

MATH-429

**Representation Theory II - Lie groups and algebras**

Negut Andrei

Cursus	Sem.	Type
Mathematics	BA6	Opt.

Language of teaching	English
Credits	5
Session	Summer
Semester	Spring
Exam	Written
Workload	150h
Weeks	14
<b>Hours</b>	<b>4 weekly</b>
Courses	2 weekly
Exercises	2 weekly
<b>Number of positions</b>	

**Summary**

This is a standard course on Lie groups, Lie algebras and their representations.

**Content**

This is a second semester course in representation theory. We will study Lie groups and Lie algebras, with particular emphasis on algebraic aspects, and with the guiding examples of the classical groups in mind. We will also classify representations of Lie groups and Lie algebras, and discuss their character theory.

**Keywords**

Lie groups, Lie algebras, classical groups, representations, character formulas

**Learning Prerequisites****Required courses**

MATH-211 Group theory

MATH-314 Representation theory I - finite groups

**Recommended courses**

MATH-213 Differential geometry

**Learning Outcomes**

By the end of the course, the student must be able to:

- Formulate the main concepts and theorems defined in the course
- Theorize the role of Lie groups and Lie algebras in the theory
- Compute the characters of certain Lie group / Lie algebra representations

**Teaching methods**

Lectures and problem sessions

**Expected student activities**

Students are expected to attend all lectures and participate in all problem sessions

**Assessment methods**

One written homework (15% of the grade) and a written exam (85% of the grade).

### Supervision

Office hours	No
Assistants	Yes
Forum	Yes

### Resources

#### Bibliography

J. Humphreys, "Introduction to Lie Algebras and Representation Theory"  
W. Fulton, J. Harris, "Representation Theory: A first course"  
D. Bump, "Lie Groups"  
A. Baker, "Matrix Groups: An Introduction to Lie Group Theory"

#### Ressources en bibliothèque

- [Introduction to Lie Algebras and Representation Theory / Humphreys](#)
- [Representation Theory / Fulton](#)
- [Lie Groups / Bump](#)
- [Matrix Groups / Baker](#)

#### Moodle Link

- <https://go.epfl.ch/MATH-429>