MATH 5210, INTRODUCTION TO REAL ANALYSIS, SPRING 2013

Classroom:	LCB 219	**Time:**	M,T,W,F 2:00 – 2:50
Instructor:	Domingo Toledo		
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Office:	JWB 324	**Phone:**	(801) 581-7824
Office Hours:	Mon,Tue 1:00-1:50 or by appointment.		
Web-page:	`http://www.math.utah.edu/~toledo/5210.html`		
Prerequisite:	Grade of "C" or better in Math 3220.		
Textbook:	W. Rudin *Principles of Mathematical Analysis*, Third Edition.		

Course Description: Analysis could be said to be the study of limits. Math 3210–3220 introduces some basic properties of real numbers in order to rigorously study limits of sequences of real numbers and real valued functions of real numbers. This leads to a rigorous understanding of continuity, differentiation, integration of real functions and vector functions.

This course develops and applies limits in more depth and more generality. The basic concept in the course will be that of *metric space*, particularly what is called a *complete* metric space. We will see many examples, for instance, spaces of functions. The fact that these are complete metric spaces will be used to solve other problems, for instance, to prove existence and uniqueness of solutions to ordinary differential equations.

We will loosely follow the textbook, but I will cover material that is not in the text. I will give supplementary references or notes for such material. The main topics to be covered will be:

Metric spaces, completeness (Chapters 2 and 3 of Rudin),
Spaces of continuous functions (Chapter 7),
Applications of the contraction mapping theorem (Chapter 9 and supplementary notes),
Special functions, Fourier series (Chapter 8),
Lebesgue integral (Chapter 11)
Possibly other topics of interest to the class.

Some of the other chapters in Rudin, particularly Chapters 1, 3, 4, 5, 6, contain material that is probably mostly familiar from Math 3210 – 3220. These topics will be discussed as needed. Please take a look at these chapters

and let me know if you see any topics there that you want to see in more detail.

Homework: I will be assigning homework problems to be collected roughly every week. The homework problems are the most important part of the course. Feel free to ask questions in class, or see me in my office.

Exams: There will be two midterm exams on February 20 and April 3, and a comprehensive final exam on Tuesday, April 30, 1–3 PM. The examinations will test knowledge of basic definitions and theorems, and will be closed book and closed notes. The more difficult problems will be in the homework, where you can consult any source that may be helpful.

Grading:	Homework, drop lowest 2:	35 %
	Midterm Exams:	40 %
	Final Exam:	25 %

Important dates:; Last day to add classes without a permission code: Sunday January 13. Last day to drop (delete) classes: Wednesday, January 16. Last day to withdraw from classes: Friday, March 1.

ADA: The Americans with Disabilities Act requires that reasonable accommodations be provided for students with physical, cognitive, systemic, learning, and psychiatric disabilities. Please contact me at the beginning of the semester to discuss any such accommodations you may require for this course.