

Course Syllabus

Term: Spring 2021

Instructor Information:

Primary Instructor:

Dr. Shannon Starr

Contact Information (Email and/or phone number)

slstarr@uab.edu

Preferred Methods of Contact:

Email is the preferred method of contact if you have questions. Please expect a response within 24 hours on weekdays and a slower response on weekends (OR Emails received after 5 pm on Friday will be returned Monday morning). Include <insert prefix, course number, and section code> in the subject line of your email for a faster response. I am available to meet with you virtually via Zoom by appointment during my virtual office hours (see below for my scheduled virtual office hours).

Virtual Office Hours:

Hours: Tuesday, Thursday 7:30-8:50am

Zoom Contact:

<https://uab.zoom.us/j/3017400650>

Instructional Method:

Remote: This class will be conducted virtually using a combination of live and recorded content through Canvas, Zoom, and other tools using the Canvas Learning Management system. Students should reserve the days and hours listed in the Class Schedule for live course elements, determined by the teacher. Students will not attend class on-campus.

Teaching Time Zone:

Central Time [U.S. Official Time Zone Site](#)

Note: Print a copy of this syllabus for easy reference about due dates, grading scale, and helpful links for student support. The syllabus is considered to be the ruling document, but dates could change for various reasons. If changes are made, you will be notified.

Course Information:

Course Number and Title:

MA-441-ET and MA-541-ET. Advanced Calculus.

Course Description:

Advanced Calculus is the rigorous mathematical study of calculus topics emphasizing proofs of all results. As an example, the intermediate value theorem is a result usually presented in a first course on calculus, for any continuous function (using the epsilon-delta definition) if the function takes two values as outputs, for two points in an interval contained in the domain, then the function also attains every intermediate value between those two values for some points in the same interval contained in the domain. Such a result is easy to see in a picture on the board, but surprisingly difficult to prove. We focus on complete, rigorous proofs of results such as these.

Course Objectives:

Upon successful completion of this course, you will be able to:

- Prove a mathematical theorem.
- Present your proof and answer any questions of students in class.
- Pose questions or challenges to other students' proofs to determine whether or not those proofs are rigorously correct.

Prerequisites and/or Corequisites:

MA 227 and MA 440/540 (Min grade C)

Required Text and Course Materials:

None. We teach using the Inquiry Based Learning technique meaning that a list of theorems will be provided in a pdf document, freely available on Canvas online. Then students will provide proofs of all the theorems, themselves. Students will alternate in turns presenting their proofs for the theorems in class.

Optional Texts or Resources:

According to the rules of the class you should not consult outside textbooks to get proofs for the theorems from the class. You need to avoid looking up the theorems online or in books (or by asking others outside the class). You may collaborate with other students in class using rules that assign points to collaborators. You may get help from the instructor. A set of rules for presentations and getting points will be provided in a separate document.

UAB Policies and Resources:

Add/Drop and Course Withdrawal

- Drop/Add: **Deadlines for adding, dropping, or withdrawing from a course and for paying tuition are published in the [Academic Calendar](#) available online. Review the [Institutional Refund Policy](#) for information on refunds for dropped courses.**
- Withdrawal: **To avoid academic penalty, a student must withdraw from a course by the withdrawal deadline shown in the academic calendar and receive a grade of W (withdrawn). Failure to attend class does not constitute a formal drop or withdrawal.**

UAB United: Safe Entry to Campus

- Please go to the [UAB United website](#) for guidance and resources related to our safe entry to campus in Spring 2021, including information on:
 - [Testing](#)
 - [Academic resources](#) and in-depth information
 - [Student Affairs resources](#) to support all students (housing, dining, extracurricular activities, parking, etc.)
 - [Health and safety resources and recommendations](#) for on and off-campus
 - Information for [graduate students](#), [School of Medicine students](#), [Post-Docs](#) and [International Students](#)

All students should use the [Student COVID-19 Entry Checklist](#) to see what they have to do in order to enter the campus safely. **Non-compliance with the required items will result in students not being able to remain on campus or participate in any in-person classes, meetings, jobs, extracurricular activities, and events.**

Misconduct:

The University of Alabama at Birmingham expects all members of its academic community to function according to the highest ethical and professional standards. Students, faculty, and the administration of the institution must be involved to ensure this quality of academic conduct. Review the Academic Honor Code and Non-Academic Student Code of Conduct linked below.

