MATH 603 – Operator Theory
Fall 2021   Instructor: Gökhan Göğüş

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Operator theory uses a number of ideas from various branches, such as complex analysis, functional analysis, and harmonic analysis. This course is designed as a further topics course after a foundational functional analysis course (alias, Banach and Hilbert spaces). Chapters covered in this course are here as material that I believe all students should see while learning analysis. The course starts by regular lectures. Students are expected to solve homework and prepare a series of seminars on a topic they select.

Lectures
Monday 13:40-14:30, Wednesday 11.40-13.30.

Textbook
J. B. Conway A Course in Functional Analysis
We will cover chapters 7-9 of the book.

Further reading and other reference
J. B. Conway *A Course in Operator Theory*
K. Zhu, *Operator Theory in Function Spaces*
B. MacCluer, *Elementary Functional Analysis*

Course Outline
Compact Operators. Spectrum. The Fredholm Alternative. Banach and C∗-Algebras. The Spectral Theorem.

Homework. During the semester you will be responsible for homework. All homework should be done individually.

Seminars. Students are supposed to prepare some material in a topic they choose as a series of seminars.

Attendance: Students are strongly supposed to attend all the lectures.

Academic Honesty

I expect you to follow common-sense practices during the exams and all course activities. Cheating will not be tolerated. The action against such violations could range from getting a zero on the particular exam to explaining your case in front of the Disciplinary Committee.

http://www.sabanciuniv.edu/tr/yonetmelikler

Course Schedule: Roughly these topics will be covered in each week.

Dates	Section Readings (weekly)	Homework
Oct 5-7	Banach algebras	
Oct 12-14	Spectrum, Riesz functional calculus	
Oct 19-21	Compact operators	
Oct 26-28	C*-algebras	**H1**
Nov 2-4	C*-algebras	
Nov 9-11	Gelfand-Neimark Segal construction	
Nov 16-18	Spectral measures and representations of abelian C*-algebras	
Nov 23-25	Spectral theorem	
Nov 30-Dec 2	Functional calculus for normal operators	**H2**
Dec 7-9	Functional calculus for normal operators	
Dec 14-16	Further topics and seminars	
Dec 21-23	Further topics and seminars	
Dec 28-30	Further topics and seminars	**H3**
Jan 6-8 Jan 8	Further topics and seminars	

Add-drop: October 13-14   **Withdrawal:** November 16-December 4