

Bayesian Statistics,
Master in Biostatistics program
University Of Gondar

Instructor: Belay B. Yimer

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Time and location: 9:00 – 1:00 PM, computing centre

General information Textbook: Lesaffre, E., & Lawson, A. B. (2012). *Bayesian biostatistics*. John Wiley & Sons.

Course Description: This advanced undergraduate/master-level course, introduces the Bayesian approach to statistical inference for data analysis. This course teaches the theory of Bayesian inference and data analysis using statistical software R and JAGS.

Prerequisites: Calculus; linear algebra; probability and statistics; Familiarity with R.

Schedule

- **Monday, May 22**
 - Modes of statistical inference- a critical reflection on classical approach
 - Introduction to Bayes theorem and the posterior distribution
- **Tuesday, May 23**
 - What have we learned up to now?
 - Posterior summary measures and the predictive distribution
 - Practical session: Use of R to compute posterior distribution and summary measures
- **Wednesday, May 24**
 - What have we learned up to now?
 - More than one parameter – Bayesian linear regression
 - Introduction of Markov Chain Monte Carlo techniques
 - Assessing and improving convergence of the Markov chain
 - Practical session: Use of Use of R2JAGS/OpenBUGS to sample from posterior distribution
- **Thursday, May 24**
 - What have we learned up to now?
 - Choosing the prior

- Bayesian hierarchical models
- Model selection and model checking
- Practical session: Use of R2JAGS/OpenBUGS for hierarchical models
- **Friday, May 25 (Master students only)**
 - Discussion about project, Exam etc