- [Academic Honor Code](#)
- [Non-Academic Student Code of Conduct](#)

DSS Accessibility Statement:

Accessible Learning: UAB is committed to providing an accessible learning experience for all students. If you are a student with a disability that qualifies under Americans with Disabilities Act (ADA) and Section 504 of the Rehabilitation Act, and you require accommodations, please contact Disability Support Services for information on accommodations, registration and procedures. Requests for reasonable accommodations involve an interactive process and consist of a collaborative effort among the student, DSS, faculty and staff. If you are registered with Disability Support Services, please contact DSS to discuss accommodations that may be necessary in this course. If you have a disability but have not contacted Disability Support Services, please call (205) 934-4205, visit [their website](#), or their office located in Hill Student Center Suite 409.

COVID-19 Adjustments for Students: Attendance <will/will not> be a part of your grade in this course. [Where attendance is part of the grade: All absences for COVID-19-related illnesses will be excused.] Students concerned about their attendance as a result of COVID-19 should register with Disability Support Services.

UAB Disability Support Services (DSS) has established a process for UAB students to request temporary adjustments based on the impact of COVID-19. The process is similar to the traditional DSS registration

procedures for accommodations based on disability. However, these requests will be referred to as "COVID-19 Related Temporary Adjustments". On the DSS website, there is a section (next to the traditional DSS application process) titled "Request COVID-19 Temporary Adjustments" where students can read the process and click to complete an application.

On the application, the student must complete an attestation and identify which of the following category(s) applies to their situation. Students will be allowed to submit documentation to support their requests.

- I am 65 or older
- My medical provider has determined that I am an individual who is considered high risk according to Centers for Disease Control and Prevention
- I care for or reside with an individual who has been determined to be high risk according to Centers for Disease Control and Prevention
- I have tested positive for COVID-19
- I am requesting adjustments for another reason

Any questions regarding this process should be referred directly to dss@uab.edu. For qualifying students, DSS staff will create a Notification of Temporary Adjustment Letter (PDF format) which will be provided to students. Students will share this letter, as needed, with instructors to request adjustments.

Title IX Statement:

The University of Alabama at Birmingham is committed to providing an environment that is free from sexual misconduct, which includes gender-based assault, harassment, exploitation, dating and domestic violence, stalking, as well as discrimination based on sex, sexual orientation, gender identity, and gender expression. If you have experienced any of the aforementioned conduct we encourage you to report the incident. UAB provides several avenues for reporting. For more information about Title IX, policy, reporting, protections, resources and supports, please visit [UAB Title IX webpage](#) for UAB's Title IX, UAB's Equal Opportunity, Anti-Harassment, Duty to Report, and Non-Retaliation policies.

Mandatory Masks and Social Distancing Requirements:

In accordance with CDC guidelines and for the health and wellbeing of all faculty, staff and students. Students, faculty and staff are required to wear cloth face coverings or face masks at all times and maintain social distancing (6 feet between individuals in traditional classrooms, or, in instructional laboratories and similar settings) while on the UAB campus. Instructors have the right to ask those who are not complying with these requirements to leave class in the interest of everyone's health and safety. In the event that a student refuses to comply with these requirements, the instructor has the right to cancel class.

Additionally, following other simple practices will promote good health in and out of the classroom, such as frequent and thorough hand washing, wiping down desks and seats with disinfectant wipes whenever possible, not sharing personal items such as pens and cell phones, and avoiding crowded areas and other enclosed spaces.

The UAB Blazer community views the adoption of these mandatory guidelines as a mark of good citizenship and respectful care of fellow classmates, faculty, and staff. Please visit the [UAB United website](#) for further information.

Food may not be consumed during class times in classrooms, but bottled water is permissible.

Course Grading:

Late Assignment Policy:

Grading Scale:

The default grading method for the Fall 2020 semester will be the normal letter grade method, and UAB is encouraging students to continue taking courses for a letter grade where possible.

A = 50 points B = 40 points C = 30 points D = 20 points F = < 20 points

Where the university can, it is providing a Pass/Fail option in case there are circumstances and/or challenges students are encountering related to the ongoing pandemic that might make a Pass/Fail option a better option. If students are not remaining with the default letter grade method for any of their courses, they must select the Pass/Fail grading method for each course individually. This selection is made toward the end of the semester. Once a student selects the option for a Pass/Fail grading method for a particular course, that decision is not reversible regardless of their performance on remaining assignments or final exams.

