# Monte Carlo Methods: Summer semester 2006

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The course will take place on Tuesday from 13.15–15.00 (at the latest) in the statistics library (`http://plan.epfl.ch/?room=MAB1504`).

Each participant is expected to take at least one of the subjects below, and to present the corresponding articles (or others, to be determined with ACD or SM) to the group. Powerpoint presentation is neither expected nor desired; the main effort should go into reading and understanding the paper(s), not into a fancy presentation.

All are expected to have made an effort to read the papers beforehand, and to contribute to discussion.

The dates we plan to meet are: 21, 28 March; 4, 11, 25 April; 2, 9, 16, 23, 30 May; 6, 13, 20 June.

## Topics

The list below gives expected topics and their (probable) order. Some of them will be fleshed out as we go along.

1. Introduction (ACD): Historical overview. Organisation.
2. Generation of random numbers and random variables (in particular, discuss normal, binomial, Poisson) (Jerôme): Ripley (1990); Devroye (1986), Hammersley and Handscomb (1964, Ch 3), Chambers (1977, Ch 7)
3. Integration (SM): Hammersley and Handscomb (1964, Ch 4, 5), Stoer and Bulirsch (1980, Ch 3)
4. Acceptance and important sampling, with examples (Maria): Hammersley and Handscomb (1964, Ch 4, 5)
5. Data augmentation (Ravi): Tanner and Wong (1987), Tanner (1996, Ch 5)
6. Markov chain theory and convergence assessment (Tuca): Robert and Casella (2005, Chapter 4), Cowles and Carlin (1996)
7. Gibbs sampler (Mehdi): Geman and Geman (1984); Gelfand and Smith (1990)
8. Metropolis–Hastings algorithm (Vahid): Metropolis *et al.* (1953); Hastings (1970); Peskun (1973)
9. Reversible jump MCMC: Green (1995); Richardson and Green (1997)
10. Simulated annealing and simulated tempering (Jerôme):
11. Quasi-Monte Carlo sampling (Sahar): Niederreiter (1992)
12. Particle filters (Ivan):
13. Resampling, jackknife and bootstrap: Efron (1979); Hartigan (1969)

## References


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