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## Bayesian statistics (3ST2015)

Filières concernées	Nombre d'heures	Validation	Crédits ECTS
<b>Master en statistique</b>	<b>Cours: 2 ph</b>	Voir ci-dessous	3

ph=période hebdomadaire, pg=période globale, j=jour, dj=demi-jour, h=heure, min=minute

### Période d'enseignement:

- Semestre Printemps

### Equipe enseignante

Dr. Pierre-Yves Deléamont  
Institut de statistique  
Av. de Bellevaux 51 , CH-2000 NEUCHATEL

### Contenu

This course will, if time permits, cover the following topics:

- I. Basic theory
  - The Bayesian choice
  - Foundations of Bayesian inference
  - Single-parameter models
  - Introduction to multi-parameter models
  - Hierarchical models
  - Model choice
- II. Introduction to Bayesian computation
  - Basics of Bayesian computation
  - Rejection sampling
  - Importance sampling
- III. Markov chain Monte Carlo methods
  - Motivation
  - Basics of Markov chains
  - Metropolis-Hastings algorithm
  - Gibbs sampling
- IV. Selected applications
  - Generalized linear models
  - Mixture models

### Forme de l'évaluation

The final mark will be based on a 2 hour written examination.

### Documentation

- Robert, C.P., The Bayesian Choice: from Decision-Theoretic Foundations to Computational Implementation (2nd edition). Springer, 2007.
- Gelman, A., Carlin, J., Stern, H., Dunson, D., Vehtari, A., and Rubin, D., Bayesian Data Analysis (3rd edition). Chapman and Hall, 2013.
- Albert, J., Bayesian Computation with R (2nd edition). Springer, 2009.
- Robert, C.P., and Casella, G., Introducing Monte Carlo Methods with R. Springer, 2010.

### Pré-requis

Inferential statistics, Probability, R programming

### Forme de l'enseignement

- 3 ECTS credits
- Spring semester

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