MATH-432 **Probability theory**

Mountford Thomas

| Cursus | Sem. | Type |
|---|---|---|
| Mathematics | BA5 | Opt. |
| Statistics | MA1, MA3 | Opt. |

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|---|---|
| Language of teaching | English |
| Credits | 5 |
| Session | Winter |
| Semester | Fall |
| Exam | Written |
| Workload | 150h |
| Weeks | 14 |
| **Hours** | **4 weekly** |
| Lecture | 2 weekly |
| Exercises | 2 weekly |
| **Number of positions** | |


## Summary

The course is based on Durrett's text book Probability: Theory and Examples. It takes the measure theory approach to probability theory, wherein expectations are simply abstract integrals.


## Content

(i) Definitions of probability space and random variables
(ii) independence
(iii) Different types of convergence for random variables.
(iv) Weak laws of large numbers
(v) Borel Cantelli Lemmas and Strong Law of large numbers
(vi) 0-1 laws
(vii) Convergence in law
(vi) Lindeberg-Feller CLT.

## Keywords

sigma field
random variable
measurable
convergence a.s.
independence

## Learning Prerequisites

### Required courses

None but it helps to be familiar with measure threory.

## Teaching methods

blackboard lectures

## Assessment methods

Mostly the final exam but also exercises.

## Resources

### Moodle Link

- https://go.epfl.ch/MATH-432