Syllabus

[cmcd.economia@fgv.br]

Course Name: Measure and Probability Theory
Faculty:

2025 FIRST SEMESTER

COURSE OUTLINE

This course provides a rigorous introduction to measure and probability theory, focusing on applications in economics and finance. Building on David Williams's *Probability with Martingales*, the course equips students with essential mathematical tools to analyze uncertainty and randomness in economic models.

Key topics include the construction of probability spaces, measurable functions, integration with respect to a measure. The course also explores conditional expectation and martingale theory.

By the end of the course, students will have developed a solid theoretical foundation to rigorously approach economic problems involving stochastic processes, risk modeling, and statistical inference that are relevant to microeconomics, macroeconomics, econometrics, and financial economics.

COURSE PROGRAM

1. What's Wrong with Riemann
2. Measure Spaces
3. Events
4. Random Variables
5. Independence
6. Integration
7. Expectation
8. Product Measure
9. Conditional Expectation
10. Martingales
11. Convergence Theorems
12. Uniform Integrability

BIBLIOGRAPHY

1. Williams, D.: "Probability with Martingales". Cambridge University Press, 1991.
2. Royden, H. L. and P. M. Fitzpatrick: "Real Analysis". Prentice Hall, 1988.
3. Capinski, M. and E. Kopp: "Measure, Integral and Probability". Springer, 2004.

GRADING

Final examination or an equivalent exercise due at the time of the final examination.

CONTACT