MATH 3220, FOUNDATIONS OF ANALYSIS II, SECTION 3, SPRING 2019

Classroom:	JWB 333	**Time:**	M,W,F 4:35 - 5:55
Instructor:	Domingo Toledo		
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Office:	JWB 324	**Phone:**	(801) 581-7824
Office Hours:	To be decided after first class meeting.		
Web-page:	`http://www.math.utah.edu/~toledo/3220S19.html`		
Prerequisite:	Grade "C" or better in Honors Math 3210.		
Textbook:	W. Rudin *Principles of Mathematical Analysis*, Third Edition, ISBN 0-07-054235-X		

Course Description: This is an honors version of Math 3220. To quote from the class schedule: "This section is designed for students whose plans include graduate school in math, science or engineering, and who are interested in getting a deeper understanding of mathematical analysis than in the standard sections." Under normal circumstances your should have taken the honors section of Math 3210.

In particular, I will expect that you know and are comfortable with most of chapters 1 to 7 of Rudin's book. From chapter 6 I only expect you to know the Riemann integral, not the Stieltjes integral. From chapter 7 I expect you to know the first 5 sections, and I will start with the sixth section on equicontinuity. The most important topic from the first 7 chapters is that of a *metric space*, and the associated concepts of *complete* metric space and *compact* and *connected* subsets of a metric space (chapter 2). These concepts appear repeatedly throughout the course.

Topics: We will cover approximately the following topics:

Spaces of continuous functions: equicontinuity,
Stone-Weiertrass theorem (Chapter 7),
Functions of several variables (Chapter 9),
Applications of the contraction mapping theorem (Chapter 9
and supplementary notes),
Special functions, Fourier series (Chapter 8),
Integration of differential forms (Chapter 10)
Lebesgue integral (Chapter 11)

As the semester goes on there may be some changes in the topics that are covered. For example, there may not be enough time to cover the two chapters on integration (chapters 10 and 11) and some choices may need to be made. We may cover some topics not in Rudin, or may cover some topics in Rudin in a different way. Whenever that happens I will provide references or notes.

Expected Learning Outcomes: The main goal of this course is to thoroughly understand the analysis of real-valued or vector-valued functions of several variables. This is the next natural step after Math 3210 that is mostly concerned with real-valued functions of one variable. After completing this course you should have a thorough understanding of differentiation and integration in several variables, as well as applications of these ideas to infinite-dimensional spaces such as spaces of functions.

Homework and Exams: I will be assigning some routine homework problems, not to be handed in. I will also give five take-home exams. These will be substantial problems that require careful writing of proofs. You will have a week or so to do these problems. You can discuss these problems with your colleagues, and we may also discuss them in class. But you must write the solutions yourself.

You are strongly encouraged, but not required, to hand in your solutions in tex. To facilitate this, I'll post, for each take-home exam, both a .pdf and .tex file.

Grading: Your grade in the course will be based completely on your scores in the take-home exams. The grading scale will depend on the over-all performance of the class, but will not be any harsher than 10 percentage points per letter grade (90 to 100 A or A-, etc)

Accommodations: The University of Utah seeks to provide equal access to its programs, services and activities for people with disabilities. If you will need accommodations in the class, reasonable prior notice needs to be given to the Center for Disability Services (CDS), 162 Olpin Union Building, 581- 5020 (V/TDD). CDS will work with you and me to make arrangements for accommodations. All information in this course can be made available in alternative format with prior notification to CDS.

Student Responsibilities: All students are expected to maintain professional behavior in the class- room setting, according to the Student Code, spelled out in the Student Handbook. You have specific rights in the classroom as detailed in Article III of the Code. The Code also specifies proscribed conduct (Article XI) that involves cheating on tests, collusion, fraud,

theft, etc. Students should read the Code carefully and know you are responsible for the con- tent. According to Faculty Rules and Regulations, it is the faculty responsibility to enforce responsible classroom behaviors, beginning with verbal warnings and progressing to dismissal from class and a failing grade. Students have the right to appeal such action to the Student Behavior Committee. http://regulations.utah.edu/academics/6-400.php