

## The Department of Mathematics

2022–23–B term

**Course Name** Lie Groups

**Course Number** 201.2.4141

**Course web page**

<https://www.math.bgu.ac.il/en/teaching/spring2023/courses/lie-groups>

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**Office Hours** <https://www.math.bgu.ac.il/en/teaching/hours>

### Abstract

### Requirements and grading<sup>1</sup>

### Course topics

1. Review of differentiable manifolds, definition of a Lie group. Quotients in the category of Lie groups, homogeneous manifolds, Haar measure, connected components.
2. Algebraic groups, matrix groups, the classical groups.
3. Lie algebras and connection to Lie groups.
4. Nilpotent, solvable and semisimple Lie algebras and Lie groups, Lie theorem, Engel theorem, Levi decomposition.
5. Cartan-Killing form.
6. Representation of a Lie algebra over the complex numbers.
7. Root and weights, root systems, Dynkin diagrams, classification of complex semisimple Lie algebras.

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<sup>1</sup>Information may change during the first two weeks of the term. Please consult the webpage for updates