

MATH-535

Algebraic geometry III - selected topics

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Cursus	Sem.	Type
Ing.-math	MA2, MA4	Opt.
Mathématicien	MA2	Opt.

Language of teaching	English
Credits	5
Session	Summer
Semester	Spring
Exam	Oral
Workload	150h
Weeks	14
Hours	4 weekly
Lecture	2 weekly
Exercises	2 weekly
Number of positions	

Summary

This course is aimed to give students an introduction to the theory of algebraic curves, with an emphasis on the interplay between the arithmetic and the geometry of global fields. One of the principle goals will be to understand the geometric formulation of global class field theory.

Content

- Algebraic curves, line bundles
- Riemann-Roch and Serre duality for curves
- Picard variety of curves
- Adelic language of global fields and geometric class field theory

Keywords

Algebraic geometry, algebraic curves, global fields, class field theory

Learning Prerequisites**Required courses**

- Linear algebra
- Group Theory
- Rings and Modules
- Modern Algebraic geometry

Recommended courses

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Learning Outcomes

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

- Analyze basic problems in algebraic geometry of curves and solve them.
- Use the statements of basic theorems like Riemann-Roch, Serre duality, etc, and understand their proofs
- Reason intuitively about the geometry and topology of curves over the complex and finite fields.

Teaching methods

2h lectures+2h exercise sessions weekly.

Assessment methods

Oral Exam

Supervision

Office hours	Yes
Assistants	Yes
Forum	No

Resources**Bibliography**

We will follow mainly

- Hartshorne, *Algebraic Geometry*
- R. Miranda, *Algebraic Curves and Riemann Surfaces*
- J. P. Serre, *Algebraic Groups and Class Fields*

Ressources en bibliothèque

- [Algebraic Geometry / Hartshorne](#)
- [Algebraic Curves and Riemann Surfaces / Miranda](#)
- [Algebraic Groups and Class Fields / Serre](#)

Moodle Link

- <https://go.epfl.ch/MATH-535>