

Mathematics 534, section 101. Lie Theory I
Term 1, 2017.

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Time and Place: The lectures are scheduled for TTh 11-12:30 in Buchanan D216. I am currently surveying students to make sure this time slot works for everyone. If there is a change, I will post an announcement on the course web page and notify all registered students by e-mail.

Textbook: James E. Humphreys, Introduction to Lie algebras and representation theory, Springer, 1972.

Course description: Lie theory is the study of continuous group of transformations. These groups play an important role in various areas of mathematics, from PDEs to number theory, as well as in physics. Their structure is most easily understood by in studying their “linear approximations”, otherwise known as Lie algebras. This course we will focus on the study of finite-dimensional Lie algebras and their representations by algebraic methods. We will discuss nilpotent, solvable, and semisimple Lie algebras, root systems, weights, highest weight modules, and (if time permits) universal enveloping algebras. Our ultimate goal will be the classification of complex semisimple Lie algebras. This material is foundational for many areas of pure mathematics. Our textbook is concise and beautifully written. I plan to follow it closely through Chapters I-III, occasionally supplementing the lectures with additional material, such as the Levi Decomposition Theorem.

Prerequisites: High comfort level with linear algebra, including Jordan canonical form of a matrix. Familiarity with abstract algebra will also be helpful.

Evaluation: The course mark will be based entirely on homework assignments. I plan to assign 6-8 problem sets throughout the term.

Course page: For detailed up to date information, please see <http://www.math.ubc.ca/~reichst/534F17syll.html>