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

Module Handbook

Module Name:	Non Linear Time Series Analysis (MAS62325)	
Module Level:	Bachelor	
Abbreviation, if applicable:	-	
Sub-heading, if applicable:	-	
Courses included in the module, if applicable:	-	
Semester/term:	6th / Third Year	
Module Coordinator(s):	Ir. Heni Kusdarwati, MS	
Lecturer(s):	Ir. Heni Kusdarwati, MS	
Language:	Indonesian	
Classification within the curriculum:	Elective course	
Teaching format / class per week during semester:	2×50 minutes	
Workload:	1.67 hours lectures, 2 hours structural activities, 2 hours individual studies, 16 weeks per semester, and total 90.67 hours per semester 3 ECTS	
Credit Points:	2	
Requirements:	Time Series Analysis (MAS61332)	
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 concept of the volatility model (ILO3, ILO5)
	M2	Students understand and are able to apply the volatility of ARCH (p) and GARCH (p, q) (ILO3, ILO4, ILO5, ILO6, ILO8)
	M3	Students are able to apply the GARCH M (p, q) volatility model (ILO3, ILO5)
	M4	Students are able to apply the E GARCH asymmetry volatility model (p, q) (ILO1, ILO3, ILO4, ILO5)
	M5	Students master the concept of calculating non-linear time series models (ILO1, ILO3, ILO4, ILO5)
	M6	Students understand and can apply the AR and M AR threshold models (ILO1, ILO3, ILO4, ILO5)
	M7	Students are able to apply the exponential nonlinear STAR time series model (ILO3, ILO4, ILO5)
	M8	Students are able to apply non-linear time series models MAR (ILO3, ILO4, ILO5, ILO6, ILO8)
Contents:	1	Volatility Model ARCH(p)
	2	GARCH(p,q) IGARCH
	3	GARCH M(p,q)
	4	EGARCH asymmetry, TGARCH, APARCH
	5	Non Linier Model TAR
	6	MTAR, Bilinear
	7	STAR
	8	MAR
Soft skill attribute:	Responsible, independently, and discipline	
Study/exam achievement:	Final score (NA) is calculated as follow: 10% Assignments, 45% Quiz, 22.5% Midterm Exam, 22.5% Final Exam. Final index is defined as follow: A : > 80 - 100 B+ : > 75 - 80 B : > 69 - 75 C+ : > 60 - 69	

	C : > 55 - 60 D+ : > 50 - 55 D : > 44 - 50 E : 0 - 44
Forms of media:	Software (R project, Ms. Office, Ms. Excel), laptop, LCD projector, whiteboard
Learning methods:	Lecture, assessments, and discussion
Literature:	**Main:**
	1. Cryer, JD and Sik Chan. 2008. Time Series Analysis with Application in R
	Support:
	1. Enders, W. 2004. Applied Econometric Time Series
	2. Fan, J and Yao Q. 2005. Non-linier Time Series. Nonparametric and Parametric Methods
	3. Wei, W. S. 1994. Time Series Analysis. Univariate and Multivariate Method
Notes:	