Course Description
Advanced Calculus I
MA 441/541-ET
Spring 2019

Department of Mathematics
University of Alabama at Birmingham

3 January, 2019

Course Instructor: Shannon Starr
Office: 478A Campbell Hall
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Email: slstarr@uab.edu
Office Hours: Monday 1:30-3:15pm, Wednesday 2-3:15pm and by appointment.

Meeting times: Monday-Thursday 3:35pm–4:25pm
Meeting locations: Education Building 134
Textbook: No textbook required. Lecture notes will be posted online at Canvas. We will use an updated version of Dr. Weikard’s lecture notes, with updates by Dr. Starr. The old notes of Dr. Weikard are here
http://people.cas.uab.edu/~weikard/teaching/ac.pdf
and the updated version will be provided on Canvas.

Aims of the course:
Our goal in this class is threefold:

(1) to obtain a body of knowledge in Advanced Calculus, the basis of the analysis of real-valued functions of one real variable;

(2) to learn how to communicate ideas and facts in both a written and an oral form;

(3) and, perhaps most importantly, to become acquainted with – indeed, to master – the process of creating mathematics.

Course content:

• Real numbers
• Sequences and series
• Elementary functions
Assessment procedures:
The following rules, based on intellectual and academic honesty, will be in force.

1. Everybody will have the opportunity to present proofs of theorems. You will have the proof written out on paper and present it with the help of a document camera.

2. The audience (including the instructor) may challenge a statement made in the course of the proof at any point.

3. If the presenter is able to defend the challenged statement, he or she proceeds; if not, the presenter must sit down earning no points for this problem and losing the right to present again that day. The challenger has earned a challenge reward (see rules (10) and (12)).

4. A proof of a theorem will be considered correct if no one has objections (or further objections). Its written version will then be “published” by uploading it to Blackboard (it should have a title and the list of authors). The presenter and, if applicable, his or her collaborators (see rule (9)) will earn a total of 10 points at this time.

5. During class the instructor has the final decision on determining whether an argument may stand or not. His verdict may still be challenged after a proof is “published” (see rule (6)).

   There are rules of conduct to allow us to move quickly through the many theorems in the semester. For example, you may only challenge the logical validity of a proof. You may not challenge a proof because you think there is something else that could have been said that you would like to see for stylistic reasons. This can become a distraction and slow us down, if frequent challenges of this type continue. If necessary, we may enforce a rule that after three (3) frivolous challenges of that type (for example) if a student does not restrict themself to challenging for valid reasons, then each extra frivolous challenge will subtract 5 points from their score. It seems unlikely this will ever need to be exercised. But it does seem appropriate to set up some consequence in case class time starts to become wastefully abused.

6. If someone other than an author discovers a flaw in a “published” proof, he or she will get the opportunity to explain the mistake and present a correct proof for a total of 20 points.

7. In preparing for proofs you must not rely on the authority of any materials outside of the class notes and the previously published proofs. More precisely, you can only refer to theorems in the notes and published proofs of theorems whose number is smaller than the one you are working on.

   This is to be interpreted in the following way: you may not consult outside resources for help in proving theorems. You may discuss with the instructor in office hours and collaborate with other students as described in rule (9). If you already learned a fact from another class, then nobody is asking you to unlearn it (although your argument must be self-contained within this class). But you are not allowed to actively try to discover new facts relating to this class by consulting textbooks or online resources, for example, during the semester. If you have a question about this, then ask the instructor.

8. You must give credit where credit is due, i.e., during your presentation you must declare the points at which you had help and by whom.

9. It is also possible to report joint work. In such a case 4 points will be earned for the presentation while the other 6 are distributed among the collaborators as they see it.
10. The successor of a presenter will be chosen as the student with the smallest number of points among the volunteers taking into account the modification by the following rules (11) and (12). A die is rolled, if necessary.

11. We will use a random number generator to determine who goes first if more than 1 student has the same (lowest) score among volunteers for a problem.

12. For a student who has earned a challenge reward 20 points will be subtracted from his or her current score for the purpose of determining a successor. At the time a student is selected to prove a theorem the challenge reward expires.

13. Class attendance and participation is required. Absences from class are recorded on Canvas. After 10 absences from class 10 points will be subtracted from your class score and the count of absences is set again to zero.

14. There will be no partial credit except as described above to share credit. Your final grade for the course depends only on your total score of points earned.

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**The grading scale**

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If you are in MA 541 you need an additional 20 points for each level. (We might have some additional theorems available for graduate students that they can write up proofs for as an option for the extra 20 points, like we had available last semester. We will determine this in the first few weeks of the semester.)

These points are based on the class size listed as of the present date. The cut-offs may be adjusted up or down depending on whether students drop out or add into the class at the beginning of the semester.

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**Disability Support Services**

If you are registered with Disability Support Services, please make an appointment with me as soon as possible to discuss accommodations that may be necessary. If you have a disability but have not contacted Disability Support Services (DSS),

[https://www.uab.edu/students/disability/](https://www.uab.edu/students/disability/)

or call their office at 934-4205 (or 934-4248 for TDD) or email at dss@uab.edu. Their office is:

Hill Student Center, Suite 409