

SPECIAL TOPICS IN OPERATOR THEORY

SPRING 2009-2010

INSTRUCTORS: Mert Çağlar, Uğur Gül, Tunç Mısırlıoğlu, Mohan Ravichandran

PLACE: Sabancı University, Karaköy Communication Center, Bankalar Caddesi 2, Karaköy 34420, İstanbul

TIMETABLE: Thursday 8:40–11:30.

CONTACT: (DMCS, İKÜ) A-315, m.caglar@iku.edu.tr, +90 (212) 498 43 58

(FENS, SU) gulugur@gmail.com

(DMCS, İKÜ) A-310, t.misirlioglu@iku.edu.tr, +90 (212) 498 41 24

(FENS, SU) FENS L017, mohanr@sabanciuniv.edu, +90 (216) 483 23 10

ASSESSMENT: One open-book examination and several homework assignments will be given during the semester. The letter grade of the student will be determined upon considering the exam and the homeworks along with student's participation to the course.

PRE-REQUISITIES: *Complex Analysis:* (Undergraduate level) Properties of holomorphic functions, Cauchy integral formula, Maximum Modulus Principle, H^2 -spaces.

Functional Analysis: (Undergraduate level) Hahn-Banach Theorem, Baire's Category Theorem and its consequences (Open Mapping and Closed Graph Theorems, Principle of Uniform Boundedness), Banach-Alaoglu Theorem.

Real Analysis: (Graduate level) Measures, Integration, Radon-Nikodým Theorem, L^p -spaces, Radon measures, Dual of $C_0(X)$.

PRINCIPAL TEXTBOOK: John B. Conway, *A Course in Operator Theory*, GSM, Vol. 21, American Mathematical Society, Providence, RI, 2000.

PROGRAMME

WEEKS	SUBJECTS TO BE COVERED
1 & 2	Introduction to C^* -algebras (M. Ravichandran)
3 & 4	Normal operators (M. Ravichandran)
5 & 6	Compact operators (T. Mısırlıoğlu)
7 & 8	Some non-normal operators (Uğur Gül)
Will be announced	Exam
9 & 10	More on C^* -algebras (M. Çağlar)
11 & 12	Compact perturbations [if time permits]
13 & 14	Introduction to von Neumann algebras [if time permits]

SUGGESTED READING:

- W. Arveson, *Ten Lectures on Operator Algebras*, Regional Conference Series in Mathematics, No. 55, American Mathematical Society, Providence, RI, 1984.
- W. Arveson, *A Short Course on Spectral Theory*, Springer-Verlag, New York, 2002.
- Kenneth R. Davidson, *C^* -algebras by Example*, Fields Institute Monographs 6, American Mathematical Society, Providence, RI, 1996.
- Ronald G. Douglas, *Banach Algebra Techniques in Operator Theory*, 2nd ed., Graduate Texts in Mathematics, Vol. 179, Springer-Verlag, New York, 1998.
- Richard V. Kadison & John R. Ringrose, *Fundamentals of the Theory of Operator Algebras, Vol. 1 & Vol. 2*, GSM, Vol. 15 & Vol. 16, American Mathematical Society, Providence, RI, 1997.
- V.S. Sunder, *Functional Analysis: Spectral Theory*, Birkhauser, 1998.