Functional Analysis
Pure Math 753
Fall 2016
Course Outline

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Class meets: MW 2:30–3:50 in MC 4040

Website: www.math.uwaterloo.ca/~krdavids/PM753.html

Recommended Textbook
- John Conway, A Course in Functional Analysis, 2nd edition

Alternate reference books
- Peter Lax, Functional Analysis
- Gert Pedersen, Analysis Now
- Laurent Marcoux, Notes for PM753 and PM810

Course Outline
- Point set topology (brief introduction)
- Banach spaces (Hahn-Banach theorem, Open mapping theorem)
- Duality (weak topologies, Banach-Alaoglu theorem, Krein-Milman theorem)
- Bounded operators
- Compact operators and Fredholm theory
- Spectral theorem for compact normal operators on Hilbert space

Grading
- There will be 5 or 6 assignments.
- There is no midterm exam.
- Undergraduates: Assignments 40%, Final Exam 60%.
- Math grad students: Assignments 40%, Talk/Paper 10%, Final Exam 50%.
- Graduate students in other faculties: the talk is optional.
The University Senate mandates that every course outline must contain the following text.

**Academic Integrity:** In order to maintain a culture of academic integrity, members of the University of Waterloo community are expected to promote honesty, trust, fairness, respect and responsibility. Check [www.uwaterloo.ca/academicintegrity/](http://www.uwaterloo.ca/academicintegrity/) for more information.

**Grievance:** A student who believes that a decision affecting some aspect of his/her university life has been unfair or unreasonable may have grounds for initiating a grievance. Read *Policy 70, Student Petitions and Grievances, Section 4*, [http://www.adm.uwaterloo.ca/infosec/Policies/policy70.htm](http://www.adm.uwaterloo.ca/infosec/Policies/policy70.htm). When in doubt please be certain to contact the department’s administrative assistant who will provide further assistance.

**Discipline:** A student is expected to know what constitutes academic integrity to avoid committing academic offenses and to take responsibility for his/her actions. A student who is unsure whether an action constitutes an offense, or who needs help in learning how to avoid offenses (e.g., plagiarism, cheating) or about “rules” for group work/collaboration should seek guidance from the course professor, academic advisor, or the undergraduate associate dean. For information on categories of offenses and types of penalties, students should refer to *Policy 71, Student Discipline*, [http://www.adm.uwaterloo.ca/infosec/Policies/policy71.htm](http://www.adm.uwaterloo.ca/infosec/Policies/policy71.htm). For typical penalties check *Guidelines for the Assessment of Penalties*, [http://www.adm.uwaterloo.ca/infosec/guidelines/penaltyguidelines.htm](http://www.adm.uwaterloo.ca/infosec/guidelines/penaltyguidelines.htm).

**Appeals:** A decision made or penalty imposed under *Policy 70, Student Petitions and Grievances* (other than a petition) or *Policy 71, Student Discipline* may be appealed if there is a ground. A student who believes he/she has grounds for an appeal should refer to *Policy 72, Student Appeals*, [http://www.adm.uwaterloo.ca/infosec/Policies/policy72.htm](http://www.adm.uwaterloo.ca/infosec/Policies/policy72.htm).

**Students with disabilities:** The *Access Ability Services*, located in Needles Hall, Room 1132, collaborates with all academic departments to arrange appropriate accommodations for students with disabilities without compromising the academic integrity of the curriculum. If you require academic accommodations to lessen the impact of your disability, please register with the Access Ability Services at the beginning of each academic term.