

Time and Place: MWF10–11 in CBB 214 (First three weeks partially online or hybrid on Teams, and after that we will decide).

Instructor: Dr. David Blecher.

Office Hours: On Teams Office Hour Channel, MW after class or by appointment.

Email: dbleche@central.uh.edu

Recommended texts (not required): Gert Pedersen's "Analysis Now", J. B. Conway's "A course in Functional Analysis", TO BE ADDED.

Prerequisite: Real variables course or consent of instructor (a course in functional analysis or topology would be nice but not required).

UNDER CONSTRUCTION–SOME OF THIS WILL CHANGE

The class will be face-to-face with a small online component. Particularly while COVID is peaking I plan to have one day a week online.

Description of the syllabus.

This is a special topics course in operator theoretic functional analysis related to quantum analysis. We will cover unbounded operators, operator algebras, operator spaces, Von Neumann algebras and quantum integration, connections to quantum theory, and other topics requested by students in the course. As requested, please share your thoughts on topics you would be interested in seeing covered this semester.

You do not need a textbook, although I recommend the Pedersen book above particularly. There is a LIST OF BOOKS IN PROGRESS TO BE ADDED They can be used for additional exercises, and for extra reading: for classnotes you will usually use the provided typed notes. You are expected to read the classnotes carefully each week, line by line, and bring to me the things you don't understand there. Sometimes the class will deviate from this set of notes. You are also expected to do most of the homework sets, and turn in selected homework problems for grading. You are encouraged to work with others, form study groups, and so on, however copied turned in homework will not help you assimilate the material, and will not be graded. Remember that the most important thing is to be doing your 'main job'. You are expected to reread and digest the typed notes after class, line by line, trying to follow why the line is true, for example how it follows from previous lines. I suggest you add a check mark after you have read and understood the line or part-of-line/phrase, add extra explanation or pictures to yourself if needed. Add a question mark next to any line you cannot follow, and ask me about it. Also memorize 'definitions' as you read. The best advice I can give to ensure success in this class is to do this reading properly. The class will be somewhat unhelpful, and much much more difficult if you do not do it. It takes a long time to do this, and it will probably be painful for most people. First one has the discipline of line by line reading; it is the way a mathematician reads a mathematics paper. At first it is painful, and one may feel inadequate. Learning a new skill is sometimes 'no pain no gain'. The good news is that in time what seems hard now will seem easy. That is because you are learning, and training your brain in the way it needs to be trained. The most efficient way to proceed is to focus on the provided typed notes and do the careful line to line reading, trying to keep up to date with the class. If one adds a lot of extra sources much of it may distract, and end up making it more time consuming and unnecessarily difficult.

Partially flipped teaching method: Because some classes will be online because of e.g. Covid peaks etc, we expect that we will sometimes use a partially flipped teaching method because of the difficulties of learning a deep theoretical subject online. This means in part that some days you will do a reading of a stretch of the Class notes before class, which we will discuss in class. Each student will have to present a proof to the class once every week or so. If you need help with the material you are presenting please ask or email. We also will discuss homework problems in class. And in class when discussing or others are presenting be willing to share thoughts, feelings, and ideas, in the spirit of a flipped classroom!

Due to the changing nature of the COVID-19 pandemic, please note that the instructor may need to make modifications to the course syllabus and may do so at any time. Notice of such changes will be

announced as quickly as possible via email and the course website.

Course grade: The final grade is approximately based on a total score of 300 points consisting of homework and other assignments (100 points), participation grade (in person or hyflex) 50 points, presentations (50 points), project (50 points), and quizzes (50 points). The instructor may change this at his discretion. There is no 'final exam' or semester test. At some point during the semester you will be given time to work on a project, which you will be able to choose.

After some chapters we will schedule a problem solving workshop, based on the homework assigned for that chapter. You should attempt all homework problems, although it is not expected that you solve all of them. Most of the problems are there to help you learn and INTERNALIZE the material.

You are encouraged to work with others, form study groups, and so on. However you should not simply copy homework. Please bring comments or complaints to my attention as soon as possible. Don't wait until the end of the semester to bring up a matter which we could deal with and solve early on. You may find the class structure complicated at first, but it will become clear as we get into it. Always ask, if you are not sure!!

