



Universitas Brawijaya
Faculty of Mathematics and Natural Sciences
Department of Statistics / Bachelor Statistics Study Programme

Module Handbook

Module Name:	Bayesian Analysis (MAS61133)
Module Level:	Bachelor
Abbreviation, if applicable:	-
Sub-heading, if applicable:	-
Courses included in the module, if applicable:	-
Semester/term:	5th / Third Year
Module Coordinator(s):	Dr. Suci Astutik S.Si., M.Si.
Lecturer(s):	Achmad Efendi, S.Si., M.Sc., Ph.D Dr. Suci Astutik, S.Si., M.Si. Dr. Dra. Ani Budi Astuti, M.Si
Language:	Indonesian
Classification within the curriculum:	Elective course
Teaching format / class per week during semester:	3 × 50 minutes
Workload:	2.5 hours lectures, 3 hours structural activities, 3 hours individual studies, 16 weeks per semester, and total 136 hours per semester 4.5 ECTS
Credit Points:	3
Requirements:	Introduction to Probability Theory (MAS62111)
Learning goals / competencies:	General Competence (Knowledge): ILO1 The students are able to master basic scientific concepts and statistical analysis methods applied on computing, social science, humanities, economics, industry and life science. ILO3 The students are able to manage, analyze, and complete the real case using statistical method on computing, social humanities, economics, industry and life science that helped by software, then present and communicate the results. ILO5 The students are able to apply logical, critical, systematic, and innovative thinking independently when applied to science and technology that contain humanities values, based on scientific principles, procedures and ethics with excellent and measurable results.

	ILO6	The students are able to take appropriate decisions to solve the problems expertly, based on the information and data analysis.
	ILO8	The students are able to apply and internalize the spirit of independence, struggle, entrepreneurship, based on values, norms, and academic ethics of Pancasila in all aspects of life.
	Specific Competence:	
	M1	Students are able to understand and explain the basic concepts of Bayesian analysis: Bayes theorem, Bayesian Inference compared to Fisher Inference (classic) (ILO1, ILO5)
	M2	Students are able to understand, explain and apply Bayesian Single Parameters (ILO1, ILO3, ILO5, ILO6, ILO8)
	M3	Students are able to understand, explain and implement multi-parameter Bayesian (ILO1, ILO3, ILO5, ILO6, ILO8)
	M4	Students are able to understand, explain and apply Bayesian Linear Regression (ILO1, ILO3, ILO5, ILO6, ILO8)
	M5	Students are able to understand, explain and apply Bayesian Logistics Regression (ILO1, ILO3, ILO5, ILO6, ILO8)
	M6	Students are able to understand, explain and apply the Bayes factor and Bayesian Normal Mixture (ILO1, ILO3, ILO5, ILO6, ILO8)
Contents:	1	Basic Concepts of Bayesian Analysis
	2	Bayesian Single Parameter
	3	Multi-parameter Bayesian
	4	Linear Regression Modeling with Bayesian Approach
	5	Logistic Regression Modeling with Bayesian Approach
	6	Bayes Factors and Introduction to Reversible Jump MCMC
	7	Modeling Bayesian Mixture Normal
Soft skill attribute:	Responsible, independently, and discipline	
Study/exam achievement:	<p>Final score (NA) is calculated as follow: 10% Attitude, 20% Assignments, 10% Quizzes, 30% Midterm Exam, 30% Final Exam</p> <p>Final index is defined as follow:</p> <p>A : > 80 - 100</p>	

	<p>B+ : > 75 - 80</p> <p>B : > 69 - 75</p> <p>C+ : > 60 - 69</p> <p>C : > 55 - 60</p> <p>D+ : > 50 - 55</p> <p>D : > 44 - 50</p> <p>E : 0 - 44</p>
Forms of media:	R, R2WinBUGS, Laptop, LCD projector, whiteboard
Learning methods:	Lecture, assessments, and discussion
Literature:	<p>Main:</p> <p>1. Gelman, A., Carlin, J. B., Stern, H. S., Dunson, D. B., Wehtari, A., and Rubin, D. B. 2016. Bayesian Data Analysis. Third Edition. CRC Press.</p> <p>2. Gelman, A., Carlin, J. B., Stern, H.S., and Rubin, D. B. 2004. Bayesian Data Analysis, 2nd edition. New York: Chapman & Hall.</p> <p>3. Ntzoufras, I. 2009. Bayesian Modeling Using WinBUGS. New Jersey: John Wiley & Son.</p> <p>4. Congdon, P. 2006. Bayesian Statistical Modeling, 2nd edition. USA: John Wiley & Sons.</p> <p>Support:</p> <p>1. Ross, S. 2007. Introduction to Probability Models. Ninth Edition. Elsevier, Ansterdam</p> <p>2. Mendenhall, Scheaffer, and Wackery. 1981. Mathematical Statistic with application. Duxbury, Boston</p>
Notes:	