

**MATH 7321**  
**Functional Analysis II**  
**Spring 2023**

- Class:** Tu&Th 10am-11:20am, SW 219
- Instructor:** Bernhard Bodmann, *bgb* @math.uh.edu
- Office:** PGH 604; Tu 1-2pm, W 2-3pm
- Content:** This course is the second part of a two semester sequence covering central results in functional analysis, including spectral theory, Gelfand representation theory, positivity in  $C^*$ -algebras and foundations of quantum theory.  
Functional analysis combines two fundamental branches of mathematics: analysis and linear algebra. Limiting arguments from analysis become essential in order to resolve questions from linear algebra in infinite-dimensional spaces. In addition, there are close connections between algebraic and topological properties in such spaces that deepen our understanding even in the finite dimensional case.  
Topics covered in this second part of the course sequence include: Spectral theory (Banach algebras and their representation, commutativity, resolutions of the identity, spectral theorem, eigenvalues and spectrum of normal operators, positivity).
- Prerequisites:** Graduate standing. Linear algebra (Math 4377) and Real Analysis (Math 4331/4332). Knowledge of Lebesgue integration is desirable.
- Text:** Walter Rudin, Functional Analysis, 2nd edition, McGraw Hill, 1991.
- Assignments:** You will be asked take notes and typeset them in LaTeX.
- Final Grade:** Based on the quality of notes.
- CoViD:** Students are encouraged to visit the University's COVID-19 website for important information including diagnosis and symptom protocols, testing, vaccine information, and post-exposure guidance. Please check the website throughout the semester for updates. Consult the Graduate Excused Absence Policy for information regarding excused absences due to medical reasons.

**Adjustments:** The University of Houston complies with Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990, pertaining to the provision of reasonable academic adjustments/auxiliary aids for disabled students. In accordance with Section 504 and ADA guidelines, UH strives to provide reasonable academic adjustments/auxiliary aids to students who request and require them. If you believe that you have a disability requiring an academic adjustments/auxiliary aid, please contact the Justin Dart Jr. Student Accessibility Center (formerly the Justin Dart, Jr. Center for Students with DisABILITIES).

**Excused absences:** Regular class attendance, participation, and engagement in coursework are important contributors to student success. Absences may be excused as provided in the University of Houston Undergraduate Excused Absence Policy and Graduate Excused Absence Policy for reasons including: medical illness of student or close relative, death of a close family member, legal or government proceeding that a student is obligated to attend, recognized professional and educational activities where the student is presenting, and University-sponsored activity or athletic competition. Under these policies, students with excused absences will be provided with an opportunity to make up any quiz, exam or other work that contributes to the course grade or a satisfactory alternative. Please read the full policy for details regarding reasons for excused absences, the approval process, and extended absences. Additional policies address absences related to military service, religious holy days, pregnancy and related conditions, and disability.

**Recordings:** Students may not record all or part of class, livestream all or part of class, or make/distribute screen captures, without advanced written consent of the instructor. If you have or think you may have a disability such that you need to record class-related activities, please contact the Justin Dart, Jr. Student Accessibility Center. If you have an accommodation to record class-related activities, those recordings may not be shared with any other student, whether in this course or not, or with any other person or on any other platform. Classes may be recorded by the instructor. Students may use instructor's recordings for their own studying and notetaking. Instructor's recordings are not authorized to be shared with anyone without the prior written approval of the instructor. Failure to comply with requirements regarding recordings will result in a disciplinary referral to the Dean of Students Office and may result in disciplinary action.