

# MATH 4003/5008 – Winter 2022

## Functional Analysis

**Instructor:** Jason Crann

**Office Hours:** Virtual via Zoom, time TBD.

**Email:** jasoncrann@cunet.carleton.ca (note: @cunet, **not** @cmail)

**Course Dates:** Jan. 10 – Apr. 12, 2022

**Lectures:** Starting the week of January 31, lectures will (hopefully) be in person, Tuesdays/Thursdays 8:35-9:55, Richcraft Hall 3202. Until then, I will be hosting live Zoom lectures during the scheduled class time. Recorded videos along with lecture notes will be posted to Brightspace.

**Accessing Campus:** Please follow University protocols for accessing campus (declaring vaccination status, prescreening and building/classroom entry via cuScreen, etc.).

**Representative Textbook:** Béla Bollobás, *Linear Analysis: an introductory course*, Second Edition.

### Evaluation:

- Assignments (4/term) - 30%;
- Mid-term - 20%;
- Final Exam - 50%.

**Assignments:** Administered through Brightspace. Upload a PDF of your solutions by the posted deadline using an appropriate scanning app (see below for recommendations).

### Possible Scanning Apps:

- CamScanner;
- TapScanner;
- Adobe scanner.

CamScanner has gotten favourable reviews amongst some Carleton instructors, and it has been used successfully in my previous online courses. Adobe scanner can be installed on mobile phones and it links your scanned items (as a PDF) to your Adobe Reader account on your PC and saves them in the cloud.

**Mid-term:** Hopefully in-person during one of the scheduled class times. If forced online, it will be administered virtually through Brightspace. Date TBD.

**Makeup Work:** There are no makeup assignments/tests for this course. Missed assignments/tests must be accompanied by an appropriate rationale (e.g., medical/health reasons) and documentation (e.g., doctor's note). Under such circumstances, assignment/test weight will be shifted to the remaining assignments/exam.

**Final Exam:** To be scheduled by the University. In-person vs. online will be determined at a later date.

**Prerequisites:** Measure theory (MATH 4007/5007, MAT 5125), or permission of the School.

**Approximate Course Description:**

1. Banach spaces: bounded linear operators, Hahn-Banach extension and separation, dual spaces, open mapping theorem, uniform boundedness principle.
2. Hilbert spaces: projections, orthonormal bases, normal operators, spaces of compact and trace class operators.
3. Selected topics from one of: weak topologies, tensor norms, introductory spectral theory.

**Requests for Academic Accommodation:** You may require special arrangements to meet your academic obligations during the term. For an accommodation request, the processes are as follows:

- **Pregnancy obligation:** Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, visit the Equity Services website: [carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf](http://carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf)
- **Religious obligation:** Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, visit the Equity Services website: [carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf](http://carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf)
- **Academic Accommodations for Students with Disabilities:** If you have a documented disability requiring academic accommodations in this course, please contact the Paul Menton Centre for Students with Disabilities (PMC) at 613-520-6608 or [pmc@carleton.ca](mailto:pmc@carleton.ca) for a formal evaluation or contact your PMC coordinator to send your instructor your Letter of Accommodation at the beginning of the term. You must also contact the PMC no later than two weeks before the first in-class scheduled test or exam requiring accommodation (if applicable). After requesting accommodation from PMC, meet with your instructor as soon as possible to ensure accommodation arrangements are made. [carleton.ca/pmc](http://carleton.ca/pmc)
- **Survivors of Sexual Violence:** As a community, Carleton University is committed to maintaining a positive learning, working and living environment where sexual violence will not be tolerated, and is survivors are supported through academic accommodations as per Carleton's Sexual Violence Policy. For more information about the services available at the university and to obtain information about sexual violence and/or support, visit: [carleton.ca/sexual-violence-support](http://carleton.ca/sexual-violence-support)
- **Accommodation for Student Activities:** Carleton University recognizes the substantial benefits, both to the individual student and for the university, that result from a student participating in activities beyond the classroom experience. Reasonable accommodation must be provided to students who compete or perform at the national or international level. Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. <https://carleton.ca/senate/wp-content/uploads/Accommodation-for-Student-Activities-1.pdf>

- **Deferred Exam:** Students who miss the final exam may be eligible for a deferral. Application for a deferral must be made, with appropriate documentation, to the Registrar's Office within five business days of the examination.