



Course unit English denomination	Bayesian Data Analysis and Computation
Teacher in charge (if defined)	<ul style="list-style-type: none"><li>• Brunero Liseo</li><li>• Andrea Tancredi</li></ul>
Teaching Hours	18
Number of ECTS credits allocated	3
Course period	05/2025-06/2025
Course delivery method	<input checked="" type="checkbox"/> In presence <input type="checkbox"/> Remotely <input type="checkbox"/> Blended
Language of instruction	English
Mandatory attendance	<input checked="" type="checkbox"/> Yes (100% minimum of presence, apart from exceptional absences that must be justify in advance) <input type="checkbox"/> No
Course unit contents	<ul style="list-style-type: none"><li>- Prior distributions for Bayesian Inference: Objective vs. Subjective</li><li>- Posterior simulation and Monte Carlo methods</li><li>- Markov Chain Monte Carlo and other computational methods</li><li>- Prediction, Model Selection and Testing</li><li>- MCMC in practice: linear models, generalized linear models and other case studies</li><li>- Mixture models and hierarchical models</li><li>- Approximate Bayesian Computation and sequential Monte Carlo methods</li></ul>
Learning goals	Participants will learn posterior simulation techniques using Monte Carlo methods. They will understand and implement Markov Chain Monte Carlo (MCMC) methods for Bayesian analysis, conducting prediction, model selection, and testing. The course will cover practical applications of MCMC in linear and generalized linear models, as well as mixture and hierarchical models. Additionally, participants will gain insights into Approximate Bayesian Computation and sequential Monte Carlo methods for complex models.
Teaching methods	<ul style="list-style-type: none"><li>• Lectures</li><li>• Laboratories</li></ul>
Course on transversal, interdisciplinary, transdisciplinary skills	<input type="checkbox"/> Yes <input type="checkbox"/> No
Available for PhD students from other courses	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Students from other PhD courses may be admitted subject to CV evaluation and until the maximum number of students has been reached



---

Prerequisites  
(not mandatory)

---

Examination  
methods  
(in applicable)                      None

---

Suggested readings                      • Course material available from the instructors

---

Additional  
information

---