MATH-233 **Probability and statistics**

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Cursus	Sem.	Type
Physics	BA3	Obl.

Language of teaching	English
Credits	4
Session	Winter
Semester	Fall
Exam	Written
Workload	120h
Weeks	14
Hours	**4 weekly**
Courses	2 weekly
Exercises	2 weekly
Number of positions	

Summary

The course gives an introduction to probability and statistics for physicists.

Content

Probability: Basic concepts, conditional probability.
Random variables: Definitions density and distribution functions, expectation, variance, covariance, correlation, transformations, sums, generating functions, characteristic functions, conditional laws.
Discrete and continuous laws: Bernoulli, binomial, hypergeometric, Poisson, geometric, normal, exponential, Gamma, Cauchy, Weibull, Gumbel, chi-square.
Limit theorems: law of large numbers, central limit theorem
Introduction to statistics: frequentist, Bayesian viewpoints
Estimation: point estimation, bias, mean square error, maximum likelihood estimator
Hypothesis testing: errors, power, significance, chi^2

Keywords

probability and statistics

Learning Prerequisites

Important concepts to start the course

Calculus and basic linear algebra.

Learning Outcomes

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

- Formulate

Assessment methods

Exam and midterm assessed coursework

Supervision

Office hours	No
Assistants	Yes
Forum	Yes

Resources

Virtual desktop infrastructure (VDI)
No

Moodle Link
- https://go.epfl.ch/MATH-233