# Information Sheet

Math 411: Advanced Calculus II, Spring 2016, Professor Rebecca Field
Section 1 MWF 1:25–2:15pm, Roop 213

Text: It's complicated, see below
Exam dates:
Big Quiz 1: Friday, February 5
Midterm: Wednesday March 2, evening
Big Quiz 2: Friday, April 8
Final Exam: week of December 14-18, time TBA

Contact information for Professor Field
Office: Roop 114
Phone: 540-746-1231
Email: fieldre@jmu.edu
Webpage: https://educ.jmu.edu/~fieldre/411.html

Preliminary Office Hours: TuW 12:00–1:30pm (will be expanded/changed as necessary), and by appointment.
*You can always make an appointment to see me*

The goal of Math 411 is to continue our rigorous introduction to one of the three major branches of mathematics, analysis that we started last semester. We are going to use all of the machinery that we so laboriously built last semester (the real number line, topology, limits, continuity) to actually prove the Fundamental Theorem of Calculus!! (Really do it this time, we will come to find that the super quick outline we did the last day of 410 included lots of cheating.) The other fundamental topic in analysis we will cover is convergence in the space of functions. Further topics will be covered as time permits. This will/may include measure theory, Lebesgue integrating, Taylor series/PDEs.

Here is my most important piece of advise about this course: We will be going FASTER than we did in 410, so DO NOT FALL BEHIND!! As usual, this includes things like DO NOT MISS CLASS!! (If you must miss a class, get notes from one of your classmates *and read them* before the next class.) It also includes things like DO YOUR HOMEWORK!! It is not possible to actually learn this material without doing problems. You might be able to convince yourself you understand, but if you can't do problems, you aren't at the level of understanding required to pass the class. In fact, if the class seems too easy at any point, do extra problems!

There will be two big quizzes, a midterm and a final as well as short in class quizzes roughly weekly (usually on Fridays). There will also be homework due on Fridays. It is highly likely that we will be doing self scheduled weekly quizzes for much of the semester. These will still take place on Friday, they just involve getting the quiz out of an envelope in the computer lab next to my office, signing in, completing the quiz and putting it in a different envelope. I will still go over the weekly quizzes in class, just on Mondays. As for the homework, I hope to be able to actually grade your homework this semester, however, the best way to get feedback on the homework is still to go over it with me, either in class (if it is a problem many people had trouble with) or in my office. Also, if you are concerned about getting your homeworks back, please scan them before you turn them in as a precaution because I can't guarantee any sort of timeliness. The quizzes will be your main source of weekly feedback.

TEXTBOOK: As with Math 410, you will continue to have a choice of the same three textbooks. As, once again, all three texts cover the same material up to FTC and sequences and series of functions, it is just a question of which style you prefer. After we cover FTC and convergence on function spaces, *none* of the three text books are helpful, so we will be slightly off the map (though I will try to find outside resources as we go along).

**Kirkwood** *An Introduction to Analysis* by James R. Kirkwood (second edition, 1995, Waveland Press Inc.) ISBN-13: 978-1-57766-232-7
This book provides good coherent explanations to the concepts it introduces while remaining accurate and sound. It also provides many examples. This book is *highly recommended*.

**Abbott** *Understanding Analysis* by Stephen Abbott (2000 Springer ISBN-13: 978-0387-95060-0
Each chapter starts out with a motivating example, instead of just definition/theorem/proof the book gives context and its explanations are thorough. This is a chattier book that has a slight tendency towards hand-wavy-ness. This book is *highly recommended*.

**Baby Rudin** *Principals of Mathematical Analysis* by Walter Rudin (3rd edition, 1976, McGraw-Hill, Inc.) ISBN: 0-07-054235-X
A good way to categorize this text is as 'sparse'. It gives you what you absolutely need and only that. Many details are left to the reader and it is the sort of book that you sit down to read a page and a half of, not more. This is the classic definition/theorem/proof style exposition, but it's beautiful and a classic and I thought I would give it as an option. This book is *only* recommended *if* you are seriously considering math graduate school, and even then, I wouldn't suggest it as your only resource. Also, please do not try to buy it new (it is a ridiculously expensive $123 on amazon), but there are more reasonably priced used copies available. Do not buy 'Big Rudin' which is *Real and Complex Analysis*, Baby Rudin is its prereq.

Because we are using multiple text sources which sometimes differ slightly in their definitions, the official definitions full credit on quizzes and exams are going to be the definitions from class. I suggest you keep a separate record of definitions/major theorems for looking up/memorizing.

One further comment about written sources. There are many analysis texts in existence, as well as many on-line resources and if you search hard enough, it is probably possible to find the answer for just about anything. However, the time you spend finding an answer online would be much better spent trying to figure it out for yourself, and then come see me if you have trouble. The ability to find solutions to problems using the internet will not help you at all on tests and quizzes! If you do end up doing the bad-idea (looking up solutions on the internet), as a minimum to get anything educational out of the process (and to avoid an HONOR CODE VIOLATION) you must 1. reference your source, 2. change the wording of the solution (choose different English words) and 3. change the names of all of the variables. If I catch anyone copying from any source (including each other or me or your textbooks) without doing those three things, I WILL bring you up on honors charges.

GRADES: Your grade for this course will be determined by the big quizzes and your midterm (50% total), the final exam (30%), and by your written work (20%). This written work includes weekly quizzes and homework. Class participation is very important and will be counted with your written work.

THE EXAMS: mark these dates and times on your calendar now. If you have an unavoidable conflict with one of the exam dates, let me know *as soon as possible* to arrange a makeup exam. Except in cases of sudden emergency, I will not arrange a makeup exam unless I know at least a week in advance.

If you have any special needs, please see me in the first two weeks of the term.

HOMEWORK may be worked on in groups, but must be written up independently in your own words. Cooperation is encouraged and we may sometimes spend the last 20 minutes of the class divided into small groups to discuss the more difficult homework problems. Typically, I will assign homework weekly, and I will let you know at the time I assign written work when it is due.

WEEKLY PROBLEMS TIME If you would like a weekly problems time, I will try to arrange one. It will be impossible in a class of these sizes to find one time everyone can meet, but I will consider setting up extra office hours/coffee shop hours to meet with students and go over homework.

TOPICS: I am planning on covering (these are chapter titles from Abbott/Kirkwood/Rudin)

Functional Limits and Continuity/Continuous Functions/Continuity

The Derivative/Differentiation/Differentiation

The Riemann Integral/Integration/The Riemann-Stieltjes Integral

Series of Real Numbers (we skipped this in 410, this chapter title is from Kirkwood)

Sequences and Series of Functions/Sequences and Series of Functions/Sequences and Series of Functions

Introduction to Measure Theory and Lebesgue Integration

Taylor Series and PDEs

ATTENDANCE and participation will be an important requirement of this course. If you must miss a class, be sure to get notes.

HONOR CODE: I take the honor code very seriously, and so should you. Any instances of suspected cheating or academic dishonesty will be referred to the JMU Honor Board for investigation. Please see the note at the end of the textbook section for specific requirements about academic honesty and homework.