Commit the assigned class time as a dedicated class time period, and put this on your weekly calendars.

Academic Honesty Policy: . In online assignments and tests you will sometimes be asked to make an Academic Honesty/Honor Code statement ("I received no help ...", etc.) It may be OK on certain kinds of assignments to use something you found on the internet, as long as you cite your link, come to a full understanding of it, and explain it in your own words. You are encouraged to work with others on homework or problems to be presented in class, form study groups, and so on, however copied turned in homework will not help you assimilate the material, and assignments with plagiarism will not be graded. So give homework assignments a good try on your own before getting help, and when you do get help, really understand and internalize the answers/material you get, and write it in your own words and understanding, citing your sources (well, with judgement, one cannot cite every tiny thing). Similarly when helping others, be sure they understand that they need to abide by the above rules too. So if you work in a group write up the solutions on your own, and not as a group. University of Houston students are expected to adhere to the UH Academic Honesty Policy (google UH Academic Honesty Policy). "Academic dishonesty" means employing a method or technique or engaging in conduct in an academic endeavor that contravenes the standards of ethical integrity expected at the University of Houston or by a course instructor to fulfill any and all academic requirements. Academic dishonesty includes, but is not limited to, the following: Plagiarism; Cheating and Unauthorized Group Work; Fabrication, Falsification, and Misrepresentation; Stealing and Abuse of Academic Materials; Complicity in Academic Dishonesty; Academic Misconduct. Refer to UH Academic Honesty website (<http://www.uh.edu/provost/policies/honesty/>) and the UH Student Catalog for the definition of these terms and university's policy on Academic Dishonesty. Anyone caught cheating will be reported to the department for further disciplinary actions, receive sanctions as explained on these documents, and will have an academic dishonesty record at the Provosts office. The sanctions for confirmed violations of this policy shall be commensurate with the nature of the offense and with the record of the student regarding any previous infractions. Sanctions may include, but are not limited to: a lowered grade, failure on the examination or assignment in question, failure in the course, probation, suspension, or expulsion from the University of Houston, or a combination of these. Students may not receive a W for courses in which they have been found in violation of the Academic Honesty Policy. If a W is received prior to a finding of policy violation, the student will become liable for the Academic Honesty penalty, including F grades.

Communication and feedback: Communication between you and the instructor is by email to your official UH Exchange email address, and by postings by the red flashing light on the class website, etc. The Exchange mail server can be accessed via Outlook, which provides a single location for organizing and managing day-to-day information, from email and calendars to contacts and task lists. Exchange email accounts can be accessed by logging into Office 365 with your Cougarnet credentials or through Access UH. They can also be configured on IOS and Android mobile devices. There may also be announcements via Blackboard or Teams. Instructor will not respond to Teams chat messages or video calls outside of class and of office hours. Please be sure that you are regularly getting and seeing your email to your official

UH email address, since the instructor will largely communicate with the class by email like this. UH policy states that all required written notices shall be addressed to the student via their UH email. Notices properly addressed and so sent shall be presumed to have been received by the student. Thus, you are responsible for the content in emails sent to your UH account, regardless if your external (non-UH) email provider filters or blocks them. Emails lost to external providers shall not be used as a justification to claim faculty are unresponsive, to appeal grades, etc.

Your instructor will not reply to chat messages via MS TEAMS outside of class times or office hours. Calls from MS TEAMS will not be responded to unless they are made by appointment. If you leave a voice mail at your instructor's office phone, he/she might not receive it. The best way of communication with your instructor outside of class times is via email.

Instructions for presentations: Prepare your presentation in plenty of time. You will be given the material to present days in advance, and can bring me any questions on it beforehand. Email me a copy to me of your write-up no later than 24 hours before your presentation. Keep a copy for your records. I will check your work for errors, and may make some suggestions before the class. In the case that an assigned presenter has to miss class at the last moment please ask another person in the class to present, or ask the instructor to present it (but do be sure to send the pdf of the solution 24 hours earlier as usual). If this does not happen and there is no presenter of a particular problem and no pdf of the solution sent to the instructor in advance, then you will lose presentation points. The instructor will keep a list of those who present; students not presenting regularly will lose all presentation points at the end of the semester (unless you have a medical reason, etc).

