

MAST 699 (MAST 840), Sec. B
Topics in Algebra
Fall 2020

Note: All lectures and office hours will be held online.

- Instructor:** Dr. M. Bertola
Email: marco.bertola@concordia.ca
- Class Location:** The course will be delivered online.
- Class Schedule:** Mondays & Thursdays, 10:00-11:30 AM (ONLINE).
- Office Hours:** Online: Thursdays, 15:00-16:00, or by appointment.
- Main Topics:**
- 1) Elements of group theory; definitions.
 - 2) Elements of differential geometry and interaction with group theory: Classical Lie Groups and $SL(n)$.
 - 3) Lie Algebras: $\mathfrak{sl}(n)$ and general definition. Exponential Map: Baker-Campbell-Hausdorff formula.
 - 4) Structure theory and classification of Lie Algebras. Nilpotent, Solvable.
 - 5) Engel's theorem. Lie's Theorem, Cartan's criteria for semisimplicity.
 - 6) Classical Lie Algebras and Dynkin Diagrams.
 - 7) Weyl groups and Coxeter groups.
 - 8) Representation theory.
- Main Text:** Samelson, Hans, *Notes on Lie Algebras*, 2nd Edition. Springer-Verlag (1990). Personal Notes will be provided also during the course.
- Supplementary:**
- Knapp, Anthony W. *Lie Groups Beyond an Introduction*, Birkhauser.
 - Humphreys, J. E. *Introduction to Lie Algebras and Representation Theory*, Springer 1972.

Evaluation:	Problem sets (4)	40%
	Oral + written presentation	60%

If the grading scheme for this course includes graded assignments, a reasonable and representative subset of each assignment may be graded. Students will not be told in advance which subset of the assigned problems will be marked and should therefore attempt all assigned problems.

Academic Integrity and the Academic Code of Conduct

This course is governed by Concordia University's policies on Academic Integrity and the Academic Code of Conduct as set forth in the Undergraduate Calendar and the Graduate Calendar. Students are expected to familiarize themselves with these policies and conduct themselves accordingly. "Concordia University has several resources available to students to better understand and uphold academic integrity. Concordia's website on academic integrity can be found at the following address, which also includes links to each Faculty and the School of Graduate Studies: concordia.ca/students/academic-integrity." [Undergraduate Calendar, Sec 17.10.2]

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