MATH-511

Modular forms and applications

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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**
Courses	2 weekly
Exercises	2 weekly
Number of positions	

Summary

In this course we will introduce core concepts of the theory of modular forms and consider several applications of this theory to combinatorics, harmonic analysis, and geometric optimization.

Content

- Basic definitions and facts of the theory of modular forms
- Combinatorial properties of the Fourier expansions of modular forms
- Modular forms and harmonic analysis
- Modular forms and the sphere packing problem

Learning Prerequisites

Required courses

Complex analysis, harmonic analysis, discrete mathematics, a basic course in topology.

Recommended courses

Riemann surfaces, Riemannian manifolds, Lie groups, analytic number theory.

Assessment methods

70% of the final grade are awarded for the final exam and 30% of the grade come from the homework done during the semester.
Dans le cas de l'art. 3 al. 5 du Règlement de section, l'enseignant décide de la forme de l'examen qu'il communique aux étudiants concernés.

Resources

Bibliography

1. **A first course in modular forms** Fred Diamond; Jerry Shurman; 2005
2. **The 1-2-3 of modular forms : lectures at a summer school in Nordfjordeid, Norway, [June 2004]**

Ressources en bibliothèque

- A first course in modular forms Fred Diamond / Jerry Shurman

Moodle Link

- https://go.epfl.ch/MATH-511