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PhD in Statistical Sciences

*Probability Theory*

Academic Year 2008/2009

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Instructors: Marco Ferrante and Giovanni Fonseca

January-February 2009

Prerequisite: Chapters 2, 3, 4 and 5 of [JP], with ALL the exercises.

Course Schedule:

January 2009

- Thursday 8, 10.00-13.00 (Ferrante): Construction of a Probability Measure (Ch.6, [JP])
- Tuesday 13, 10.00-13.00 (Ferrante): Construction of a Probability Measure on  $\mathbb{R}$  and  $\mathbb{R}^n$  (Ch.7, [JP])
- Thursday 15, 10.00-13.00 (Ferrante): Integration with respect to a Probability Measure (Ch.8, [JP])
- Tuesday 20, 10.00-13.00 (Ferrante): Independent Random Variables (Ch.10, [JP])
- Thursday 22, 10.00-13.00 (Ferrante): Probability Distributions on  $\mathbb{R}$  and  $\mathbb{R}^n$  (Ch.11, [JP])
- Tuesday 27, 10.00-13.00 (Ferrante): Order Statistics (Ch. 4, [Gut])
- Thursday 29, 10.00-13.00 (Ferrante): Conditional expectation (Ch. 2, [Gut] and Ch. 23, [JP])

February 2009

- Tuesday 3, 10.00-13.00 (Ferrante): Convergence of Random Variables (Ch.17, 18, [JP] and Ch. 6 [Gut])
- Thursday 5, 10.00-13.00 (Ferrante): Law of Large Numbers (Ch.20, [JP] and Ch. 6 [Gut])
- Tuesday 10, 10.00-13.00 (Ferrante): The Central Limit Theorem (Ch.21, [JP] and Ch. 6 [Gut])
- Monday 16, 10.00-14.00 (Fonseca): Discrete time Markov chains (Ch.1, [NOR])

- Wednesday 18, 10.00-14.00 (Fonseca): Continuous time Markov chains (Ch.2, 3, [NOR])
- Monday 23, 10.00-14.00 (Fonseca): Poisson process and Brownian motion (Ch.4, 6, [RES])

Text:

[Gut] A.Gut, An intermediate course in probability, Springer Verlag, 1995.

[JP] J.Jacod, P.Protter, Probability essentials, 2nd edition, Universitext, Springer Verlag, 2002.

[NOR] J.R.Norris, Markov chains, Cambridge University Press, 1997.

[RES] S.I.Resnick, Adventures in Stochastic Processes, Birkhauser, 1992.