

**BANACH AND HILBERT SPACE THEORY:
MATH 528B: SECTION 001
SYLLABUS**

SPRING 2020

Instructor:	Office:	Office Hours:	Phone:
Robert Sims	ENR2 S346	By Appointment	626-1990

My preferred method of contact is by e-mail: rsims@math.arizona.edu and I typically respond within 24 hours.

I will keep course information on our course website:

<https://www.math.arizona.edu/~rsims/ma396t/ma396t.html>

I will keep up-to-date grades for homework and tests online in D2L.

1. Textbook:

The textbook for this course is:

Linear Operators in Hilbert Space by Joachim Weidmann.

2. Material to be Covered:

My goal is to cover:

- Chapter 4: Linear Operators and Their Adjoints
- Chapter 5: Closed Linear Operators
- Chapter 6: Special Classes of Linear Operators
 - 6.1 Finite Rank and Compact Operators
 - 6.2 Hilbert-Schmidt Operators
- Chapter 7: The Spectral Theory of Self-Adjoint and Normal Operators
- Chapter 9: Perturbation Theory for Self-Adjoint Operators

Course Format and Teaching Methods: This course consists of regular lectures with in-class discussions.

Course Objectives: The goal of this course is to extend many of the topics discussed in linear algebra from matrices to operators defined over a Hilbert space.

Expected Learning Outcomes:

- Be able to rigorously analyze unbounded operators on a Hilbert space.
- Be able to understand and apply the spectral theorem (and the resulting functional calculus) for normal operators on a Hilbert space.

3. Grading Policy:

Your grade will consist of a midterm and a final.

Item	Weight
Homework	40%
Midterm	25%
Final Exam	35%

Homework: Homework will be assigned roughly once a week. There will be suggested problems and problems to be turned-in for grading. Each homework assignment will be graded out of ten points. Five points are available for completeness and five points are available for correctness. Although discussion of homework problems with other students and with the instructor is encouraged, students should write up their own answers. Homework submitted must be a reflection of the student's own knowledge, not another student's knowledge or the knowledge of someone who posted a solution online. Homework should be typed or written in legible, complete sentences, showing calculations and reasoning in a clear, logical order. Homework is due at the beginning of class. When averaging to produce the final homework score of 100 points, your lowest two homework score will be dropped. For this reason, no late homework will be accepted.

4. Midterm:

There will be a take-home mid-term approximately 1/2 way through the semester.

5. Final

The final exam will be take-home and cumulative.

Grading Disputes: Any grading disputes must be addressed within one week after an exam or homework has been returned.

Withdrawal and Incompletes: A student may withdraw from the course with a deletion from record through January 28th, using UAccess. A student may withdraw with a grade of **W** through March 31, using UAccess. A grade of **I** (Incomplete) will be given only at the instructors discretion and according to University Policy as described:

<http://www.registrar.arizona.edu/gradepolicy/incomplete.htm>

Attendance and Class Participation Policy: Participating in the course and attending lectures are vital to the learning process. As such, attendance is required at all lectures. For information on the Administrative Drop Policy, see

<http://catalog.arizona.edu/policy/class-attendance-participation-and-administ>

If you need to miss class for unavoidable circumstances, contact your instructor as soon as possible. Please note the following: All holidays or special events observed by organized religions will be honored for those students who indicate affiliation with that particular religion.

<http://policy.arizona.edu/human-resources/religious-accommodation-policy>

Absences pre-approved by the UA Dean of Students (or Deans designee) will be honored.

<https://deanofstudents.arizona.edu/policies/attendance-policies-and-practices>

It is the student's responsibility to notify the instructor in advance of an absence related to religious observation or an activity for which a Dean's excuse has been granted, and to arrange for how any missed work will be handled.

Communication with Students: Announcements and important course information will be discussed in class, indicated on our course website, and announces on D2L. It is the student's responsibility to check for messages and announcements regularly.

Accessibility and Accommodations: It is the University's goal that learning experiences be as accessible as possible. If you anticipate or experience physical or academic barriers based on disability or pregnancy, please let me know immediately so that we can discuss options. You are also welcome to contact Disability Resources (520-621-3268) to establish reasonable accommodations.

<https://drc.arizona.edu/instructors/syllabus-statement>

Please be aware that the accessible table and chairs in this room should remain available for students who find that standard classroom seating is not usable.

Academic Integrity: Students are responsible to inform themselves of University policies regarding the Code of Academic Integrity. Students found to be in violation of the Code are subject to penalties ranging from a loss of credit for work involved to a grade of E in the course, and risk possible suspension or probation. The Code of Academic Integrity will be enforced in all areas of the course, including, but not limited to homework and tests. For more information about the Code of Academic Integrity policies and procedures, including information about your rights and responsibilities as a student, see the following website:

<http://deanofstudents.arizona.edu/academic-integrity/students/academic-integrity>

Student Code of Conduct: Students at The University of Arizona are expected to conform to the standards of conduct established in the Student Code of Conduct. Prohibited conduct includes: All forms of student academic dishonesty, including cheating, fabrication, facilitating academic dishonesty, and plagiarism. Interfering with University or University-sponsored activities, including but not limited to classroom related activities, studying, teaching, research, intellectual or creative endeavor, administration, service or the provision of communication, computing or emergency services. Endangering, threatening, or causing physical harm to any member of the University community or to oneself or causing reasonable apprehension of such harm. Engaging in harassment or unlawful discriminatory activities on the basis of age, ethnicity, gender, handicapping condition, national origin, race, religion, sexual orientation, or veteran status, or violating University rules governing harassment or discrimination. Students found to be in violation of the Student Code of Conduct are subject to disciplinary action. For more information about the Student Code of Conduct, including a complete list of prohibited conduct, see the following website:

<http://deanofstudents.arizona.edu/accountability/students/student-accountability>

Other Relevant University Policies Relating to Conduct: Please take note of the following University policies:

- Policy on Threatening Behavior by Students:

<http://policy.web.arizona.edu/education-and-student-affairs/threatening-behavior-students>

- Nondiscrimination and Anti-Harassment Policy:

<http://policy.arizona.edu/human-resources/nondiscrimination-and-anti-ha>

Expected Classroom Behavior: Students should turn off all electronic devices during class unless the device is deemed necessary for the class by the instructor. This includes, but is not limited to cell phones, mp3 players, and laptops. If you have a disability-related accommodation that involves the use of a computer during class, please discuss this with your instructor in advance.

Changes to the Course Syllabus: The information contained in the course syllabus, other than the grade and absence policies, may be subject to change with reasonable advance notice, as deemed appropriate by the instructor.

Scheduled Topics/Activities:

Information concerning course topics each week can be found on the course calendar which is available on the course website.