Operational Math

DoSS Summer Prep Bootcamp 2022

1 Time & Place

July 11 to 29, online synchronous

2 Instructor

Emma Kroell, 2nd year PhD student, Department of Statistical Sciences

3 Course Outline

Review of proof techniques. Selected topics in linear algebra, real analysis and topology.

4 Textbooks

The following books are optional texts for the different areas we will cover. All books are freely available online, however some require a U of T log-in.

Proofs:

1. *An Introduction to Mathematical Structures and Proofs* by Larry J. Gerstein

Set theory and topology:

2. *A Taste of Topology* by Volker Runde

Analysis:

3. *Real Mathematical Analysis* by Charles C. Pugh

Linear algebra:

4. *Linear Algebra Done Right* by Sheldon Axler
5. *Linear Algebra Done Wrong* by Sergei Treil

Additional resources:

6. *Lecture notes in Mathematics for Economics and Statistics* by Piotr Zwiernik
7. *Real Analysis Lecture Notes* by Laurent Marcoux
8. *Understanding Analysis* by Stephen Abbott

5 Tentative Lecture Schedule

The lecture topics and corresponding texts are outlined below. This schedule is tentative and may be changed as the course progresses.

Lecture	**Topics**	**References**
1	Review of logic & proof techniques	1
2	Set theory	2, 6, 7
3	Metric spaces and sequences I	2, 3, 6
4	Metric spaces and sequences II	2, 3, 6
5	Topology	2, 7
6	Linear algebra I	4 & 5
7	Linear algebra II	4 & 5
8	Linear algebra III	4 & 5
9	Differentiation and integration	2, 6
10	Multivariable calculus	2, 6