Instructions for writing your presentations: Begin by writing the statement of the result you are presenting. Write big! And neatly and legibly, or type. Draw a picture(s) if possible. It would help others if you highlight the key points by putting them in a box. Write your initials but do not write your student number or any other personal information you do not want to share on your pdf.

And in class when others are presenting... be willing to share thoughts, feelings, and ideas, in the spirit of a flipped classroom!

Attendance: Attendance of all class meetings is expected, but we also realize that because of the Covid crisis or other life events there may be times some of you simply have to miss class. Coming to class you will hear a lot of math 'culture', how we think about a result or problem, how to think through computations, how to express your answers, and so much more. If you do not come to class or pay attention you are missing out on a lot of very important conscious and subconscious learning and culture. This is a synchronous class. Many synchronous classes are designed to incorporate interactive classroom activities for students, indeed studies show that such activities can greatly facilitate learning. Thus students treating a synchronous class as if it were asynchronous in terms of 'live' attendance may be at a real disadvantage at times. You will need an university recognized excuse, eg. doctors note, for important class occasions such as tests which you are forced to miss. If you have to miss class but are able to participate online, send me an email before that class.

Class calendar events/Upcoming assignments may be found by the red flashing light on the class website. You will sometimes be emailed about these too.

Homework: You will turn in homework as a PDF on Blackboard. Corrections to grading errors should be brought to my attention in a timely manner.

Incompletes: only given to students passing the class on the work during the semester, who are unable to take the Final for unforeseeable, unpreventable, documented circumstances.

TECHNOLOGY REQUIREMENTS: Computer and internet access is required for this course. In summary, students will need:

- a functioning and updated computer
- reliable internet connection
- PDF viewer
- Ability to log in to Blackboard for online assignments, etc.

- Ability to watch mp4 files
- Ability to access Microsoft TEAMS platform. Note that all UH students have access to Blackboard and MS teams with their cougar ID.

COURSE DELIVERY FORMAT: This course is being offered in the face to face format, with some small online component, although the first three weeks are partially online or hybrid on Teams, and after that we will see. The classroom is quite large for the number of students, so good social distancing should be no problem. Hybrid/hyflex is a significantly worse platform (at least for this kind of class) than either purely online or purely face-to-face—so students not in class will be at a significant disadvantage—on top of the usual great difficulties of staying focused etc. How much in-class meeting we have of course also depends on the covid peaks and university directives, etc. It is usually much better to attend in person from the point of view of avoiding distractions, keeping in touch with fellow students, etc, etc. Thus we encourage students to come face-to-face (unless immunocompromised etc). From the student FAQ on the UH student page: Q: What should students do if they or a family member are immunocompromised and/or at high risk from COVID-19 infection, and they feel uncomfortable attending any in person classes/exams? A: Students with these types of concerns should contact the Student Accessibility Center - University of Houston (<https://www.uh.edu/accessibility/>) to discuss University policy and procedures for requesting an academic accommodation.

This course is not self-paced; students are expected to follow assignment due dates. Live meetings (lectures) for this course will take place according to the class schedule. This is a face to face lecture and by signing up for this class, students agree that they are available during the meeting times. Due to the changing nature of the pandemic, the team for this lecture will be created and available on MS TEAMS. In case of a need to move to the purely online setting, all students will be enrolled in the team. Make sure you are a member of the team. If we move to the online setting there probably will be a cameras-on policy and a daily participation-during-the-meeting grade. Students are expected to behave professionally during online meetings. Any students who do not follow the university's code of conduct might be removed from the meeting. Turn on your webcam and silence microphone before joining the meeting.

Face Covering Policy/social distance : To reduce the spread of COVID-19, the University strongly encourages everyone (vaccinated or not) to wear face coverings indoors on campus including classrooms for both faculty and students. The instructor also recommends social distancing. In particular please respect others whose need for social distancing may be greater than yours: ask permission to approach into fellow students personal space if in doubt. They may have immunocompromised friends or relatives.

Presence in Class: Your presence in class each session means that you:

- Are NOT exhibiting any Coronavirus Symptoms that makes you think that you may have COVID-19,
- Have NOT tested positive or been diagnosed for COVID-19
- Have NOT knowingly been exposed to someone with COVID-19 or suspected/presumed COVID-19.

