

MATH 4154A / 9054: FUNCTIONAL ANALYSIS (FALL 2017)

Instructor. Matthias Franz

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Class. MWF 9:30–10:30, MC 107. The plan is to change this to twice 90min per week.

Textbook. There are many books on functional analysis; we will not follow a fixed one. You might find the following books helpful:

J. B. Conway, A course in functional analysis, 2nd ed., Springer 1990

P. D. Lax, Functional analysis, Wiley 2002

M. Reed, B. Simon: Methods of mathematical physics I: Functional analysis, rev. ed., Academic Press 1980

Prerequisites. Mathematics 2120, Mathematics 3122

Pre- or Corequisite. Mathematics 3124

Unless you have either the requisites for this course or written special permission from your Dean to enroll in it, you may be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.

Course Description. Hilbert spaces: L^2 spaces, orthogonal complements, dual spaces, Riesz representation theorem, the Fredholm alternative, spectral resolution of compact normal operators.

Banach spaces: Hahn–Banach theorem, bounded linear operators, adjoints, closed graph and Banach Steinhaus theorems.

Evaluation of Student Performance.

Presentation. A presentation in class (90min) of some textbook material, worth 20% of the final grade.

Midterm Examination. One midterm exam (probably written in class), worth 30% of the final grade.

Final Examination. An oral exam (30min) worth 50% of the final grade.

Assignments. There will be homework assignment, at least every two weeks. They may be graded, but the grades only serve as feedback; they will not affect the final grade. Solving the exercises is strongly recommended as this is the best (and probably the only) way to understand the material. It is also a very good preparation for the exams.

Solutions will not be graded if they consist of scrap paper, are not clearly and carefully written or if they are not stapled. Discussion of exercises and solutions during tutorials or office hours may be limited to students who have handed in non-negligible solutions (which are not required to be correct).

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site: http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf.

No electronic devices are not allowed during exams.

Make-up exams and conflicts.

For the midterm exam. In the event that you must miss the midterm due to a valid conflict, the make-up exam may be given before the regular exam. Usually this will be earlier on the same day, or on the day before. If you are in this situation, you must let the instructor know at least two weeks before the exam date.

If you miss the midterm due to illness, you must present a doctor's note to the appropriate Dean's office, and you may be given a make-up exam as soon as possible after the regular exam. If you are in this situation, you should contact your instructor as soon as you realize that you will miss the exam.

For the final exam. If you have a conflict with another final exam, you must contact Rob Downes in the Registrar's office by mid November to arrange a special time/place to write the final.

If you have a conflict with a midterm for a year-long course, you must contact the instructor of the other course.

If you have three final exams in 3 consecutive periods, you must contact the Dean of your faculty.

In all case, please let your instructor know.

If we need to give you a make-up exam, it will be given before the regular exam. If you miss an exam due to illness, you must present a doctor's note to the appropriate Dean's office, and you will be given a make-up exam as soon as possible after the regular exam. If you are in this situation, you should contact your instructor as soon as you realize that you will miss the exam.

Failure to follow these rules may result in a grade of zero.

See also the University's policy on final exam conflicts.

Statement on services for students in emotional/mental health distress. Students who are in emotional/mental distress should refer to Mental Health@Western <http://www.uwo.ca/uwocom/mentalhealth/> for a complete list of options about how to obtain help.

Accessibility Statement. Please contact the course instructor if you require material in an alternate format or if you require any other arrangements to make this course more accessible to you. You may also wish to contact Services for Students with Disabilities (SSD) at 661-2111 ext. 82147 for any specific question regarding an accommodation.