

# Computational Statistics II

Ph.D. in Economics and Statistics, University of Milano-Bicocca

Tommaso Rigon

Computational Statistics II is a short course (12h) on **Bayesian Computations**. The course covers both theoretical and programming aspects. The final examinations is based on 3 homeworks, that must be submitted in the form of a Markdown file.

The teaching material will be available at the website: <https://tommasorigon.github.io/CompStat/>

## Syllabus

Topic	Slides	Markdown
	<b>Efficient R programming</b>	
R programming and MCMC	[Unit A.1]	[Markdown A.1]
Rcpp & RcppArmadillo	[Unit A.2]	[Markdown A.2]
	<b>Advanced MCMC algorithms</b>	
Optimal scaling & adaptive Metropolis	[Unit B.1]	
MALA algorithm & Hamiltonian Monte Carlo	[Unit B.2]	
Benchmark: probit and logit models	[Unit B.3]	
<i>Homework</i>		[Homework 1]
	<b>Data augmentation (DA)</b>	
Missing data problems	[Unit C.1]	
Benchmark: DA for the probit model	[Unit C.2]	
Benchmark: DA for the logit model	[Unit C.3]	
<i>Homework</i>		[Homework 2]
	<b>Variational Bayes (VB)</b>	
Variational inference	[Unit D.1]	
Benchmark: VB for the probit model	[Unit D.2]	
Benchmark: VB for the logit model	[Unit D.3]	
<i>Homework</i>		[Homework 3]

## Essential references

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2. Blei, D. M., Kucukelbir, A., and McAuliffe, J. D. (2017). Variational inference: a review for statisticians. *Journal of the American Statistical Association*, **112**(518), 859–877.
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