If you are experiencing any COVID-19 symptoms that are not clearly related to a pre-existing medical condition, do not come to class. Please see Student Protocols for what to do (<https://www.uh.edu/covid-19/guidelines-protocols/diagnosis-symptoms/#students>) if you experience symptoms and Potential Exposure to Coronavirus (<https://www.uh.edu/covid-19/guidelines-protocols/potential-exposure/>) for what to do if you have potentially been exposed to COVID-19. Consult the Graduate Excused Absence Policy for information regarding excused absences due to medical reasons.

Excused Absence Policy : 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 IF THE CORRECT PROCEDURES ARE FOLLOWED, 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. **THERE IS A PROCEDURE TO BE FOLLOWED TO QUALIFY FOR THESE POLICIES—PLEASE READ THEM** <https://uh.edu/provost/policies-resources/student/excused-absence-policy/>.

COVID-19 Information: Students are encouraged to visit the University's COVID-19 website <https://www.uh.edu/covid-19/information-for/students/> for important information including on-campus testing, vaccines, diagnosis and symptom protocols, campus cleaning and safety practices, report forms, and positive cases on campus. Please check the website throughout the semester for updates.

Vaccinations: Data suggests that vaccination remains the best intervention for reliable protection against COVID-19. Students are asked to familiarize themselves with pertinent vaccine information <https://www.uh.edu/covid-19/information/vaccine/>, consult with their health care provider. The University strongly encourages all students, faculty and staff to be vaccinated.

Reasonable Academic Adjustments/Auxiliary Aids/ Dart Center Accommodations: 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).

Accommodation Forms: Students seeking academic adjustments/auxiliary aids must, in a timely manner (usually at the beginning of the semester), provide their instructor with a current Student Accommodation Form (SAF) from the CSD office before an approved accommodation can be implemented. Additionally, if a student is requesting a (CSD approved) testing accommodation, then the student will also complete a Request for Individualized Testing Accommodations (RITA) paper form to arrange for tests to be administered at the CSD office. CSD suggests that the student meet with their instructor during office hours and/or make an appointment to complete the RITA form to ensure confidentiality.*Note: RITA forms must be completed at least 48 hours in advance of the original test date. Please consult your counselor ahead of time to ensure that your tests are scheduled in a timely manner.

Additionally, if a student is requesting a (SAC approved) testing accommodation, then the student will also complete a Request for Individualized Testing Accommodations (RITA) paper form to arrange for tests to be administered at the SAC office. SAC suggests that the student meet with their instructor during office hours and/or make an appointment to complete the RITA form to ensure confidentiality. Students should bring a copy of their approved SAF form when meeting with the instructor to complete a RITA form. Note: RITA forms must be completed at least 48 hours in advance of the original test date. Please consult your counselor ahead of time to ensure that your tests are scheduled in a timely manner.

Webcams: Access to a webcam is required for students participating remotely in this course. Webcams must be turned on when this is possible—this is part of your class participation grade, and it helps focus (an understatement).

Recording of Class: 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.

Syllabus Changes: Due to the changing nature of the COVID-19 pandemic, please note that the instructor may need to make modifications to the course syllabus and may do so at any time. Notice of such changes will be announced as quickly as possible by email, the instructor's website, or MS Teams.

Resources for Online Learning: The University of Houston is committed to student success, and provides information to optimize the online learning experience through our Power-On website. Please visit this website for a comprehensive set of resources, tools, and tips including: obtaining access to the internet, AccessUH, and Blackboard; requesting a laptop through the Laptop Loaner Program; using your smartphone as a webcam; and downloading Microsoft Office 365 at no cost. For questions or assistance contact UHOnline@uh.edu.

UH CAPS Statement: 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: <https://www.uh.edu/caps/outreach/lets-talk/index.php#hours>, <https://uh.edu/caps/outreach/lets-talk/>

Helpful Information:

COVID-19 Updates and information: <https://uh.edu/covid-19/>

Coogs Care: <https://www.uh.edu/dsaes/coogscare/>

Laptop Checkout Requests:
<https://www.uh.edu/infotech/about/planning/off-campus/index.php#do-you-need-a-laptop>

Health FAQs: <https://uh.edu/covid-19/faq/health-wellness-prevention-faqs/>

Student Health Center: <https://www.uh.edu/healthcenter/>