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

Module Handbook		
Module Name:	Decision Theory (MAS61331)	
Module Level:	Bachelor	
Abbreviation, if applicable:	-	
Sub-heading, if applicable:	-	
Courses included in the module, if applicable:	-	
Semester/term:	3rd/Second Year	
Module Coordinator(s):	Nurjannah, S.Si., M.Phil., Ph.D Darmanto, S.Si., M.Si.	
Lecturer(s):	Ir. Mudjiono, M.M.	
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:	Introduction to Probability Theory (MAS62111), Management Information System (MAS61136)	
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.
	ILO2	The students are able to arrange and/or choose an efficient data collection/ data generated design that applies in surveys, experiments or simulations.
	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.
	ILO7	The students are able to improve and develop a job networks, then supervise and evaluate the team's performance they lead.
	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 definition and elements of decision (ILO1, ILO5, ILO8)
	M2	Students are able to understand the concept of decision making in uncertain condition (ILO1, ILO3, ILO5, ILO6, ILO8)
	M3	Students are able to understand the concept of decision making in risk condition (ILO1, ILO3, ILO5, ILO6, ILO8)
	M4	Students are able to do a decision analysis based on the probability, statistics, and mathematical approaches (ILO1, ILO3, ILO5, ILO6, ILO8)
Contents:	1	**Introduction:** Normative and Descriptive Decision Theory; Rational and Right Decisions; Risk, Ignorance, and Uncertainty; Social Choice Theory and Game Theory; A Brief History of Decision Theory
	2	**Decision Matrix:** Statement; Output; Action; Rival / Competitor Formalization
	3	**Decision Under Ignorance:** Dominance; The concepts of Maximum and Maximum; Maxims and Optimism-Pessimism Rules; Minimax Regret; The Principle of Reasons for Insufficiency; Random Action
	4	**Decision Under Risk:** Introduction; Axiomatic Approach; Allais Paradox; Ellsberg Paradox; St. Petersburg Paradox; Two-Envelope Paradox

	5	**Utilities:** Constructing Priority Scale; Von Neumann Scale and Morgenstern Interval; Utilities on a Ratio Scale; Immeasurable Utility
	6	**Mathematical Probability:** Probability Calculus; Conditional Probability; Bayes theorem; Problems Without Prior
	7	**Probability Philosophy:** Classical Interpretation; Frequency Interpretation; Propensity Interpretation; Logic and Epistemic Interpretation; Subjective Probability.
	8	**The Axiom of Preferences:** Transitive and Complete Rational Preferences; Multi-attribute approach; Axiom of Independency; Aversion risk
	9	**Casual and Evidential Decision Theory:** Newcomb Problems; Casual Decision Theory; Evidential Decision Theory
	10	**Bayesian and Non-Bayesian Decision Theory:** Bayesian Definition; Non-Bayesian Approach
	11	**Social Choice Theory:** Problems of Social Choice; Arrow's Impossibility Theorem; The principle of sen on liberalism and Pareto; Utilitarian Harsanyi's Theorem
	12	**Descriptive Decision Theory:** Estimation of the Utility Principle; Prospect Theory; Violations of Transitivity and Completeness; The relevance of descriptive decision theory
Soft skill attribute:	Responsible, independently, and discipline	
Study/exam achievement:	Final score (NA) is calculated a s follow: 15% Assignments, 20% Quizzes, 30% Midterm Exam, 30% Final Exam, 5% Attitude 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:	-	
Learning methods:	Lecture and assessment	
Literature:	Main:	

	1. Peterson, Martin. 2009. An Introduction to Decision Theory. New York: Cambridge University Press.
	Support:
	1. Mangkusubroto, K., & Trisnadi, L. (1983). Analisa keputusan: pendekatan sistem dalam manajemen usaha dan projek. Sistekon.
	2. Hasan, M. I. (2002). Pokok-Pokok Materi Teori Pengambilan Keputusan. Jakarta: Ghalia Indonesia.
	3. Mulyono, S. (1996). Teori Pengambilan Keputusan. Jakarta: Lembaga Penerbit Fakultas Ekonomi Indonesia.
Notes:	