
Advanced Mathematics for Statistics

Probability Theory

A.A. 2018/2019

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Course schedule

November 2018

1. Monday 26, 15.00-18.00 Basics on probability space and random variables. (Ch.1 [Sev])
2. Tuesday 27, 15.00-18.00 Independence of random variables. Conditional distribution and expectations. (Ch.1,2 [Sev], Ch.2 [Gut])
3. Thursday 29, 16.00-19.00 Characteristic and moment generating functions. (Ch.3,4 [Sev])

December 2018

4. Tuesday 04, 15.00-18.00 Functions of random variables. (Ch.7 [Sev])
5. Thursday 06, 16.00-19.00 Applications: order statistics; Martingales (Ch.2,7 [Sev], Ch 7 [Gut])
6. Monday 10, 15.30-18.30 Normal distribution theory (Ch.5 [Gut], Ch.8 [Sev])
7. Thursday 13, 15.30-18.30 Convergence of random variables (Ch.6 [Gut], Ch.11 [Sev])
8. Tuesday 18, 15.30-18.30 The law of large numbers (Ch.6 [Gut], Ch.11 [Sev])
9. Wednesday 19, 15.30-18.30 The Central Limit Theorem (Ch.6 [Gut], Ch.12 [Sev])

January 2018

10. Tuesday 8, 15.30-18.30 Exercises
11. Monday 21, 09.30-12.30 Discrete time Markov models. (Ch.2 [Bre])

12. Wednesday 23, 09.30-12.30 Recurrence and ergodicity (Ch.3 [Bre])
13. Friday 28, 09.30-12.30 Long time behavior and MCMC methods (Ch.4 [Bre])
14. Monday 30, 09.30-12.30 Stochastic processes in continuous time: Poisson processes and continuous time Markov models (Ch. 8 [Bre])

References

- [**Gut**] A. Gut, An intermediate course in probability, Springer Verlag, 1995.
- [**Bre**] P. Bremaud, Markov chains, Gibbs fields, Monte Carlo simulation and queues, Springer Verlag, 1998.
- [**Sev**] T.A. Severini, Elements of distribution theory, Cambridge University Press, 2005.