Mathematics 431: Advanced Calculus I

Fall 2017   Tuesdays, Thursdays 11:45am–1:00pm   Physics building 047

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You are responsible for knowing the information on this sheet. Please read carefully and ask me if you have questions.

Course synopsis: Algebraic and topological structure of the real number system; rigorous development of one-variable calculus including continuous, differentiable, and Riemann integrable functions and the Fundamental Theorem of Calculus; uniform convergence of a sequence of functions; contributions of Newton, Leibniz, Cauchy, Riemann, and Weierstrass.

Course web site: The schedule for the course (including homework listings and exam dates) will be posted at `http://math.duke.edu/~ng/math431/` . Some other material (including quiz and exam solutions) will be posted on Sakai, `http://sakai.duke.edu/` .

Textbook: The required text for this course is *Fundamental Ideas of Analysis* by Michael Reed. I strongly recommend that you read the text concurrently with lectures as we go along.

Office hours: TBA, and by appointment (set up in person or by email). Please take full advantage of office hours to resolve any questions you may have about course material or homework. If you want to set up an appointment via email outside of scheduled office hours, please keep in mind that I can't usually answer email immediately; on occasion it may take a day for me to respond.

Prerequisites: Math 202, 212, or 222.

Alternate course: A more advanced version of our course is Math 531, which can be extended to a yearlong course by adding Math 532. However, you can't take Math 531 if you've already taken Math 431, so please plan carefully.

Other section: There are two sections of Math 431 being taught this fall. Our section is Math 431-02. In case the other section, Math 431-01, is more convenient for you, it is being taught by Professor Bill Pardon and meets WF 8:30-9:45am in Physics 119. Please note that the two sections will be run independently of each other.

Please see the next page for information about assignments.

Homework: There will be weekly homework sets due in class on Tuesdays. I will announce each assignment in class (and post on the web page) the previous week. You are allowed and encouraged to work on the homework with fellow students; however, *each student must write up their problem sets on their own*. If you've collaborated with someone, please mention this fact (and their name) on your homework, for full disclosure. *No late homework will be accepted.* Note however that homeworks do not directly contribute to your grade.

This is a writing course, and it is important that you use the homeworks to practice your proof-writing skills. Proofs should use complete sentences with proper (understandable!) grammar and punctuation; write things out rather than using mathematical abbreviations such as $\exists$ and $\Rightarrow$. Please take care to make your homeworks neat and legible, and remember to staple multi-page submissions.

Quizzes: There will be weekly quizzes on the days that homework assignments are due. These will occupy the first 15 minutes of class, and will consist of problem(s) taken from the problem set due that day. Quizzes must be taken during the allotted time; *there are no makeups*. Your lowest two quiz scores will be dropped.

Exams: There will be two midterm exams and a final exam. The final is **Sunday December 17, 2:00–5:00 pm**. The midterms will be held in class, and are **tentatively** scheduled for Tuesday October 3 and Friday November 2.

Grading: Your grade will be based on a weighted average of your grades as follows:

- Quizzes 20%

- Each midterm 20%

- Final exam 40%.