the homework has to be independent, and in your own words. If you use any external source (e.g., books or internet) you must acknowledge the source in your submission. Penalty for not reporting your sources will be a score of zero for the homework. The instructor may deduct points if these rules are not followed.

**Exams:** During the semester there will be two midterm exams and one cumulative final exam, all held online. The exams will contain a mixture of problems. Some of them will resemble problems you have seen in your homework, while some may be brand new to you. Exams shall be worked on independently and without the use of your textbook, homework, and class notes. There will be no makeup exams. Exam grades can be disputed until one week after they have been returned. After that your grade cannot be changed. The exam period for the final exam is in May (specific dates have not yet been announced).

The tentative schedule for the midterm exams is 02/23/21, 10am and 03/30/21, 10am.

- Absences:** Regular class attendance, participation, and engagement in coursework are important contributors to student success. Absences may be excused as provided in the University of Houston Undergraduate Excused Absence Policy and Graduate Excused Absence Policy for reasons including: medical illness of student or close relative, death of a close family member, legal or government proceeding that a student is obligated to attend, recognized professional and educational activities where the student is presenting, and University-sponsored activity or athletic competition. Additional policies address absences related to military service, religious holidays, pregnancy and related conditions, and disability.
- Counseling:** Counseling and Psychological Services (CAPS) can help students who are having difficulties managing stress, adjusting to college, or feeling sad and hopeless. You can reach CAPS ([www.uh.edu/caps](http://www.uh.edu/caps)) by calling 713- 743-5454 during and after business hours for routine appointments or if you or someone you know is in crisis. Also, there is no appointment necessary for the “Let’s Talk” program ([https://www.uh.edu/caps/outreach/ lets-talk](https://www.uh.edu/caps/outreach/lets-talk)), which is a drop-in consultation service at convenient locations and hours around campus.
- Tutoring:** CASA offers tutoring for mathematics students, and proctored testing for students in all subject areas. The CASA Tutoring Center offers tutoring to all students enrolled in undergraduate mathematics courses. It is located in the Garrison Gym, Room 222. During weekdays, the Department of Mathematics offers tutoring for more advanced-level, undergraduate math courses. Tutoring sessions are located in M.U.S.L. at 11 Fleming (basement). Tutoring hours are subject to change, so please check the dedicated websites before planning your schedule. More information on tutoring services, including scheduling information, can be found here: <http://www.uh.edu/nsm/math/undergraduate/academic-assistance/Support-and-Tutoring>.

**Academic Honesty:** In online assignments and tests you will sometimes be asked to make an Academic Honesty Statement. University of Houston students are expected to adhere to the Academic Honesty Policy as described in the UH Undergraduate Catalog. “Academic dishonesty” means employing a method or technique or engaging in conduct in an academic endeavor that contravenes the standards of ethical integrity expected at the University of Houston or by a course instructor to fulfill any and all academic requirements. Academic dishonesty includes, but is not limited to, the following: Plagiarism; Cheating and Unauthorized Group Work; Fabrication, Falsification, and Misrepresentation; Stealing and Abuse of Academic Materials; Complicity in Academic Dishonesty; Academic Misconduct. Posting answers for homework assignments online (at group chats or other online tools) is considered an academic honesty violation. Students are expected to know the difference between “getting and/or giving help on a problem” and “getting/giving answers to a problem”. If a student is caught sharing answers (in person or online), they might be reported to the departmental hearing officer for an academic honesty violation. If a student becomes aware of cheating or any other violations; that student is responsible for informing the instructor. Refer to UH Academic Honesty website (<http://www.uh.edu/provost/policies/honesty>) and the UH Student Catalog for the definition of these terms and university’s policy on Academic Dishonesty. Anyone caught cheating will be reported to the department for further disciplinary actions, receive sanctions as explained on these documents, and will have an academic dishonesty record at the Provosts office. The sanctions for confirmed violations of this policy shall be commensurate with the nature of the offense and with the record of the student regarding any previous infractions. Sanctions may include, but are not limited to: a lowered grade, failure on the examination or assignment in question, failure in the course, probation, suspension, or expulsion from the University of Houston, or a combination of these. Students may not receive a W for courses in which they have been found in violation of the Academic Honesty Policy. If a W is received prior to a finding of policy violation, the student will become liable for the Academic Honesty penalty, including F grades.

**Syllabus Changes:** Due to the changing nature of the pandemic, please note that the instructor may need to make modifications to the course syllabus and may do so at any time. Notice of such changes will be announced as quickly as possible by email.