



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

Module Handbook

Module Name:	Time Series Analysis (MAS61322)	
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):	Ir. Heni Kusdarwati, MS	
Lecturer(s):	Ir. Heni Kusdarwati, MS	
	Dr. Suci Astutik, S.Si., M.Si.	
	Dr. Eni Sumarminingsih, S.Si., M.M	
Language:	Indonesian	
Classification within the curriculum:	Compulsory 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 Regression Analysis (MAS62122), Mathematical Statistics I (MAS62115)	
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.
	ILO4	The students are able to master at least two statistical softwares, including based on open source.

	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 the basic concepts and variations in time series (ILO3, ILO5).
	M2	Students are able to apply deterministic models such as regression models and smoothing methods (ILO3, ILO4, ILO5, ILO6, ILO8).
	M3	Students understand the characteristics and are able to write stationary stochastic models of ARMA (ILO3, ILO5).
	M4	Students are able to understand the characteristics and are able to write non-stationary stochastic models of ARIMA (ILO3, ILO1, ILO4, ILO5).
	M5	Students are able to identify stationarity and transformation and ARIMA model specifications based on ACF, PACF, SACF, and SPACF (ILO3, ILO1, ILO4, ILO5).
	M6	Students are able to estimate the ARIMA parameters (ILO3, ILO4, ILO5).
	M7	Students are able to test the parameters and residual of the ARIMA model (ILO3, ILO4, ILO5).
	M8	Students are able to analyze time series data, model and forecast time series models (ILO3, ILO4, ILO5, ILO6, ILO8).
	M9	Students are able to analyze time series data, model and forecast seasonal stochastic models (ILO3, ILO4, ILO5, ILO6, ILO8).
	M10	Students know the time series model: harmonic analysis, ARMAX, VAR (ILO3, ILO1, ILO5, ILO6).
Contents:	1	Basic concepts and variance of time series
	2	Deterministic model

	3	Stationary Stochastic model
	4	Non-stationary stochastic model
	5	Model specification
	6	Parameter estimation
	7	Model testing
	8	Forecasting
	9	Seasonal stochastic model
	10	Introduction to time series models: harmonic analysis, ARMAX, VAR
Soft skill attribute:	Responsible, independently, and discipline	
Study/exam achievement:	<p>Final score (NA) is calculated as follow: 10% Assignment, 12% Presentation, 20% Quizzes, 25% Midterm Exam, 25% Final Exam, 8% Tutorial Class.</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:	Software (SAS, Minitab, R), laptop, LCD projector, whiteboard	
Learning methods:	Lecture, assessments, and discussion	
Literature:	<p>Main:</p> <p>1. Wei, W.S., 2006. Time Series Analysis. Univariate and Multivariate Method. Second Edition Pearson Addison-Wesley. Pub. Company, New York</p> <p>Support:</p> <p>1. Box, G.E.P. and Jenkin, G.M. 1976. Time Series Analysis. Forecasting and Control. Holden- Day. San Francisco.</p> <p>2. Cryer, J.D. and SikChan, K. 2008. Time Series Analysis with Application in R. Springer. Iowa</p> <p>3. Makridakis, Wheelwright and Hydiman. 2008. Forecasting: Methods and Application. 3rd Edition. John Wiley & Sons.</p>	
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