

Math 2315, Fall 2015, Advanced Calculus and Linear Algebra I

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OFFICE HOURS: Tu 11:00 - 12:00 or by appointment

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Text: *Multivariable Mathematics* by R.E. Williamson and H.F. Trotter, Prentice Hall, 2004.

In addition, numerous handouts and other materials will be distributed via e-mail and posted on UVACollab.

Prerequisites: Good command of single variable calculus (at least “4” on AP Calculus AB and BC exams), and also genuine interest in advanced mathematics combined with a strong commitment to working hard during the semester.

Course description: This course, which starting this year becomes the 1st semester of a year-long sequence, is meant primarily for those first year students who intend to major in sciences and/or mathematics, and who would like to receive an intensive introduction to fundamental mathematical methods and ideas. We plan to study various topics from (abstract and linear) algebra, (analytic and differential) geometry, analysis, differential equations and combinatorics. The Math Department offers a variety of courses covering each of those subjects in detail, but this advanced calculus sequence will make an attempt to cover the essentials in one year. This does not mean that this sequence will be a substitute for such (popular) classes as Math 3250, 3310, 3340, 3351 or 3354, but we expect that after completing it students should be able to take 5000-level math courses in the following year (in some cases, an additional 3000-level proof-oriented class may be recommended). In fact, this is what our best math majors do anyway, and all we try to do is to make this track of mathematical training accessible to a broader group of students. In our experience, it is beneficial not only to those who want to go to graduate school in mathematics, but also to those who intend to pursue in-depth study of other sciences or even economics. At the same time, taking Math 2315 does **not** put you under any obligation to take the follow up class Math 3315 “Advanced Calculus and Linear Algebra II” in the spring.

Of course, fitting all this material into one semester presents a big challenge. In fact, it is simply impossible to cover everything in regular lectures, so this class will include a considerable amount of independent work. First and foremost, you should expect substantial reading assignments and problem sets. We also offer the opportunity to write an extra credit paper in order to boost your grade. So, students should view this class as a serious (but worthwhile) investment of their time and effort. We hope that among other things, this class will teach students to work independently with mathematical literature, a skill that will likely be helpful in their future careers (whatever these may be). In short, we intend to conduct this class more in the format of a “supervised independent study” rather than in the format of a “regular lecture class.” Not everybody may find this format well serving his/her goals, so feel free to discuss your concerns with the instructor at any time – taking this advanced class is only *one of many* possible ways to receive advanced mathematical training, and the traditional track, starting with Math 2310, may work for you equally well or even better! In any case, all your suggestions regarding the content, format, pace etc. are very much welcome.

Workload: By rather conservative estimates, in this class you will need to work a minimum of 1–1.5 hours every day in addition to lectures, so your total workload will amount to something like 12-15 hours a week. In fact, you will be expected to do the reading assignments and the comprehension quizzes on the weekends.

Attendance is REQUIRED in the lectures AND the discussion sections. The fast pace of the course and the large amounts of material covered each week will make it virtually impossible to catch up once you miss a couple of classes. In addition, you need to be in class to turn in all assignments (homework, quizzes, review assignments) on time. **Late assignments (for whatever reason) will not be accepted – no exceptions!**

Review assignments: As we stated above, a good command of single variable calculus is an absolutely necessary prerequisite for this class. To encourage you to review this material, we will have 3 review assignments, which will account for 15% of your grade. These assignments are already available on UVaCollab, and the due dates are September 14, October 19 and November 23 (the lines on the front pages are meant for your scores, and not for the answers!).

Exams: There will be one midterm test and a final examination. Both exams will be take-home, and will be posted on UVaCollab at the appropriate times. Tentative dates are as follows:

Midterm – posted - October 3, due - October 8 in class;

Final - posted - December 10, due - December 18 at 5pm in the envelope on the instructor's door (KER 307).

Format: Two lectures (TuTh, 9:30-10:45, Rouss 410) and one discussion section (M, 17:00-17:50, Monroe 116) each week. Here is a schedule for a typical week (from Thursday through next Thursday):

Thursday	-new material is introduced; reading assignment, comprehension quiz (meant to encourage you to read the assigned material) and homework assignment are posted on UVaCollab
Friday	-homework assignment from the previous week is due by 3pm in TA's mailbox
Monday	-comprehension quiz is due by 3pm in the envelope on the instructor's door; discussion section: discussion of this week's homework assignment, quiz on the previous week's material is handed out
Tuesday	-more detailed discussion of this week's material focused on the difficulties that emerged in your comprehension quizzes; quiz handed out at the discussion section is due by 3pm in TA's mailbox
Wednesday	-independent work on this week's homework assignment; optional problem session 5-6pm, room: TBA
Thursday	-graded homework assignment from the previous week is returned; tutoring session on homework, time and room TBA

There will be a review session in class on October 1, and no comprehension quiz will be due on October 5 (which is a reading day) or November 31. We will have optional problem sessions virtually every Wednesday. While the attendance at these sessions is not required, students find them very useful as we go over the previous exams and do extra problems. Starting this year, the Math Tutoring Center will hold one session per week for Math 2315 which will focus exclusively on homework.

Grading policy: Final grades will be assigned on the basis of your total scores calculated according to the percentages displayed below:

Review Assignments	15%
Comprehension quizzes	10%
Homework	10%
Quizzes	15%
Midterm	20%
Final	30%

The grading scale is as follows: $A+$ – 95-100; A – 90-94; $A-$ – 86-89; $B+$ – 83-85; B – 78-82; $B-$ – 75-77; $C+$ – 72-74; C – 69-73; $C-$ – 65-68; $D+$ – 62-64; D – 57-61; $D-$ – 54-56; F – below 53. You will be given a chance to boost your score if necessary by writing a paper and making a presentation in class on a math related topic approved by the instructor.

Honors policy: Review assignments, comprehension quizzes and homework assignments are not pledged, so you may use the text and discuss these assignments with others (in fact, we strongly encourage collaboration among students). However, what you turn in must represent your personal effort and not just be a copy of someone else's paper. Quizzes, the midterm and the final examination are pledged assignments, so no aid may be used (unless authorized by the instructor).

All students with special needs requiring accommodations should present the appropriate paperwork from the Student Disability Access Center (SDAC). It is the student's responsibility to present this paperwork in a timely fashion and follow up with the instructor about the accommodations being offered. Accommodations for test-taking (e.g., extended time) should be arranged at least 5 business days before an exam.