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	Nota di contenuto	- 1. Science and Uncertainty -- 2. Bayesian Inference -- 3. Assigning a Prior Distribution -- 4. Assigning a Likelihood Function -- 5. Deriving the Posterior Distribution -- 6. Markov Chain Monte Carlo Sampling (MCMC) -- 7. Sampling from the Posterior Distribution by MCMC -- 8. MCMC and Multivariate Models -- 9. Bayesian Calibration and MCMC: Frequently Asked Questions -- 10. After the Calibration: Interpretation, Reporting, Visualisation -- 11. Model Ensembles: BMC and BMA -- 12. Discrepancy -- 13. Approximations to Bayes -- 14.Thirteen Ways to Fit a Straight Line -- 15. Gaussian Processes and Model Emulation -- 16. Graphical Modelling -- 17. Bayesian Hierarchical Modelling -- 18. Probabilistic Risk Analysis -- 19. Bayesian Decision Theory -- 20. Linear Modelling: LM, GLM, GAM and Mixed Models -- 21. Machine

Learning -- 22. Time Series and Data Assimilation -- 23. Spatial Modelling and Scaling Error -- 24. Spatio-Temporal Modelling and Adaptive Sampling -- 25. What Next?.

Sommario/riassunto	This book describes how Bayesian methods work. Aiming to demystify the approach, it explains how to parameterize and compare models while accounting for uncertainties in data, model parameters and model structures. Bayesian thinking is not difficult and can be used in virtually every kind of research. How exactly should data be used in modelling? The literature offers a bewildering variety of techniques (Bayesian calibration, data assimilation, Kalman filtering, model-data fusion, …). This book provides a short and easy guide to all these approaches and more. Written from a unifying Bayesian perspective, it reveals how these methods are related to one another. Basic notions from probability theory are introduced and executable R codes for modelling, data analysis and visualization are included to enhance the book's practical use. The codes are also freely available online. This thoroughly revised second edition has separate chapters on risk analysis and decision theory. It also features an expanded text on machine learning with an introduction to natural language processing and calibration of neural networks using various datasets (including the famous iris and MNIST). Literature references have been updated and exercises with solutions have doubled in number.