

MATH-432

**Probability theory**

Mountford Thomas

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

Language of teaching	English
Credits	5
Session	Winter
Semester	Fall
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**

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 theory.

**Teaching methods**

blackboard lectures

**Assessment methods**

Mostly the final exam but also exercises and a midterm

**Resources****Moodle Link**

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