Each proof presentation is worth 10 points. So if you present 6 proofs on your own, then you have enough points for an A, and at that point you will be requested to stop working on any new proofs. We use a method whereby the student with the lowest number of points has priority to present their proofs first. In case of a tie we will use a random number generator to decide order. If any student misses 10 lectures, their points decrease by 10 points each time they miss 10 lectures (an extra 10 points if they miss a total of 20 lectures, etc.). Students in MA 540 need to add 20 points to each grade cut-off. But they will have an opportunity to present 2 proofs each in a special set of problems related to set-theory and the Dedekind cut construction of the real numbers (as opposed to the axiomatic approach used in the rest of the course) that only other MA 540 students compete for. Moreover, their presentations may be recorded outside of class separately.

Student Access to Grades:

A running total of points will be available each day to determine who has preference for presentations. Those with the fewest points have the first chance to prove a new theorem. But if a student presents a proof they must upload pictures of their written proof to Canvas to receive official credit. If a student fails to do so, the instructor will warn them in email that they risk losing points for that theorem unless they upload it shortly after the warning.

Graded Assignments & Activities Overview:

100 percent of the grade is based on in-class presentations. For MA 540 students, they have the option of doing 2 theorems (worth a total together of 20 points, or 10 points per theorem) in a separate pool of theorems not needed for the rest of the class. There are no homework assignments. There are no tests. But you must spend time outside of class studying the proofs of others and thinking about the list of theorems to come up with your own proofs. You may not consult outside references such as textbooks or online resources to help. You may not talk to anybody outside of class to get help with proofs. You may collaborate with students in class following the rules for spitting points. And you may get help from the instructor. The official rules of the points and presentations will be provided in a separate document.

Time Commitment:

This is an online course worth 3 credit hours. You should prepare to spend about 9 hours per week on course activities (reading the assigned chapters/articles, watching the videos, participating in the discussions, and completing the assessments).

This class meets four times per week for 50 minutes each. In addition to our virtual class time, you should spend between 5 and 6 hours per week reading the list of theorems provided in a pdf file on Canvas, reading the proofs provided by the other students on Canvas, and thinking of your own proofs to new theorems possibly in collaboration with fellow student in class (splitting up points according to the rules). You may also attend office hours to get help. Additional times for office hours beyond the 2 sessions of 50 minutes each listed above will be decided as a class in the first week.

Weekly Course Schedule:

Week/Module	Assignments & Activities	Due Dates
Week 1: Introduction	The first lecture I will describe the syllabus and the rules and I will present the first proof to illustrate the style of proof presentation. All remaining lectures are filled with student presentations of their proofs.	
Week 2:	All remaining lectures are filled with student presentations of their proofs.	
Week 3:	All remaining lectures are filled with student presentations of their proofs.	
Week 4:	All remaining lectures are filled with student presentations of their proofs.	
Week 5:	All remaining lectures are filled with student presentations of their proofs.	
Week 6:	All remaining lectures are filled with student presentations of their proofs.	

Week/Module	Assignments & Activities	Due Dates
Week 7:	All remaining lectures are filled with student presentations of their proofs.	
Week 8:	All remaining lectures are filled with student presentations of their proofs.	
Week 9:	All remaining lectures are filled with student presentations of their proofs.	
Week 10:	All remaining lectures are filled with student presentations of their proofs.	
Week 11:	All remaining lectures are filled with student presentations of their proofs.	
Week 12:	All remaining lectures are filled with student presentations of their proofs.	
Week 13:	All remaining lectures are filled with student presentations of their proofs.	
Week 14:	All remaining lectures are filled with student presentations of their proofs.	
Week 15:	All remaining lectures are filled with student presentations of their proofs.	

Course Netiquette:

There are course expectations concerning etiquette on how we should treat each other online. It is very important that we consider the following values during online discussions and email.

- **Respect:** Each student's opinion is valued as an opinion. When responding to a person during the online discussions, be sure to state an opposing opinion in a diplomatic way. Do not insult the person or their idea. Do not use negative or inappropriate language.
- **Confidentiality:** When discussing topics be sure to be discreet on how you discuss children, teachers, and colleagues. Do not use names of people or names of facilities.
- **Format:** When posting use proper grammar, spelling, and complete sentences. Avoid using ALL CAPITALS. This signifies that you are yelling. Avoid using shortcuts/text abbreviations such as 'cu l8r' for 'See you later.'
- **Relevance:** Think before you type. Keep posts relevant to the discussion board topic.