**EPFL**

## MATH-519

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

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|---|---|
| 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** | |

**Remark**

pas donné en 2023-24

**Summary**

This year we will be looking into probabilistic study of some models of mathematical physics.

**Content**

We will consider some probabilistic models of mathematical physics and try to understand them as deeply as we can. The prime example will be the lattice Yang-Mills model, but we will have to also look at other models like the Ising model or Brownian motion to develop some tools.

**Keywords**

High-dimensional probability, concentration of measure, Gaussian processes, phase transitions, universality

**Learning Prerequisites**

**Required courses**

Mathematics Bachelor's level knowledge of analysis, linear algebra and probability.

**Recommended courses**

Knowledge of basic measure theory will simplify your life a lot. Interest in mathematical physics, combinatorics and geometry is of use.

**Important concepts to start the course**

Probability space, random variable and random vector, expectation, Gaussian random variables.

**Teaching methods**

Lectures, exercise classes. Maybe on some topics we also try a flipped format, where you can give a presentation.

**Assessment methods**

Most likely an oral exam, but in case of presentations, these would also count towards the final grade.

**Resources**

**Bibliography**

Will be discussed in class

**Notes/Handbook**
There might be partial notes, though the book is excellent.

**Moodle Link**
- https://go.epfl.ch/MATH-519