

MATH 6361
Analysis with Applications II
Spring 2019

Class: MWF 10am-10:50am, AH (Agnes Arnold Hall) 301

Instructor: Bernhard Bodmann, *bgb@math.uh.edu*

Office: PGH 604; Tu 10-11am, Th 1-2pm

Objectives: This course continues the first term, covering topics in analysis that are motivated by applications. The second term starts with approximation strategies in Hilbert spaces and Fourier analysis. Special regard is given to weak convergence and compactness. Next, we study the spectral theory of normal operators. The course concludes with optimization theory and convexity. The students are assumed to be familiar with properties of sets and functions in Euclidean spaces such as in Math 4331, as well as elementary linear algebra as covered in Math 2331 or Math 4355.

Contents:	<i>Topic</i>	<i>Duration</i>
	Hilbert spaces	best approximation 2 weeks
	Weak convergence	compactness 2 weeks
	Fourier series	convergence 1 week
	Linear operators	spectral theorem 2 weeks
	Integral operators	Fredholm alternative 1 week
	Convex sets in Euclidean space	Carathéodory 1 week
	Separation theorems	convex projections 1 week
	Convex functions	multivariate optimization 2 weeks

Prerequisites: Math 4331 and elementary linear algebra.

Text: John Hunter and Bruno Nachtergaele, Applied Analysis, available online at <https://www.math.ucdavis.edu/~hunter/book/pdfbook.html>
 another book from which I may draw supplementary material: Kenneth Davidson and Allan Donsig, Real Analysis and Applications, Theory in Practice, Springer, New York, 2010.

Assignments: There will be approximately 10 homework sets.

Exams, Grades: The midterms are in class, March 1 and April 12, the final as scheduled by the registrar. The midterms count 20% each, homework and final contribute 30% to your grade.

Disabilities:

If there are aspects of the instruction or design of this course that result in barriers to your inclusion or accurate assessment or achievement, please notify the instructor as soon as possible. Students are also welcome to contact the Center for Students with DisABILITIES at 713-743-5400 or uhcsd@central.uh.edu to discuss a range of options to removing barriers in the course, including reasonable academic adjustments/auxiliary aids in accordance with the Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990 guidelines.

Counseling:

Counseling and Psychological Services (CAPS) can help students who are having difficulties managing stress, adjusting to college, or feeling sad and hopeless. You can reach CAPS (www.uh.edu/caps) by calling 713-743-5454 during and after business hours for routine appointments or if you or someone you know is in crisis. No appointment is necessary for the “Let’s Talk” program, a drop-in consultation service at convenient locations and hours around campus. http://www.uh.edu/caps/outreach/lets_talk.html